

ELECTRONIC INDUSTRIES

1959-60
**VERIFIED DIRECTORY
& ALL-REFERENCE ISSUE**
(17th Edition)

Includes:

- Latest Transistor Specifications
 - Specifications for Semiconductor Diodes
 - Coaxial Cable Chart
 - Wire Data Charts
 - Electronic Hardware—Fasteners
 - Laminated Plastics Chart
 - Potting & Encapsulating Data
 - Guided Missile & Military Procurement
 - Russian Electronic Abstracts
 - Roster of Electronic Associations
 - New Electronic Standards
 - New Vacuum Tube Registrations
 - Coming Events 1959-60
- and many other technical reference features
Also includes the complete

- 1959-60 VERIFIED PRODUCT
and MANUFACTURERS DIRECTORY

For complete contents see pages I to 8



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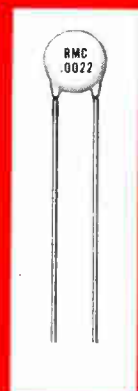
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RMC DISCAPS



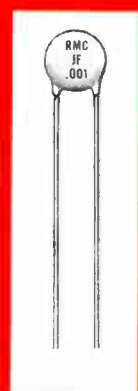
Type JI

RMC Type JI DISCAPS are engineered for applications requiring a minimum of capacity change as temperature varies between -60°C and $+110^{\circ}\text{C}$. Over this wide range the capacity change of type JI DISCAPS is only $\pm 7.5\%$ of capacity at 25°C . Standard working voltage is 1000 V.D.C.



Type B

Designed for by-passing, coupling or filtering applications, Type B DISCAPS meet and exceed all E.I.A. RS198 specifications for Z5U ceramic capacitors. Type B DISCAPS are manufactured in capacities between .00015 MFD and .04 MFD and are rated at 1000 working volts.



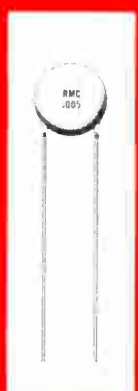
Type JF

Type JF DISCAPS exhibit a frequency stability characteristic that is superior to similar types. These DISCAPS show a change of only $\pm 7.5\%$ over the range between $+10^{\circ}\text{C}$ and $+85^{\circ}\text{C}$. These DISCAPS extend the available capacity range of the E.I.A. Z5F ceramic capacitor between $+10^{\circ}\text{C}$ and $+85^{\circ}\text{C}$ and meet all Y5S specifications between -30°C and $+85^{\circ}\text{C}$.



Type C

Specifications of E.I.A. RS198 are met or exceeded by these temperature compensating DISCAPS. Smaller sizes are well suited to designs where space is at a premium. Type C DISCAPS are rated at 1000 working volts providing a higher safety factor.



Type SM

Where space is at a premium, Type SM DISCAPS can be specified with complete assurance of the quality, dependability, and electrical performance built in all RMC DISCAPS. SM DISCAPS show minimum capacity change between $+10^{\circ}\text{C}$ and $+65^{\circ}\text{C}$.



FIN-LOCK DISCAPS

Designed for holes from .040 to .052 "Fin-Lock" DISCAPS are automatically stopped in holes over .052 by the shoulder design of the leads. "Fin-Lock" leads permit either automatic or hand assembly. "Fin-Lock" leads are available on all DISCAPS of standard voltages, ratings and spacings at no increase in price.

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ELECTRONIC INDUSTRIES, June, 1959. Vol. 18,
No. 6. A monthly publication of Chilton Com-
pany, Executive, Editorial & Advertising offices
at Chestnut & 56th Sts., Phila. 39, Pa. Accepted
as controlled circulation publication at Phila.,
Pa. \$1 a copy; Directory issue (June), \$5.00 a
copy. Subscription rates U. S. and U. S. Posses-
sions: 1 yr. \$10.00; 2 yrs. \$18.00. Canada 1 year,
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ELECTRONIC INDUSTRIES

Vol. 18, No. 6

June, 1959

Seventeen and Two!

WELCOME again . . . to the seventeenth edition of the Electronic Industries Directory and to our second annual All-Reference Issue. We hope that you will find this issue as informative and as helpful as you apparently found the 1958 edition. This latter volume deluged our reader service department with more than 40,000 inquiry requests for more information on published material, reprints, and additional technical data. In our editorial last year we suggested holding the 1958 issue until June of 1959. Now we'd recommend that you continue to keep it available along with this issue. We recommend this because some of the reference data published last year is not repeated in this year's issue. Many new technically informative sections have been added to this 1959-60 issue. A review of the next two pages will reveal the great reference scope of this volume that makes it a valuable year-round working tool.

Again, in the interests of our readers, the listings in the Directory have been streamlined this year to reflect only live organizations. We call this a *verified* listing series. All information contained in these listings was acquired in 1959. No organization has been listed as a manufacturer or as a sales representative, nor has any brand or trade name been listed unless the directory editor has been supplied with written evidence that that organization or that product is physically in existence. In short, these listings reflect conditions as they are and not as they may be or as it is hoped they may become. We seek to save the reader time and effort in locating suppliers by providing him with a live source list only.

Directory data presented in this issue is from the manufacturer-product information data contained in our IBM card files describing all electronic producers in the U. S. This file is constantly being updated and is available to manufacturers under the EIC Marketing Assistance program (see pages 6 and 7). Under this program information on more than 4600 producers for the electronic industries has been punched into more than 35,000 IBM cards. Since December of 1958, when these IBM card decks first became available to industry, more than a score have been integrated into the market research and statistical analysis programs of leading manufacturers. This same industry data is now being recorded on magnetic tape for use at the Computer Center of the University of Pennsylvania. Ultimately copies of these tapes will be available at other university computer centers throughout the United States.

In presenting this 1959-60 Directory and All-Reference issue may we reiterate: Please examine this issue carefully and send us your reactions. We will appreciate suggestions for improvement, subject additions and even subject omissions. It is the reaction from you as the reader, fed back through our editorial operations, that ultimately creates the product you most need and will find most helpful.

SOMETHING NEW

Bold face type appearing in "Electronic Firms A to Z" starting on page 404 indicate advertisers in this issue—for more detail on their products find their page number in the advertising index on pages 4 and 5.

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VERIFIED DIRECTORY OF THE ELECTRONIC INDUSTRIES—Page 271

"**BRAND & TRADE NAME INDEX**"—More than 2,500 brand and trade names are identified with the firms using them on electronic equipment. **Page 384.**

"**PRODUCT FINDING INDEX**"—Easy-to-follow alphabetical listing of close to 3,000 electronic products, showing where to find their manufacturers in this directory. **Page 274**

"**ELECTRONIC PRODUCT MANUFACTURERS**"—Over 4,000 electronic manufacturers and suppliers to the electronic industry are listed in 101 major categories, according to their product lines. The 101 sections are further

subdivided into 2,900 individual products, providing the most accurate breakdown of products available in the industry. **Page 282.**

"**ELECTRONIC FIRMS—A TO Z**"—An alphabetical listing of electronic equipment and component manufacturers and suppliers to the electronic industry. Includes street addresses and phone numbers. **Page 404.**

"**ELECTRONIC REPRESENTATIVES**" — State-by-state listings of manufacturers' representatives active in the electronic industry, with information on the territories they cover, the types of lines carried and whether they have warehousing facilities. **Page 392.**

COMING EVENTS

Listing all the major trade and engineering shows planned for the balance of 1959 and 1960. Information includes, dates, sponsoring organizations and location. **Page 12.**

COMPONENTS

BATTERIES — "1959 Battery Specifications" — Voltage ratings, dimensions, and interchangeability information

on all the A and B batteries and units made for transistorized circuits. **Page 240.**

DIODES—"1959 Semiconductor Diode Specifications"—Close to 6,000 semiconductor diodes are listed in this section, with their technical specifications, case outlines and dimensions. Diodes are listed by category: General Purpose, Switching, Zener, etc. Only units rated at below 1 amp. are included here. **Page 191.**

Directory & All-Reference Issue

COMPONENTS (cont.)

PLASTICS—"Laminated Plastics for the Electronic Industries"—A chart lists electrical characteristics and engineering data on standard grades of laminated plastics and includes areas of best use for each grade. "Encapsulation and Potting Electronic Components" discusses characteristics of standard potting and encapsulating compounds. A plastic glossary defines commonly used terms. **Page 118.**

SYNCHROS—"Synchro Zeroing Methods" and "Synchro Nameplates . . . Their Meaning"—The first article presents, in simple chart form, the proper electrical zero methods for synchros per Mil-S-20708 and ARP 461A (SAE). The second article shows how to properly interpret the synchro nameplate to determine the synchro's size and type. **Page 126.**

THERMISTORS—These tiny elements are finding an ever increasing number of uses in the electronic industry. Included in this section are basic information on the various thermistor types, typical characteristics, and circuits for the most common applications. **Page 247.**

TRANSISTORS—"1959 Transistor Specifications"—The most complete and comprehensive listing of transistors available to industry. Includes all the domestic transistors, with pertinent technical characteristics, case outlines, dimensions and lead arrangements. **Page 143**

VACUUM TUBES—"New Receiving Tubes & Special Purpose Tubes"—A run-down on all the new vacuum tubes, camera tubes, magnetrons, photomultipliers and thyratrons released during the period June 1958 to May 1959. Technical specifications are included, with primary applications. **Page 132.**

WIRE & CABLE—"Wire & Cable in the Electronic Industries"—Comprehensive five-part article provides essential engineering information on (1) Coaxial cable, complete with technical specs on all coaxial cable currently on the market (2) Details of wire stranding—how many strands of given diameter wire for a certain overall size (3) an American Wire Gauge chart (4) Specifications on magnet wire coding (5) Coil winding. **Page 79.**

ELECTRONIC HARDWARE

"**HARDWARE CHART**" lists, with complete descriptions and illustrations, rivets, eyelets, fasteners, quick operating releases, straight pins, taper pins and roll pins. Material is presented in an easy-to-find form for quick comparison. This is the first of a series to be presented in succeeding months. **Page 258**

EMPLOYMENT

MISSILE OPPORTUNITIES—"Firms Active in Missile Projects"—For engineers interested in employment in the missile field here is a comprehensive listing of the electronic firms active on missile projects, with the name of the engineer-in-charge of missile activities and the personnel manager to contact. **Page 435**

GUIDED MISSILES

MISSILE ROUND-UP—Summarizing the experimental and operational missiles in the U. S. arsenal, listed by service and giving pertinent data on the operational characteristics. The name of the prime contractor is included, and a list is provided of missiles that have been cancelled or are being phased out. **Page 439.**

MISSILE BUYING—"1959 Guided Missile Directory"—A look at the missile procurement situation—who is responsible for purchasing, the various services' missile procurement offices, and the officers in charge. **Page 450.**

MILITARY

MILITARY PROCUREMENT—"1958 Military Procurement Directory"—Listing the major procurement offices of the Army, Navy and Air Force, with the names of procurement officers, phone numbers, locations and the categories of electronic gear for which they are responsible. **Page 459.**

PRODUCTS

"**Products Generating 'Peak' Response**"—Surveying the new products appearing in EI during the past 12 months that brought the greatest show of interest from our engineer-readers, in terms of requests for further information. **Page 520.**

STANDARDS

IRE-EIA-AIEE-ASA—"Electronic Industries Standards"—Reviewing the significant electronic standards established by the four major coordinating agencies during the past 12 months. **Page 20.**

RELAYS—"Relay Engineering"—A large measure of the credit for the progress in relay engineering must be attributed to the National Association of Relay Manufacturers. Here its committee on standardizing test procedures summarizes the progress made so far. **Page 255.**

SEMICONDUCTOR SYMBOLS—The semiconductor art has spawned a large family of new letter symbols to describe the various parameters affecting circuit performance. They have been gathered together as the new IRE Standard—56 IRE 28.81. **Page 20.**

TECHNICAL DATA

COMPANY LITERATURE—"Technical Data for Engineers"—Highlights of the releases of company bulletins, technical data sheets and engineering specifications are summarized here for the past 12 months, with instructions on how to obtain copies. **Page 504.**

NEW TEXTBOOKS—Keeping pace with the mushrooming growth of the electronic field is the great increase in the number of textbooks on electronic techniques. Here, categorized by subject, are the textbooks released during the past 12-month period by the leading U. S. technical book publishers. **Page 242.**

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MANUFACTURERS' LISTINGS

In the free "Alphabetical Listing of Manufacturers" in the *Electronic Industries Directory* published in this issue, many manufacturers use listings of their engineering, executive and sales personnel, and Representatives, regional offices, branches, etc.—all appearing immediately under the manufacturer's name. Department starts on Page 403.

Arnold Engineering Co., The
Centralab Division of Globe-Union
General Electric Co., Laminated Products Div.
Gertsch Products, Inc.
Instrument Development Laboratories

Jerrold Electronics Corp.
Motorola, Inc.
Nems-Clarke Div. of Vitro Corp.
Radio Corp. of America, Semiconductor Div.
Radio Corp. of America, Electron Tube Div.

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- b. Determine sales potentials
- c. Measure sales performance
- d. Pinpoint your prospects
- e. Plot sales territories
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- h. Develop sources of supply

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For full explanation of the content and uses of the "EI Marketing Guide" book and "EI" census data in punched form, contact any of the ELECTRONIC INDUSTRIES' Regional Managers listed.

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Profile of Today's Electronic Engineer—What is the age of the "average" engineer? What is his income? How much money would he like to make in the future? What would prompt him to change companies? What is the worth of his liquid assets? How many children? The answers to these and many other questions about the personal and career side of the engineer can be gotten from a deck of 2000 IBM cards.

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Products

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Major Product Group

Company Name

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100 East 42nd St.
Phone: OXford 7-3400

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MENARD DOSWELL, III
100 East 42nd St.
New York, N. Y.
Phone: OXford 7-3400

CHICAGO

GEORGE H. FELT
360 N. Michigan Ave.
Phone: Randolph 6-2166

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SHELBY A. McMILLION
930 Keith Bldg.
Phone: SUperior 1-2860

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AIRCRAFT AND MISSILES MANUFACTURING

AIRCRAFT AND MISSILES MANUFACTURING is the design and production guide for America's fastest growing industry. Written expressly for design and production engineers, it provides analyses of basic problems and reports authoritative solutions. Featuring design producibility and the latest processes, developments, and techniques in airframes, powerplants, components, and materials, it has become a prominent part of the integrated manufacturing team of the aircraft and missile industry.

AUTOMOTIVE INDUSTRIES

AUTOMOTIVE INDUSTRIES is the industrial and technical news magazine of the automotive, aviation and supplier industries. Edited for quick and easy reading, it gives readers factual and useful information on latest developments in research, design and production, in the United States and in foreign countries. Editorial coverage embraces all types of automotive vehicles, aircraft, construction equipment and self-propelled farm machinery. It also reports on the newest engines, transmissions, suspension systems and components, and accessories.

BOOT AND SHOE RECORDER

BOOT AND SHOE RECORDER is the Shoeman's magazine, edited for him at all levels of his industry. It is his accredited interpreter of news, his respected merchandising counsel, his trusted economic advisor. The oldest shoe publication in America, for 76 years the RECORDER has lived shoes and shoe selling and has been a motivating force in the progress of the industry.

BUTANE-PROPANE NEWS

BUTANE-PROPANE NEWS has been headquarters for L. P. gas information since 1931. It is a management guide for the marketer of liquefied petroleum gases, covering every phase of his operations from plant design, layout, and operations to the delivery of gas, the merchandising of appliances and equipment, and the development of new markets.

COMMERCIAL CAR JOURNAL

COMMERCIAL CAR JOURNAL is the business magazine for truck and bus fleet operators. It is welcomed at key management levels in local, long-haul and construction fleets. For nearly 50 years it has been suggesting new ways of doing old jobs more profitably. Primary editorial objectives include service, maintenance, safety, operations, new product descriptions and news interpretations.

DEPARTMENT STORE ECONOMIST

DEPARTMENT STORE ECONOMIST is the authority for store executives and buyers in the department store market. It is a guide to buyers, merchandise managers and top executives in the selection, promotion and selling of merchandise, and profitable store management and operation.

DISTRIBUTION AGE

DISTRIBUTION AGE concerns itself with the physical distribution of goods. It supplies shippers and carriers with operational information on public warehousing, freight transportation—air, rail, highway and water. Because this is the most complex, most taxed, and most regulated of all industries, it also reports significant transportation news, and interprets its effect on shippers and carriers. Transportation of commodities embraces damage-free packaging, warehousing, and loading and unloading vehicles and vessels. How-to-do-it articles emphasize efficiency in material handling and low cost distribution.

GAS

GAS magazine delineates operations, developments and problems of the fuel gas industry, which is basically the natural gas industry, in North America. It covers the industry from wellheads or gas-making plants, through transmission and distribution, to final utilization. It serves producing, pipeline, city utility and integrated gas companies.

HARDWARE AGE

HARDWARE AGE is an intimate associate of the retail and wholesale hardware trade—a relationship that has existed for more than a century. It is a leading force in the development of more profitable merchandising and management methods. Its role of friend, critic and counselor makes its pages familiar and welcome in retail stores and wholesale houses across the nation.

HARDWARE WORLD

HARDWARE WORLD's feature articles reflect and promote the development of the retail hardware business in the 13 Western States. This 53-year-old publication is looked upon as a home-town paper by the retail hardware people and the wholesaler's executives, buyers and salesmen. It also covers news, literature, and new products selected with the interests of Western hardware retailers in mind.

THE IRON AGE

THE IRON AGE is a weekly magazine for busy men in metal-working—administrative, engineering, production and purchasing executives. Its editorial staff, guided by modern research, writes clearly and concisely to save its readers time. Dynamic layout encourages quick scanning and easy reading. It reports news, technical and market developments in original interpretative articles that inform and guide the reader in terms of their meaning to him, his business and his industry.

JEWELERS' CIRCULAR-KEYSTONE

JEWELERS' CIRCULAR-KEYSTONE shows both traditional and "installment-type" members of the jewelry industry how to expand sales of diamonds, jewelry, watches, clocks, silverware, giftwares, china, glass, electrical appliances, radios, cameras, luggage and other lines. Also reports news and market data of interest to retailers, importers, manufacturers and wholesalers of these commodities.

MOTOR AGE

MOTOR AGE is a workbench tool for professional men who sell, service and repair automobiles and light trucks. It teaches its readers to be better workmen, and more enterprising business men. It provides information that is accurate and authoritative—timely, useful and profitable. MOTOR AGE has served the automotive industry and recorded its progress since 1899.

THE OPTICAL JOURNAL AND REVIEW OF OPTOMETRY

THE OPTICAL JOURNAL AND REVIEW OF OPTOMETRY covers the field of ophthalmic optics—the refracting of the eye, and the dispensing and servicing of the prescription. This includes visual training to correct muscle imbalances, the fitting of contact lenses and subnormal vision devices, and all non-medical and non-surgical aspects of eye care. The JOURNAL-REVIEW helped to bring optometry into being and serves its professional interests. It also serves as a medium of communication between optical manufacturers, distributors, prescription laboratories and professional and retail elements.

PRODUCT DESIGN & DEVELOPMENT

PRODUCT DESIGN & DEVELOPMENT is the design engineer's technical information center in print. Its factual, easy-to-read reports on what's new in materials and component parts enable him to do a better job designing his company's products. Also, significant news on research and design equipment, processes, and application ideas keep the designer thoroughly informed.

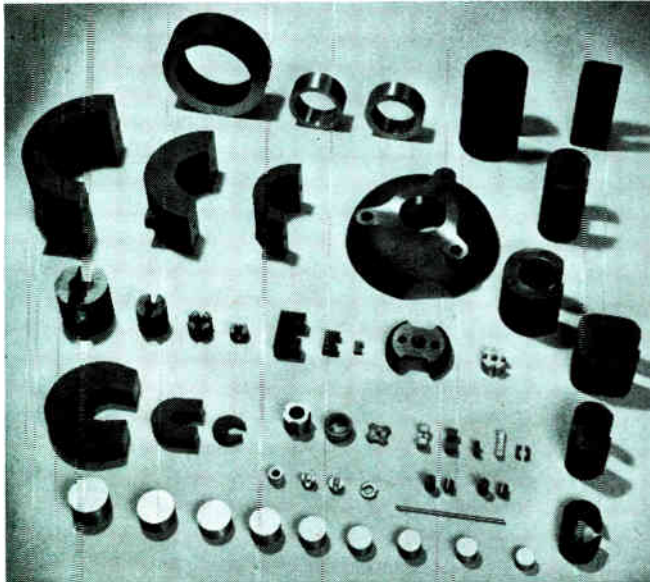
THE SPECTATOR

THE SPECTATOR guides "the permanent insurance man," the executive or agent who makes insurance his full time work. For the last 91 years, it has analyzed significant trends in all segments of insurance—fire, life, casualty, accident and health—from both the news and statistical standpoint.

Chilton Company, Chestnut & 56th Sts., Philadelphia 39, Pa.

Specify "ARNOLD"

for your **PERMANENT MAGNET** requirements



Typical group of Arnold permanent magnets, both cast and sintered types.



Typical group of permanent magnet assemblies, aluminum jacketed.

ALNICO MAGNETS

Arnold permanent magnets are available in all types of Alnico material, in sizes ranging from large castings weighing over 80 pounds to very small sintered parts weighing less than one gram.

Alnico V can usually be depended upon to deliver the greatest energy product to the magnetic circuit per unit weight of magnet material. It is therefore generally the first choice for a magnetic material except where special physical considerations are paramount.

Special assemblies such as rotors, traveling wave tube

magnets, magnetron magnets, etc. may be supplied in an aluminum jacket to facilitate mounting and supply an added protection to the magnet.

Large magnet assemblies may also be supplied for mass spectrometer and other measuring applications where a high degree of stability and uniformity of field is required.

Many sizes and types of Alnico magnets are carried in stock for immediate delivery. For more information, write for *Bulletin GC-106C*.

SPECIAL PERMANENT MAGNET MATERIALS

ARNOX III

Arnox III is a molded-type magnet having high coercive force and moderately low residual induction and energy product. Principal uses are for magnetic requirements which are not stringent, and for a relatively short magnet of reasonable cross section. Accurate dimensions and close tolerances can be economically obtained. These magnets can be premagnetized before assembly, and have very high resistance to demagnetization. Slightly better magnetic properties are obtained in the pressing direction than in other directions.

ARNOX V

Arnox V is a ceramic permanent magnet material composed of highly oriented barium ferrite. It has many times the energy product of Arnox III and is comparable in many applications to Alnico V. Because of its high coercive force, its use is recommended in applications where a short magnetic length is desirable or where extremely high demagnetizing forces may be encountered. In many applications, it may be magnetized prior to assembly.

VICALLOY

Vicalloy is a carbon-free permanent magnet alloy con-

taining about 10% vanadium, 50% cobalt and the balance iron.

Vicalloy may be fabricated in the form of castings, hot rolled bars and forgings, or cold rolled strip, wire and tubing. After suitable heat treatment, the material is quite readily machinable. Vicalloy is available on special order in bar, strip and thin tape for recording purposes. For more information, write for "The Magneer," Vol. 2, No. 1.

CUNIFE

Cunife is a permanent magnet alloy of copper, nickel and iron which is malleable, ductile and machinable, after final heat treatment. The magnetic properties of Cunife are developed by cold working and are directional, with the best magnetic properties found only in the smaller sizes of rods or wires.

WSW 7506



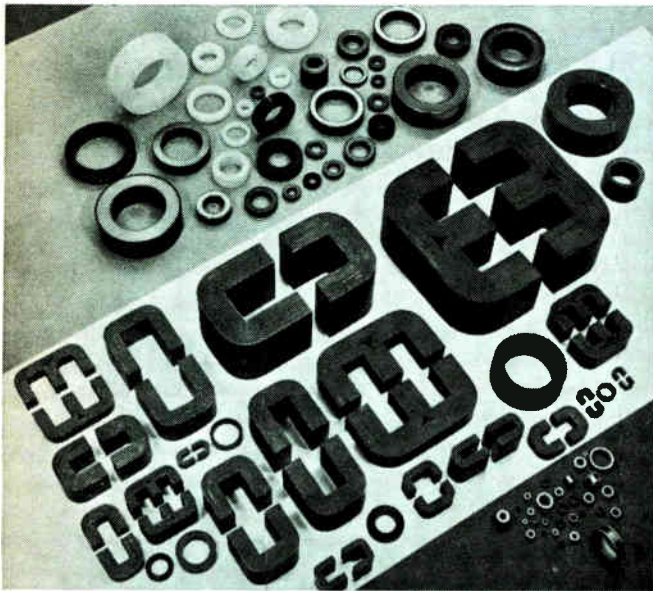
ARNOLD

SPECIALISTS in MAGNETIC MATERIALS

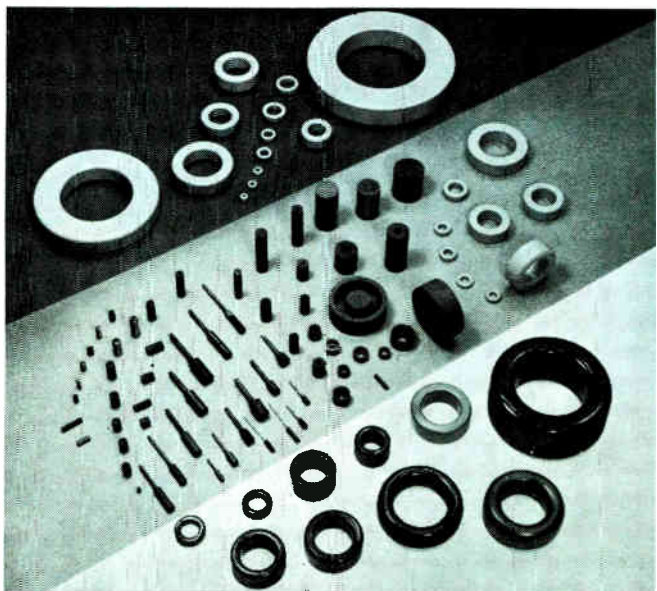
THE ARNOLD ENGINEERING COMPANY, Main Office: MARENGO, ILL.
BRANCH OFFICES and REPRESENTATIVES in PRINCIPAL CITIES

Specify "ARNOLD"

for your **MAGNETIC CORE** requirements



Top to bottom: Tape wound cores, Silectron C, E and O cores, and bobbin cores.



Top to bottom: Mo-Permalloy powder cores, iron powder cores, and Sendust cores.

SILECTRON C-CORES, E-CORES and TOROIDS Arnold C and E cores are made from precision-rolled Silectron strip in 1, 2, 4 and 12 mil thicknesses.

They are supplied in a wide variety of shapes, and in sizes from a fraction of an ounce to several hundred pounds. In addition to standard transformer applications, they may also be supplied for special applications such as saturable reactors, instrument transformers and pulse transformers.

Over 1,000 stock cores are listed in the Arnold Silectron catalog. A wide selection of preferred sizes are carried in stock for immediate shipment. For complete data on C and E cores and Silectron toroids, write for *Bulletin SC-107A*.

TAPE WOUND CORES of High Permeability Materials Arnold tape wound cores are available made of Deltamax, 4-79 Mo-Permalloy, Supermalloy, Mumetal, 4750 Electrical Metal, Silectron, or the new rectangular-loop material, Supermendur. All except Supermendur cores are available in standard tape thicknesses of 1/2, 1, 2, 4 or 12-mils.

Toroidal cores are made in 30 standard sizes with protective nylon or aluminum cases. Special sizes of toroidal cores are produced to individual requirements. Write for *Bulletin TC-101A*. (TC-113A for Supermendur Cores.)

BOBBIN CORES Arnold bobbin cores are available in a wide range of sizes, tape thicknesses, widths and number of wraps to suit the ultimate use of the core in electronic computer assemblies. Magnetic materials usually employed are Deltamax and Square Permalloy in standard thicknesses of 1, 1/2, 1/4 and 1/8 mil. Bobbins are supplied in ceramic or stainless steel. Write for *Bulletin TC-108A*.

SPECIAL MATERIALS

2V PERMENDUR . . . a ferromagnetic alloy of cobalt, vanadium and iron that possesses high flux density saturation properties. Its magnetostrictive properties are useful in many transducer applications. Write for *Bulletin EM-23*.

VIBRALLOY . . . a ferromagnetic alloy of nickel, molybdenum and iron whose temperature coefficient of elastic modulus is controllable over a wide range. It has high ferromagnetic permeability, and a rather high coefficient of magnetostriction. Used in applications where a zero or controlled thermo-elastic coefficient is desired.

BARIUM TITANATE . . . A piezoelectric ceramic widely used in ac-

MO-PERMALLOY POWDER CORES Available in a wide range of sizes, from .260" OD to 5.218" OD. They are given various types of enamel and varnish finishes, some of which permit winding with heavy Formex insulated wire without supplementary insulation over the core.

These powder cores are supplied in four standard permeabilities: 125, 60, 26 and 14 Mu. They provide constant permeability over a wide range of flux density, and in many cases may be furnished stabilized to provide essentially constant permeability over a specific temperature range. Large warehouse stocks of preferred sizes are carried for immediate shipment. Write for *Bulletin PC-104B*.

IRON POWDER CORES A wide selection of cores is available, from simple cylinders to special cores of complicated design. The line includes all standard types of threaded cores, cup, sleeve, slug and cylindrical insert cores: for use in antenna and RF coils, oscillator coils, IF coils, perm tuning, FM coils, television coils, noise filter coils, induction heating and bombardier coils, and other low frequency applications. Preferred sizes are carried in warehouse stock for quick shipment. A standard series of iron powder toroids is also manufactured, conforming to the standard sizes proposed by the Metal Powder Industries. Write for *Bulletin PC-109*.

SENDUST POWDER CORES Available in a wide selection of sizes, ranging from .800" OD to 3.346" OD, and in permeabilities of 10, 13, 25, 30, 50 and 80, although not all sizes are available in all permeabilities. They possess magnetic properties generally superior to iron powder cores, but inferior to Mo-Permalloy powder cores in the audio and carrier frequency range. Write for *Bulletin SDC-110*.

celerometers, phono pickups, microphones, ultrasonic grinding and cleaning devices and underwater signaling devices. For more information, write for *Bulletin CM-116*.

WSW 7507

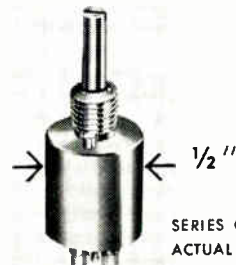
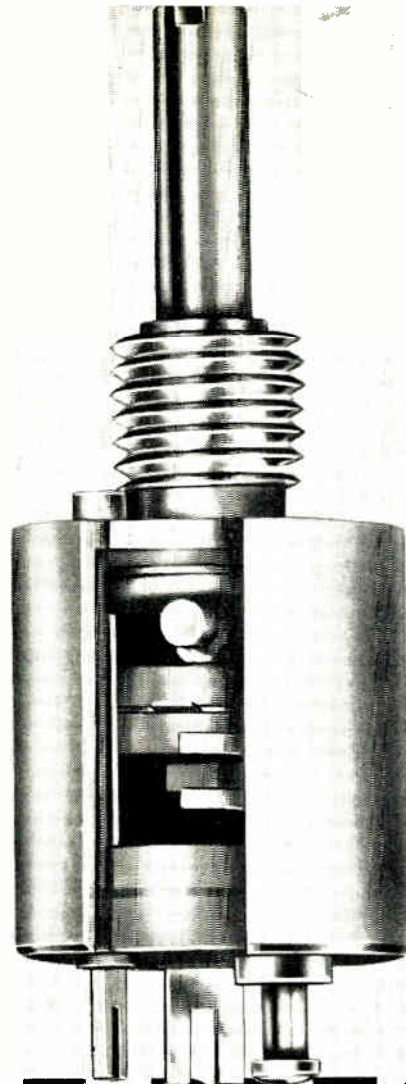


ARNOLD

SPECIALISTS in MAGNETIC MATERIALS

THE ARNOLD ENGINEERING COMPANY, Main Office: MARENGO, ILL.
BRANCH OFFICES and REPRESENTATIVES in PRINCIPAL CITIES

Series C-050 Potentiometers meet all requirements of MIL-R-12934B with the addition of 1000 hours load life (certified test data available).



SERIES C-050
ACTUAL SIZE

BIG-POT PRECISION IN MICRO-MINIATURE SIZE

Here is the tiniest member of DeJUR's extensive line of precision potentiometers. The new Series C-050... combines micro-miniaturization with high precision and accuracy.

Just check these features:—Exclusive one-piece metal case and bearing design eliminates need for special field installation precautions. • Exclusive watertight molded covers with integrally cored, solid terminals which cannot loosen or transmit solder or resin. • Multiple finger brush. • Molded nylon side insulation. • Direct connection from winding ends to terminals. •

Rotation: electrical, 320°; mechanical, 325° or continuous 360°. • Threaded bushing, servo or ball-bearing mounting. • O-ring sealed shaft and epoxy sealed cover (optional)

And while you're checking, look into some of the other single-turn precision potentiometers which include many different sizes and types. Chances are you'll find exactly the unit you need to solve that sticky design problem. If we don't show it in our catalog, we'll make it for you. Write today for DeJUR's new complete technical catalog on your company letterhead.

manufacturers of precision potentiometers for over 30 years



SERIES C-078. 7/8" miniature, height only 5/8", weight 1/2 oz. Multiple finger brush. Single or multiple gangs... completely enclosed. Cored terminals can't loosen. Board integrally molded in housing.



SERIES C-200. 2" ... independently phasable... multiple sections suitable for ganging... up to 10 adjustable taps in 320°. Ball-bearing or sleeve bearing.

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SERIES C-300 SINE COSINE. 3". Independent brush contacts produce accurate sine-cosine outputs. Also available in multiple ganged units and 1 1/2" and 2" diameters.



SERIES HP. 2", 3", 5" diameters. High resolution... long function angles... ganging multiples... welded taps. Completely enclosed. Pilot servo or tapped 3-hole mounting.

Coming Events for 1959 and 1960

A listing of meetings, conferences, shows, etc., occurring during the balance of 1959 and 1960 that are of special interest to electronic engineers.

- June 1-3: National Symposium, IRE (PGMTT), Div. of Engineering & Applied Physics; Harvard University, Cambridge, Mass.
- June 3-5: Annual Convention & Exhibition, Armed Forces Communications & Electronics Assoc.; Sheraton Park Hotel, Washington, D. C.
- June 4-5: 3rd National Convention on Production Techniques, IRE; Vila Hotel, San Mateo, Calif.
- June 4-5: Film, Sheeting & Coated Fabrics Conf., SPI; Concord Hotel, Kiamesha Lake, N. Y.
- June 15-20: Symposium on Electromagnetic Theory, Commission VI of the International Scientific Radio Union; also NSF, IRE; University of Toronto, Toronto, Canada.
- June 16-18: International Symposium on Circuit and Information Theory, URSI, IRE; University of California, Los Angeles, Calif.
- June 17-20: Annual Meeting, National Society of Professional Engineers; Commodore Hotel, New York, N. Y.
- June 18-20: Applied Mechanics Conference, ASME; Virginia Poly. Institute, Blacksburg, Va. (Tent.)
- June 18-20: Meeting, American Physical Society; Milwaukee, Wis.
- June 20-22: ARRL National Convention, American Radio Relay League; Galveston, Tex.
- June 21-26: Summer & Pacific Meeting, AIEE; Olympic Hotel, Seattle, Wash.
- June 21-26: Annual Meeting, American Society for Testing Materials; Chalfonte-Haddon Hall, Atlantic City, N. J.
- June 22-25: Music Industry Trade Show & Convention, National Assoc. of Music Merchants; Hotel New Yorker, The N. Y. Trade Show Bldg., New York, N. Y.
- June 24-26: 2nd Nuclear Instrumentation Symposium, ISA; Idaho Falls, Idaho.
- June 29-30-July 1: 3rd National Convention on Military Electronics, IRE (PGMIL); Sheraton Park Hotel, Washington, D. C.
- June (No date): Molecular Beam Research Symposium, AFOSR/Physics Div., AEC, ONR, Columbia University; University of Heidelberg, Germany.
- June (Last week): International Conference on Medical Electronics, IRE participating; Paris, France.
- July 1-16: Annual Meeting, International Electrotechnical Commission; Stockholm, Sweden.
- July 25 (Opening date): American National Exhibition, Sokolniki Park, Moscow, U.S.S.R.
- June 8-9: Industry Missile and Space Conf., Aero Club of Michigan; Sheraton-Cadillac Hotel, Detroit, Mich.
- June 8-11: Meeting, American Rocket Society; San Diego, Calif.
- June 9-11: 8th Annual Convention, National Community TV Assoc.; Mayflower Hotel, Washington, D. C.
- June 9-12: Material Handling Institute's Exposition of 1959, Material Handling Institute, Inc.; Public Auditorium, Cleveland, Ohio.
- June 9-21: Triennial Meeting, International Organization for Standardization, U. S. Member-American Standards Assoc.; Harrogate, England.
- June 10-12: 2nd, International Symposium on Gas Chromatography, ISA; East Lansing, Mich.
- June 12-21: 23rd French Air Show, Le Bourget; Paris, France.
- June 13-23: 1st International Conference on Information Processing, UNESCO, AIEE, ACM, IRE; UNESCO Palace, Paris, France.
- June 14-18: Semi-Annual Meeting, ASME; Chase-Park Plaza, St. Louis, Mo.
- June 15-18: Summer Meeting, Institute of the Aeronautical Sciences; Ambassador Hotel, Los Angeles, Calif.
- June 15-19: Fifth International Conference on Electrodeposition and Metal Finishing, AES, Inc.; Artillery Armory, Oak Park, Detroit, Mich.
- July 25-28: Trade Show, National Audio-Visual Assoc., Inc.; Morrison Hotel, Chicago, Ill.
- Aug. 3-6: 25th Annual Convention, Associated Police Communications Officers, Inc.; Shirley Savoy Hotel, Denver, Colo.
- Aug. 9-12: Heat Transfer Conference, ASME; University of Connecticut, Storrs, Conn.
- Aug. 10-17: Meeting, International Assoc. of Electrical Leagues, El Cortez Hotel, San Diego, Calif.
- Aug. 17: 1st National Ultrasonics Symposium, IRE (PGUE); Stanford University Stanford, Calif.
- Aug. 8-21: WESCON, West Coast Electronic Manufacturers Assoc., also 7th Region IRE; Cow Palace, San Francisco, Calif.
- Aug. 20-24: Annual Convention, Nat'l Alliance of TV & Electronic Service Assoc.; Congress Hotel, Chicago, Ill.
- Aug. 24-26: Meeting, American Rocket Society; Evanston, Ill.
- Aug. 27-29: Meeting, American Physical Society, AIP; Hawaii.

(Continued on page 17)



Contamination Control: *State of the art*

Happily for you, Hughes frowns on poor house-keeping. In fact, our plants are famed for cleanliness...and all the other controls that insure highest product quality.

Our products prove it. Whatever you specify, you're assured of unexcelled reliability...even when operating conditions get rough.

Hughes products are backed by the brainpower of over 5,000 engineers and scientists and the manufacturing know-how which has produced billions of dollars in reliable electronics equipment.

Check the following three pages for specific examples of reliable Hughes components...silicon transistors, MEMO-SCOPE® recorders, and TONOTRON* storage tubes.

In addition to these, other Hughes Products devices which offer you this "built-in" reliability include: special purpose oscilloscopes... MEMOTRON®, TYPOTRON® and TONOTRON* storage tubes...microwave tubes...vacuum tubes...thermal relays...a wide variety of semiconductors: diodes, transistors and rectifiers...and an industrial system which operates a complete and integrated line of machine tools.

*Trademark of H.A.C.

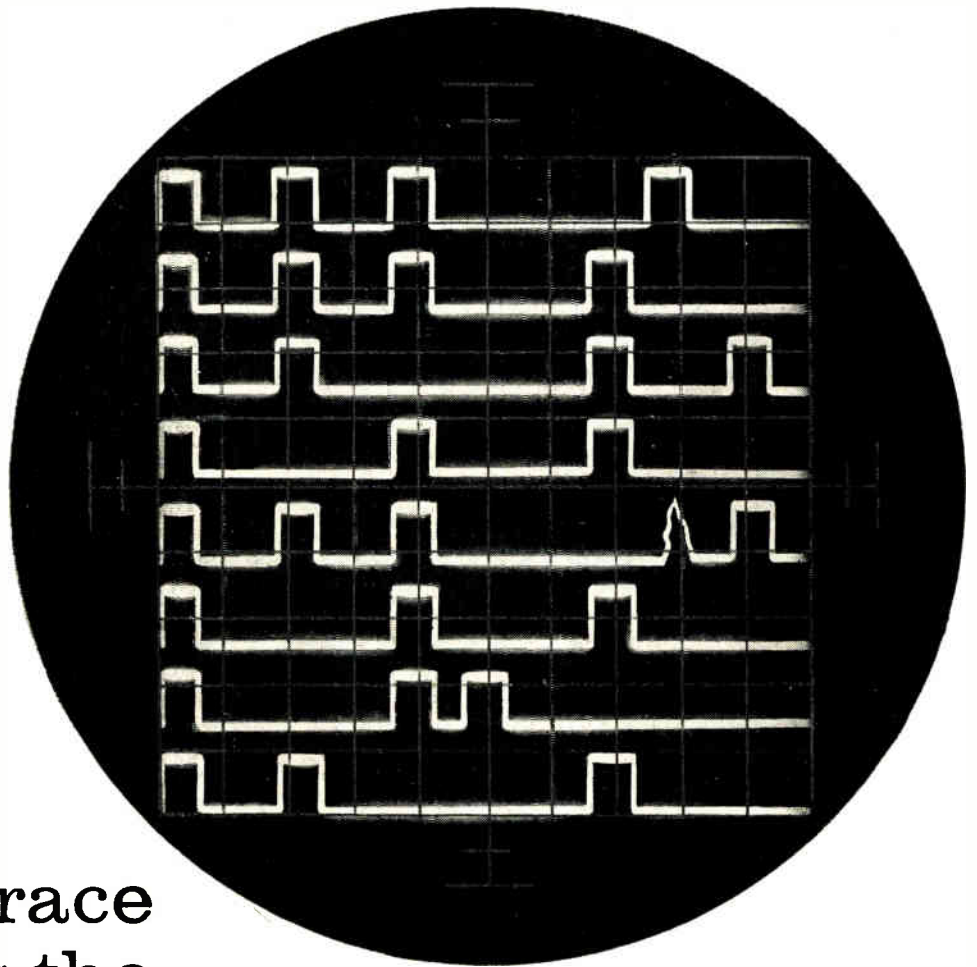
For additional information about Hughes components or systems please write: Hughes Products, Marketing Dept., International Airport Station, Los Angeles 45, California.

Creating a new world with ELECTRONICS

HUGHES PRODUCTS

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SEMICONDUCTOR DEVICES • STORAGE AND MICROWAVE TUBES • CRYSTAL FILTERS • OSCILLOSCOPES • RELAYS • SWITCHES • INDUSTRIAL CONTROL SYSTEMS



which trace has the transient?

Data reduction systems have long been plagued by false signals from intermittents and transients—particularly those using digital bits and words. With the MEMO-SCOPE® recorder you can locate this false information with comparative ease.

For example, the above display shows 8 traces—one showing a non-recurrent transient pulse. The MEMO-SCOPE recorder freezes this transient information on the face of the tube until intentionally erased. Therefore, transients can be retained for study, regardless of the fact that they are intermittent in nature and last only a few microseconds. For more information concerning this application, write for Data Sheet MSAD-A2.

Many unique problems have been solved with the MEMO-SCOPE recorder through trace retention. Refer your problems to us by writing: Hughes MEMO-SCOPE recorder, Hughes Products, International Airport Station, Los Angeles 45, California.

A new MEMO-SCOPE recorder accessory . . . the **Multitracer** . . . makes it possible for you to automatically program up to 20 different traces on the tube face.

In addition to data reduction trouble shooting, the MEMO-SCOPE recorder makes it possible for you to save time and money in problems associated with:

- Ultrasonic flaw testing
- Drift measurements
- Ballistics, explosives research
- Switch, relay contact studies
- Welding
- Transducer testing
- XY plotters
- Medical diagnosis problems
- Physical testing
- plus many more

SPECIFICATIONS:

Sweep Speed for Storage: 10 microseconds per division to 10 seconds per division (0.33").
 Frequency Response: DC to 250 KC down 3 db.
 Sensitivity: 10 millivolts to 50 volts per division or with optional high sensitivity preamplifier 1 millivolt to 50 volts per division.



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GOLD BONDED

HUGHES GERMANIUM DIODES

first of all for reliability.

Hughes gold bonded diodes exhibit fast recovery together with high forward conductance, low reverse leakage and high peak inverse voltage. They are fusion sealed in a subminiature one-piece glass envelope. This assures you complete isolation from damage or contamination.

Under varied and severe environmental and operating conditions, Hughes Gold Bonded diodes exhibit outstanding performance. You can be assured of reliable performance, since Hughes diodes exhibit the following characteristics: shock resistance... vibration resistance... thermal stability... electrical stability.

Typical performance levels: @ 25° C. unless otherwise stated

	Forward Current @ +1V (mA min.)	Inverse Current @ Specified Voltage (μ A max.)	Maximum Inverse Voltage (Volts)
1N270	200	100 @ -50V	100
1N276	40	100 @ -50V 100 @ -10V*	60
1N277	100	250 @ -50V* 75 @ -10V*	125

*Measured @ 75° C.

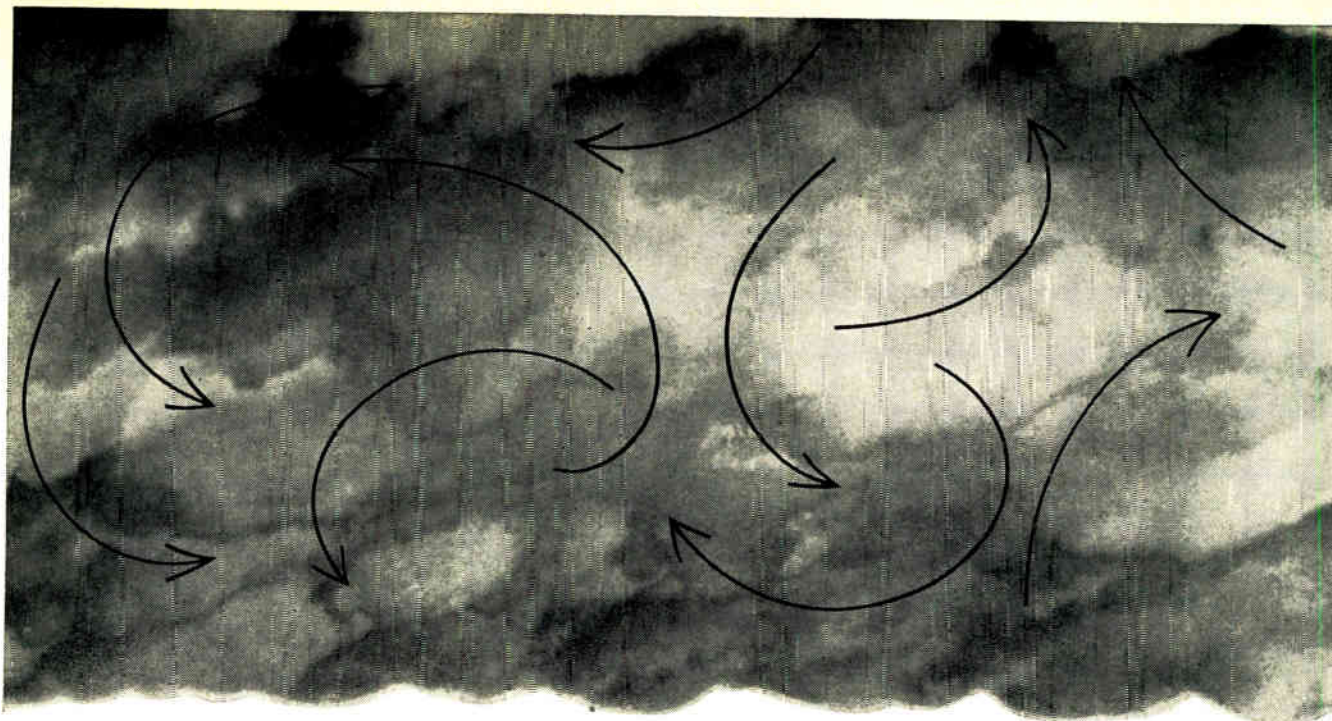
*For additional information write: Hughes Products,
Marketing Dept.—Semiconductors, International
Airport Station, Los Angeles 45, California.*

Creating a new world with ELECTRONICS

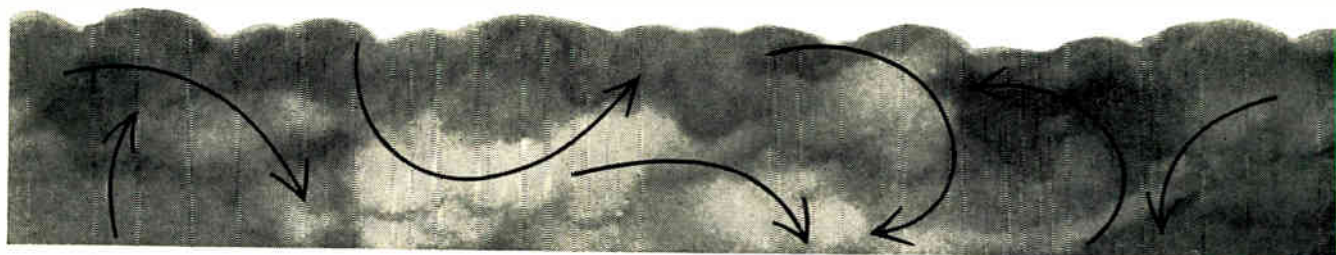
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all-weather radar finds  *the calm corridor*



Providing a clear picture of turbulence cells in storms ahead, Hughes TONOTRON* tube gives your airborne weather radar exceptional ability to find the "calm corridor."

Hughes TONOTRON tube gives you several features which make it ideal for weather radar readout and ground mapping:

Full Gray Scale—Seven different shades of gray.

High Picture Brightness—In excess of 1500-foot lamberts with full halftone range. Even in full sunlight no viewing hood is required—thereby providing maximum safety.

Controllable Persistence—Gives you flexibility in analyzing the complete weather problem.

Developed by the famed Hughes Research and Development Laboratories, the TONOTRON tube is just one of the nation's largest family of storage tubes!

For further information about the TONOTRON tube, please write: Hughes Products, Electron Tube Sales, International Airport Station, Los Angeles 54, California.



The new Bendix Airborne Weather Radar uses the Hughes TONOTRON tube for a high-fidelity picture reproduction. With this system the pilot can keep an area as great as 150 miles ahead and to the right and left, under constant observation—day or night.

The Hughes TONOTRON tube

Applications: Airborne weather radar, "B" scan radar, armament control radar, plan position indicator information and slow-scan television.

Available models: Electrostatic deflection, 3-inch, 4-inch and 5-inch diameters. Magnetic deflection, 5-inch and 21-inch diameters.

*TRADE-MARK OF H. A. C.

Creating a new world



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Coming Events for 1959 and 1960

(Continued from page 12)

- Aug. 31-Sept. 2: Conference on Semiconductors, Metallurgical Society of AIME, Statler Hotel, Boston, Mass.
- Sept. 1: 6th International Meeting, Institute of Management Sciences, Paris, France.
- Sept. 5-6: New England Division Convention, American Radio Relay League; Hartford, Conn. (Tent.)
- Sept. 10-11: Midwest Sections Conf., SPI; Sheraton Hotel, French Lick, Ind.
- Sept. 10-21: Radio, TV, and Records Exhibition, Federation Nationale Des Industries Electroniques; Exhibition Park, Porte de Versailles, Paris, France.
- Sept. 13-16: 11th Electronic Industry Conf., Electronic Representatives Assoc.; Excelsior Springs, Missouri.
- Sept. 15: Conf. on Photosensitive Materials and Silk Screen Processes, Western Assoc. of Circuit Manufacturers; Rodger Young Aud., Los Angeles, Calif.
- Sept. 16-18: Engineering Management Conference, ASME; Statler-Hilton Hotel, Los Angeles, Calif.
- Sept. 17-18: Engineering Writing & Speech Symposium, IRE (PGEWS); Boston & Los Angeles.
- Sept. 20-23: Petroleum Mech. Engrg. Conference, ASME; Rice, Houston, Tex.
- Sept. 21-23: 8th Annual Meeting, Standards Engineers Society, Somerset Hotel, Boston, Mass.
- Sept. 21-25: 14th Annual Instrument-Automation Conference & Exhibition, ISA; International Amphitheater, Chicago, Ill.
- Sept. 22-24: Quarterly Conference, Electronic Industries Assoc., Plaza Hotel, New York City.
- Sept. 22-24: 3rd Industrial Nuclear Technology Conf., ARF, AEC; Morrison Hotel, Chicago, Ill.
- Sept. 23-25: 4th Annual. Special Technical Conference on Non-linear Magnetics & Magnetic Amplifiers, AIEE, IRE; Shoreham Hotel, Washington, D. C.
- Sept. 28-30: National Symposium on Telemetering, IRE (PGTRC); Civic Auditorium and Whitcomb Hotel, San Francisco, Calif.
- Sept. 30-Oct. 1: Industrial Electronics Symposium, IRE, AIEE; Mellon Institute, Pittsburgh, Pa.
- Oct. 1-2: 15th New England Section Conf., SPI; Wentworth-by-the-Sea, Portsmouth, N. H.
- Oct. 5-7: 5th National Communications Symposium, IRE; Hotel Utica, Utica, N. Y.
- Oct. 5-9: 11th Annual Convention, Audio Engineering Society; Hotel New Yorker, New York, N. Y.
- Oct. 5-9: 86th Semiannual Convention, including Equipment Exhibit, Society of Motion Picture & Television Engineers, Statler Hotel, New York, N. Y.
- Oct. 5-16: 7th Anglo-American Conference, IAS, Royal Aeronautical Society, Canadian Aeronautical Institute, Institute of the Aeronautical Sciences; Hotel Astor, New York, N. Y.
- Oct. 6-7: Value Engineering Symposium, EIA; University of Pennsylvania, Phila., Pa.
- Oct. 6-9: 2nd International Symposium on High Temperature Technology, Stanford Research Institute; Asilomar Conference Grounds, Calif.
- Oct. 7-9: Canadian Convention, IRE; Toronto, Canada.
- Oct. 7-9: National Symposium on Vac. Tech., American Vacuum Society; Hotel Sheraton, Phila., Pa.
- Oct. 8-10: Meeting, Optical Society of America; Chateau Laurier, Ottawa, Canada.
- Oct. 11-15: 3rd Pacific Area National Meeting, American Society for Testing Materials; Sheraton-Palace Hotel, San Francisco, Calif.
- Oct. 11-16: Fall General Meeting, AIEE; Morrison Hotel, Chicago, Ill.
- Oct. 12-15: Annual Conference, National Electronics Conference, IRE, AIEE, EIA, SMPTE; Hotel Sherman, Chicago, Ill.
- Oct. 13-16: Midyear Meeting of Lab Apparatus & Optical Sections; Scientific Apparatus Makers Assoc.; The Cavalier, Virginia Beach, Va.
- Oct. 15-17: Fall Meeting, National Society of Professional Engineers, Olympic Hotel, Seattle, Wash.
- Oct. 17-25: International Fair of Plastics Ind., Duesseldorf, Germany.
- Oct. 18-22: Meeting, The Electrochemical Society, Inc.; Deshler-Hilton Hotel, Columbus, Ohio.
- Oct. 19-21: Fall Meeting, URSI, IRE; Balboa Park, San Diego, Calif.
- Oct. 19-22: 6th Annual Conference, Int'l. Municipal Signal Assoc.; Stardust Hotel, Las Vegas, Nev.
- Oct. 20: Plating Techniques as Applied to Printed Circuitry, Western Assoc. of Circuit Manufacturers; Rodger Young Aud., Los Angeles, Calif.
- Oct. 20-22: Lubrication ASME Conference, ASME; Sheraton-McAlpin, New York, N. Y.
- Oct. 20-22: 10th National Conference on Standards, American Standards Assoc.; Sheraton-Cadillac Hotel, Detroit, Mich.
- Oct. 22-24: Meeting, Acoustical Society of America, AIP; Cleveland, Ohio.
- Oct. 25-29: Midyear Meeting of Industrial Instrument Section, Scientific Apparatus Makers Assoc.; Camelback Inn, Phoenix, Ariz.
- Oct. 26-28: East Coast Aero. & Nav. Electronic Conf., IRE (PGANE); Baltimore, Md.
- Oct. 26-30: 1959 National Conf., Society of Photographic Scientists & Engineers; Edgewater Beach Hotel, Chicago, Ill.
- Oct. 27-29: Midwestern Meeting on New Frontiers in Aviation, Institute of the Aeronautical Sciences; Broadview Hotel, Wichita, Kan.
- Oct. 28-29: Computer Conference, Armour Research Foundation; Morrison Hotel, Chicago, Ill.
- Oct. 28-30: Annual Industry Display, Aircraft Electrical Society; Pan Pacific Auditorium, Los Angeles, Calif.
- Oct. 29-31: 1959 Electron Devices Meeting, IRE; Shoreham Hotel, Washington, D. C.
- October (No Date): Fuels - AIME Conference, ASME; Cincinnati, O.
- Oct. (No date): 6th Annual Meeting, IRE-PGNS; Boston, Mass.
- Oct. (No Date): Conf. on Radio Interference Reduction, IRE, ARF, Chicago, Ill.
- Nov. 2-4: Annual Conference, Atomic Industrial Forum; Sheraton-Park, Washington, D. C.
- Nov. 2-6: Fall Meeting, Metallurgical Society of AIME; Morrison Hotel, Chicago, Ill.
- Nov. 3-4: Annual Convention, Ultrasonic Manufacturers Assoc.; Hotel Sheraton, Chicago, Ill.
- Nov. 3-5: Mid-America Electronics Convention (MAECON), IRE-Kansas City Section; Kansas City, Mo.
- Nov. 4-6: National Automatic Control Conference, IRE, ISA, AIEE; New Sheraton-Dallas Hotel, Dallas, Tex.

(Continued on page 18)

Coming Events for 1959 and 1960

(Continued from page 17)

- Nov. 8-13: International Rubber Tech. Conference, ASME; Washington.
- Nov. 9-11: Radio Fall Meeting, IRE, EIA; Hotel Syracuse, Syracuse, N. Y.
- Nov. 9-11: Instrumentation Conference, IRE; Atlanta, Ga.
- Nov. 9-13: Annual Meeting, National Electrical Manufacturers Assoc.; Traymore Hotel, Atlantic City.
- Nov. 10-12: 12th Annual Conf. on Elec. Tech. in Medicine and Biology, AIEE, IRE; Penn-Sheraton Hotel, Phila., Pa.
- Nov. 12-13: National Industrial Research Conference, Armour Research Foundation; Sherman Hotel, Chicago, Ill.
- Nov. 16-20: 5th Int'l. Automation Congress & Exposition, ASME; New York Trade Show Building, New York, N. Y.
- Nov. 16-20: Meeting, American Rocket Society; Washington, D. C.
- Nov. 16-20: Conf. on Magnetism & Magnetic Materials, IRE, AIEE, APS, AIM, ONR; Detroit, Mich.
- Nov. 17-19: 1959 NEREM, IRE; Boston Commonwealth Armory, Boston, Mass.
- Nov. 18-20: 9th National Conference on Standards, American Standards Assoc.; Hotel Roosevelt, N. Y.
- Nov. 24-25: Fall Meeting, Fluid Controls Institute, Inc.; Drake Hotel, Chicago, Ill.
- Dec. 1-3: Eastern Joint Computer Conference, IRE, AIEE, ACM; Hotel Statler, Boston, Mass.
- Dec. 1-2: 4th Midwest Symposium on Circuit Theory; Marquette Univ., Milwaukee, Wis.
- Dec. 2-4: Electric Furnace Conference, Metallurgical Society of AIME; Cleveland Hotel, Cleveland, Ohio.
- Dec. 2-4: Meeting, Electronic Industries Assoc.; Statler Hilton, Los Angeles, Calif.
- Dec. 3-4: PGVC Annual Meeting, IRE; Colonial Inn & Desert Ranch, St. Petersburg, Fla.
- Dec. 8-10: 2nd Nat'l. Conf. on the Application of Electrical Insulation; Shoreham Hotel, Washington, D. C.
- Dec. 17: Wright Brothers Lecture, Institute of the Aeronautical Sciences; Natural History Bldg. Auditorium, Smithsonian Institute, Washington, D. C.
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- ## Events occurring in 1960
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- Jan. 11-13: 6th Nat'l Symposium on Reliability & Quality Control, IRE, AIEE, ASQC, EIA; Statler-Hilton Hotel, Washington, D. C.
- Jan. 12-15: 16th Annual Tech. Conf., SPE; Conrad Hilton Hotel, Chicago, Ill.
- Jan. 25-28: 28th Annual Meeting, Institute of the Aeronautical Sciences; Hotel Astor, New York, N.Y.
- Jan. 31-Feb. 5: Winter General Meeting, AIEE; Hotel Statler, New York, N. Y.
- Feb. 1-5: Committee Week, American Society for Testing Materials; The Sherman Hotel, Chicago, Ill.
- Feb. 2-4: 15th Reinforced Plastics Div. Conf., SPI; Edgewater Beach Hotel, Chicago, Ill.
- Feb. 11-12: Transistor & Solid State Circuits Conference, IRE, AIEE, University of Pennsylvania; University of Pennsylvania, Phila., Pa.
- March 21-24: IRE National Convention, IRE-all PG's; Coliseum & Waldorf-Astoria Hotel, New York, N. Y.
- April 4-6: Southwest District Meeting, AIEE; Shamrock-Hilton Hotel, Houston, Tex.
- April 20-22: S.W. IRE Regional Conference & Electronics Show, IRE Region 6; Shamrock-Hilton Hotel, Houston, Tex.
- May 1-5: Meeting, The Electrochemical Society, Inc.; LaSalle Hotel, Chicago, Ill.
- May 2-4: North Eastern District Meeting, AIEE; Providence, R. I.
- May 2-4: National Aeronautical Electronics Conference, IRE; Dayton, Ohio.
- May 2-6: Western Joint Computer Conference, IRE, AIEE, ACM; San Francisco, Calif.
- May 8-13: Annual Meeting of All Sections, Scientific Apparatus Makers Assoc.; Broadmoor Hotel, Colorado Springs, Colo.
- May 16-18: 7th Regional Tech. Conference & Trade Show, IRE, Region 7; Olympic Hotel, Seattle, Wash.
- June 25-July 9: 1st Congress International Federation of Automatic Control, IRE; Moscow, USSR.
- June 26-July 1: Annual Meeting, American Society for Testing Materials; Chalfonte-Haddon Hall, Atlantic City, N. J.
- June 19-24: Summer General Meeting, AIEE; Chalfonte-Haddon Hall, Atlantic City, N. J.
- June (No Date): 6th National Communications Symposium, IRE; San Francisco, Calif.
- August 8-12: Pacific General Meeting, AIEE; San Diego, Calif.
- Aug. 23-26: WESCON, IRE; Ambassador Hotel & Pan Pacific Auditorium, Los Angeles, Calif.
- Sept. 12-16: 2nd Int'l. Congress, Int'l. Council of the Aeronautical Sciences, Zurich, Switzerland.
- Sept. 21-22: Industrial Electronics Symposium, IRE, AIEE; (Location Not Firm).
- Sept. (No Date): National Symposium on Telemetering, IRE; Washington, D. C.
- Oct. 9-13: Meeting, The Electrochemical Society, Inc.; Shamrock Hotel, Houston, Tex.
- Oct. 9-14: Fall General Meeting, AIEE; Chicago, Ill.
- Oct. 10-12: National Electronics Conference, IRE, AIEE EIA, SMPTE; Chicago, Ill.
- Oct. 24-26: East Coast Aero. & Nav. Electronics Conference, IRE; Baltimore, Md.
- Oct. 27-29: 1960 Electron Devices Meeting, IRE; Shoreham Hotel, Washington, D. C.
- Oct. 31-Nov. 2: Radio Fall Meeting, IRE, EIA; Syracuse Hotel, Syracuse, N. Y.
- Nov. 14-16: Mid-America Electronic Convention (MAECON), IRE; Kansas City, Mo.
- Nov. (No Date): Midyear Meeting of Laboratory Apparatus and Optical Sections, Scientific Apparatus Makers Assoc., Boca Raton, Fla.
- Nov. (No Date): 13th Annual Conf. on Elec. Tech. in Medicine & Biology, AIEE, IRE, Wash., D. C.
- Dec. (No Date): Eastern Joint Computer Conference, IRE, AIEE, ACM; New York, N. Y.

TRANSISTORIZED CIRCUITS



MINISIG Sensitive Indicators

Proven indicators, incorporating neon or incandescent lamp and transistorized driver circuit, that operate directly from low-level signals, yet occupy no more panel space than conventional indicators. New wide selection includes filament-, high-temperature-, memory-, and plug-in-type units, as well as miniature and subminiature designs.

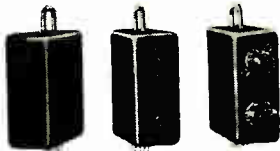
Typical Neon Minisig (R-101), unit price \$5.60 to \$6.55.



W-SERIES Silicon Transistor Plug-in Circuits

Premium units for -45°C to $+100^{\circ}\text{C}$ environment. Particularly suited for compact, high-temperature-environment military and industrial systems. A complete line of compatible circuits, including dc and pulse logic... the first with hermetically sealed silicon semi-conductors and other components.

Typical 150-kc RST Flip-Flop, unit price \$99.10 to \$121.55.



N-SERIES Transistorized DECADES

Our NEWEST Series—compact, transistorized plug-in Decades for reliable pulse counting and frequency division in the frequency range of 0-250 kcs and 0-5 megacycles. Feature simple power supply requirements, low power consumption, small size, and extreme reliability. Nixie, incandescent, and remote-readout models available with or without preset controls.

Completely compatible with T-Series Germanium Plug-in Circuits.



ONE-HALF
ACTUAL SIZE

T-SERIES Germanium Transistor Plug-in Circuits

A complete line of low-cost, transistorized plug-in circuits that operate reliably in -45°C to $+65^{\circ}\text{C}$ environment. Incorporate standardized signal levels for compatibility and discrimination against false triggering. Circuit designs are based on saturated transistor operation, and are de-rated to give reserve reliability. (Units typically designed for 50% greater frequency range than rated in guaranteed specifications.)

Typical 300-kc RS, Flip-Flop, unit price \$26.80 to \$33.15.

EECO BUILDING BLOCKS

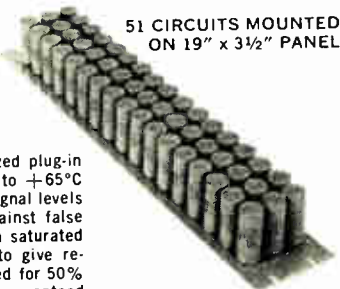
for digital
systems engineering

... Whether you're going the semi-conductor or the vacuum-tube route, EECO has the packaged circuits to make your job an easier and more productive one.

You can concentrate on systems design instead of circuit detail, because every EECO Plug-in Circuit has been tested and proven in advance for you.

While EECO circuits are primarily digital in nature, many types of linear circuits are available. In addition, we stand ready to package your special circuits, both quickly and at low cost.

WRITE FOR FULL INFORMATION AND PRICE LIST on these and other EECO building blocks, including Systems Development Racks for transistor and vacuum-tube systems, as well as Vacuum-Tube Decade Counters.



51 CIRCUITS MOUNTED
ON 19" x 3 1/2" PANEL

VACUUM-TUBE CIRCUITS



STANDARD-SERIES Plug-in Circuits

Our old dependable series for application in most military and industrial electronic systems is still doing a yeoman job. More than 325 different types of circuits have been packaged in this container. Complete systems compatibility is ensured by our policy of low-cost custom-circuit packaging. Compatible with EECO Systems Development Rack and Single or Dual Power Supplies.

Typical 100-kc T Flip-Flop, unit price \$8.00 to \$11.50.



RUGGEDIZED-SERIES Plug-in Circuits

For military and industrial electronic systems where shock, vibration, or temperature are design factors. Pass Mil-E-5272A tests for shock and vibration in -54°C to $+71^{\circ}\text{C}$ environment. Same wide selection of circuits, same packaging service, and same compatibility as in Standard Series.

Typical 1-mc Flip-Flop, unit price \$14.50 to \$17.75.



Y-SERIES COMPUTER Plug-in Circuits

A compatible series of digital and logic building blocks. Employ ultra-conservative circuit design. Units are designed to provide heat barrier between tubes and heat-sensitive components. They

feature etched circuits on epoxyglass and rugged, pin-type connectors. Complete family of proven circuits and diode logic units incorporating "And" and "Or" circuits. Custom diode logic available at no set-up charge.

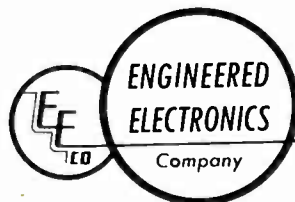
Typical 4-mc RS Flip-Flop, unit price \$59.95 to \$84.95.



DIODE/MATRIX Plug-in Circuits

Multiple clippers, limiters, dc restorers, modulators, or demodulators, ring circuits, bridge circuits, rectifiers, diode gates, or circuits built to order and enclosed in a rugged case for plug-in use. These units eliminate the need for soldering diodes during breadboarding or production. Diode plug-in units are tested to diode manufacturer's specifications after assembly. Diodes are protected from physical damage at all times and can be tested or replaced in groups of 8, 12, or 16.

Typical 8-diode unit, employing 1N67A's, from \$16.00 to \$25.50.



ENGINEERED ELECTRONICS COMPANY
(a subsidiary of Electronic Engineering Company of California)

506 East First Street • Santa Ana, California

New Electronic Standards

A listing of the electronic standards issued during the 12-month period, June 1958 to May 1959, by the American Institute of Electrical Engineers, the American Standards Association, the Electronic Industries Association, and the Institute of Radio Engineers are given. Copies of standards listed may be obtained by contacting the issuing group directly.

INSTITUTE OF RADIO ENGINEERS (IRE) STANDARDS

- 59 IRE 8.S1—IRE Standards on Static Magnetic Storage: Definition of Terms, 1959, \$.50
- 58 IRE 27.S1—Supplement to Standard 54 IRE 17.S1. IRE Standards on Receivers: Methods of Measurement of Interference Output of Television Receivers in the Range of 300 to 10,000 KC, \$.50
- 58 IRE 11.S1—IRE Standards on Information Theory: Definition of Terms, 1958, \$.50
- 58 IRE 19.S1—IRE Standards on Recording and Reproducing: Methods of Calibration of Mechanically-Recorded Lateral Frequency Records, 1958, \$.60
- 58 IRE 3.S1—IRE Standards on Audio Techniques: Definitions of Terms 1958, \$.60

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS (AIEE) STANDARDS

- 1F—Guide for Statistical Analysis of Test Data (June 1958), (No Charge)
- 45—Recommended Practice for Electric Installations on Shipboard (Dec. 1958), \$1.75
- 57—Test Procedure for Evaluation of the Thermal Stability of Enamelled Wire in Air (1/59), \$.30
- 432—Test Procedure for Toroidal Magnetic Amplifier Cores (Jan. 1959), \$.30
- C42.15—Transformers, Regulators, Reactors, and Rectifiers (Aug. 1958), \$.50

ELECTRONIC INDUSTRIES ASSOCIATION (EIA) STANDARDS

- JEDEC-2B—Basing Diagrams for Electron Tubes (including Supplemental Index), September 1958, \$4.00
- JEDEC-3D—Summary of Registered Crystal Diodes, February 1959, \$4.00
- JEDEC-5C—"5500" Series Tubes, February 1959, \$4.00
- JEDEC-6C—Summary of Registered Transistors, February 1959, \$4.00
- JEDEC-9—Summary of Registered Cathode Ray Tubes (*Addendum issue*), June 1958, \$1.00
- JEDEC-12—Bases and Outlines for Semiconductor Devices, June 1958, \$1.00
- JEDEC-13—The Specification of Switching Transistors, March 1959, \$2.50

- RS-168-1—Dimensional and Electrical Characteristics Defining Tube and Transistor Sockets (*Addendum #1 to RS-168*), September 1958, \$.90
- RS-185-1—Dimensional and Electrical Characteristics Defining Sockets for Printed Circuits (*Addendum #1 to RS-185*), September 1958, \$1.65
- RS-186-A—Standard Text Methods for Electronic Component Parts, November 1958, \$1.70
- RS-191-A—Measurement of Direct Interelectrode Capacitances, October 1958, \$1.50
- RS-210—Terminating and Signaling Equipment for Microwave Communication Systems Part I: Telephone Equipment, August 1958, \$1.10
- RS-211—Dimensional Characteristics of Phonograph Use (*Revision of REC-103*), August 1958, \$.60
- RS-212—EIA-NEMA Standards for Numbering of Electrodes and Designation of Units In Electron Tubes (*Revision of ET-113*), August 1958, \$.25
- RS-213—Test Point Locations for Printed Wiring Assemblies, September 1958, \$.25
- RS-214—Method for Calculation of Current Ratings on Hookup Wire, November 1958, \$.60
- RS-215—Basic Requirements for Broadcast Microphone Cables (*Revision TR-130*), November 1958, \$.25
- RS-216—Standard Method of Test for Adhesion of Printed Wiring, February 1959, \$.50
- RS-217—Wound Cut Cores, February 1959, \$.60
- SMC-2—Electrical Wire (Insulated, High Temperature), August 1958, \$2.35

AMERICAN STANDARDS ASSOCIATION (ASA) STANDARDS

- C7.9-1958—Soft Rectangular and Square Bare Copper Wire for Electrical Conductors, Specifications for (*ASTM B48-57*), \$.30
- C7.36-1958—Standard Nominal Diameters and Cross-Sectional Areas of AWG Sizes of Solid Round Wires Used as Electrical Conductors, Specifications for (*ASTM B258-57*), \$.30
- C7.39-1958—Soft or Annealed Coated Copper Conductors for Use in Hookup Wire for Electronic Equipment, Specifications for (*ASTM B286-57T*), \$.30
- C7.40-1958—Aluminum Wire for Communication Cable, Specifications for (*ASTM B314-57T*), \$.30
- C8.15-1958—Metallic and Associated Coverings for Insulated Cables, Requirements for (*IPCEA S-54-401; NEMA WC 2-1958*), \$1.00
- C9.8-1958—Single and Heavy Nylon-Coated Round Copper Magnet Wire (*NEMA MW 6-1957*), \$.80

(Continued on page 24)

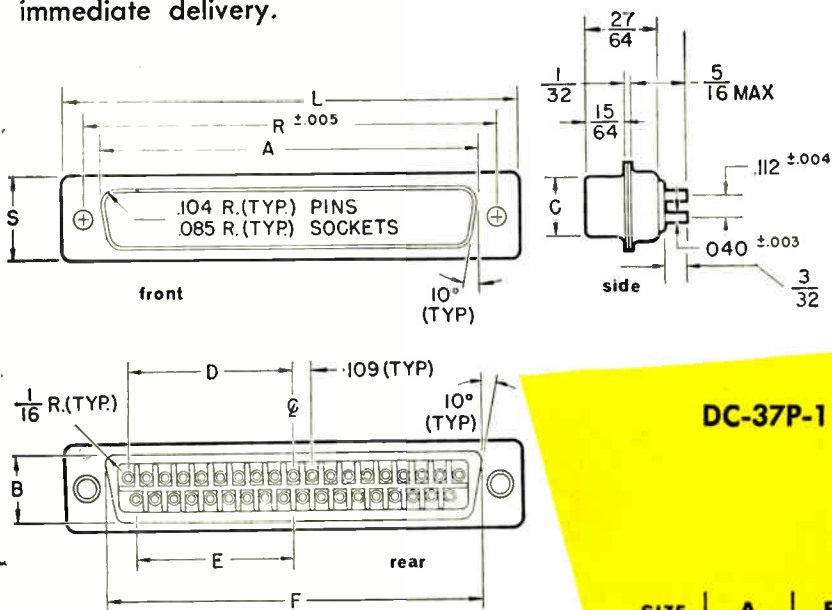
NEW PRINTED CIRCUIT SUB-MINIATURE CONNECTORS

BY CINCH:

More than thirty years experience in the design and manufacture of standard electronic components insure Cannon Connectors by CINCH to be of the highest quality materials, fabricated to specifications to maintain consistent quality of product; highest standards throughout all operations.

D-SUB-MINIATURES: PRINTED CIRCUIT PIN AND SOCKET INSERTS

D Sub-Miniature plugs and sockets with printed circuit pin and socket inserts are now available as listed for immediate delivery.



DC-37P-1

DC-37S-1

DIMENSION TAB

SIZE	A	B	C	D	E	F	L	R	S
DE-9P-1	45/64	27/64	23/64	.216	.162	49/64	1-13/64	63/64	31/64
DE-9S-1	41/64	27/64	5/16	.216	.162	49/64	1-13/64	63/64	31/64
DA-15P-1	1-1/64	27/64	23/64	.378	.324	1-3/32	1-17/32	1-5/16	31/64
DA-15S-1	31/32	27/64	5/16	.378	.324	1-3/32	1-17/32	1-5/16	31/64
DB-25P-1	1-9/16	27/64	23/64	.652	.598	1-5/8	2-5/64	1-55/64	31/64
DB-25S-1	1-33/64	27/64	5/16	.652	.598	1-5/8	2-5/64	1-55/64	31/64
DC-37P-1	2-13/64	27/64	23/64	.978	.924	2-9/32	2-23/32	2-1/2	31/64
DC-37S-1	2-11/64	27/64	5/16	.978	.924	2-9/32	2-23/32	2-1/2	31/64
DD-50P-1	2-7/64	17/32	15/32	.933	.879	2-11/64	2-5/8	2-13/32	39/64
DD-50S-1	2-5/64	17/32	27/64	.933	.870	2-11/64	2-5/8	2-13/32	39/64

CONDENSED DATA

- SHELL MATERIAL—Steel with cadmium plate finish
- CONTACT MATERIAL—Copper alloy with gold over silver plate
- INSULATION MATERIAL—nylon or Diallyl-phthalate
- POLARIZATION—keystone shell shape
- CURRENT RATING—5 amperes
- WIRE SIZE—#20 AWG
- NUMBER OF CONTACTS—9, 15, 25, 37, or 50
- VOLTAGE—D's will withstand a test voltage (60cps ac rms) of 1300 volts and show no evidence of breakdown. The test voltage is applied for a period of 1 minute between the contacts and between the contacts and the shell.



Manufactured by Agreement with
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Examine this resume of the DALOHM line. You'll find a wide variety of resistors, trimmer potentiometers and other electronic products from which you can select a component to meet your needs.

And, remember, DALOHM engineers stand ready to help in design, development and production of special resistance products, resistor networks and electronic equipment.

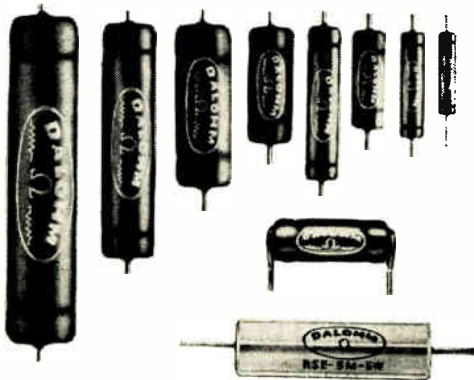
DALOHM Wire Wound Miniature Power Resistors

Carefully designed, precision made to meet all space problems and for all applications where equipment must meet the most severe environmental, shock, vibration and humidity condi-

tions. Smallest in size, completely welded from terminal to terminal, coated with special silicone material, impervious to moisture, salt spray, vapor gases. Temperature coefficient all types 0.00002/Deg. C.

TYPES RS—RLS—RSE

Resistance range from .05 ohm to 175K ohms, depending on type; tolerance range from .05% to 3%. Type RS with axial leads in six wattages—1, 2, 3, 5, 7, 10; nine sizes. Type RLS with radial leads in six wattages—1, 2, 3, 5, 7, 10; eight sizes. Type RSE ruggedized in metal housing for tremendous shock resistance; five wattages—2, 3, 5, 7, 10; seven sizes.



Ask for Bulletins R-23, R-30, R-25

TYPES NS—NLS

Non-inductive characteristics. Five wattages—2, 3, 5, 7, 10; six sizes. Resistance range from 1 ohm to 37K ohms; tolerance range .05% to 3%. Type NS with axial leads. Type NLS with radial leads.



Ask for Bulletin R-34

TYPE RH

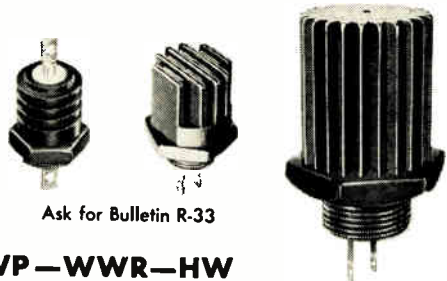
Silicone sealed in die-cast, black anodized, radiator finned housing. Lugs provided for mounting to heat sink. Four wattage ranges—10, 25, 50, 250; resistance range 0.1 ohm to 100K ohms; tolerance range .05% to 3%, depending on type.



Ask for Bulletin R-21

TYPE PH

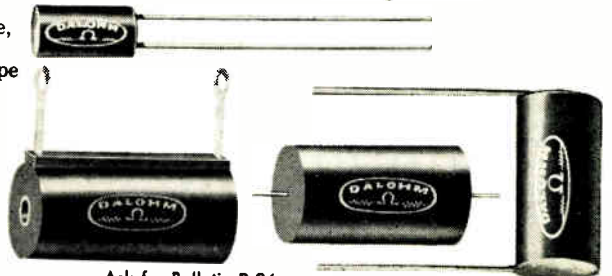
New ruggedized Powerhouse resistor designed for mounting through hole in chassis or heat sink; sealed in black anodized, finned aluminum housing. Three wattages—10, 25, 100; resistance values from 0.1 ohm to 60K ohms; tolerances from .05% to 3%.



Ask for Bulletin R-33

TYPES WWA—WWL—WWP—WWR—HW

Precision encapsulated, non-inductive, pi-wound. Resistance range from 1 ohm to 6 Megohms, depending on type and size; tolerances from .05% to 1%. Type WWA (axial leads) in sub-miniature and standard sizes; Type WWL (lugs) in sub-miniature and standard sizes; Type WWP (parallel leads) in sub-miniature sizes; Type WWR (radial leads) in sub-miniature sizes; HW (high temperature) in sub-miniature sizes.



Ask for Bulletin R-26

**DALE
PRODUCTS,
INC.**

1304 28th Ave.
COLUMBUS, NEBRASKA

DALOHM Metal Film Resistors

New molded metal film resistors combine advantages of DALOHM molding techniques with advanced high vacuum evaporated metal film procedures to provide the best characteristics of wire wound resistors, yet retain miniature size. Metal film resistors have inherently good H.F. characteristics and low noise levels. DALOHM MF resistors have other outstanding features: high stability, fully insulated, low and control-

lable temperature coefficients and ability to withstand rigorous environmental conditions.

TYPE MF

Resistance range from 100 ohms to 4 Megohms, depending on size; tolerance 1%; temperature coefficient is ± 50 P.P.M. or ± 100 P.P.M. Available in five wattages—2, 1, $\frac{1}{2}$, $\frac{1}{4}$ and $\frac{1}{8}$ watts; five sizes.



Ask for Bulletin R-43

DALOHM Deposited Carbon Resistors

Assure stable, accurate, dependable performance. Pure crystalline carbon bonded on ceramic rods of special material. Provide precision resistance values, low voltage coefficient, low capacitive

and inductive characteristics in high frequency applications, extremely high stability and economy.

TYPES DC—DCH

Resistance range from 10 ohms to 200 Megohms; tolerance 1% or higher as specified. Type DC in six wattages— $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, 1, 2, and 5; nine sizes. DCH hermetically sealed in non-hygroscopic ceramic envelope; seven wattages— $\frac{1}{10}$, $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, 1, 2 and 5; ten sizes.

TYPES MC—DCF

Type MC is a deposited carbon resistor completely insulated and protected from environmental and mechanical damage by molded housing; resistance range from 1 ohm to 50 Megohms. Available in five wattages— $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, 1 and 2; five sizes in standard tolerance of 1%. The DCF type has a new coating material which provides a completely insulated resistor, yet maintains sub-miniature size. Available in five wattages— $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, 1 and 2; eight sizes in standard tolerance of 1%.



Ask for Bulletins R-24, R-27



Ask for Bulletins R-37, R-42

DALOHM Trimmer Potentiometers

TYPE 1000 Trimmer

Miniature precision trimmer potentiometer with completely sealed case and welded construction throughout; is resistant to stringent environmental conditions. Rated at 2.5 watts; resistance range from 100 ohms to 50K ohms; tolerance 5%.

TYPE A10-W Trimmer

Rated at 1 watt; resistance range from 10 ohms to 30K ohms; tolerance 5% standard.

Ask for Bulletin R-32

TYPE B11-W Trimmer

Identical to A10-W but with 10% tolerance and resistance range to 100K ohms.

Ask for Bulletin R-37

TYPE C12-W Trimmer

Similar to B11-W but with 15% standard tolerance and resistance range to 20K ohms.

Ask for Bulletin R-38

TYPE A10-C Trimmer

Superior performing deposited carbon trimmer rated at .25 watts; resistance range from 20K ohms to 1 Megohm and 10% tolerance.



Ask for Bulletin R-44

TYPE 750 Miniature

Identical to the Type 1000 trimmer except is smaller with 2 watts rating and resistance range from 100 ohms to 30K ohms.



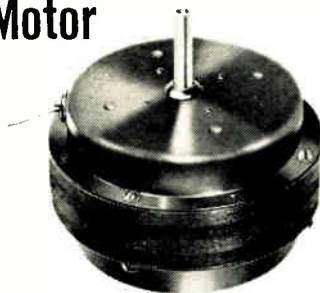
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DALOHM Hysteresis Motor

The DALOHM hysteresis motor is a split-capacitor type, sub-fractional horsepower from 1/20th to 1/300th. Totally enclosed, it has a new space-saving pancake design giving great rigidity. It is ideally suited for such applications as facsimile machines, Hi-Fi turntables, tape recorders, tele-metering and many other types of equipment where constant synchronous speed is essential.

An outstanding feature is the exceptionally low heat rise. This removes the basic objection common in most hysteresis motors. It also has extremely low noise and no vibration or magnetic strays.

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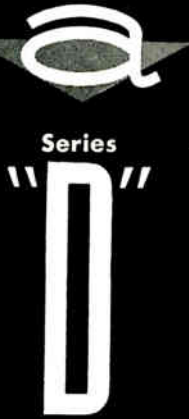
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New York 7, N.Y.



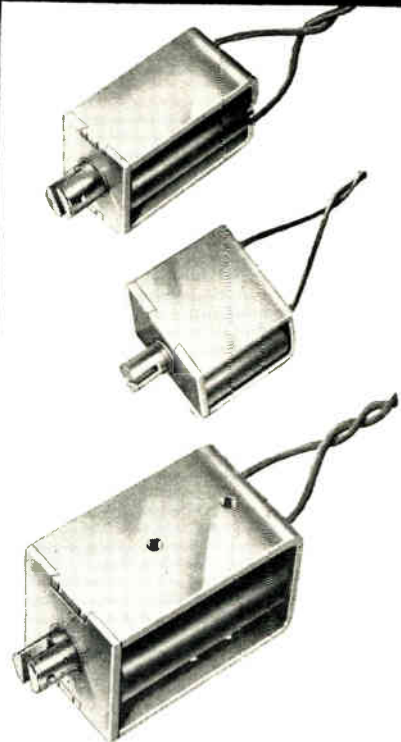
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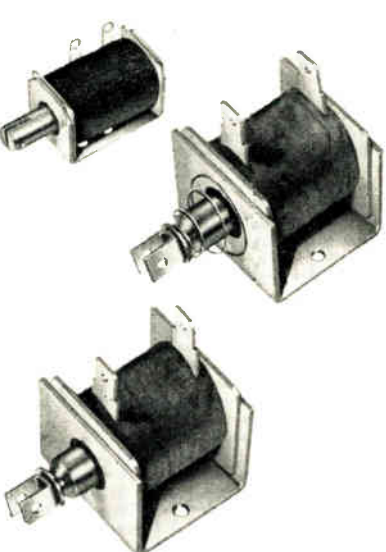
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New Electronic Standards

(Continued from page 20)

- C9.9-1958—Single-Paper-Covered Round Copper Magnet Wire (*NEMA MW 31-1956*), \$.50
- C9.10-1958—Paper-Covered Rectangular and Square Copper Magnet Wire (One Paper $\frac{3}{4}$ Lap or Four Intercalated Papers) (*NEMA MW 33-1957*), \$.50
- C9.11-1958—Glass-Fiber-Covered Rectangular and Square Copper Magnet Wire (*NEMA MW 42-1957*), \$.80
- C33.4-1958—Specialty Transformers, Safety Standard for (*UL 506*), \$.75
- C33.9-1959—Armored Cable, Safety Standard for (*UL 4*), \$.75
- C42.15-1958—Transformers, Regulators, Reactors, and Rectifiers, Definitions (Group 15), \$1.00
- C59.6-1958—Rubber Insulating Tape, Specifications for (*ASTM D119-57T*), \$.30
- C59.14-1958—Testing Laminated Tubes Used for Electrical Insulation, Methods of (*ASTM D348-56*), \$.30
- C59.15-1958—Testing Laminated Round Rods Used for Electrical Insulation, Methods of (*ASTM D349-56*), \$.30
- C59.26-1958—Natural Block Mica and Mica Films Suitable for Use in Fixed Mica-Dielectric Capacitors, Specification for (*ASTM D748-54T*), \$.30
- C59.30-1958—Testing Varnishes Used for Electrical Insulation, Methods of (*ASTM D115-55*), \$.30
- C59.31-1958—Testing Varnished Cotton Fabrics and Varnished Cotton Fabric Tapes Used for Electrical Insulation, Methods of (*ASTM D295-58*), \$.30
- C59.32-1958—Test for Product Uniformity of Phenolic Laminated Sheets, Methods of (*ASTM D634-44*), \$.30
- C59.35-1958—Testing Varnished Glass Fabrics and Varnished Glass Fabric Tapes Used for Electrical Insulation, Methods of (*ASTM D902-56*), \$.30
- C59.36-1958—Testing Silicone Insulating Varnished, Methods of (*ASTM D1346-57*), \$.30
- C59.37-1958—Ozone Resistant Rubber Insulating Tape, Specifications for (*ASTM D1373-57T*), \$.30
- C59.38-1958—Silicone Varnished Glass Cloth and Tape for Electrical Insulation, Specifications for (*ASTM D1459-57T*), \$.30
- C78.390-1958—Designation of Miniature Lamps, Method for the \$.35
- C83.4-1958—Ceramic Dielectric Capacitors Classes 1 and 2, Requirements for (*EIA RS-198*), \$.80
- C83.15-1958—Electrolytic Capacitors (For Use Primarily in Transmitters and Electronic Instruments), Requirements for (*EIA RS-198*), \$.80
- C83.17-1958—Measurement and Definition of the Piezoelectric Vibrator, Methods of (*57 IRE 14.S1*), \$.60
- C83.18-1958—Fixed Wire-Wound Power Resistors, Requirements for (*EIA RS-155*), \$.80
- C83.19-1958—Circular Waveguides, Requirements for (*EIA RS-200*), \$.30
- C83.20-1958—Vibrators for Auto Radios, Requirements for (*Revision of C16.16-1949*) (*EIA RS-187*), \$1.65
- C83.21-1958—Solid Dielectric Transmission Lines, Requirements for (*EIA RS-199*), \$1.20
- C86.1-1958—Shockproof Cable Terminals and Receptacles for Use on X-ray Equipment Specification for, (price not determined)

* * *

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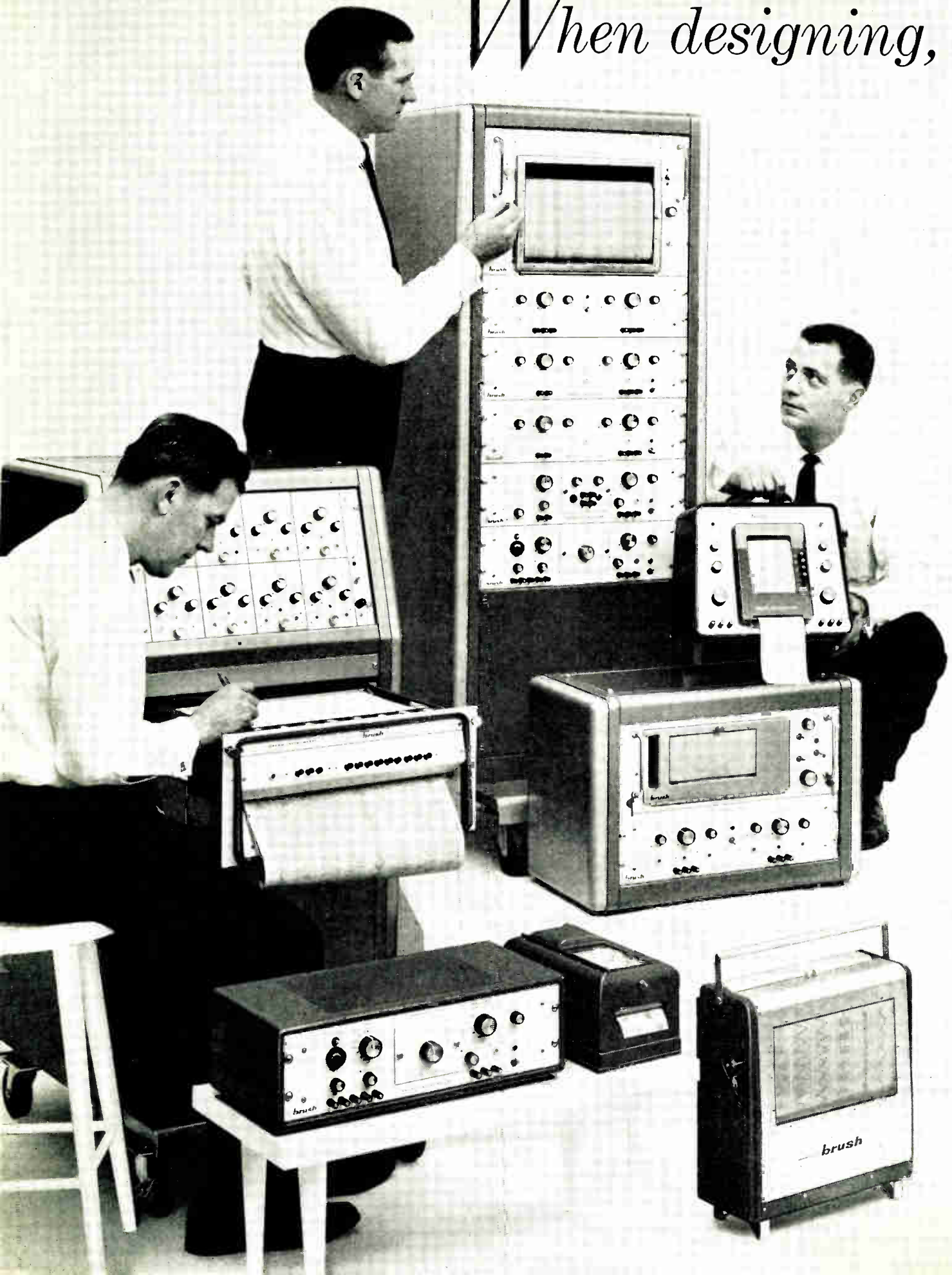
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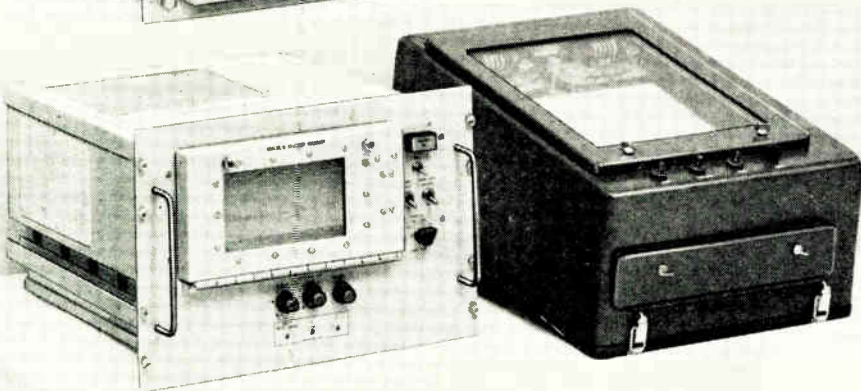
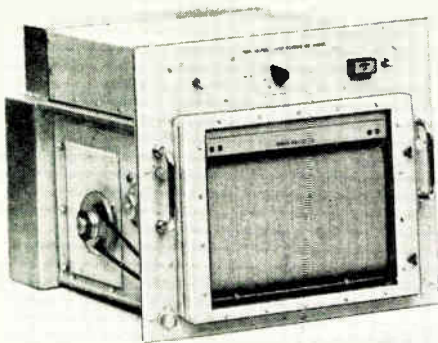
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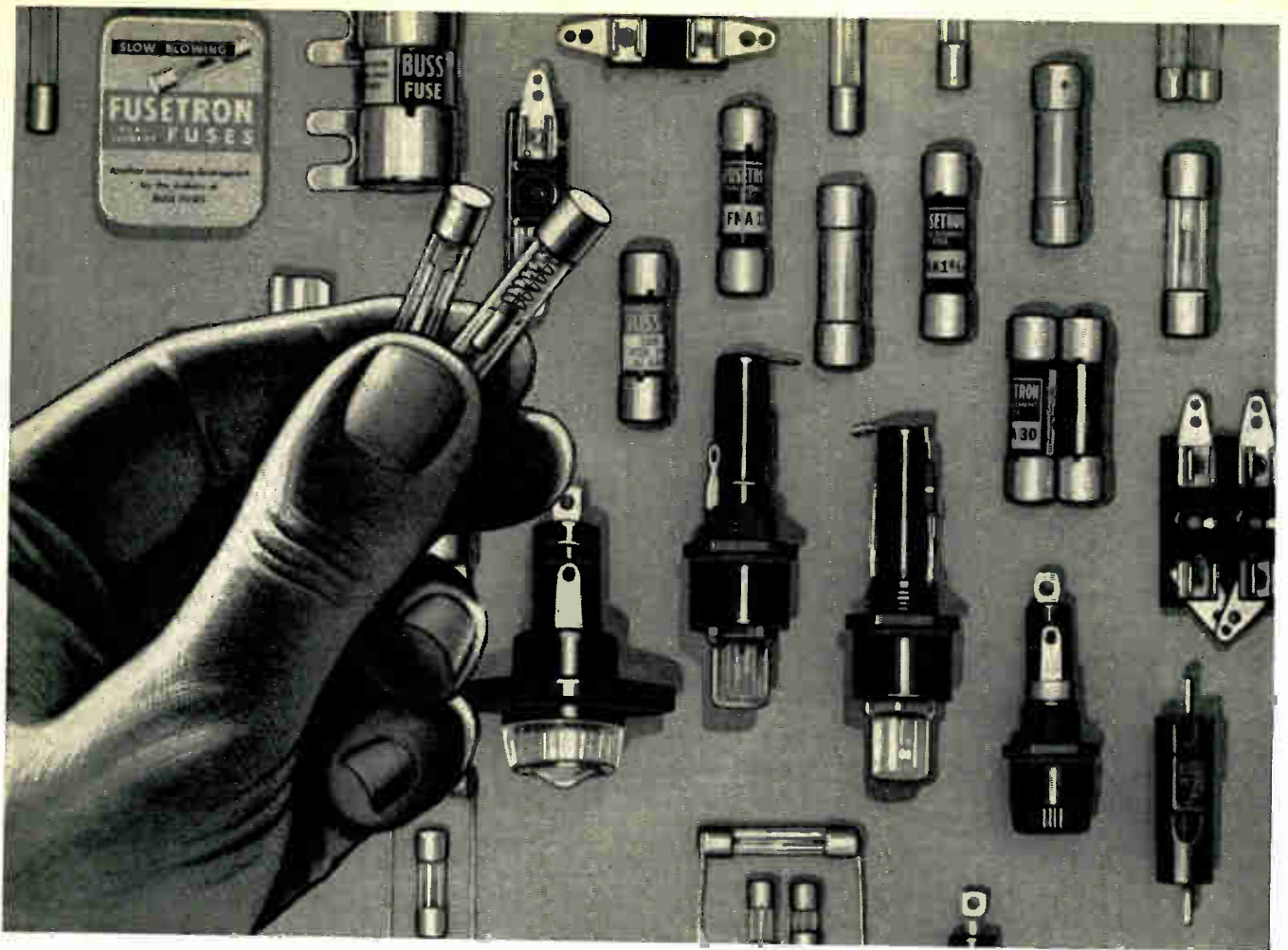
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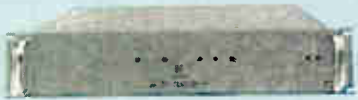
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NLS 50 GO/NO-GO VOLTAGE COMPARATOR — Instantly gives go/no-go indication of voltage level within range of ± 0.001 to ± 999.9 volts . . . 50 milli-second operating time . . . limit settings to $\pm 0.01\%$. . . transistorized for highest reliability . . . 3 1/2-in. high.

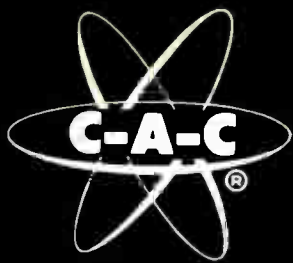


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NLS — The Digital Voltmeter That Works... And Works... And Works!



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2. To provide the best service
3. To keep a realistic price structure

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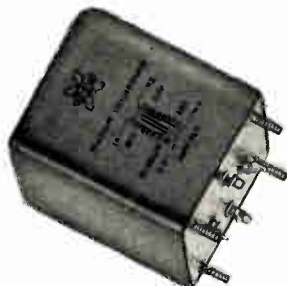
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CORE TYPE 848. Same physical size as the 206. Lower permeability for use from 2 KC to 100 KC. Q to 190. Inductance from 2 MH to 500 MH.

CORE TYPE 930. High Q for high power level and stability with slight increase in weight and volume. Frequency .5 KC to 10 KC. Q to 160. Inductance from 5 MH to 17.5 HY.

CORE TYPE 395. Same physical size as 930. Lower permeability for use from 1 KC to 50 KC. Exceptional high Q to 225. Inductance from 5 MH to 500 MH.

CORE TYPE 254. Exceptional Q below 5 KC. For critical filters, oscillators and tuned transformers. Sharp characteristics and highest power capabilities. Q to 205. Inductance from 20 MH to 36 HY.

CORE TYPE 715. Used below 2.5 KC where higher Q is important. Best in high level networks where stability versus voltage is a factor. Q to 250. Inductance from 20 MH to 60 HY.



MOLDED PLASTIC
(TYPE MP)



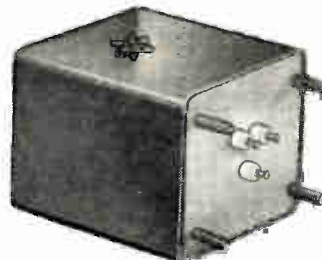
HERMETICALLY SEALED
(TYPE HS)

Special core types in a variety of permeabilities and sizes, including temperature stabilized, are available on request. Many in stock.



Communication

TELEGRAPH TONE FILTERS and NETWORKS



HERMETICALLY SEALED
170 Cycle Spacing

Transmit Filters, 90-0574 Series
Receive Filters, 90-0573 Series
Center Frequency from 425 CPS to 3315 CPS.

C-A-C produces many types of telegraph filters with a variety of channel spacing—120 Cycle, 150 Cycle, 85 Cycle and others. Also Oscillators, Discriminators and Translation Filters.

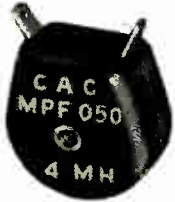


SUB-MINIATURE TOROIDS



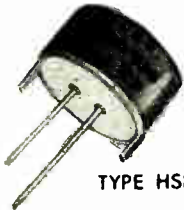
TYPE QLS

Basic Inductor Component with flex leads. Wax impregnated units standard. Plain or plastic dipped on special order. Q values from 12 to 190 over a frequency range of 1 KC to 5 MC. Maximum 4 HY inductance.



TYPE MPF

Hi-temp polyester resin molding compound. Tinned brass terminals. 3-48 tapped center bushing easily stacked. Special versions available for 350° F. application.



TYPE HSD

CORE TYPE 050 from 5.0 MH to 3.0 HY
For Freq. up to 15 KC.

CORE TYPE 051 from 1.0 MH to 500 MH
For Freq. up to 100 KC.

CORE TYPE 054 from .05 MH to 10 MH
For Freq. up to 5 MC.

THIS SERIES NOT AVAILABLE WITH TEMPERATURE STABILIZATION

MAGNETIC AMPLIFIERS SATURABLE REACTORS PRECISION TRANSFORMERS



We build saturable transformers for 2-phase servomotors, missile control and other automatic control devices in a wide variety of types. Frequency, 60 CPS to 15 KC. Also complete magnetic amplifiers and Special Mag Amp devices.

Built to MIL-T-27A
Grade 4, Class R, Life X
Altitude to 50,000 Feet (or you name it!)

Accessories

Company



FILTERS



BAND PASS

100 KC BAND PASS FILTER

LC filters utilizing high Q toroidal inductors, high quality capacitors, impedance transformations, near unity coupling and other applications of advanced network theory resulting in high performance units in small volume packages. C-A-C filters range from sub-audio to over 500 KC.



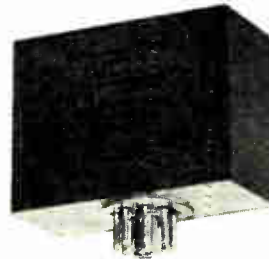
UNIVERSAL 90-0036 SERIES
40 CPS to 50 KC

LOW PASS

All the wide variety of C-A-C Low Pass Filters are built to military specifications. Temperature: -40°C to +85°C for a pass band tolerance of ± 1 db.

BAND REJECTION AND HIGH PASS FILTERS ALSO AVAILABLE

SPECIAL FILTERS



TELEMETERING FILTERS

TELEMETERING CHANNEL FILTERS

Miniaturized Version of Standard RDB Series
90-0734 Series
90-0735 Series
90-0003 Series
400 CPS to 960 CPS
1,300 CPS to 2,300 CPS
3,000 CPS to 70,000 CPS

AIRCRAFT NAVIGATION FILTERS



AIRCRAFT NAVIGATION FILTERS

C-A-C has developed numerous custom designs for equipment manufacturers. Send your specifications for a prompt engineering proposal.

TACTICAL AIR NAVIGATION

15 Cycle Band Pass Filters
135 Cycle Band Pass Filters
4046 Cycle Band Pass Filters
1350 Cycle Tuned Circuits
Pulse Differentiating Transformers
Rate Coupling Transformers
Special Toroidal Coils
Pulse Delay Networks

MARKER BEACON

400 CPS Tuned Circuits
1300 CPS Tuned Circuits
3000 CPS Tuned Circuits
Audio Transformers

INSTRUMENT LANDING SYSTEM

90 and 150 Cycle Filters

VHF OMNI RANGE

30 Cycle Filters
9960 Cycle Discriminators
30 Cycle Transformers

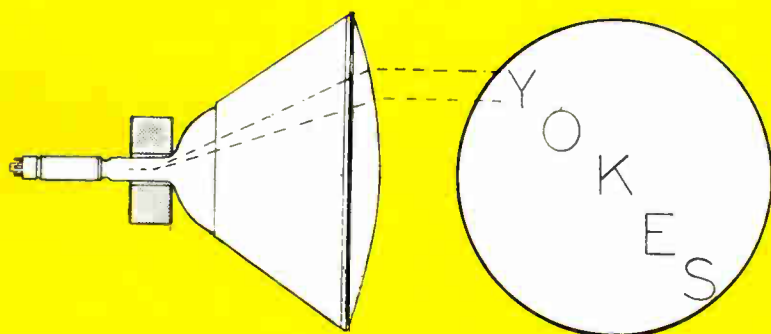
THESE ARE TYPICAL OF MANY SPECIAL FILTERS C-A-C SUPPLIES

Circle 60 on Inquiry Card

CELCO *Specialized*

YOKES

FOR CHARACTER DISPLAYS



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For critical applications, many of our customers have saved years of trial and error in YOKE selection by specifying Celco YOKES.

The construction of our yokes makes it possible to achieve **sensitivities, linearities, responses and distortion-free deflecting fields** not possible with the usual types of yoke.

For precision military and commercial displays, Celco also offers standard yokes in 7/8", 1", 1 1/8", 2", & 2 1/2" CRT neck diameters.

Write for CELCO DEFLECTION YOKE Catalogue & Design Sheets or for immediate engineering assistance Call your nearest CELCO Plant:

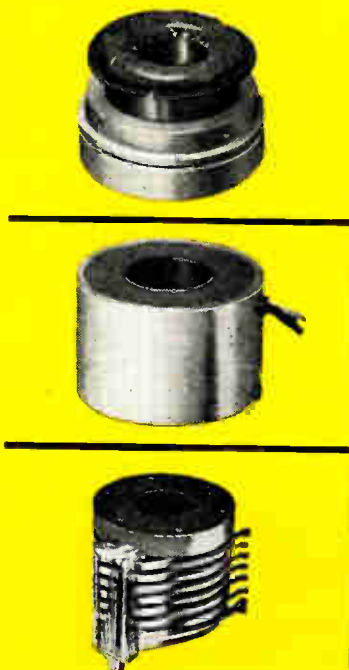


Constantine Engineering Laboratories Co.

Mahwah, N. J.
Davis 7-1123

Miami, Fla.
Plaza 1-9083

Cucamonga, Calif.
Yukon 2-2688



Common Electronic Abbreviations

- AAE—American Association of Engineers
- AAP—Aerodynamics Advisory Panel, Atomic Energy Commission
- AAS—American Astronautical Society
- AASE—Association for Applied Solar Energy
- ABMA—Army Ballistic Missile Agency
- ACM—Association for Computing Machinery
- ADMA—Aviation Distributors and Manufacturers Association
- ADSEC—Air Defense Systems Engineering Committee, U. S. Air Force
- AEC—Atomic Energy Commission
- AEPEM—Association of Electronic Parts & Equipment Manufacturers
- AES—American Electroplaters Society
- AES—Audio Engineering Society
- AES—Aircraft Electrical Society
- AEW—Airborne Early Warning
- AFA—Air Force Association
- AFCA—Armed Forces Communications Association
- AFCCCE—Association of Federal Communications Consulting Engineers
- AFCEA—Armed Forces Communications & Electronics Association
- AFCRC—Air Force Cambridge Research Center, Air R & D Command, U. S. Air Force
- AFCSA—Air Force Scientific Advisory Board
- AFOSR—Air Force Office of Scientific Research
- AGA—American Gas Association
- AGREE—Advisory Group on Reliability of Electronic Equipment
- AIA—Aircraft Industries Association
- AICHe—American Institute of Chemical Engineers
- AIEE—American Institute of Electrical Engineers
- AIF—Atomic Industrial Forum
- AIME—American Institute of Mining, Metallurgical & Petroleum Engineers
- AIP—American Institute of Physics
- AITA—Air Industries and Transports Association
- AMA—American Management Association
- AMDC—Army Missile Development Center Redstone Arsenal
- ANPP—Aircraft Nuclear Propulsion Program
- ANS—American Nuclear Society
- APCO—Association of Police Communications Officers
- APPA—American Public Power Association
- APS—American Physical Society
- ARF—Armour Research Foundation
- ARF—Aeronautical Research Foundation
- ARRL—American Radio Relay League
- ARS—American Rocket Society
- ASA—Acoustical Society of America
- ASA—American Standards Association
- ASA—American Statistical Association
- ASCE—American Society of Civil Engineers
- ASET—Armed Services Electron Tube Committee
- ASLE—American Society of Lubrication Engineers
- ASM—American Society for Metals
- ASME—American Society for Mechanical Engineers
- ASNE—American Society of Naval Engineers
- ASQC—American Society for Quality Control
- ASTE—American Society of Tool Engineers
- ASTIA—Armed Services Technical Information Agency

(Continued on Page 34)



basic snap-action switches

FOR AIRCRAFT, MISSILE, ELECTRONIC AND INDUSTRIAL APPLICATIONS

more answers to switching problems

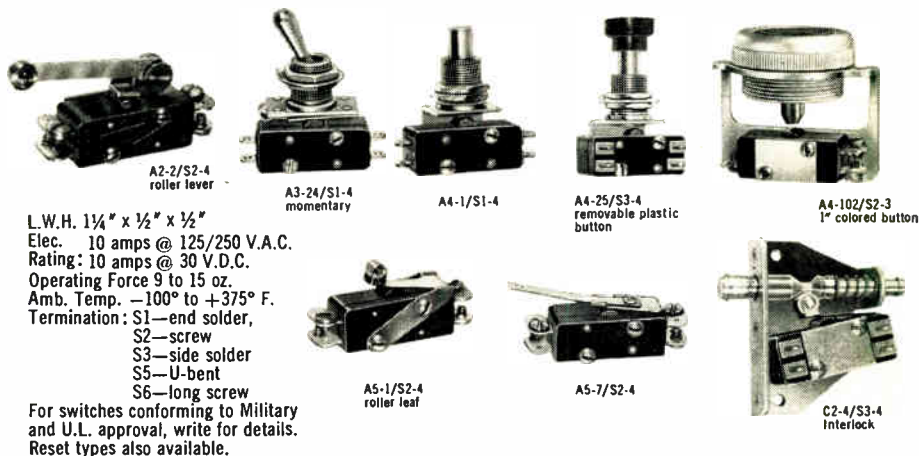
- quality engineered designed to meet human factors
- over 60,000 switch and actuator variations available
- adaptations can be made to fit your requirements

single pole



actual size

S series SPDT



L.W.H. $1\frac{1}{4}'' \times \frac{1}{2}'' \times \frac{1}{2}''$
 Elec. 10 amps @ 125/250 V.A.C.
 Rating: 10 amps @ 30 V.D.C.
 Operating Force 9 to 15 oz.
 Amb. Temp. -100° to $+375^{\circ}$ F.
 Termination: S1—end solder,
 S2—side solder
 S3—side solder
 S5—U-bent
 S6—long screw
 For switches conforming to Military and U.L. approval, write for details. Reset types also available.

in stock?
WE HAVE THEM...

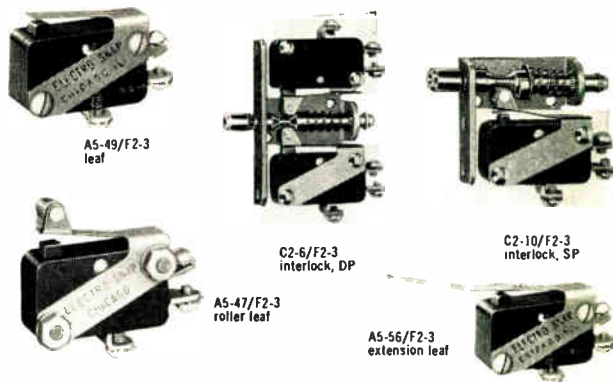
single pole



actual size

F series SPDT

L.W.H. $1\text{-}3/32'' \times 13/32'' \times 5/8''$
 Elec. 10 amps @ 125/250 V.A.C.
 Rating: 60 cycles
 10 amps Res. @ 28 V.D.C.
 6 amps Ind. @ 28 V.D.C.
 Operating Force 7 to 12 oz.
 Amb. Temp. -100° to $+350^{\circ}$ F.
 Termination: F1-solder, F2-screw
 May be banked with unlimited units per row. For switches conforming to Military and U.L. approval, write for details.



40 amps?
YES...

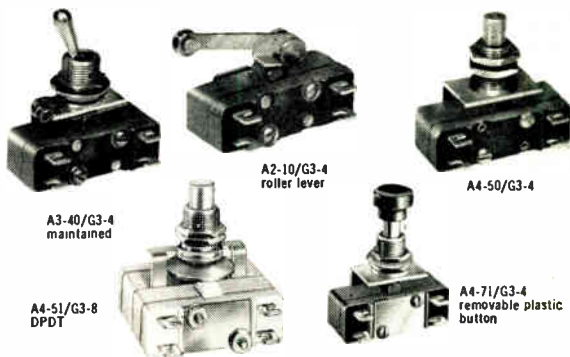
heavy duty



actual size

G series SPDT, 2 CKT.

L.W.H. $1\frac{3}{4}'' \times 43/64'' \times 35/64''$
 Elec. 40 amps @
 Rating: 125/250 V.A.C.
 40 amps Res. @ 30 V.D.C.
 30 amps Ind. @ 30 V.D.C.
 Operating Force 45 oz.
 Amb. Temp. -100° to $+300^{\circ}$ F.
 Termination: G3—side solder
 G4—top and bottom screws
 Reset models also available. For switches requiring Military and U.L. approval, write for details.



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SWITCH DIVISION • 4244 W. Lake Street, Chicago 24, Illinois
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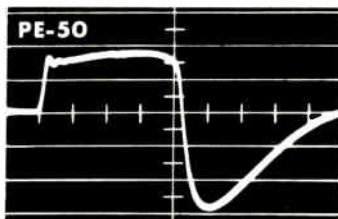
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Designed for Navy Preferred Circuits
and other
blocking oscillator applications

These CHICAGO ultra-miniature wound core pulse transformers are hermetically encapsulated 3 winding units. They are designed and built in accordance with MIL-T-27A and are characterized by extremely fast rise time, minimum droop, and high temperature stability. The leads are arranged so that they can be soldered directly in to the circuit or clipped and plugged into a standard 7-pin miniature tube socket. Each unit in the "PE" series weighs approximately .16 ounce.

CHICAGO Part No.	Nominal Pulse Width Microseconds	Rise Time Microseconds	Height	Width	Depth
PE-50	0.5	.07	1/16"	1/16"	1/16"
PE-75	0.75	.07	1/16"	1/16"	1/16"
PE-100	1	.06	1/16"	1/16"	1/16"
PE-200	2	.05	1 1/16"	1 1/16"	3/4"
PE-500	2	.07	1 1/16"	1 1/16"	3/4"
PE-700	7	.1	1 1/16"	1 1/16"	3/4"

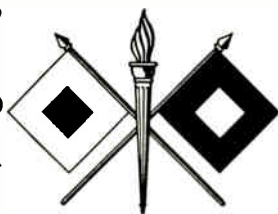


0.5 Microseconds/Division

Data obtained through use of N.B.S. Preferred Circuit #46 as found in Navy Aeronautical Preferred Circuits Handbook.

Oscillograph pictures of pulses for all units and other technical data are available in Chicago Bulletin CT-45. Write for your free copy.

**R
I
Q
A
P**



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CHICAGO STANDARD Transformer Corporation
3516 West Addison Street • Chicago 18, Illinois

Abbreviations

(Continued from Page 32)

- ASTM—American Society for Testing Materials
- AVS—American Vacuum Society
- AWA—Aviation Writers Associations
- AWRTV—American Women in Radio and TV
- AWS—American Welding Society
- Balmi—Ballistic Missile
- BLS—Bureau of Labor Statistics
- BMDC—Ballistic Missile Defense Committee
- BS—Biometric Society
- CAA—Civil Aeronautics Administration
- CCIR—International Radio Consultative Committee
- CCM—Counter-counter Measures
- ECM—Electronic-counter Measures
- EEL—Edison Electric Institute
- EIA—Electronic Industries Association (formerly RETMA)
- EMA—Electronic Manufacturers Association
- EMEA—Electrical Maintenance Engineers Association
- EJC—Engineers Joint Council
- EPDS—Electronic Parts Distributors Show
- EPMA—Electronic Parts Manufacturers Association
- EPRA—Electronic Production Resources Agency of the Defense Department
- ERS—Electronic Representatives Association
- ES—Electrochemical Society
- EWR—Early Warning Radar
- FMDA—FM Development Association
- FPA—Film Producers Association of New York
- GAM—Guided Aircraft Missile
- HEI—Human Engineering Institute
- IAF—International Astronautical Federation
- IAS—Institute of Aeronautical Sciences
- ICA—Industrial Communications Association
- IDI—Industrial Designers Institute
- IEA—Instruments, Electronics, Automation
- IEC—International Electrotechnical Commission
- IEE—Institute of Environmental Engineers
- IEE—Institute of Electrical Engineers (British)
- IGY—International Geophysical Year
- IHF—Institute of High Fidelity Manufacturers
- IME—Institute of Mechanical Engineers
- IMS—Institute of Management Sciences
- IMSA—International Municipal Signal Association
- IPC—Institute for Printed Circuits
- IRE—Institute of Radio Engineers
- ISA—Instrument Society of America
- ISU—International Scientific Union
- ITE—Institution of Telecommunications Engineers
- ITU—International Telecommunication Union
- JAN—Joint Army-Navy
- JEDEC—Joint Electron Tube Engineering Council (EIA-NEMA)
- JTAC—Joint Technical Advisory Committee (IRE-EIA)
- MAECON—Mid America Electronics Convention
- MDAP—Mutual Defense Assistance Program
- MHI—Material Handling Institute
- MPA—Metal Powder Association
- MPCA—Metal Powder Core Association
- MRIA—Magnetic Recording Industry Association
- MSA—Mutual Security Agency
- MSA—Mine Safety Appliances
- NAB—National Association of Broadcasters

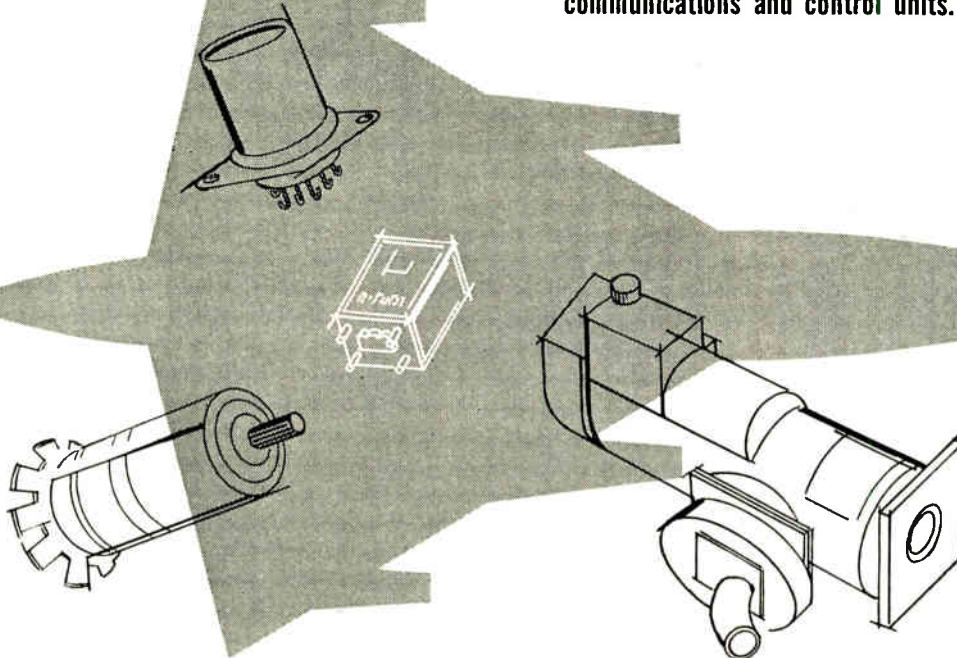
(Continued on Page 36)

Armco Thin Electrical Steels Armco Nickel-Iron Magnetic Alloys

New steels are
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Help assure reliability and efficiency of missile and aircraft components

Special Armco materials provide advantages in production of light-weight, high-performance power, communications and control units.



Armco Thin Electrical Steels—Three different grades, Armco TRAN-COR® T, Oriented T and Oriented TS, in thicknesses from 1 to 7 mils, for applications for 400 cycles and higher. Extensive design information enables you to make most effective use of their magnetic properties for servo-mechanisms, motors, specialty transformers and magnetic amplifiers.

Armco-Nickel Iron Magnetic Alloys—Armco 48 Ni combines very high permeability at low and moderate inductions, extremely low coercive force and low hysteresis loss. Specially processed for laminations or wound cores and available in 2 to 14 mil cold-reduced strip, it is widely used for gyro and synchronous motors, audio transformers, relays and magnetic amplifiers.

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Use the multiple advantages of Armco's Thin Electrical Steels and Nickel-Iron Magnetic Alloys to assure the reliability and performance of electronic or electrical equipment you make for aircraft, missiles or industrial applications.

Write to Armco Steel Corporation, 1949 Curtis Street, Middletown, Ohio, for information.

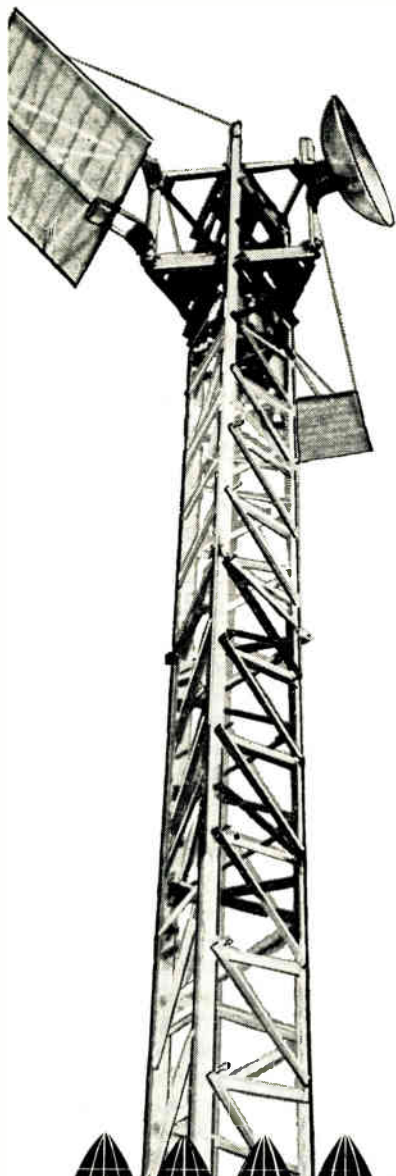
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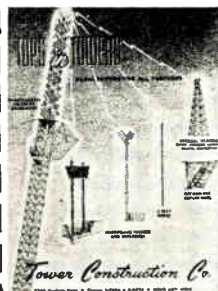
2731 Hawkeye Drive, SIOUX CITY, IOWA

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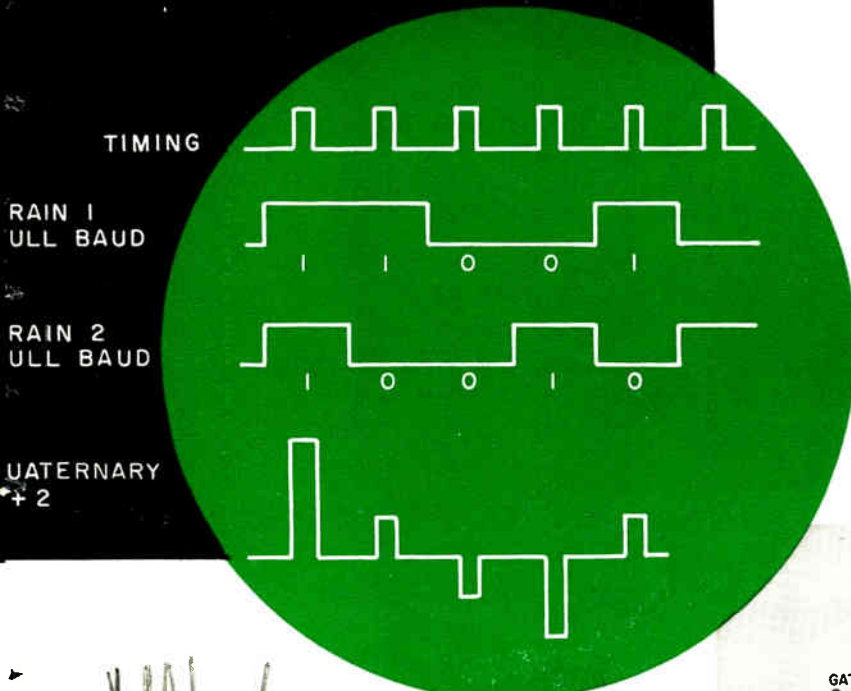
Abbreviations

(Continued from Page 34)

- NAECON—National Aeronautical Electronics Conference
- NAED—National Association of Electrical Distributors
- NAM—National Association of Manufacturers
- NAMM—National Association of Music Merchants
- NARDA—National Appliance and Radio TV Dealers Association
- NARM—National Association of Relay Manufacturers
- NARTB—National Association of Radio & TV Broadcasters
- NASA—National Aeronautics & Space Administration
- NATO—North Atlantic Treaty Organization
- NATV&ESA—National Alliance of TV & Electronic Service Associations
- NAVA—National Audio-Visual Association
- NBS—National Bureau of Standards
- NBP—National Business Publications
- NCTVA—National Community TV Association
- NEC—National Electronics Conference
- NEDA—National Electronics Distributors Association
- NEMA—National Electrical Manufacturers Association
- NEREM—Northeast Electronics Research & Engineering Meeting
- NORAD—North American Air Defense Command
- NRC—National Rocket Club
- NRL—Naval Research Laboratory
- NSF—National Science Foundations
- NSPE—National Society of Professional Engineers
- OA&BETA—Office Appliance & Business Equipment Trades Association
- OCRD—Office of Chief of Research and Development, U. S. Army
- ONR—Office of Naval Research
- PACE—Producers of Associated Components for Electronics
- PMA—Photograph Manufacturers Association
- RCEEA—Radio Communications & Electronic Engineering Association
- R&D—Research & Development
- REPM—Representatives of Electronic Products Manufacturers
- RETMA—Radio-Electronic-TV Manufacturers Association—Now EIA
- RIAA—Record Industry Association of America
- RSQC—Rochester Society for Quality Control
- RTCA—Radio Technical Commission for Aeronautics
- RTES—Radio Technical Commission for Aeronautics
- SAB—Scientific Advisory Board
- SAE—Society of Automotive Engineers
- SAMA—Scientific Apparatus Makers Association
- SAMPE—Society of Aircraft Materials & Process Engineers
- SBA—Small Business Administration
- SES—Standards Engineers Society
- SESA—Society for Experimental Stress Analysis
- SMPTE—Society of Motion Picture & TV Engineers
- SPE—Society of Plastic Engineers
- SPI—Society of the Plastics Industry
- SPIE—Society of Photographic Instrumentation Engineers
- SSO—Submarine Supply Office
- STWE—Society of Technical Writers and Editors

(Continued on Page 38)

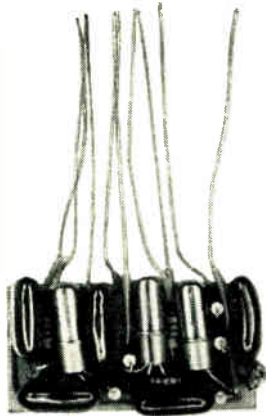
PULSE CODE MODULATION



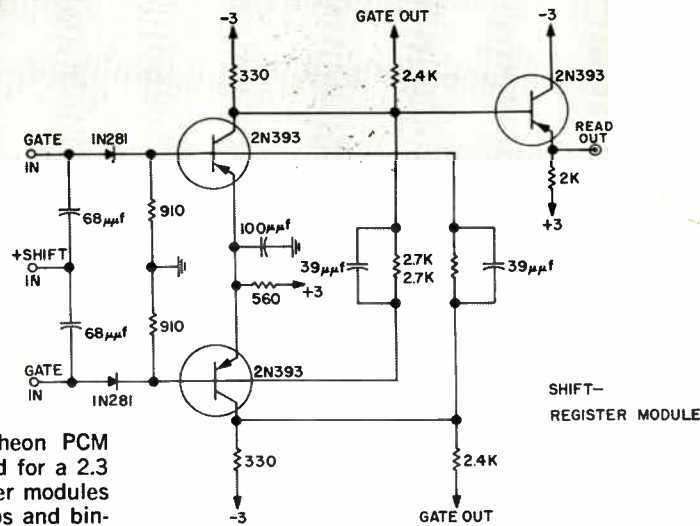
PCM is a new method of coding voice and analog information into digital form. It provides a completely digitalized message by time-division multiplexing of voice circuits. Adaptation of the technique offers advantages in signal-to-noise characteristics, signal regeneration, message security and equipment reliability not usually achieved with conventional techniques.

A 96-voice channel, fully transistorized PCM equipment for cable and radio transmission meeting rugged military requirements is now being developed by the Communications Department of Raytheon's Government Equipment Division. In this system a sampling frequency of 8,000 cycles is used. Each sample is coded in six-bit binary form, at a bit frequency of 4.6 mc. Many new circuit techniques, closely allied to high-speed data processing and computer systems are being developed for this equipment.

THE QUATERNARY WAVE combines information from trains 1 and 2, and the timing pulse regulates the width and position of the quaternary output wave. Thus, twice as much information is passed through the same bandwidth as is required for one train.



TYPICAL MOLDED MODULE used in Raytheon PCM equipment comprises logic circuitry required for a 2.3 mc shift register shown in the diagram. Other modules are used for repetitive and-or gates, flip-flops and binary-storage elements.



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Engineering Laboratories: Wayland, Maynard, Mass.; Santa Barbara, Calif. • Manufacturing Facilities: Waltham, North Dighton, Mass.



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SEA



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C-16



ELECTRO-MEASUREMENTS, INC.

7524 S. W. MACADAM • PORTLAND 19, OREGON

Abbreviations

(Continued from Page 36)

SWEE—South West Electronic Exhibit
 UMA—Ultrasonic Manufacturers Association
 UNESCO—United National Educational, Scientific & Cultural Organization
 USICIP—United States Committee for the International Conference on Information Processing
 VWOA—Veteran Wireless Operators Association
 WACM—Western Association of Circuit Manufacturers
 WCEMA—West Coast Electronic Manufacturers Association
 WESCON—Western Electronic Show & Convention
 WJCC—Western Joint Computer Conference

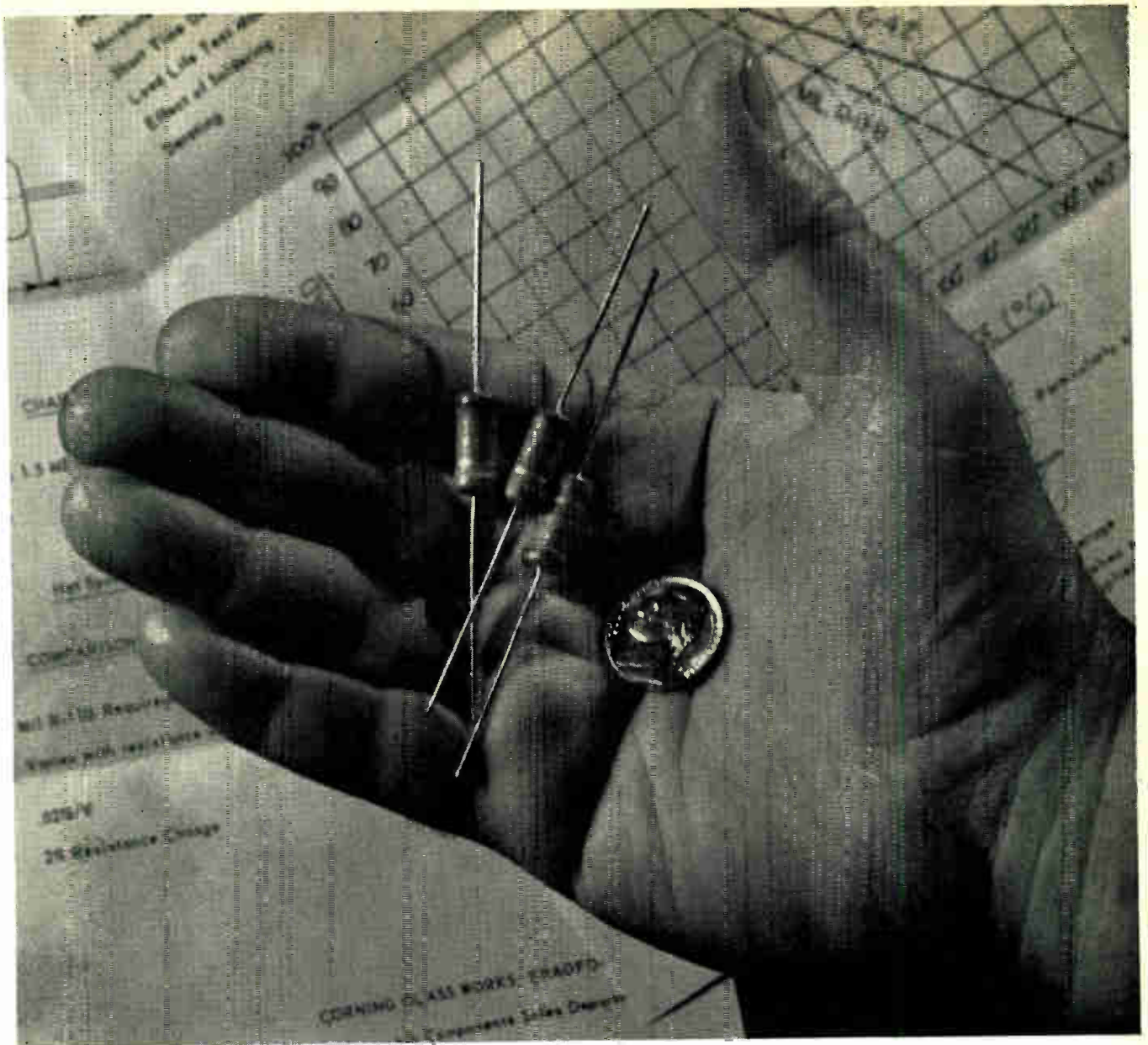
MISSILES

AAM—Air-to-air missile
 AICBM—Anti-intercontinental ballistic missile
 AIRBM—Anti-intermediate range ballistic missile
 ANSAM—Anti-missile surface-to-air missile
 ASM—Air-to-surface missile
 AUM—Air-to-underwater missile
 CBM—Continental ballistic missile
 DICBM—Defense intercontinental ballistic missile
 FBM—Fleet ballistic missile, U. S. Navy
 GAM—Guided aircraft missile
 GAR—Guided aircraft rocket
 GM—Guided missile
 ICBM—Intercontinental ballistic missile
 IM—Interceptor missile
 IRBM—Intermediate range ballistic missile
 MRBM—Medium range ballistic missile
 SAM—Surface-to-air missile
 SM—Strategic missile
 SRBM—Short range ballistic missile
 SSM—Surface-to-surface missile
 SUM—Surface-to-underwater missile
 TM—Tactical missile
 TV—Test vehicle
 UAM—Underwater-to-air missile
 USM—Underwater-to-surface missile
 XM—Research missile
 YM—Prototype missile

IRE PROFESSIONAL GROUPS

PGA—Audio
 PGBTS—Broadcast Transmission Systems
 PGAP—Antennas & Propagation
 PGCT—Circuit Theory
 PGNS—Nuclear Science
 PGVC—Vehicular Communications
 PGRQC—Reliability & Quality Control
 PGBTR—Broadcast & TV Receivers
 PGI—Instrumentation
 PGTRC—Space Electronics & Telemetry (Formerly Telemetry & Remote Control)
 PGANE—Aeronautical & Navigational Electronics
 PGIT—Information Theory
 PGEM—Engineering Management
 PGIE—Industrial Electronics
 PGED—Electronic Devices
 PGEC—Electronic Computers
 PGMTT—Microwave Theory & Techniques
 PGME—Medical Electronics
 PGCS—Communications Systems
 PGUE—Ultrasonics Engineering
 PGCP—Component Parts
 PGPT—Production Techniques
 PGAC—Automatic Control
 PGME—Military Electronics
 PGE—Education
 PGEWS—Engineering Writing & Speech

* * *



NEW FROM CORNING

C-42 low-power, low-cost film-type resistor

What this Country needs is a good five-cent resistor—and here it is.

At the heart of the C-42 you'll find a glass core coated with a very thin film of metallic oxide. It's this construction that gives you the exceptional performance you've come to expect from metallic film-type resistors.

In every characteristic, this new C-

42 outperforms the requirements of MIL-R-11B; for example:

Load life stability (1000 hrs.): 6% max.—4% average
 Humidity: 1% max. resistance change
 Shelf life: 0.2% per year, maximum
 Noise output: .1 microvolt per volt
 Nominal length of the C-42 is $\frac{1}{16}$ " \pm $\frac{1}{32}$ ". Power rating is 2 W at 70°C.

You can get the new C-42 in resistances from 200 ohms to 1.5 megohms.

For all the facts, including detailed comparison of the C-42 with MIL-R-11B, write to Corning Glass Works, 546 High Street, Bradford, Pa. Or contact our sales offices in New York, Chicago, or Los Angeles.

See us in Booths 506 to 508 at the WESCON Show, August 18-21.



CORNING GLASS WORKS

Electronic Components Department

CORNING MEANS RESEARCH IN GLASS

Versatile wide range dc voltmeter Model 2900 A

A Product of Convair Instruments
Developers and Builders of:

Electromechanical Instruments

Mechanical Instruments

AC and DC Measuring Instruments

Transducers



CONVAIR INSTRUMENTS / CONVAIR, A DIVISION OF GENERAL DYNAMICS CORPORATION

3595 FRONTIER STREET
SAN DIEGO, CALIFORNIA



FROM ± 10
Microvolts
Full Scale

TO ± 1000
Volts
Full Scale

TODAY'S MOST USEFUL DC VOLTMETER

Examine the specifications and discover for yourself how the high sensitivity, low noise, low drift, versatile packaging—and wide range—of the Model 2900A combine to make it today's most useful dc voltmeter. Its applications are myriad: for precise measurement of low-voltage potentials in potentiometer and bridge circuits, for use as a null detector, for measurement and amplification of small thermocouple effects and biological micropotentials, or for rugged performance in circuit evaluation and check-out.

FULL SCALE RANGE: ± 10 microvolts to ± 1000 volts, in nine decaded steps.

NOISE: On the 10 microvolt range, random needle movement is less than ± 0.4 microvolts referred to the input.

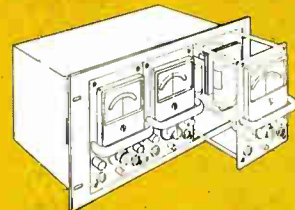
DRIFT: Zero drift of the needle is less than ± 1 microvolt in 2-hour period.

PACKAGING: Zero-center meter movement; transistorized, etched circuit construction; illuminated mirror scale. A twist of a knob releases chassis from carrying case, for insertion in 3-unit modular rack.

Place your order for this proven instrument today, or write for CI Bulletin 29-2.

Prices:	
Model 2900A DC Voltmeter	\$395.00
Model 2901A Carrying Case	90.00
Model 2902A 3-Unit rack	175.00

ALL PRICES FOB SAN DIEGO



VARO *Mfg. Co., Inc.*

DESIGNERS and MANUFACTURERS

of

PRECISION ELECTRONIC EQUIPMENT

INVERTERS

DC CONVERTERS

GROUND SUPPORT EQUIPMENT

MAGNETIC COMPONENTS

FREQUENCY STANDARDS

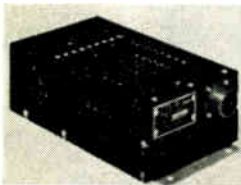
FREQUENCY CONTROLS

FREQUENCY METERS

• DEMODULATORS

• TACHOMETERS

VARO specializes in the design and production of precision electronic equipment to meet the exacting requirements of the "Missile" age. The years of experience in precision airborne and ground power equipment have led to the development of new and better units for modern missiles and aircraft. From the ground power supply to the satellite, VARO is found wherever precision is required.



TRANSISTOR INVERTER

Precision 400 cycle power. Designs up to 2000 VA.



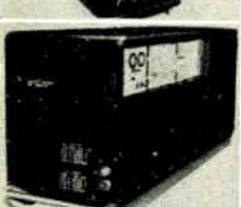
ROTARY INVERTER

250 VA to 3000 VA. Frequency $400 \pm 0.1\%$ or better.



DC POWER SUPPLY

Multiple output, transistor magnetic amplifier design.



GROUND SUPPORT SYSTEMS

Automatic tracking and switching, programmed output, 400 cycle accurate to 0.001%.

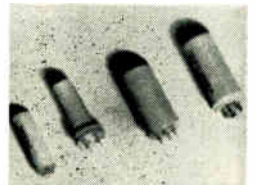


MAGNETIC COMPONENTS

Binary transformers, filters, magnetic amplifiers other than standard units.

FREQUENCY STANDARDS

Tuning forks, frequency generators 50 to 4000 cps.



FREQUENCY CONTROLS

Phase lock design for precision control of 400 cycle constant speed drives.



FREQUENCY METERS

400 cps measured to 0.05%, laboratory units to 0.01% from 397-403 cps.



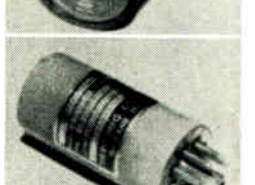
TACHOMETERS

Dual units with overspeed protection in single package. Electronic, transistorized.



DEMODULATORS

Transistorized, plug-in units designed for hi-temperature requirements.



VARO *Mfg. Co., Inc.*

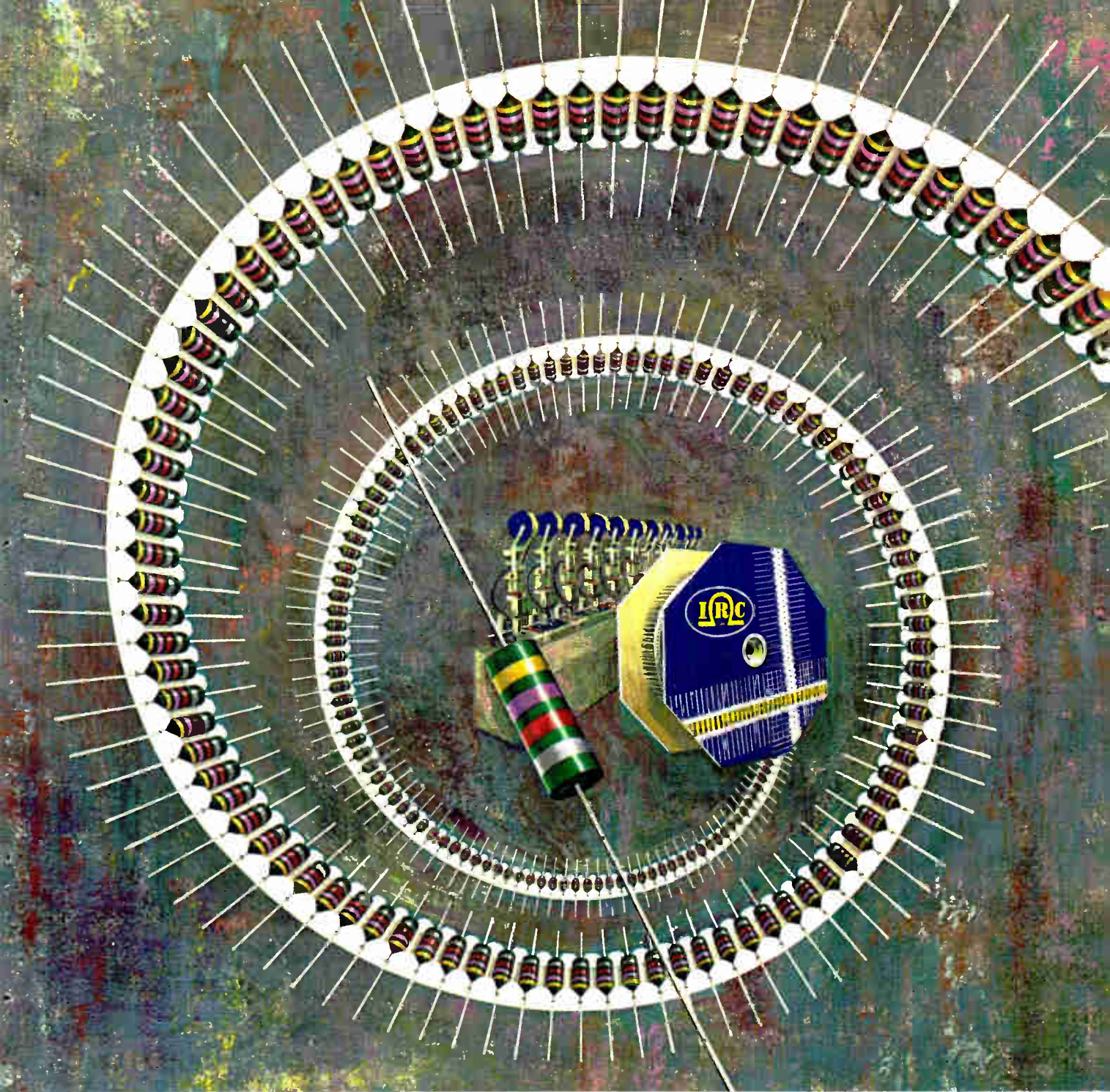
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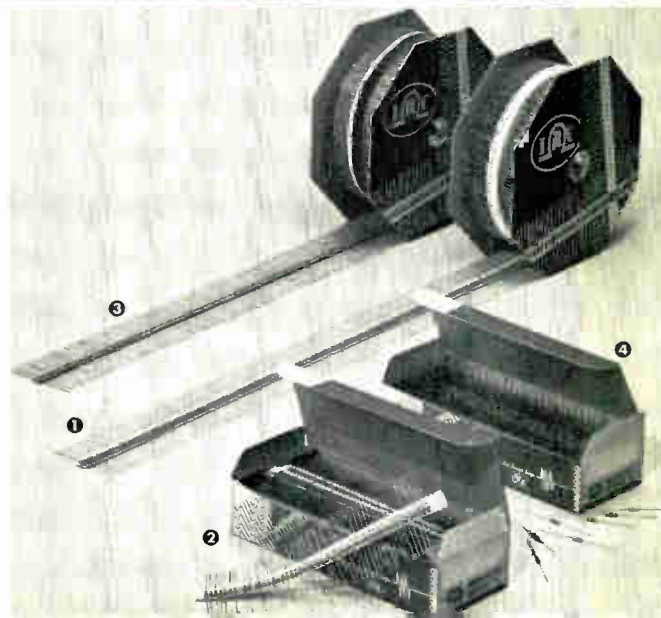


Primed for the Push Button

If there's one thing IRC resistors go along with willingly, it's Automation. Handsome new GBT resistors were designed to be automated, deliberately shaped and sized for automation. And, they're wax-free, packaged 4 different ways especially for a variety of push button machines.



1. NEW GRIP REEL—Resistors held without adhesive. Exclusively IRC.
 2. NEW GRIP STRIP—Same principle as Grip Reel but with resistors in strips of 50.
 3. BODY-TAPED REEL—Resistors on a pressure-sensitive tape.
 4. AUTOMATION PACK—Bu'k resistors with straight leads, neatly oriented.
- And soon to come . . . Lead Tape.



TUBE TESTERS



AUTOMATIC—CARDMATIC
MODEL 1230—Card programmed to automatically set-up predetermined voltages and conditions for each tube under test. Self-calibrating and accurate within 1 to 3% of best known standards for transconductance and plate current measurements. Reject levels set in accordance with military specs. Also permits special purpose tube tests to meet specific circuit requirements. Portable style with cover.



FIELD SERVICE STANDARD
MODEL 1575—Meets Western Electric specifications as a Mutual Conductance tester. 0-60,000 micromhos in 7 ranges. Two separate meters for line and grid bias voltage indications. Has 4 signal voltages. Features new, voltage regulator tube test. Built-in roll chart. Portable style with cover.

RESEARCH LABORATORY MODEL (Not Illustrated)

MODEL 1700—For tube tests under handbook conditions. All voltages and currents are variable and metered (9 meters). 0-60,000 micromhos in 8 ranges. Electronically regulated and metered power supplies.

OSCILLOSCOPES



WIDE RANGE—VERSATILE
MODEL 1810—5" flat face, post accelerated CRT and illuminated, calibrated screen. 4 mc band vertical amplifier. 10 millivolts peak-to-peak per cm sensitivity. Triggered or recurrent sweeps—variable from 2 cps to 30 kc. Built-in, direct reading, regulated square wave voltage calibrator. AC or DC vertical amplifier inputs.



INDUSTRIAL'S 5" PORTABLE
MODEL 685—Features identical amplifiers DC to 750 kc—1 cps to 750 kc. 0.5 microseconds rise time. Sensitivity—20 millivolts RMS vertical (30 horizontal). Recurrent or triggered sweep. Covers 1 cps to 10 kc in 5 calibrated decade ranges with vernier control of 10 to 1. External sync for triggering and synchronizing the built-in sweep generator.



3" RACK MOUNT
MODEL 387R—Identical horizontal and vertical amplifiers. Triggered or recurrent sweeps from 1 cps to 100 kc. Slow sweeps (10 seconds or more) with external capacitors. 10 millivolts RMS per inch vertical sensitivity (14 horizontal).



3" PORTABLE
MODEL 385 CSM—Rugged lightweight designed for field service. Features unitized circuit modules. DC amplifiers (horizontal and vertical) with frequency coverage to 4 mc at .075 RMS volts per inch. 2 MC bandwidth has roll-off per IRE standard. Telescopic light shield and shock mounted carrying case.



CARD PROGRAMMED SWITCH
Cardmatic automatic or manual multiple switch provides up to 10-trillion variables. Self-cleaning, wiping type contacts rated .00025 ohms nominal (contact-to-pin), current rating is 10 amperes. Prox. 7" x 7 1/2" x 4 1/2" D.

GENERATORS



SINE WAVE—SQUARE WAVE
MODEL 710—Both sine and square wave outputs in one generator with wide frequency range (20 cps to 1 megacycle in 5 ranges). Sine wave total harmonic distortion below 1%. Hum level better than 90 db down. Square wave rise time less than 0.1 microsecond. Portable—easily adapted to rack mount.



SQUARE WAVE

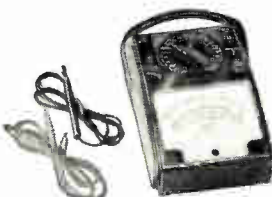
MODEL 1715—Wide frequency range of 1 cps to 1 megacycle, continuous in 6 decade bands with constantly variable frequency available throughout the entire range. Rise time is 0.02 microseconds. Consistent output level is independent of frequency setting. Electronic regulation of power supply. Includes symmetry control and provision for external synchronization.

VACUUM TUBE VOLTMETERS



HIGH FREQUENCY MODEL

MODEL 1600—Accurately indicates AC voltages from .05 to 300 volts in frequencies from 20 cps to 700 mc (up to 3000 mc are possible). Includes special thermionic diode probe. Excellent plus or minus DC volts, readability from .05 to 1000 volts. 7-range ohmmeter with practical readability from 0.2 ohm to 1000 megohms. Power supply built-in. Has 1% meter.



SMALL SIZE VOM

MODEL 456—Has full-wave bridge type rectifier circuit. Features a patented automatic (button-reset) overload protection system to hold meter and associated circuits from damage due to accidental overload. 0-1200 AC or DC volts in 6 ranges. Sensitivity—20,000 ohms per volt DC (1000 AC). Resistance—0 to 100 megohms. 5 db ranges (-18 to +57).

HICKOK-DAWE INSTRUMENTS

True RMS-VTVM—300 microvolts to 300 volts, 5 cps to 500 kc.
Stroboscopes—3 models with wide ranges.
Sound Level Indicators—Portable and laboratory types.
Balancing Machine—For rotating parts (4 oz. to 10 lbs.).

HICKOK METERS

Accurate DC and AC Portables



Ammeters, milliammeters, microammeters, voltmeters, millivoltmeters, volt-ammeters, thermometers. Shielded. Accuracy within 1/2 of 1%—available to 2/10 of 1%.

PANEL METERS

A complete panel meter line is available in numerous types, styles and ranges to meet every specification. The many special movements developed by HICKOK are: Electrodynamometers, self-contained frequency meters, galvanometers, true logarithmic deflections, ruggedized, long scale subminiatures, and taut-band suspensions with sensitivities to as low as 1/2 microampere.

THE HICKOK ELECTRICAL INSTRUMENT CO. 10514 DUPONT AVENUE CLEVELAND 8, OHIO

They
look
great
going
out

...but
how about
6 months
from now?



2" SHORTER THAN THEIR PROTOTYPES!
New RCA "VC" 110° Picture Tubes offer high
reliability in slim-style very compact TV Sets.



FIELD OFFICES

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MIDWEST:
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Chicago 54, Ill., Whitehall 4-2900

WEST:
6355 E. Washington Blvd.
Los Angeles 22, Calif.
RAYmond 3-8361

The sure way to *preclude* early-hour field failures is to specify performance-improved RCA "VC" (very compact) 110° picture tubes for your TV design. But, you ask, how can one say that brand new "VC" Picture Tubes are "performance-proved"?

Here's why...RCA "VC" 110° types employ the same heater-cathode assembly that has been used and *proven for reliability* over the past decade in RCA picture tubes. Now commercially available in the shorter "VC" 110° designs are the RCA-17DKP4 and RCA-21EQP4, all-new premium types. They utilize conventional 110° components and circuitry. And, with only slight changes in focusing-voltage control, they are unilaterally interchangeable with previous 10° types.

You get the performance you design for when you specify RCA "VC" Picture tubes. Ask your RCA Field Representative for full information. For technical data, write RCA Commercial Engineering, Section F-50-DE, Harrison, N. J.



RADIO CORPORATION OF AMERICA
Electron Tube Division
Harrison, N. J.



FOR TOP RELIABILITY

MILITARY AND INDUSTRIAL

HERMETIC AUDIO AND POWER COMPONENTS... FROM STOCK

UTC stock hermetic units have been fully proved to MIL-T-27A, eliminating the costs and delays normally related to initial MIL-T-27A tests. These rugged, drawn case, units have safety factors far above MIL requirements, and are

ideal for high reliability industrial applications. Listed below are a few of the hundred stock types available for every application. Industrial ratings in bold.

Typical Miniature Audios

RC-25 Case
61/64 x 1-13/32 x 1-9/16
1.5 oz.



Type No	Application	MIL Type	Pri. Imp. Ohms	Sec. Imp. Ohms	Unbal. OC in Pri. MA	Response + 2 db (Cyc.)	Max. level dbm
H-1	Mike, pickup. line to grid	TF4RX10YY	50, 200 CT, 500 CT	50,000	0	50-10,000	+ 5
H-2	Mike to grid	TF4RX11YY	82	135,000	50	250-8,000	+18
H-5	Single plate to P.P. grids	TF4RX15YY	15,000	95,000 CT	0	50-10,000	+ 5
H-6	Single plate to P.P. grids, DC in Pri.	TF4RX15YY	15,000	95,000 split	4	200-10,000	+11
H-7	Single or P.P. plates to line	TF4RX13YY	20,000 CT	150/600	4	200-10,000	+21
H-8	Mixing and matching	TF4RX16YY	150/600	600 CT	0	50-10,000	+ 8
H-14	Transistor Interstage	TF4RX13YY	10K/2.5K, Split	4K/1K split	4	100-10,000	+20
H-15	Transistor to line	TF4RX13YY	1,500 CT	500/125 split	8	100-10,000	+20

Type No.	Application	MIL Type	Pri. Imp. Ohms	Sec. Imp. Ohms	Unbal. OC in Pri. MA	Response + 2 db (Cyc.)	Max. level dbm
H-20	Single plate to 2 grids, can also be used for P.P. plates	TF4RX15YY	15,000 split	80,000 split	0	30-20,000	+12
H-21	Single plate to P.P. grids, DC in Pri.	TF4RX15YY	15,000	80,000 split	8	100-20,000	+23
H-22	Single plate to multiple line	TF4RX13YY	15,000	50/200, 125/500	8	50-20,000	+23
H-23	P.P. plates to multiple line	TF4RX13YY	30,000 split	50/200, 125/500	8 BAL.	30-20,000	+19
H-24	Reactor	TF4RX20YY	450 Hys.-0 DC, 250 Hys.-5 Ma. DC, 6000 ohms 65 Hys.-10 Ma. DC, 1500 ohms				
H-25	Mixing or transistors to line	TF4RX17YY	500 CT	500/125 split	20	40-10,000	+30



Typical Compact Audios

RC-50 Case
1-5/8 x 1-5/8 x 2-5/16
8 oz.

Typical Subminiature Audios

SM Case
1/2 x 11/16 x 29/32
.8 oz.



Type No	Application	MIL Type	Pri. Imp. Ohms	Sec. Imp. Ohms	Unbal. OC in Pri. MA	Response + 2 db (Cyc.)	Max. level dbm
H-31	Single plate to 1 grid, 3:1	TF4RX15YY	10,000	90,000	0	300-10,000	+13
H-32	Single plate to line	TF4RX13YY	10,000	200	3	300-10,000	+13
H-33	Single plate to low Imp.	TF4RX13YY	30,000	50	1	300-10,000	+13
H-35	Reactor	TF4RX20YY	100 Henries-0 DC, 50 Henries-1 Ma. DC, 4,400 ohms.				
H-36	Transistor Interstage	TF4RX15YY	25,000 (DCR800)	1,000 (DCR110)	.5	300-10,000	+10
H-39	Transistor Interstage	TF4RX13YY	10,000 CT (DCR600)	2,000 CT	2	300-10,000	+15
H-40A	Transistor output	TF4RX17YY	500 CT (DCR26)	600 CT	10	300-10,000	+15

Type No.	HV Sec. CT	DC MA*	Military Rating Fil. Secs.	DC MA*	Industrial Rating Fil. Secs.	Case
H-80	450	120	6.3V,2A	130	6.3V,2.5A.	FA
H-81	500/550	65/55	6.3V,3A-5V,2A	75/65	6.3V,3A-5V,2A.	HA
H-82	540/600	110/65	6.3V,4A-5V,2A.	180/100	6.3V,4A-5V,2A.	JB
H-84	700/750	170/110	6.3V,5A-6.3V,1A.,5V-3A.	210/150	6.3V,6A-6.3V,1.5A-5V,4A.	KA
H-89	850/1050	320/280	6.3V,8A-6.3V,4A.,5V-6A.	400/320	6.3V,8A-6.3V,4A.-3V,6A.	OA



Typical Power Transformers

Pri: 115V 50/60 Cyc.
*Choke/Cond. inp.

Type No.	Sec. Volts	Amps.	Test Volts	Case	Type No.	Sec. Volts	Amps.	Test Volts	Case
H-121	2.5	10(12)	10 KV	JB	H-131	6.3 CT	2(2.5)	2500	FB
H-122	2.5	20(26)	10 KV	KB	H-132	6.3 CT	6(7)	2500	JA
H-125	5	10(12)	10 KV	KB	H-133	6.3 CT	7(8)	2500	HB
H-130	6.3 CT	.6(.75)	1500	AJ	H-134	6.3 CT	10(12)	2500	HA

Typical Filament Transformers

Pri: 105/115/210/220V
except H-130 (115) and
H-131 (115/220) 50/60 Cyc.

Typical Filter Reactors



Type No.	MIL Type	Ind. @ MA Hys.	MA DC	Ind. @ MA Hys.	MA DC	Ind. @ MA Hys.	MA DC	Ind. @ MA Hys.	MA DC	Res. Ohms	Max. DCV Ch. Input	Test V. RMS	Case
H-71	TF1RX04FB	20	40	18.5	50	15.5	60	10	70	350	500	2500	F
H-73	TF1RX04HB	11	100	9.5	125	7.5	150	5.5	175	150	700	2500	H
H-75	TF1RX04KB	11	200	10	230	8.5	250	6.5	300	90	700	2500	K
H-77	TF1RX04MB	10	300	9	350	8	390	6.5	435	60	2000	5500	M
H-79	TF1RX04YY	7	800	6.5	900	6	1000	5.5	1250	20	3000	9000	7x7x8

And Special Units to
Your Specifications

UNITED TRANSFORMER CORPORATION

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Circle 103 on Inquiry Card

THE FIRST COUNT-DOWN WAS . . .

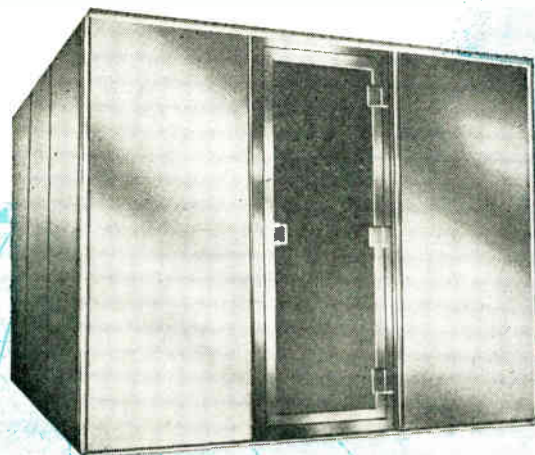
Inside AN R.F. SHIELDING ENCLOSURE

Proper functioning of critical missile electronic guidance systems demands exhaustive pretesting in the laboratory, on the production line and at the launching site. One very important pre-testing procedure is analyzing the performance of electronic components, sub-systems and systems in an area completely free of RF interference.

Shielding, Inc. is a supplier of RF Shielding enclosures for use in both the Thor and Atlas programs. As a designer and producer of RF shielding enclosures from the **largest ever built** to standard, modular rooms, Shielding has the experience and abilities to fill critical RF shielding requirements — with either a standard or custom-designed enclosure.

Missile and communication equipment manufacturers and government officials know from experience that Shielding enclosures offer the **highest RF shielding effectiveness** available for construction material used . . . incorporate **extra mechanical design features and installation versatility** not found in conventional enclosures.

Whatever your RF interference needs, Shielding will deliver an enclosure to your specifications. Write or wire, outlining your problems, to Shielding, Inc. You will receive a prompt appraisal.



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ASTRON capacitors

ACCEPTED AND APPROVED

INDUSTRIAL — for computers, printed circuits and critical electronic equipment
MILITARY — for missile and ground support applications and all reliable military equipment
COMMERCIAL — for radio, TV, Hi-Fi, and transistorized applications

SOLID TANTALUM

Subminiature, (1/8" x 1/4") hermetically sealed metal case . . .
 Temperature range -80° to +85° C
 Maximum capacity variation averages less than ±5%
 Indefinite shelf life, meets environmental requirements MIL-C-3965



TYPE TES (ACTUAL SIZE)



TYPE TES (ACTUAL SIZE)

METALLIZED MYLAR*

Type RQL in a hermetically sealed case is designed to meet electrical and environmental requirements of MIL-C-18312 (U.S.N.)
 Type RLR is an uncased unit . . . tough protective mylar* wrap and epoxy end seal
 Both have a temperature range of -55° C to +125° C without derating



TYPE RLR



TYPE RQL

MYLAR* DIELECTRIC

Round (XPR) and flat (XPF) miniature capacitors
 Temperature range of -55° to +125° C
 Units employ an outer mylar* polyester tape wrap and ends sealed with a plastic thermosetting resin to afford excellent protection against moisture.



TYPE XPR



TYPE XPF

MIL-C-25A PAPER

Temperature range to +125° C . . . Hermetically sealed miniature tubulars and bathtub cans with ratings up to and including 1000 volts . . . Variety of types and mounting styles available.



TYPES AQ-TO



TYPE ADM

METALLIZED PAPER

With self healing characteristics
 Miniature glass-to-metal sealed tubulars
 Metal cased and uncased units
 Conform to MIL tests for moisture resistance, thermocycle immersion and vibration . . .
 To +125° C operation.



TYPE MDL



TYPE MQL

SAFETY MARGIN** ELECTROLYTIC

Astron Electrolytics with high purity foil, special stable electrolytes and precision assembly provide long life, exceptionally low leakage and resistance to corrosive elements. Designed for use in transistorized and printed circuits in all military, industrial and commercial applications.



TYPES EX-EZ



TYPE EK

RF NOISE SUPPRESSION FILTERS

A standard line of typical filters covering a wide range of electrical and mechanical requirements or custom engineered and produced filters specifically for your equipment.
SOLVING YOUR FILTER REQUIREMENTS FROM THE PROBLEM TO THE PRODUCT.



CERAMIC CAPACITORS

Skottie Electronics, Inc., wholly owned subsidiary of Astron Corporation, offers a complete and reliable selection of disc and tubular types — temperature compensating, all purpose high dielectric constant, and high voltage ceramic capacitors.



** TRADEMARK
 * REGISTERED DUPONT TRADEMARK

SPECIALISTS IN CAPACITOR MINIATURIZATION

ASTRON CORPORATION



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WRITE TODAY FOR COMPLETE INFORMATION

all the performance . . . half the size!

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K

K_u

K_a

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BOMAC CRYSTAL PROTECTORS

1/2 the size of previous types . . . yet they perform better!

New Bomac crystal protectors are the smallest available. They pack a maximum of performance into a minimum of space. They're half the overall length of the usual broadband TR tube, but with electrical characteristics that are equal or better. There's a complete line, for all the above bands — and every single one is 100% tested and life-tested with crystals mounted in position. Complete information is waiting for you. *Write today.*

Bomac

LABORATORIES, INC.

Salem Road, Beverly, Massachusetts

THE BLS-504

PERFORMANCE DATA

BANDS — L S C X X_b K_u K K_a

TYPICAL X-BAND RATINGS:

Power — 10 kw peak

Insertion Loss — 0.7 db
including ignitor interaction

Recovery Time — 1.5 μ sec.

VSWR — 8565-9487 > 1.3
8490-9578 > 1.6

Dimensions — approx. 3/4" between flange faces

Life — 500 hours

End of life recovery time — 5.0 μ sec.



Leaders in the design, development and manufacture of TR, ATR, Pre-TR tubes, shutters; reference cavities; hydrogen thyratrons; silicon diodes; magnetrons; klystrons; duplexers; pressurizing windows; noise source tubes; high frequency triode oscillators; surge protectors.

Offices in major cities—Chicago • Kansas City • Los Angeles • Dallas • Dayton • Washington • Seattle • San Francisco • Canada: R-O-R Associates Limited, 1470 Don Mills Road, Don Mills, Ontario • Export: Maurice I. Parisier, 741-745 Washington St., N.Y.C. 14, N.Y.

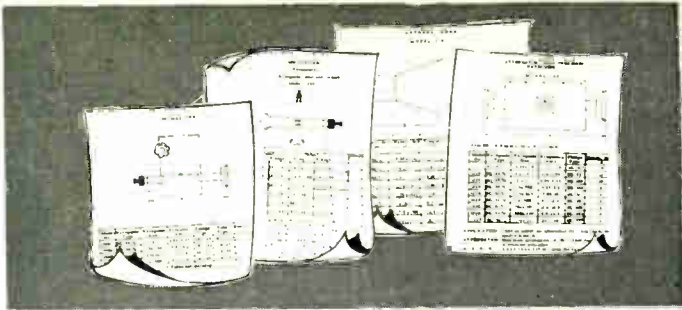
If it's "MICROWAVE"

Partial list of standard items

EQUIPMENT	MODEL	L	M	S	C	A	B	X	G	K	T	V	W	Z	EQUIPMENT-	MODEL	L	M	S	C	A	B	X	G	K	T	V	W	Z		
ADAPTER—COAX. TO W.G.	101	L	M	S	C	A	B	X							High Speed 7/8"	261															
Choke to Choke	102	L	M	S	C	A	B	X	G	K	T				Inline L.T.	262															
Cover to Cover	103	L	M	S	C	A	B	X	G	K	T	V	W	Z	RO*ARY JOINT WAVEGUIDE Doorknob Transition	270			S				X								
7/8" to RG 48/U	104			S											Circular Transition	271						B	X			K					
ANTENNA—Horn	110	L	M	S	C	A	B	X	G	K	T	V	W	Z	Crosstr Transition	272						B	X								
ATTENUATOR—WAVEGUIDE Fixed High Power	119	L	M	S	C	A	B	X	G	K	T	V	W	Z	SHIFTER—PHASE Waveguide	275	L	M	S	C	A	B	X	G	K	T					
Fixed - Low Power	120	L	M	S	C	A	B	X	G	K	T	V	W	Z	SHORT—MOVABLE Waveguide - (Unhoused)	283	L		S	C	A	B	X	G	K	T	V	W			
Flap	121	L	M	S	C	A	B	X	G	K	T	V	W	Z	SHORTS—MOVABLE (HOUSEO) 3/8" Coaxial	290	L		S	C	A	B	X								
Precision	123	L	M	S	C	A	B	X	G	K	T				5/8" Coaxial	291	L		S	C											
Fixed - Coaxial	125														7/8" Coaxial	292	L		S												
Fixed - Coaxial	126														Waveguide	293	L	M	S	C	A	B	X	G	K	T	V	W	Z		
Variable Coaxial	127														Waveguide Precision	294	L	M	S	C	A	B	X	G	K	T	V	W	Z		
Fixed Coaxial—Very High Power	128														SLOTTED LINE—COAXIAL 3/8" Line	300															
BEND— E Plane	130	L	M	S	C	A	B	X	G	K	T	V	W	Z	7/8" Line	301															
H Plane	131	L	M	S	C	A	B	X	G	K	T	V	W	Z	Waveguide	310	L	M	S	C	A	B	X	G	K	T					
Coaxial (7/8") Right Angle	135			S											STAND	330	L		S	C	A	B	X	G	K	T					
CAVITY— Filter	140	L	M	S	C										SWITCH—Coax	334	L														
LHT Transmitter	141	L		S											W.G. Rotary Type	335	L	M	S	C	A	B	X	G	K	T	V	W	Z		
Reference	142	L	M	S	C										W.G. Multiple Type	336			S				X		K						
COUPLER— Signal Sampler Coaxial	148														TEE—Coaxial 7/8" Line	340	L		S												
Waveguide	149	L	M	S	C	A	B	X							W.G. Series TEE	350	L	M	S	C	A	B	X	G	K	T	V	W	Z		
CRYSTAL DETECTOR MOUNTS COAXIAL Broadband	150														W.G. Shunt	351	L	M	S	C	A	B	X	G	K	T	V	W	Z		
Tunable	151														W.G. E/H (Hybrid)	352	L	M	S*	C	A	B	X*	G	K*	T	V	W	Z		
Matched	152														TRANSITIONS—COAXIAL 3/8" - 7/8" Line	370															
CRYSTAL DETECTOR MOUNTS WAVEGUIDE Broadband	160			S	C	A	B	X	G	K					7/8" to 1 1/4"	371															
Tunable	161			S	C	A	B	X	G	K	T	V	W	Z	W.G. Taper	380															
DIRECTIONAL COUPLERS Coax 3/4"	165														W.G. Step	381															
Coax - 7/8"	167														W.G. Elbow	382															
Coax - 1 1/4"	168														TUBE MOUNT—KLYS.	390				C	A	B	X								
Coax - 3 1/4"	169														TUNER—Coaxial 7/8" Single Stub	400	L		S	C	A	B	X								
Waveguide Uni-Directional	170	L	M	S	C	A	B	X	G	K	T	V	W	Z	7/8" Single Stub	401	L		S												
Bi-Directional	171	L	M	S	C	A	B	X	G	K	T	V	W	Z	3/8" Double Stub	402	L		S												
Uni- Reflectometer	172			S	C	A	B	X	G	K	T	V	W	Z	7/8" Double Stub	403	L		S												
Bi- Reflectometer	173			S	C	A	B	X	G	K	T	V	W	Z	3/4" Triple Stub	404	L		S												
Broadband	174			S	C	A	B	X	G	K	T	V	W	Z	7/8" Triple Stub	405	L		S												
FILTER—LOW PASS Coaxial	175														7/8" Slug	407	L		S												
LINE STRETCHER— Coaxial - 3/8"	180														TUNER—WAVEGUIDE Single Stub	409	L	M	S	C	A	B	X	G	K	T	V	W	Z		
LOAD—COAXIAL Low Power	190														Double Stub	410	L	M	S	C	A	B	X	G	K	T	V	W	Z		
Medium Power 7/8" Line	191	L		S											Triple Stub	411	L	M	S	C	A	B	X	G	K	T	V	W	Z		
Medium Power 1 1/4" Line	192	L													E/H	412	L	M	S	C	A	B	X	G	K	T	V	W	Z		
High Power 7/8" Line	193	L		S											Glide Screw	413			S	C	A	B	X	G	K	T	V	W	Z		
High Power 1 1/4" Line	194	L													Double Slur	414			S	C	A	B	X	G	K	T					
LOADS—WAVEGUIDE Low Power	200	L	M	S	C	A	B	X	G	K	T	V	W	Z	TWISTS	420			S	C	A	B	X	G	K	T					
Medium Power	201	L	M	S	C	A	B	X	G	K	T	V	W	Z	WAVEMETER—COAXIAL Micrometer	430	L		S	C											
High Power	202	L	M	S	C	A	B	X	G	K	T	V	W	Z	In Case	440	L	M	S	C											
Tunable	203			S	C	A	B	X	G	K	T	V	W	Z	Waveguide MICROMETER Absorption	450							A	B	X	G	K	T			
Movable	204			S	C	A	B	X	G	K	T	V	W	Z	Transmission	451							A	B	X	G	K	T			
Water	210	L		S	C		B	X							Direct Reading	460							B	X							
Monitor— Power	219																														
MIXER—CRYSTAL Coaxial	220	L		S	C																										
Waveguide	230			S	C	A	B	X	G	K	T																				
Balanced Waveguide	235			S				X		K																					
NUT & BOLT	240	L		S	C	A	B	X	G	K	T																				
POWER DIVIDER— Coaxial - Fixed	245	L		S																											
Adjustable	246	L		S																											
MULTIPLIER—(FREQUENCY) Waveguide - Coaxial Input	248																														
Waveguide Input	249																														
PROBE— Tunable	0																														
REFLECTION— Standard W.G.	256			S	C	A	B	X	G	K	T																				
ROTARY JOINT—COAXIAL Med. Speed 7/8"	260																														

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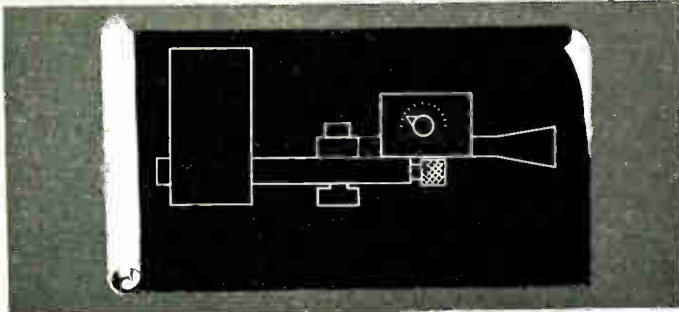
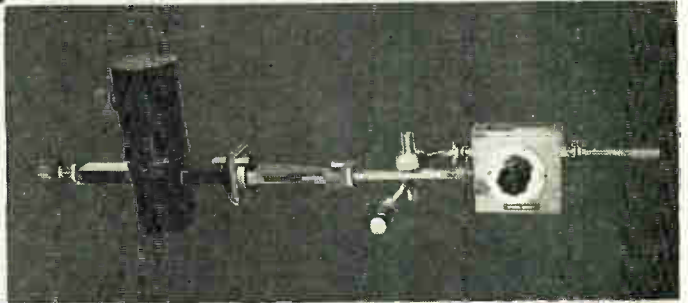
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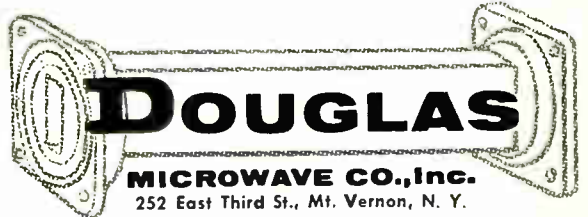
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VOLTMETERS

SENSITIVE RF VOLTMETERS

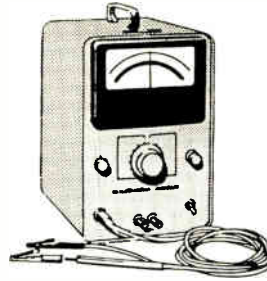
- RANGE:
Model 91-C: 1 mv to 3 v.
Model 91-CA: 0.3 mv to 3 v.
- FREQ. RANGE: 10 kc to 600 mc.
- ACCURACY: 5% to 200 mc.
10% to 600 mc.
- High impedance probe and 52 ohm adapter.
- Special adapters and voltage divider available.



MODEL 91-C Price \$395
MODEL 91-CA Price \$495

DIFFERENTIAL DC VOLTMETER-AMPLIFIER

- RANGE: 10 μ v to 1000 v.
- ACCURACY: 3% full scale.
- COMMON MODE REJECTION: 80 db.
- INPUT RESISTANCE: 10 megohms to 100 megohms.
- Zero center meter.
- OUTPUT CAPABILITY: 0.5 ma into 1500 Ω .

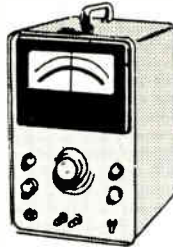


MODEL 98-A Price \$395

NULL DETECTORS

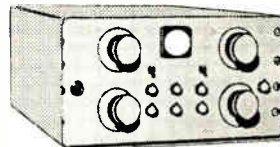
NEW DC NULL DETECTOR

- For use with bridges. Provides compression for hunting or linearity for close tolerance work.
- HUNTING RANGE: 60 db.
- FULL SCALE SENSITIVITY:
VOLTAGE: 10 μ v to 100 v.
CURRENT: 1 μ o to 10 μ a.
POWER: 10⁻¹⁷ watts to 10⁻³ watts.
- INPUT RESISTANCE: 10 meg.
- OUTPUT RATING: 1.0 v across 500 Ω .
- MAX. AMPLIFIER GAIN: 100 db.



MODEL 56-A
Price \$450

NEW AC NULL DETECTOR



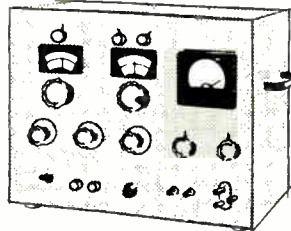
MODEL 51-A Price \$1900

- TUNING RANGE: 20 cycles to 200 kc.
- SENSITIVITY: 10 μ v for 1/4 inch CRT deflection or 100 μ o dc output.
- PHASE SENSITIVE.
- HUNTING RANGE: 75 db with AVC on; 25 db with AVC off.
- INPUT IMPEDANCE: 1 megohm shunted by 100 μ o.
- Discrimination of 2nd harmonic of tuned freq. is 35 to 40 db.
- Useful as a low frequency impedance bridge detector, tuned voltmeter, or in wave analysis.

BRIDGES

THREE TERMINAL CAPACITANCE BRIDGE

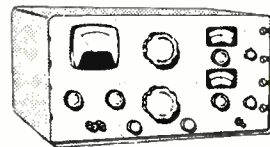
- CAP. RANGE: .0002 μ o to 11,000 μ o.
- APPROX. ACCURACY: $\pm 0.25\%$ + range factor.
- Measures direct or grounded capacitance and conductance.
- Self-contained 100 kc oscillator and detector.
- Special models available at 1000 \sim , 465 kc and with built-in dc bias for diode testing.



MODEL 74-C Price \$935

NEW INDUCTANCE BRIDGE

(Tentative Specifications)

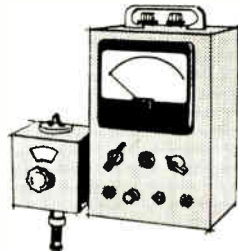


MODEL 63-A

- INDUCTANCE RANGE: .002 μ h to 1.1 henry.
- INDUCTANCE ACCURACY: $\pm 0.25\%$ + range factor.
- RESOLUTION: .01%.
- TEST FREQUENCIES: Continuously variable from 1 kc to 100 kc with internal oscillator and detector.
- EFFECTIVE SERIES RESISTANCE RANGE: .01 to 110,000 ohms.
- Non-interacting inductance and resistance balance controls.

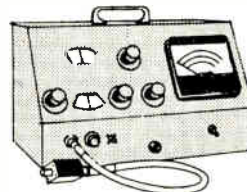
UHF GRID DIP METER

- FREQ. RANGE: 300 to 1000 mc.
- Small, lightweight probe.
- High sensitivity for both capacitive and inductive coupling.
- Internal 120 \sim modulation or external modulation.
- May be operated as a diode detector.



MODEL 101-B Price \$275

RF DISTORTION METERS



MODEL 85 Price \$740

- FREQ. RANGE:
Model 85-B: 1 to 100 mc.
Model 85-C: 0.1 to 6 mc.
- SENSITIVITY: 60 db below 1 v.
- INPUT IMPEDANCE: Approximately 50 ohms.
- Rapid measurement of total distortion.
- Some voltmeter features as model 91-C above.

HERE ARE OUR REPRESENTATIVES

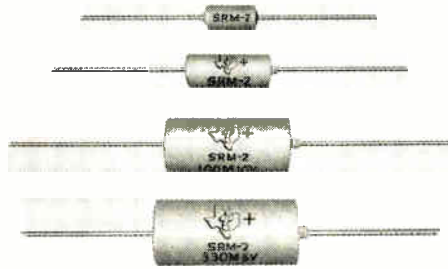
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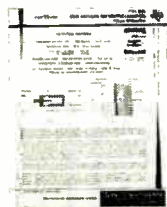
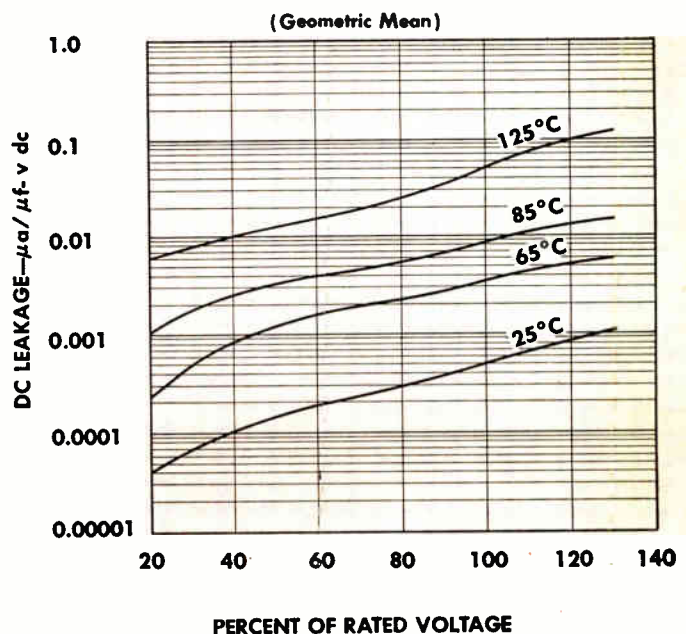
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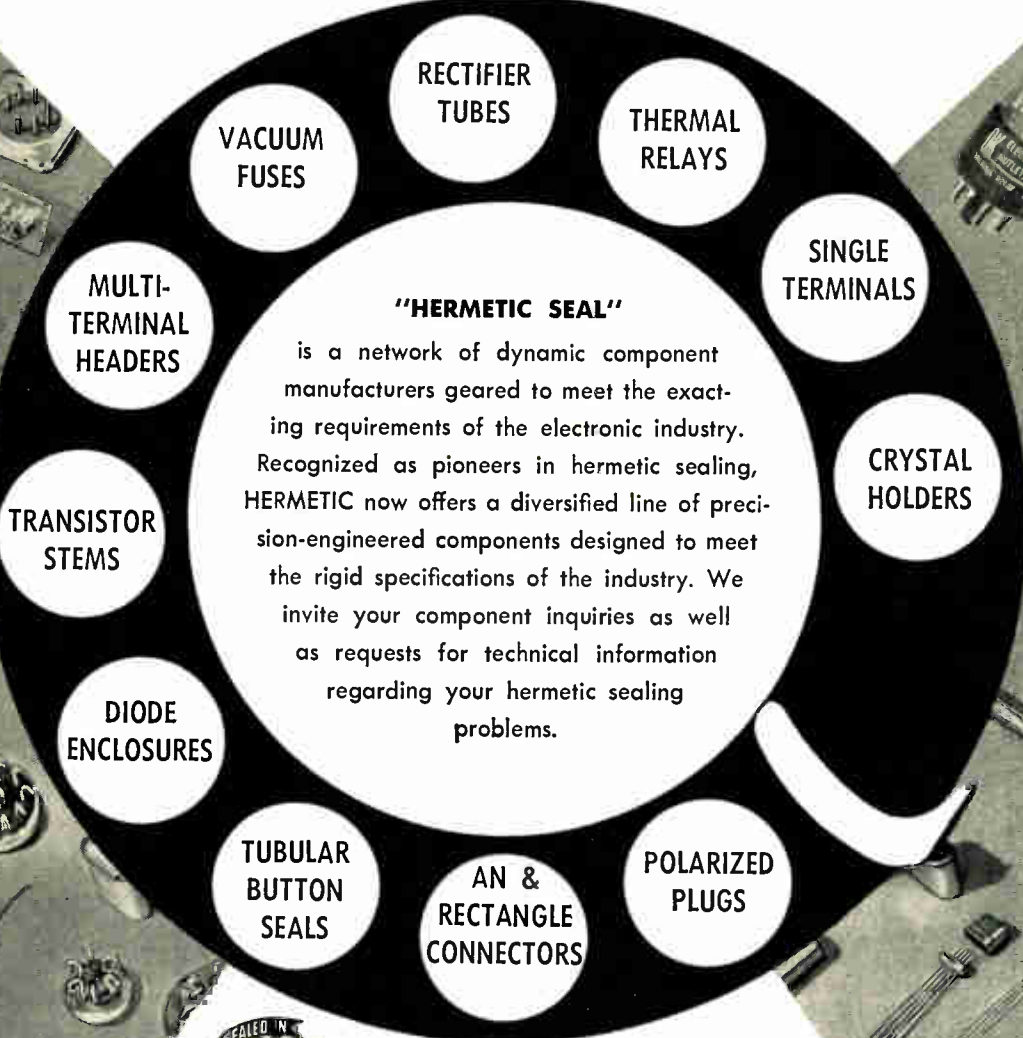
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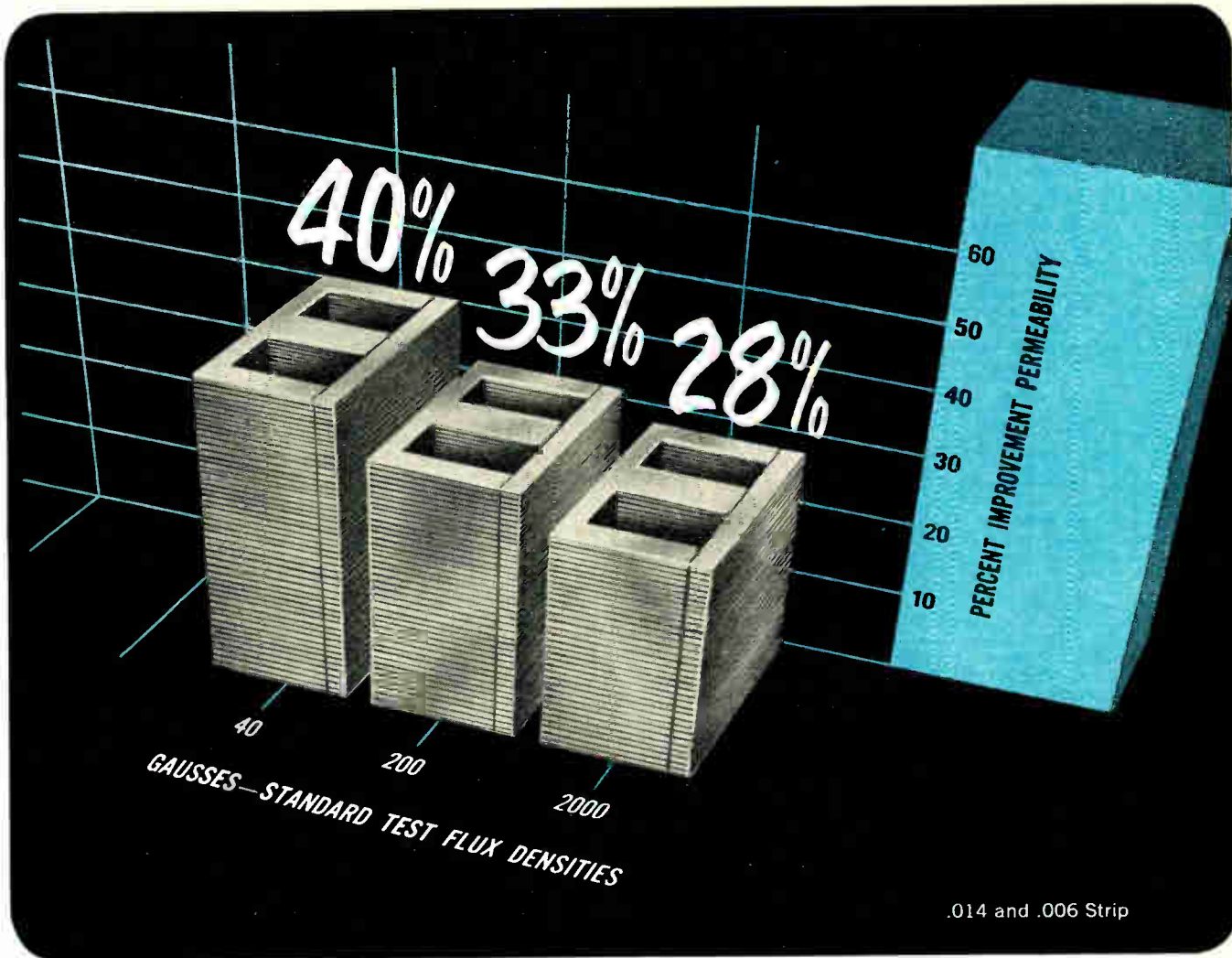
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TRUE RMS INDICATION MODEL 320



Voltage Range 100 μ v — 320 v
Frequency Range 5 cps — 500 kc
Accuracy 3% 15 cps — 150 kc
5% elsewhere
Stability of Internal Calibrator 0.5%
Input Impedance
10 megs shunted by 18 μ f below 10 mv
10 megs shunted by 8 μ f above 10 mv



AUDIO to 250 kc MODEL 300D

Voltage Range 1 mv — 1000 v
Frequency Range 10 cps — 250 kc
Accuracy 2% ENTIRE RANGE
Input Impedance 2 meg shunted by 15 μ f

DC & AC PRECISION CALIBRATOR MODEL 420

Voltage Range 0-10 v RMS; Pk-to-Pk; or DC
Frequency (Std. Model) 1 kc
(other values an special order)
Accuracy (long term) Better than 0.5% above 1 mv
Distortion and Hum Less than 0.25%
Setting Resolution Approaches 0.01% above 10 mv
Output Impedance (AC) 2-20 ohms depending
on range setting



SUB-AUDIO to 150 kc MODEL 302C

Battery Operated

Voltage Range 100 μ v — 1000 v
Frequency Range 2 cps — 150 kc
Accuracy 3% 5 cps — 100 Kc
5% elsewhere
Input Impedance 2 meg shunted by 10 μ f*



SENSITIVE INVERTER MODEL 700

For Measuring DC Voltages when
combined with any AC Voltmeter

Voltage Range 1 μ v — 100 v DC
Ratios DC Input to RMS Output 1:100 & 10:1
Accuracy 1% 100 μ v — 100 v
Input Resistance >10 meg for 1:100
50 meg for 10:1



PEAK-to-PEAK MODEL 305

Voltage Range 1 mv — 1000 v pk-to-pk
Frequency Range 10 cps — 100 kc (sine wave)
Pulse Width 3 μ sec — 250 μ sec
Min Rep Rate 20 pulses per sec
Accuracy 5% for pulses
Input Impedance 2 meg shunted by 8 μ f*
*Shunt capacitance, 15 μ f on two most sensitive ranges

DECADE AMPLIFIER MODEL 220B

For Increasing the Sensitivity of any
AC Voltmeter by 10 or 100 times

Voltage Range 20 μ v — 50 mv
Frequency Range 10 cps — 150 kc
Accuracy 2% ENTIRE RANGE
Input Impedance 5 meg shunted by 15 μ f



AUDIO to 2 mc MODEL 310A

Voltage Range 100 μ v — 100 v
Down to 40 μ v at reduced accuracy
Frequency Range 10 cps — 2 mc
As null detector 5 cps. — 4 mc
Accuracy 3% 15 cps — 1 mc
5% elsewhere
Input Impedance 2 meg shunted by 9 μ f*
*Shunt capacitance, 19 μ f on two most sensitive ranges



DIRECT READING CAPACITANCE METER MODEL 520

Capacitance Range 0.01 μ f to 12 μ f
in 9 decade ranges covering over a billion to 1
Accuracy 2% above 0.1 μ f
5% below 0.1 μ f
Capacitor Power Factor 0.15
Test Frequency 1 kc



AUDIO to 6 mc MODEL 314

Voltage Range 1 mv — 1000 v
(100 μ v — 1 mv without probe)
Frequency Range 15 cps — 6 mc
Accuracy 3% 15 cps — 3 mc
5% elsewhere
Input Impedance 11 meg shunted by 8 μ f
(1 meg shunted by 25 μ f without probe)

ACCESSORIES are available for all voltmeters to extend voltage measurements down to 20 μ v and up to 10 kv, and to measure currents from 0.1 μ amp to 10 amp, and to provide DC from the Model 300 Voltmeter to drive external recorders or remotely located meters.

INFRASONIC to 30 kc MODEL 316

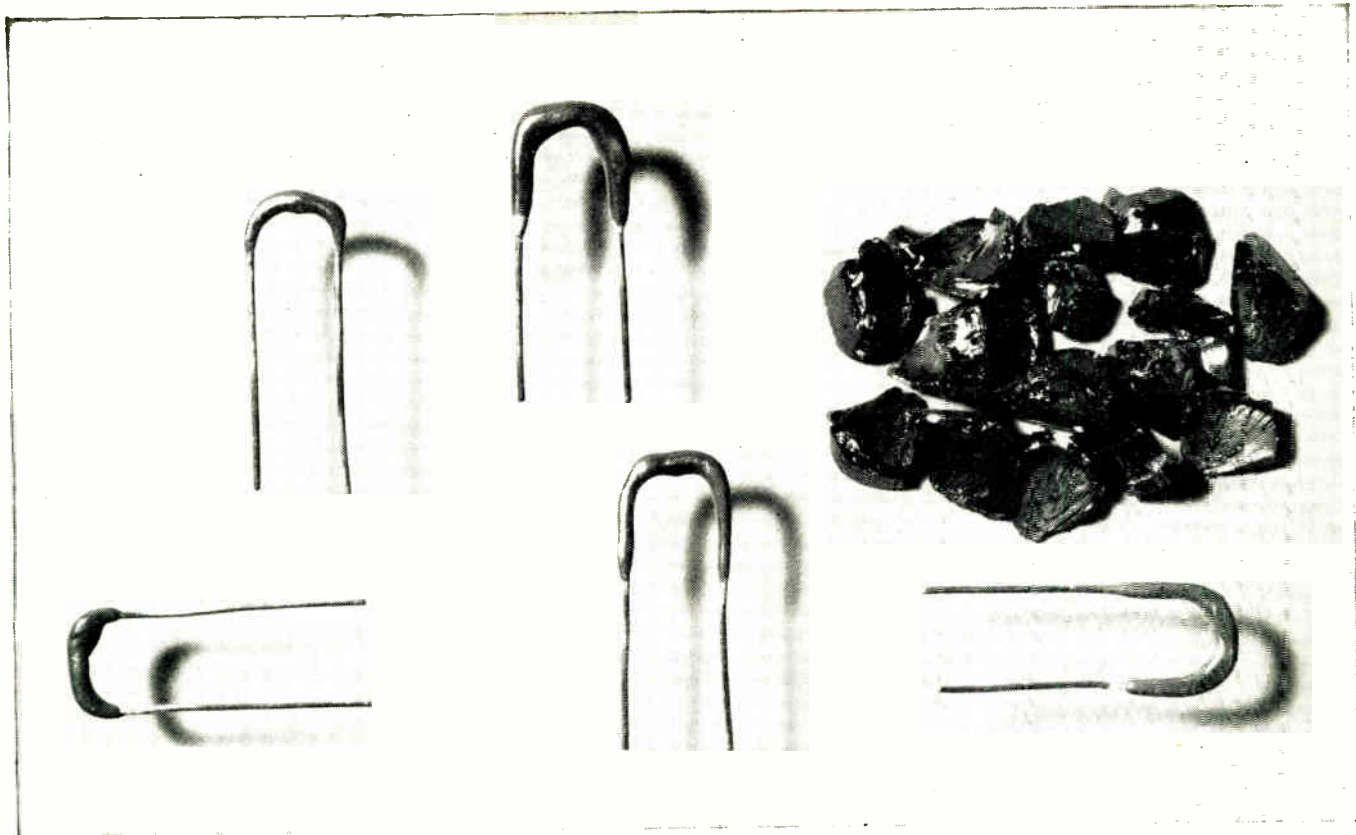
Voltage Range 20 mv — 200 v pk-to-pk
Frequency Range 0.05 cps — 30 kc
(Down to 0.01 cps with correction)
Accuracy 3% ENTIRE RANGE
Input Impedance 10 meg shunted by 17 μ f
or 40 μ f depending on setting



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*Abstract No. 116, Journal of The Electrochemical Society, August, 1958.

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New to the family of Muirhead Oscillators, comes the D-880-A Two-Phase Low Frequency Decade Oscillator. Having a frequency range of 0.01c/s (one cycle in a hundred seconds) to 11.2kc/s, this oscillator forms part of the Muirhead Transfer Function Analyser and has many other applications in the servo-engineering field where the study of low frequencies is of increasing importance. Write for publication 130.

NEW Two Phase Low Frequency Decade OSCILLATOR D-880-A



376

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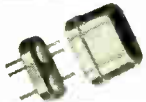
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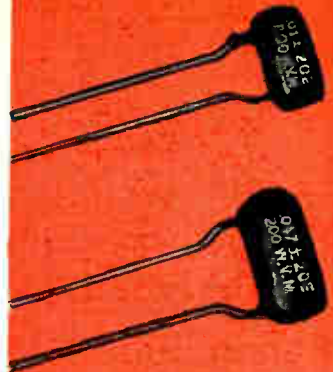
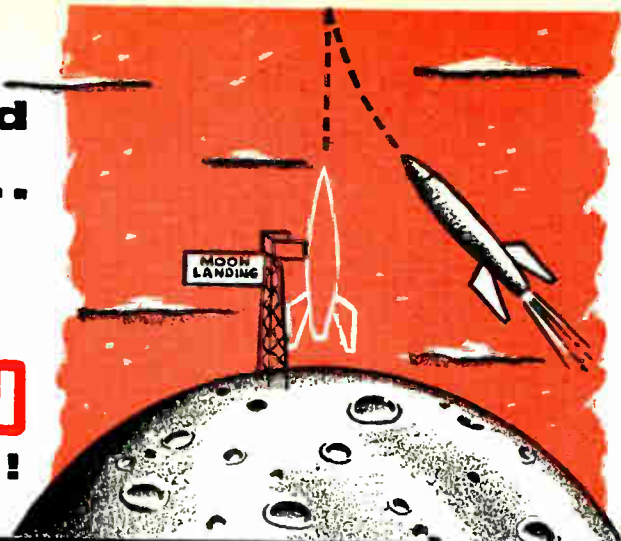
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CAPACITORS!



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CAPACITORS

**TYPE
MPD**

INSURE FAILURE-PROOF PERFORMANCE!

Only 1 Failure in 7,168,000 Unit-Hours for 0.1 MFD Capacitors*

Setting a new standard of reliability!

*Life tests have proved that El-Menco Mylar-Paper Dipped Capacitors — tested at 100°C with rated voltage applied — have yielded a failure rate of only 1 per 716,800 unit-hours for 1 MFD. Since the number of unit-hours of these capacitors is inversely proportional to the capacitance, 0.1 MFD El-Menco Mylar-Paper Dipped Capacitors will yield **ONLY 1 FAILURE IN 7,168,000 UNIT-HOURS.**

SUPERIOR FEATURES!

• Five case sizes in working voltages and ranges:

200 WVDC —	.018 to .5 MFD
400 WVDC —	.0082 to .33 MFD
600 WVDC —	.0018 to .25 MFD
1000 WVDC —	.001 to .1 MMF
1600 WVDC —	.001 to .05 MFD

SPECIFICATIONS

- **TOLERANCES:** ±10% and ±20%. Closer tolerances available on request.
- **INSULATION:** Durez phenolic resin impregnated.
- **LEADS:** No. 20 B & S (.032") annealed copper-weld crimped leads for printed circuit application.
- **DIELECTRIC STRENGTH:** 2 or 2½ times rated voltage, depending upon working voltage.
- **INSULATION RESISTANCE AT 25°C:** For .05MFD or less, 100,000 megohms minimum. Greater than .05 MFD, 5000 megohm-microfarads.
- **INSULATION RESISTANCE AT 100°C:** For .05MFD or less, 1400 megohms minimum. Greater than .05MFD, 70 megohm-microfarads.
- **POWER FACTOR AT 25°C:** 1.0% maximum at 1 KC.

Write for Technical Brochure Giving Complete Information on the El-Menco Tubular Dur-Paper Line.

THESE CAPACITORS WILL EXCEED ALL THE ELECTRICAL REQUIREMENTS OF E.I.A. SPECIFICATION RS-164 AND MILITARY SPECIFICATIONS #MIL-C-91A AND MIL-C-25A.

FOR FAILURE-PROOF PERFORMANCE... COUNT ON EL-MENCO MYLAR-PAPER DIPPED CAPACITORS... FROM MISSILE GUIDANCE SYSTEMS TO DATA PROCESSING EQUIPMENT!

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Capacitors

THE ELECTRO MOTIVE MFG. CO., INC.

WILLIMANTIC CONNECTICUT

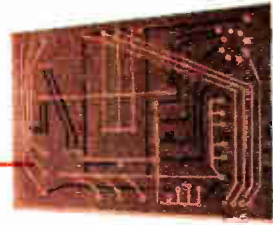
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FORMICA[®]
Laminated Plastic

NEW EP-37



Formica team:

(1 to r) Eldon Fender, R&D; John Fitzer, Manager of Process Engineering; and Fenton Hamilton, Manager of Industrial Products—demonstrates flame retardant properties of new paper-epoxy grade.

Formica perfects new Flame Retardant grade

New EP-37 Properties . . .

- Flame retardant
- Self-extinguishing
- Dimensional stability under both solder dipping and humidity conditions
- Million megohms IR
- Cold punch 1/16"
- 10# avg. bond strength
- 500°F. solder heat resistance for 25 secs.

The team shown above demonstrates the flame retardant, self-extinguishing properties of the newest Formica[®] copper clad, EP-37. Because of these unusually effective properties, the new paper-epoxy is well suited for use in computers, radio, tv, telephone and aviation electrical devices. Increased dimensional stability—30% greater than existing grades under moisture conditions—offers many other application advantages.

This basic new material offers the additional properties shown at left—so essential for dependable printed circuit performance. For complete information, send for free test sample and data information. Formica Corporation, a subsidiary of American Cyanamid, 4536 Spring Grove Ave., Cincinnati 32, Ohio.



a product of 

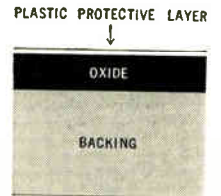
F1-2158

NEED A TAPE WORKHORSE?

"SCOTCH" BRAND Sandwich Tapes

wear longer, cut head maintenance even in digital work

1
22
336
9578
34916
872271
6355009
74400932
330562217
7703220522
88806111956
437773220071
5662225436662
33200973327106
777894440032119
5522789007830062
49340062112213977
322273460007244119
8890026782334110024
44033219077823224422
922247323680274118034
5687321900333405589226
3350668322118856723323
440329996779233001166
68220032320011237787
8300337444323801232
211345788821723309
56697700329008022
9210322431102143
473761670553762
30723881760203
2762030784301
942427750593
63090410782
2490589547
317130273
46302222
6006736
592181
26700
3259
746
53
2



Tote that tape—change that reel—clean that head! If your project atmosphere sometimes seems that way, "SCOTCH" BRAND Sandwich Tape comes to the rescue. How about the possibility of getting over 50,000 passes out of a computer tape? And if that sounds attractive, consider the value in a tape that has no rub-off, won't give you any head build-up, drastically reduces maintenance and replacement on costly head assemblies.

One user found that the simple change to "SCOTCH" BRAND Sandwich dramatically reduced head replacements. And—where heads previously had to be cleaned after every run, "SCOTCH" BRAND Sandwich Tape cut cleaning to once a week.

The secret's in the Sandwich—the high potency oxide magnetic coating is sandwiched between the tough polyester base and a thin protective plastic layer. The coating never contacts the head—you get smooth, low-friction tape movement, plus an end to rub-off, head build-up, and a reduction in erosion of the critical slit in the recording head. Though the 50 micro-inch protective layer causes some slight reduction in high frequency response, the plain facts are that Sandwich Tape packs up to 600 pulses per inch in digital work—has broad usage in AM, FM, or PDM applications.

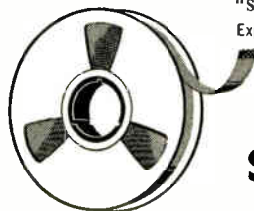
In "SCOTCH" BRAND Sandwich Tape you have a tape workhorse, pulling a big load over long distances. One user reported fewer drop-outs with each successive pass. As his recording heads were cleaned, the contaminates proved to be in the system, not the tape. Speaking of drop-outs, beware the villainous cigarette—often a culprit. One careless gesture and an ash can cause 40 to 60 drop-outs.

Whatever your application—data reduction, acquisition or control programming—count on 3M technology to create tape of higher uniformity and reliability for error-free performance.

"SCOTCH" BRAND High Output Tape No. 128 gives you top output at low frequencies, even under extremes of ambient temperatures. "SCOTCH" BRAND High Resolution Tape No. 159 lets you pack more bits per inch, offers extra playing time. Finally, for top performance at low cost per foot, "SCOTCH" BRAND Instrumentation Tapes Nos. 108 and 109 remain the standard for the industry.

Where there's no margin for error, there's no tape like "SCOTCH" BRAND. For more details, write Magnetic Products Div., 3M Company, St. Paul 6, Minn., or mail the reader inquiry card. © 1959 3M Co.

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SCOTCH BRAND MAGNETIC TAPE
FOR INSTRUMENTATION

MINNESOTA MINING AND MANUFACTURING COMPANY
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meanwhile back on the earth



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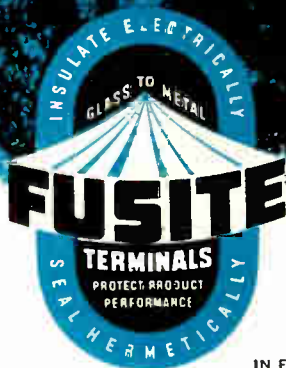
Naturally, it is gratifying to us to know that Fusite Glass-to-Metal Hermetic Terminals are aboard nearly all these history making trips into the outer universe. But

at least part of the excitement of participation is passing us by.

We have no top secret labs or special assembly or exotic military model terminals. The Fusite Terminals that are performing so well under these extremes of temperature, pressure, and mechanical shock are pretty much the same kind of terminals we produce every day by the tens of thousands for commercial production.

We're fairly certain that this proves something or other about the ability of Fusite Terminals to perform rather well in your earth-bound electronic components.

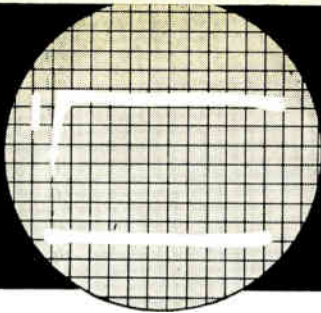
But we suspect nothing can prove this point to your satisfaction quite so well as trying them yourself—testing and comparing with other kinds of terminals. It may seem like an "earthy" approach, but if it makes sense to you, samples are yours for the asking.



THE FUSITE CORPORATION

Dept. G-4, 6000 Fernview Ave., Cincinnati 13, Ohio

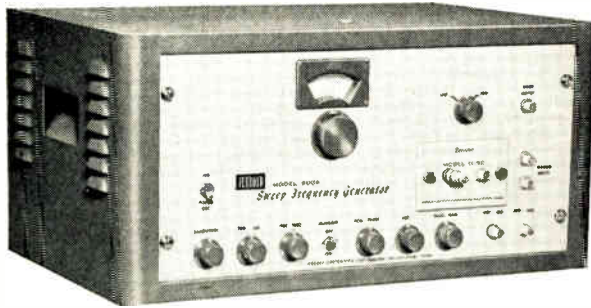
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JERROLD

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USING SWEEP FREQUENCY GENERATOR TECHNIQUES...



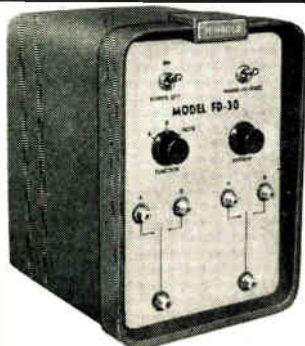
NEW

WIDE BAND SWEEP FREQUENCY GENERATOR — MODEL 900-A

SWEEP WIDTHS—AS WIDE AS 400 MC . . . FROM 0.5 MC to 1200 MC. The JERROLD Model 900-A, Wide Band Sweep Frequency Generator is an instrument of unusual versatility. In two ranges—0.5 MC to 400 MC and 275 MC to 1200 MC—the instrument supplies sweep signal with center at any frequency from 500 KC to 1000 MC and with sweep widths as broad as 400 MC and as narrow as 100 KC. The RF output—carefully monitored by matched, crystal diodes feeding a two stage, push-pull AGC amplifier—is flat within ± 0.5 db at full sweep width up to 800 mcs. and ± 1.5 db from 800 mcs. to 1200 mcs. When using sweep widths as narrow as 20 mcs. flatness at any center frequency is approximately ± 0.15 db. The output voltage is 0.5 volts RMS across a 50 ohm load at the upper range and 0.25 volts at the lower range.

The instrument features provisions for external markers, employing "birdie bypass" circuitry, and a plug-in R.F. detector that can be used in remote applications.

\$1260.00



A HIGH SPEED COAXIAL SWITCH — MODEL FD-30

For the simultaneous display of two channels or voltages on an oscilloscope.

Frequency range of coaxial circuit is from DC to 250 MC with a VSWR of less than 1.1 at 50 or 75 ohms impedance. Switch contacts "Mercury-Wetted" with an adjustable switch rate of 30, 15 or 10 cps.

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Wide Band Sweep Generators—Models 601 and 602

Portable, wide band instruments designed for the test and alignment of LF, IF, and RF circuitry. The Generators feature an electronic, saturable reactor sweep circuit with a maximum sweep deviation of approximately 5 to 1. RF output on all ranges is fundamental.

MODEL 601

12 MC to 225 MC in eleven overlapping ranges. RF output of 1.0 volt RMS. Output flat $\pm 1/2$ db over widest sweep width and as flat as 1/5 db at sweep widths of 40 mc or lower.

MODEL 602

4 MC to 112 MC in eleven overlapping ranges. RF output of 2.5 volts RMS. Output flat within $\pm 1/2$ db.

Other Generators available on special order to cover any portion of the frequency range from 15 KC to 225 MC.



\$395.00

VARIABLE, LABORATORY ATTENUATORS — MODELS AV-50 and AV-75



\$150.00

Variable, switch-type attenuators from DC to 500 MC. The attenuators feature: 0 to 62.5 db attenuation, in 0.5 db steps; low insertion loss of $1/4$ db at 250 MC, and $1/2$ db at 500 MC; VSWR of less than 1.15 at 250 MC, and less than 1.4 at 500 MC; newly developed rotary, coaxial switches that utilize a floating rotor with dual wiping, self aligning contacts mounted in a "Tel-F" dielectric; completely shielded switch sections; and rugged, compact design. Model AV-50 is 50 ohms with BNC connectors, and Model AV-75 is 75 ohms with Jerrold "F" Series connectors.

ALSO AVAILABLE FOR ACCURATE QUANTITATIVE MEASUREMENTS

MODEL 707 — PRECISION SWEEP GENERATOR

Available with plug-in oscillator heads for any frequency range from 4 MC to 250 MC. Flatness $\pm 5/100$ db, power output +20 dbm.

MODEL CM-6 & CM-10 — CRYSTAL MARKERS

Available with 6 or 10 crystal frequencies of your choice. Harmonics, side band or "birdie bypass" markers.

MODEL VC-12 — VOLTAGE COMPARATOR

For use with any sweep generator for accurate quantitative measurements of Voltage, Power, dbm, and relative db differential.

MODEL SPR-100 — OSCILLOSCOPE PREAMPLIFIER

A complete sweep generator accessory featuring a built-in detector that is flat to 250 MC, a preamp. gain of 40 db, and provision for marker insertion employing "birdie bypass" circuitry.

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1.

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- EXTREME UNIFORMITY
- LOWER NOISE

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AMPEREX FRAME GRID TUBES — PROVEN FOR RELIABILITY BY MILLIONS OF TUBE HOURS (LESS THAN 0.1% PER 1000 HRS. FAILURE RATE) — ARE NOW IN FULL PRODUCTION TO MILITARY SPECIFICATIONS IN ONE OF THE WORLD'S MOST MODERN TUBE MANUFACTURING INSTALLATIONS — AMPEREX HICKSVILLE, LONG ISLAND, N. Y.

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It results in:

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- low transit time
- low capacitances
- lower microphonics
- rugged construction

AMPEREX FRAME GRID

The grid-to-cathode spacing tolerance is determined by the carefully controlled diameter of grid support rods (centerless ground) and by frame crossbraces between these rods. Extremely fine grid wire eliminates the "island effect" usually encountered in conventional tubes with equally close grid-to-cathode spacing. Rigid support of fine wires reduces mechanical resonance and microphonics in the grid.

CONVENTIONAL GRID

Grid-to-cathode spacing tolerance depends on accuracy of grid dimension, obtained by stretching on a mandrel, and on tolerances of holes in top and bottom mica rod supports. Diameter of grid wire must be large enough to be self-supporting.



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Reliable Broadband Amplifier Pentode

- plug-in replacement for Type 404A in existing equipment
- high figure of merit



AMPEREX 6688A (MIL-E-1/1218 NAVY)

Reliable, Ruggedized, Broadband Amplifier Pentode

- for similar applications as the 5847, but with improved base pin arrangement and higher transconductance
- figure of merit of 250 Mc as broadband amplifier
- saves entire stages in IF and video amplifiers
- improves signal-to-noise ratio
- preferred for new equipment design, particularly airborne applications
- long-life cathode



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- for HF, IF, mixer and phase-inverter stages
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- long-life cathode
- new "dimple" anode



AMPEREX 5842 (MIL-E-1/466)

Reliable, High-Gain Single Triode

- plug-in replacement for type 417A in existing equipment
- for grounded grid amplifiers
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- low noise
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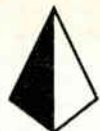
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about applications assistance for reliable Premium Quality (PQ) frame grid tubes.


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radio and TV replacement market — and model RC-1, New Resistance-Capacity-Ratio Brid

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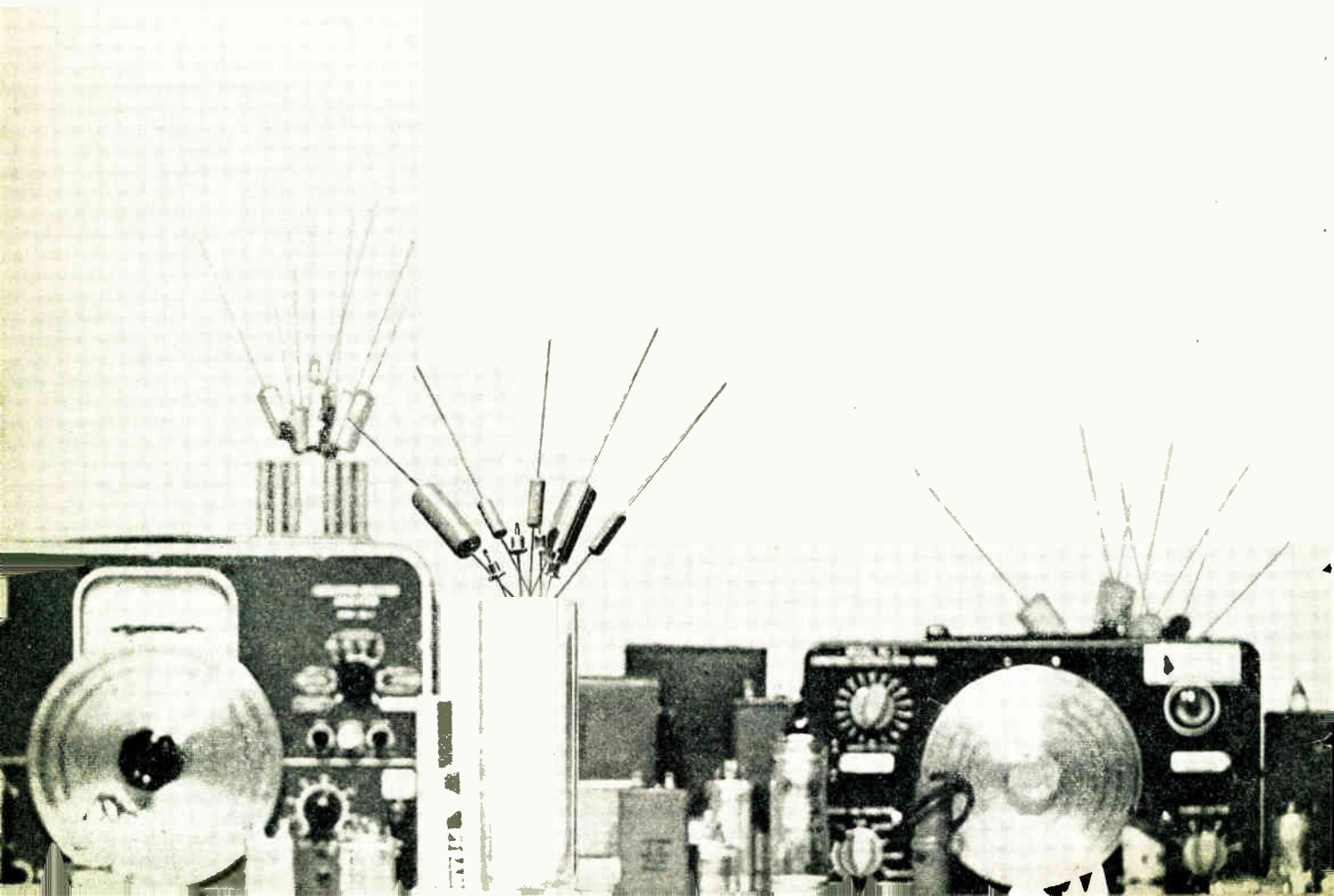
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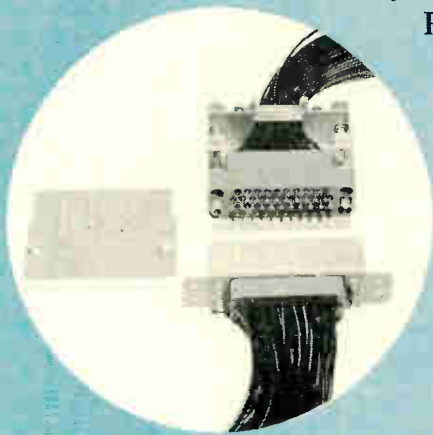




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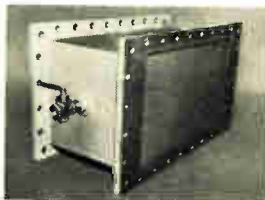
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Terminations



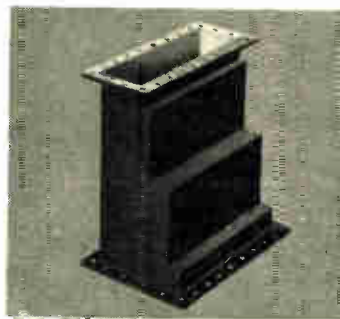
Waveguide to coax transition



Gas barriers



Slab-slug tuners



Stepped transformers



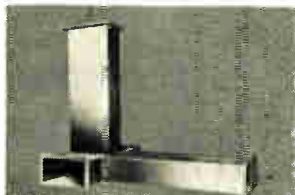
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OF INDUSTRY

AN/MS CONNECTORS a complete selection of standard MIL-C-5015 connectors, including new "Stub E" environmentally resistant constructions. Miniature AN-type 165 series; miniature "Minni E" environmentally resistant connectors. Request Catalog A5 for complete data.



RF CONNECTORS every standard RF Series, N, BNC, C, HN, BN, LC, LT, UHF is available from AMPHENOL. Subminax RF connectors are an expanding line of subminiature types made only by AMPHENOL. Complete engineering services stand behind each AMPHENOL RF. Request Catalog D3.



RACK & PANEL CONNECTORS from the remarkable Blue Ribbon connectors with their smooth-working "ribbon" contacts to new "Poke Home" contact designs, AMPHENOL connectors meet every rack & panel application need. Request Catalog B6.



MISSILE CONNECTORS Breakaways, umbilical and interstage, are designed and produced by AMPHENOL for a large number of missile projects. Each is a special purpose connector, application-engineered for a particular requirement. Write for additional information.



HERMETIC SEAL CONNECTORS new "Identoseal" marking on AMPHENOL hermetically sealed connectors provides clear contact identification in the compression sealed glass inserts. Receptacles to mate with AN/MS, 165 and MinnieE connectors. Headers also available. Request Catalog A5.



PRINTED CIRCUIT CONNECTORS 143 Series receptacles mate with standard .055" -.073" boards, 6 to 22 contacts, and with 133 Series plugs and adapters, 10 to 22 contacts. Superior gold-plated contacts, other reliability features. Request Catalog B6.



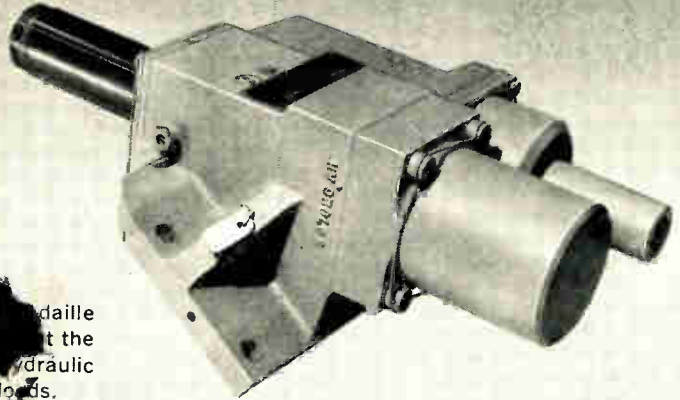
AMPHENOL CONNECTOR DIVISION
Amphenol-Borg Electronics Corporation



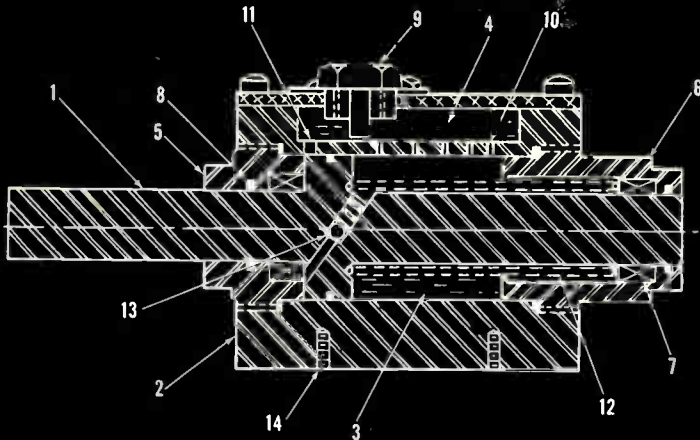
Engineered to solve a problem

radar antenna buffers

by HOUDAILLE



TO PREVENT DAMAGE caused by over-travel, Houdaille has engineered a new Radar Antenna Buffer. In the limits of antenna travel, the Houdaille Buffer utilizes hydraulic damping to dissipate the energy of extreme shock loads.



TYPICAL HOUDAILLE BUFFER

- 1 Ram 2 Housing 3 Cylinder 4 Reservoir
5 & 6 Closure flanges 7 Bearings 8 Seals
9 Fluid-level indicator and filler opening 10 Orifices 11 Return Port
12 Return Spring 13 Check Valve 14 Tapped Holes

A load applied to the ram head causes the ram to move forward, thus developing hydraulic pressure within the cylindrical working chamber. The fluid displaced by the ram movement is forced through orifices (10) into the reservoir. Port (11) allows the fluid to return to the evacuated space on the other side of the piston. The energy originally applied to the ram is dissipated by the high-pressure fluid being forced through the orifices. At the completion of the stroke, the ram is rapidly repositioned by a return spring (12). Fluid returns to the working chamber through check valve (13). Reservoir (4) is designed to provide adequate space for thermal expansion. A variety of mounting arrangements, such as tapped holes (14) can be provided to meet any requirement.

HOUDAILLE BUFFERS CURRENTLY IN PRODUCTION INCLUDE:

- Resisting force from 100 lbs. to 125,000 lbs.
 - Strokes from 1 inch to 9 inches.
- Fireproof and other types of hydraulic fluids, to meet any thermal or logistic requirement.
 - Pressurized reservoirs, when required.
- High-working-pressure units, when needed for maximum compactness.

Houdaille Buffers can also be engineered to cushion the impact of air-dropped portable equipment, and for missile handling equipment.

HOUDAILLE'S EXPERIENCE and know-how could be working for you! Damping devices can be designed for any application—to meet any specifications or envelope requirements. Send details of your problem to



Houdaille Industries, Inc.

BUFFALO HYDRAULICS DIVISION

539 East Delavan Avenue • Buffalo 11, New York

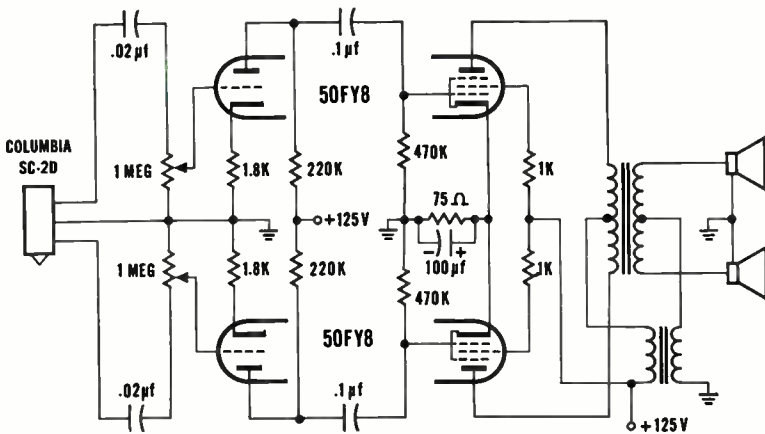
Specialists in hydraulic damping and vibration control

WRITE FOR ENGINEERING BULLETINS giving complete performance curves and other data on Houdaille Buffers

ECONOMICAL

STEREO

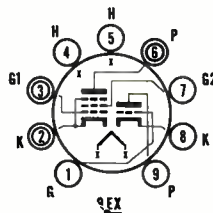
WITH ONLY TWO TUBES



CBS SIMPLEX STEREO: A modified simplex amplifier by CBS Laboratories... a special cartridge by Columbia Records... and the new 50FY8 triode-pentode by CBS Electronics unite to make possible truly economical stereo.

The CBS type 50FY8 combines a triode voltage amplifier and a pentode power output tube in a T-6½, nine-pin miniature bulb. Operating from the popular Columbia CD stereo cartridge, the triode section drives the beam pentode to 3.5 watts output.

The compact new tube (same outline as 6BQ5) is available in four heater versions: 6FY8, 12FY8, 25FY8 and 50FY8. Designed for stereo, this versatile tube has other potential applications. Check the characteristics. Write for technical bulletin E-334.



*More reliable products through
Advanced-Engineering*

CBS ELECTRONICS, Danvers, Massachusetts
A Division of Columbia Broadcasting System, Inc.



TYPICAL CLASS A OPERATION OF 50FY8

CHARACTERISTIC	TRIODE	PENTODE
Heater	50 volts at 150 ma	
Plate voltage (volts)	125	125
Grid 2 voltage (volts)	—	125
Grid 1 voltage (volts)	—1.5	—13.5
Plate current (ma)	2.5	50
Grid 2 current (ma)	—	10
Transconductance (μmhos)	2000	7500
A-c load resistance (ohms)	—	2000
A-f input voltage (vrms)	0.3	—
Max. power output (watts)	—	3.5
Distortion	Approx. 10%	

Important max. ratings for pentode section are: Plate and grid 2 voltages, 150 volts. Plate and grid 2 dissipations, 8 and 2 watts respectively. Heater-cathode voltage (heater negative or positive to cathode), 200 volts.



THE VICTOREEN INSTRUMENT COMPANY

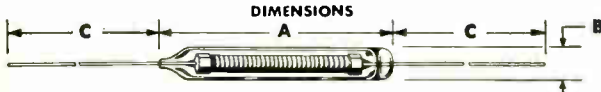
5806 HOUGH AVENUE • CLEVELAND 3, OHIO

GLASS-SEALED DEPOSITED CARBON RESISTORS

RESISTOR DATA CHART

TYPE	RESISTANCE	TOLERANCE	VOLTAGE COEF. % / V	TEMP. COEF. % / °C	MAX. W.V.	WATTAGE	MAX. TEMP. °C	DIMENSIONS		
								A (MAX)	B (MAX)	C (MIN)
RX2	1 Meg to 50 Meg	1,2.5,10,20 Note 1	-.0002	-0.08	3000	1	125	2	.413	1 1/2
RX3	1 Meg to 200 Meg	1,2.5,10,20 Note 2	-.0002	-0.08	10,000	3	125	3 1/4	.413	1 1/2
RX4	200 ohm to 50 Meg	1,2.5	-.0002	-0.05	800	5	200	2	.413	1 1/2
RX5	200 ohm to 200 Meg	1,2.5 Note 3	-.0002	-0.05	2000	10	200	3 1/4	.413	1 1/2
RX8	100 ohm to 10 Meg	1,2.5	-.0002	-0.05	750	2	200	1 1/2	.240	1 1/2

NOTE: 1: 1% and 2% tolerance available only below 20 meg.
 2: 1%, 2% and 5% tolerance available only below 100 meg.
 3: 1% and 2% tolerance available only below 100 meg.



HI-MEG RESISTORS

GLASS SEAL: HI-MEGs are vacuum sealed in a glass envelope which is treated with a special silicone varnish which keeps the resistor relatively free from the effects of moisture.

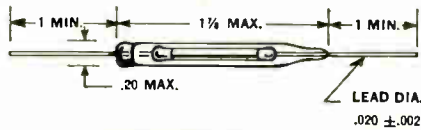
RESISTANCE: HI-MEG resistors are available in values from 10⁸ to 10¹⁴ ohms.

TOLERANCE: HI-MEG resistors can be supplied in the following tolerances: 1% below 10¹² ohms, 2% and 5% below 10¹³ ohms, and 10% over the entire range.

MAXIMUM WORKING VOLTAGE: 1000 volts.

MAXIMUM OPERATING AMBIENT TEMPERATURE: 100°C.

POWER RATING: The power rating for any HI-MEG resistor is equal to one divided by the resistance in megohms.



ELECTROMETER TRIODE VX-55



TYPICAL OPERATION AND TEST CONDITIONS

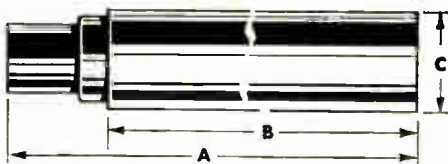
E _f	1.25	Volts	I _p	95	μa
I _f	10.0	ma	G _m	110	μmho
E _p	7.5	Volts	I _g	5 x 10 ⁻¹⁴	amp
E _g	-2.2	Volts	M _U	2.1	

ELECTROMETER TETRODE 5800/VX-41A

AS A TETRODE ELECTROMETER

Plate Voltage	+4.5	Volts	Transconductance	15	μmhos
Accelerator Grid Voltage (g ₂)	+3.4	Volts	Plate Current	12	μa
Control Grid Voltage (g ₁)	-3	Volts	Accelerator Grid Current	300	μa
Amplification Factor	1		Control Grid Current	10 ⁻¹³	Amp

CORONA TYPE VOLTAGE REGULATORS



Commonly Used Metal Regulators*

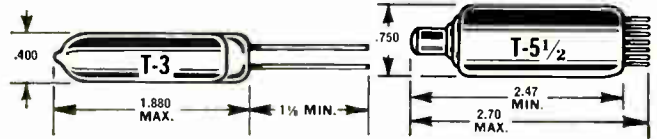
TYPE	VOLTAGE RANGE	TOLERANCE	NOM. TEST POINT	CURRENT		REGULATION 100-1000 μa	DIMENSIONS		
				MAX.	MIN.		A	B	C
M105B	6 KV-10 KV	±500V	500 μa	1000 μa	50 μa	7 1/2 %	6 7/8	5	1 1/4
M105	10 KV-20 KV	±500V	500 μa	1000 μa	100 μa	10 %	6 7/8	5	1 1/4
M108	10 KV-20 KV	±500V	500 μa	1000 μa	100 μa	7 %	8 7/8	8	1 1/4
M126	20 KV-25 KV	±500V	500 μa	1000 μa	100 μa	10 %	7 7/8	6	1 1/2
M128	20 KV-27 KV	±500V	500 μa	1000 μa	100 μa	7 %	8 7/8	8	1 1/2

CORONA TYPE VOLTAGE REGULATORS



R. E. T. M. A. Types

TYPE	NOM.	TOLERANCE	NOM. TEST PT.	CURRENT IN μa			REGULATION	
				MIN.	MAX.	PEAK	VOLTS	CURRENT RANGE
5950	700V	± 15V	25 μa	5	100	150	14V	5-100 μa
5841	900V	± 18V	25 μa	5	100	150	18V	5-100 μa
6143	1200V	± 24V	25 μa	10	100	150	24V	5-100 μa
6119	2000V	± 100V	25 μa	15	100	150	40V	5-100 μa

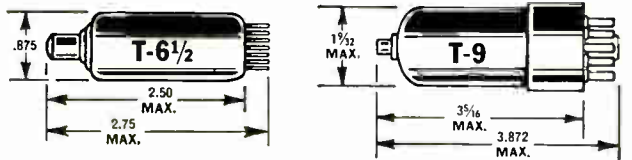


Commonly Used Models in T-3 Size*

TYPE	NOM. TEST PT.	TOLERANCE	NOM.	CURRENT IN μa			REGULATION	
				MIN.	MAX.	PEAK	VOLTS	CURRENT RANGE
GV3B-400	50 μa	± 10V	400V	5	150	300	15V	5-150 μa
GV3B-600	50 μa	± 10V	600V	5	150	300	20V	5-150 μa
GV3A-900	50 μa	± 15V	900V	10	250	350	25V	10-250 μa
GV3A-1200	50 μa	± 30V	1200V	10	250	400	40V	10-250 μa
GV3A-1500	50 μa	± 30V	1500V	15	300	500	50V	15-300 μa
GV3A-2000	50 μa	± 50V	2000V	15	300	500	75V	15-300 μa

Commonly Used Models in T-5 1/2 Size*

TYPE	NOM.	TOLERANCE	NOM. TEST PT.	CURRENT IN μa			REGULATION	
				MIN.	MAX.	PEAK	VOLTS	CURRENT RANGE
GV5B-700	700V	± 20V	100 μa	10	250	350	25V	10-250 μa
GV5B-900	900V	± 25V	100 μa	10	300	500	30V	10-300 μa
GV5B-1000	1000V	± 30V	100 μa	10	300	500	35V	10-300 μa
GV5A-1200	1200V	± 36V	100 μa	10	400	600	40V	10-400 μa
GV5A-2200	2200V	± 65V	100 μa	20	800	1000	50V	20-800 μa
GV5A-3000	3000V	± 90V	100 μa	30	1000	1200	75V	30-1000 μa



Commonly Used Models in T-6 1/2 Size

TYPE	NOM. VOLTAGE	TOLERANCE	NOM. TEST PT.	CURRENT IN μa			REGULATION**
				MIN.	MAX.	PEAK	
GV6A-450	450	± 11V	500 μa	20	1000	1300	30V
GV6A-1000	1000	± 25V	500 μa	30	1000	1500	42V
GV6A-2500	2500	± 65V	500 μa	50	1500	3500	100V
GV6A-3000	3000	± 75V	500 μa	50	1000	3500	70V

**This regulation is the change in voltage over the useful range of current from MIN. to MAX.

Commonly Used Models in T-9 Size

TYPE	NOM. VOLTAGE	TOLERANCE	NOM. TEST PT.	CURRENT IN μa			REGULATION**
				MIN.	MAX.	PEAK	
GV9A-600	600	± 15V	1000 μa	50	1500	2000	25V
GV9A-1000	1000	± 25V	1000 μa	50	1750	2200	45V
GV9A-2000	2000	± 50V	1000 μa	50	3500	4200	80V
GV9A-3000	3000	± 75V	1000 μa	50	2700	7000	110V

**This regulation is the change in voltage over the useful range of current from MIN. to MAX.

*T-3 size voltage regulators are available in any desired nominal voltage ± 2% from 400 volts to 2000 volts at the customary test point of 50 μa. T-5 1/2 size voltage regulators are available in any desired nominal voltage ± 3% from 400 volts to 6000 volts at the nominal test point at 100 μa. Metal regulators are available in any desired voltage ± 500 volts from 7 1/2 KV. to 27 1/2 KV. at the customary test point of 500 μa. All other characteristics such as maximum and minimum currents, regulation, etc., may be interpolated from the table.



ITT

**Industrial
Products
Division**

ST

**IN
CUSTOM
POWER
EQUIPMENT**

The Industrial Products Division of ITT offers a complete facility for custom airborne, ground, and ground-support power equipment and systems. Backed by the research, development, manufacturing, and technical experience of the worldwide International Telephone and Telegraph Corporation, we can package power equipment with built-in reliability to your exact requirements. Our complete engineering staff and environmental testing facilities enable us to supply reliable, high-quality units and systems, both quickly and at reasonable cost —

- DC Transformers
- T/R units
- Partial Systems
- Complete Systems
- High-voltage Supplies
- Inverters
- Magnetic Amplifiers
- Transistor-regulated Supplies



20-Amp Silicon T/R used on Chance-Vought F-8-U and Douglas A4D-2N.



Launcher power supply for Lockheed's F-104 Starfighter.



Static power unit for this nation's most advanced jet bomber.

Typical ITT Power Units. More than 50 different models of ITT power equipment are proving themselves in use every day.

THE LATEST IN STATIC POWER DESIGN

We have a complete line of fully qualified static power equipment, from 20 to 200 amps, in silicon or selenium. No moving parts. Long life — models up to 10,000 hours.

Let us know your requirements . . . write, wire, or phone.

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Industrial Products Division
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15191 Bledsoe St. • San Fernando, Calif.

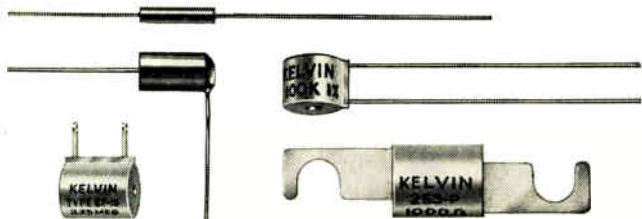
REGIONAL OFFICES: NEW YORK (Lodi, N.J.), PRescott 3-1550; DALLAS, Fleetwood 1-4468
CHICAGO, LOnG Beach 1-3936; LOS ANGELES (San Fernando), EMpire 7-6161

ITT provides power source for Conqair's B-58 Hustler — a completely integrated electrical power system.

KELVIN

Precision Electrical Components

RESISTORS



WIRE WOUND precision, encapsulated

Newly developed Kelvin winding techniques produce tension-free ("RELAXED") resistor windings, practically eliminating resistance drift with age and "shorts" or "opens" due to thermal shock.

Specifications: Shock, moisture and temperature proof; exceeds military specifications.

Size Range: from micro-miniature, .080 dia. x .375 length to 1.0 dia. x 2.125 length.

Wattage, Resistance and Voltage Range: from .05 watt, 100K max. resistance, 100 volts max., to 2.5 watts, 25.0 Meg. max. resistance, 1200 volts max.

Temperature Range: -65°C to $+125^{\circ}\text{C}$.

Standard resistance tolerances are 1%, 0.5%, 0.25% and 0.1%. Special tolerances upon request.

Temperature coefficient: $\pm .002\%$ per degree C within operating temperature ranges.

Microscopic techniques are used for precision welding of all terminations.

WIRE WOUND power, precision

Available from 20 watts, $\frac{5}{8}$ " dia. x 2" length to 200 watts, $1\frac{1}{4}$ " dia. x $10\frac{1}{2}$ " length.

Specifications:

Maximum Resistance Ranges: up to 15K

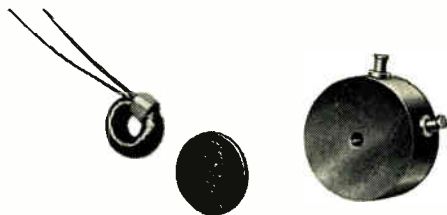
Tolerances: up to .01%

Temperature Coefficient: $\pm .002\%/^{\circ}\text{C}$, closer upon request.

Temperature Range: -55°C to $+100^{\circ}\text{C}$.

Coating: Silicone varnish

TOROIDS



INDUCTORS

Uncased: impregnated with a special plastic compound for high Q factors and maximum temperature stability. Coils are coated with an inert wax having a melting point of approximately 125°C . to provide moisture resistance and mechanical protection. Insulated flexible lead wires with Hi-temp insulation are provided.

Cased: hermetically sealed in conformance with MIL-T-27A specifications. A variety of standard sizes and shapes are available. Special case configurations available to customer's specifications.

Encapsulated: easily mounted or stacked on a single screw through the center holes. The sturdy turret lugs may be used as tie points to mount other components. Will withstand temperatures of -55°C to $+125^{\circ}\text{C}$ under conditions of high humidity and severe mechanical shock.

Specifications: Kelvin now offers higher Q factors and inductances at lower frequencies in miniature coils than heretofore available due to the application of advanced winding techniques. Excellent stability vs. temperature and current, and self-shielding effects are also main features of Kelvin toroids wound on molybdenum permalloy dust cores.

Size Range: Encapsulated; $\frac{3}{4}$ " O.D. x $\frac{3}{8}$ " height, to $2\frac{3}{8}$ " O.D. x $1\frac{1}{8}$ " height. Uncased; $\frac{5}{8}$ " O.D. x $\frac{1}{32}$ " height, to $2\frac{1}{4}$ " O.D. x 1" height.

Inductance Range: from .00002 HY. to 200 HY.

Temperature Coefficient: 100 PPM/degree F.

Tolerance: within 1% of nominal inductance values.

Stabilized coils available upon request. These units will remain within 0.1% tolerance from $+30^{\circ}\text{F}$ to $+130^{\circ}\text{F}$.

TRANSFORMERS power, miniature

400 cycle, in the power range under 15 V. A.

Specifications:

Frequency Range: 375 cps to 525 cps.

Ambient Temperature (for full rating): -55°C to $+90^{\circ}\text{C}$.

Encapsulation: Epoxy; moisture, temperature, shock-proof.

Windings: Toroidal, no external fields.

Specials up to 100 V. A., 400 cycle.

RATIO precision

For precise voltage division or multiplication over wide range of load fluctuations, frequency and ambient temperature... with low insertion loss... in small packages.

Specifications:

Ratio: Two secondary windings, choice of any ratio from 1:1 to 1000:1 on both windings; choice of 115, 28, 12 or 6.3 volt primary windings.

Tolerance: 0.1% standard; accuracies to .005% available, Case: Hermetically sealed.

MAGNETIC AMPLIFIERS

Toroidal construction, maintenance free, rugged and highly reliable. Designed to fulfill the most exacting requirements. When inquiring, specify power supply frequency, voltage, output, input and output impedance, signal power for full output, response time, temperature requirements, maximum case size and weight.

POWER TRANSFORMERS AND FILTER CHOKES

Available in all standard case sizes and hermetically sealed in conformance with MIL-T-27A.

FILTERS

WAVE precision, electric

Cases hermetically sealed to MIL-T-27A. Low-pass, band-pass, high-pass and band suppression types available in the audio and low RF ranges.

TELEMETERING Sub-miniature

Available in standard RDB frequencies.

Send for complete literature



KELVIN

ELECTRIC COMPANY

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FOR MICROWAVE SPECTRUM ANALYSIS

DIRECT-READING SPECTRUM ANALYZER

Model TSA 10 to 44,000 mc

FEATURES:

- Direct-reading UNI-DIAL control
- High accuracy, resolution and sensitivity
- Stable, accurate frequency marker
- To test missile, radars, microwave components, telemetering, multi-pulse transmissions

Model DU

Spectrum Display and Power Unit

Five interchangeable Tuning Units

STU-1	10	1,000 mc
STU-2A	510	4,000 mc
STU-3A	4,570	70,000 mc
STU-4	21,000	30,000 mc
STU-5	44,000	44,000 mc



COMBINATION SYNCHROSCOPE SPECTRUM ANALYZER

Model TSA-5 10 to 44,000 mc



Time Display:
Pulse signal as seen in synchroscope operation.



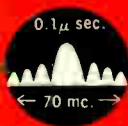
Frequency Display:
Same signal as seen in spectrum analyzer operation.



Selector switch determines function instantly. Tuning Units: Same as Model TSA above

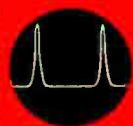
VERY WIDE DISPERSION SPECTRUM ANALYZER

Model TSA-W 10 to 44,000 mc



Narrow and Wide Pulse Analysis

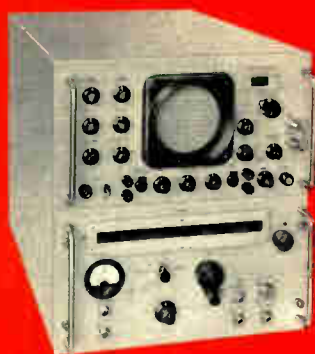
20 mc frequency dispersion displays pulses as narrow as 0.1 μ sec. For wide pulse analysis, dispersion may be adjusted to as narrow as 120 kc



Wide dispersion permits simultaneous observation of two or more signals separated by relatively large frequency differences



Resolution: 7 kc narrow bandwidth, 50 kc wide bandwidth. Tuning Unit frequency ranges: Same as Model TSA above



MULTI-BAND, SINGLE UNIT SPECTRUM ANALYZER

Model SA-84

Complete frequency coverage: 10 to 40,000 mc, all in one self-contained unit. No additional tuning units required.

Also available: Model SA-83W 10-40000 mc in one unit, and same choice of dispersion bandwidths as Model TSA-W above.



MULTI-PULSE SPECTRUM SELECTOR

Model SO-1

Permits spectrum analysis of individual microwave pulses in a pulse group. Any pulse in a complex coded signal may be isolated and intensified for examination.

FOR GENERAL LABORATORY USE

PULSE JITTER TESTER

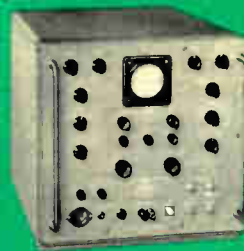
Model PJ-1

Measures:

- Relative jitter
- Pulse width jitter
- Repetition rate jitter

Displays:

- Jitter magnitude
- Jitter waveform



TRANSISTOR MICROWAVE POWER METER

Model P-3 10-39,000 mc

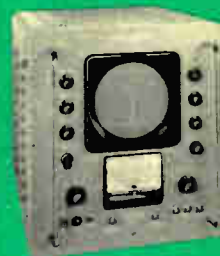
Measures absolute r-f power level instantly without tuning. Line or internal-battery operated. Rugged, weighs only 6 pounds.



RAPID SCAN RATIO-SCOPE

Model VS-2

Used with sweep generator (ESG, opposite side). Displays ratio of two input signals, visual plot VSWR or response-frequency on 7" CRT.



KLYSTRON TUBE TESTER

Model K-200

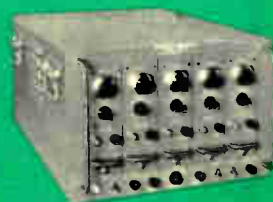
Tests all microwave tubes as easily as ordinary vacuum tubes.



5-PULSE, CODED MULTI-PULSE GENERATOR

Model MP-1A

Generates 5 separate pulses each with independently variable width and delay for missiles, beacons, and other systems.



FREE LIFETIME SERVICE
ON ALL POLARAD
INSTRUMENTS

POLARAD

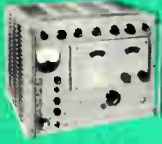
PROVEN RELIABILITY

MICROWAVE · ELECTRONICS

FOR MICROWAVE SIGNAL GENERATION 650 to 50,000 mc

All Polarad microwave signal generators and sources feature single-dial tuning control, direct reading frequency dial accurate to 1%, continuous tuning in each

range, high stability, low harmonic content, and non-contacting short-type klystron cavity chokes for noiseless tuning and accurate calibration.

**MICROWAVE SIGNAL GENERATORS**

Model MSG-1
950 to 2,400 mc
Model MSG-2
2,150 to 4,600 mc
Power Output:
0 dbm to -127 dbm

Model MSG-1

**MICROWAVE SIGNAL GENERATOR**

Model PMX
4,450 to 11,000 mc
Basic Unit Model GB-2
(Modulator, Keyer,
Power Supplies)
Tuning Unit G-48:
4,450 to 8,000 mc
Tuning Unit G-711:
6,950 to 11,000 mc

Model PMX

**MICROWAVE SIGNAL GENERATOR**

Model MSG-34
4,200 to 11,000 mc all
in one unit
Power Output:
0 dbm to -127 dbm

Model MSG-34

**MICROWAVE SIGNAL GENERATOR**

Model PMK
10,000 to 21,000 mc
Basic Unit Model GB-3
(Modulator, Keyer,
Power Supplies)
Tuning Unit G-1015:
10,000 to 15,500 mc
Tuning Unit G-1521:
15,000 to 21,000 mc

Model PMK

Model SG-1218 Signal Generator and Model SS-1218 Source are available to cover the frequency range 12,400 to 17,500 mc.

MICROWAVE SIGNAL SOURCE Model KSS—1,050 to 11,000 mc

Tuning Unit	Frequency Range	Power Output Range
S-12	1,050 to 2,250 mc	80 to 400 mw
S-24	2,140 to 4,600 mc	40 to 250 mw
S-48	4,450 to 8,000 mc	15 to 50 mw
S-711	7,850 to 11,000 mc	14 to 40 mw



Basic Unit: Power Supply and Modulator, Model HU-4.

EHF Generator

Model ESG

**EHF MICROWAVE GENERATORS AND SOURCES
9 plug-in units cover 18,000 to 50,000 mc**

SIGNAL GENERATORS Basic Unit Model HU-2	FREQUENCY RANGE	SIGNAL SOURCES Basic Unit Model HU-1
Plug-In Tuning Unit Model No.		Plug-In Tuning Unit Model No.
G1822-1	18,000 — 22,000 mc	S1822-1
G2225-1	22,000 — 25,000 mc	S2225-1
G2427-1	24,700 — 27,500 mc	S2427-1
G2730-1	27,270 — 30,000 mc	S2730-1
G2933-1	29,270 — 33,520 mc	S2933-1
G3336-1	33,520 — 36,250 mc	S3336-1
G3540-1	35,100 — 39,700 mc	S3540-1
	37,100 — 42,600 mc	S3742-1
	41,700 — 50,000 mc	S4150-1

MICROWAVE SWEEP GENERATOR

Model CSG
1,000 to 16,000 mc
Basic Unit: Model E-81
5 Interchangeable
Tuning Units:

Tuning Unit	Frequency Range	Power Output
Model E12	1,000 to 2,000 mc	70 — 800 mw
Model E24	2,000 to 4,000 mc	70 — 750 mw
Model E37	3,600 to 7,200 mc	15 — 500 mw
Model E611	6,700 to 11,400 mc	15 — 200 mw
Model E816	8,500 to 16,000 mc	3 — 75 mw

Sweep Rate: .001 to 100 sweeps per second.
Sweep Width: Continuously adjustable to full frequency range of tuning unit in use.

PULSE CODE MODULATED MICROWAVE SIGNAL GENERATOR

With Precision Oscilloscope

Model B

950 to 10,750 mc
4 Interchangeable
Tuning Units

Frequency Range:

BL-1— 950 to 2,400 mc
BS-1— 2,150 to 4,600 mc
BC-1— 4,450 to 8,000 mc
BX-1— 7,850 to 10,750 mc
Provides 5 independently adjustable pulse channels.



Model B

FOR MICROWAVE RECEPTION

EXTENDED RANGE MICROWAVE RECEIVER

Model R
400 to 46,700 mc

Four instruments in one:

- AM-FM receiver
- Field intensity receiver
- Pulse, pulse-time or pulse-position demodulator
- Sensitive power meter



Basic Unit Model R.B.

8 Interchangeable Plug-in Tuning Units*

Model RR-T	400-1,000 mc	Model RX-T	7,300-11,260 mc
Model RL-T	950-2,040 mc	Model RKS-T	9,500-15,600 mc
Model RS-T	1,900-4,340 mc	Model RKU-T	14,700-22,000 mc
Model RM-T	4,200-7,740 mc	Model RQ-T	20,260-46,700 mc

*U. S. Patent 2,774,243

CALIBRATED FIELD INTENSITY METER



Power Supply



Monitor Unit

Model FIM 1,000-10,000 mc

A highly sensitive instrument for field intensity and r-f interference measurements, antenna pattern analysis. Used as null detector and r-f voltmeter. Highly accurate frequency and power calibration.



Calibrated Antenna
Supplied with
Model FIM

Four Interchangeable Tuning Units*

FIM-L	1,000 to 2,240 mc
FIM-S	2,140 to 4,340 mc
FIM-M	4,190 to 7,740 mc
FIM-X	7,360 to 10,000 mc

*U. S. Patent 2,774,243

Test Antennas (not calibrated) 1,000 to 39,700 mc

MICROWAVE ACCESSORIES

**MICROWAVE ATTENUATOR**

Model SIJ
Covering
4,000 to 12,400 mc
Continuously variable, stub-tuned.

**SUB-MINIATURE S-BAND CAVITIES**

Plate and Grid
Pulsed Models
Each Covering
2,750 to 3,000 mc

**ALL CERAMIC KLYSTRON TUBES**

Maximum Heat &
Shock Resistance
ZV 1012 600 to 2,000 mc
ZV 1010 900 to 3,800 mc
ZV 1009 1,600 to 6,500 mc

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INSTRUMENTS**

ELECTRONIC INDUSTRIES

Wire and Cable Reference Section

$$R_t = R_o [1 + \alpha (t - t_o)]$$

$$T_2 = \frac{F - C}{2}$$

$$R = K \log_{10} \frac{D}{d}$$

$$R = \frac{\rho}{2\pi l} \log_e \frac{D}{d}$$

This is the third in a planned series of editorial features on wire and cable and their applications in the electronic industry.

- Coaxial Cable Charts

*M. L. Ferber & A. M. Kushner
Engineering Department
Times Wire and Cable Co., Inc.
(See page 97 for chart legend)*

- Coil Winding Data Chart

- AWG Table

- Wire Stranding Chart

- Magnetic Wire Insulations

- Useful Wire Formulas

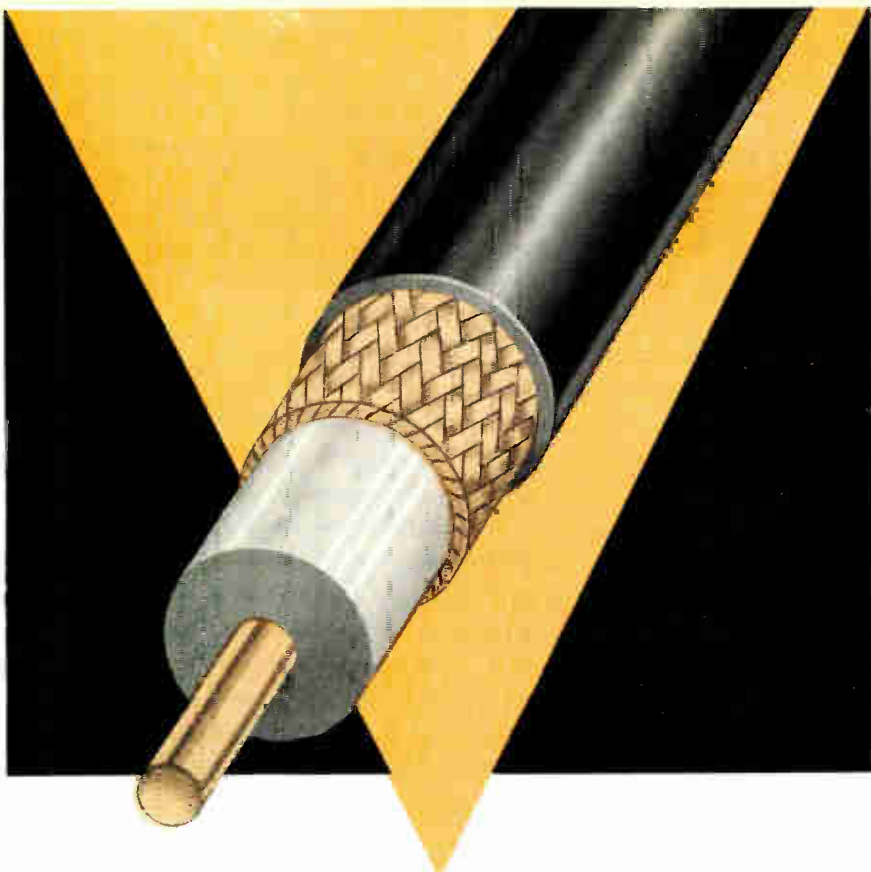
- Wire Conversion Tables

RG/U TYPE	INNER CONDUCTOR	DIELECTRIC MATERIAL $\frac{2}{3}$	NOMINAL DIAMETER OF DIELECTRIC (inch)	NUMBER & TYPE OF SHIELDING BRAIDS	PROTECTIVE COVERING $\frac{3}{4}$	NOMINAL OVER-ALL DIAMETER (inch)	WEIGHT (lb./ft.)	NOMINAL IMPEDANCE (ohms)	NOMINAL CAPACITANCE ($\mu\mu\text{f}/\text{ft.}$)	ENGINEERING DATA	NOMINAL ATTENUATION IN db/100ft. FREQ. (mc) ATTEN.		MAXIMUM OPERATING VOLTAGE (Volts rms)
4	20 AWG copper	A-1	0.116	Copper, double braid	I	0.226	0.025	50.0	30.0	Replaced by RG-58/U			1,900
5	16 AWG copper	A-1	0.185	Copper, double braid	I	0.335	0.088	52.5	28.5		100 2.6 1000 9.5	300 4.7 3000 18.0	3,000
5A	16 AWG silver covered copper	A-1	0.183	Silver coated copper, double braid	II	0.331	0.088	50.0	29.0		1 0.16 100 2.4 3000 16.7	10 0.66 1000 8.8	3,000
* 5B	0.051 inch silver covered copper	A-1	0.181	Silver coated copper, double braid	IIA	0.328	0.087	50.0	28.5	Now designated as RG-212/U	1 0.16 100 2.4 3000 16.7	10 0.66 1000 8.8	3,000
6	21 AWG copper weld	A-1	0.185	Double braids; inner silver-coated copper; outer, copper	II	0.332	0.081	76.0	20.0		100 2.8 1000 11.0	300 5.3 3000 21.0	2,700
* 6A	0.0285 inch copper covered steel	A-1	0.185	Double braids; inner, silver covered copper; outer, copper	IIA	0.332	0.082	75.0	20.0		100 2.8 1000 11.0	300 5.3 3000 21.0	2,700
7	19 AWG copper	A-2	0.250	Copper, single braid	I	0.370	0.080	95.0	12.5	Replaced by RG-63B/U			1,000
8	7/0.0285 inch copper	A-1	0.285	Copper, single braid	I	0.405	0.106	52.0	29.5		100 2.1 1000 9.0	300 4.2 3000 18.0	4,000
* 8A	7/0.0285 inch copper	A-1	0.285	Copper, single braid	IIA	0.405	0.106	52.0	29.5	Now designated as RG-213/U	100 2.1 1000 9.0	300 4.2 3000 18.0	5,000
9	7/0.0285 inch silver coated copper	A-1	0.280	Double braids; inner, silver coated copper; outer, copper	II	0.420	0.140	51.0	30.0		100 2.0 1000 8.5	300 4.0 3000 17.0	4,000
9A	7/0.0285 inch silver coated copper	A-1	0.280	Silver coated copper, double braid	II	0.420	0.140	51.0	30.0		100 2.3 1000 8.6 10000 42.0	300 4.2 3000 17.8	4,000
* 9B	7/0.0285 inch silver coated copper	A-1	0.280	Silver coated copper, double braid	IIA	0.420	0.150	50.0	30.0	Now designated as RG-214/U	100 2.3 1000 8.6 10000 41.0	300 4.2 3000 17.8	5,000
10	7/0.0285 inch copper	A-1	0.285	Copper, single braid	II with Armor	0.475 (max)	0.146	52.0	29.5		100 2.1 1000 9.0	300 4.2 3000 18.0	4,000
* 10A	7/0.0285 inch copper	A-1	0.285	Copper, single braid	IIA	0.475 (max)	0.146	52.0	29.5	RG-8A/U with Armor. Now designated as RG-215/U	100 2.1 1000 9.0	300 4.2 3000 18.0	5,000
11	7/0.0159 inch tinned copper	A-1	0.285	Copper, single braid	I	0.475 (max)	0.096	75.0	20.5		100 2.1 1000 7.8	300 3.8 3000 16.0	4,000
* 11A	7/0.0159 inch tinned copper	A-1	0.285	Copper, single braid	IIA	0.405	0.096	75.0	20.5		100 2.1 1000 7.8	300 3.8 3000 16.0	5,000
12	7/0.0159 inch tinned copper	A-1	0.285	Copper, single braid	II with Armor	0.475 (max)	0.141	75.0	20.5		100 2.1 1000 7.8	300 3.8 3000 16.0	4,000

See page 97 for Chart Legend)

RG/U TYPE	INNER CONDUCTOR	DIELECTRIC MATERIAL $\frac{1}{2}$	NOMINAL DIAMETER OF DIELECTRIC (inch)	NUMBER & TYPE OF SHIELDING BRAIDS	PROTECTIVE COVERING $\frac{1}{2}$	NOMINAL OVER-ALL DIAMETER (inch)	WEIGHT (Lb/ft.)	NOMINAL IMPEDANCE (ohms)	NOMINAL CAPACITANCE (μ f/ft.)	ENGINEERING DATA	NOMINAL ATTENUATION IN db/100ft. FREQ. (mc) ATTEN.				MAXIMUM OPERATING VOLTAGE (Volts rms)
*12A	7/0.0159 inch Tinned copper	A-1	0.285	Copper, single braid	11A	0.475 (max)	0.141	75.0	20.5	RG-11A/U with Armor	100 1000	2.1 7.8	300 3000	3.8 16.0	5,000
13	7/0.0159 inch tinned copper	A-1	0.280	Copper, double braid	I	0.420	0.126	74.0	20.5		100 1000	2.1 7.8	300 3000	3.8 16.0	4,000
*13A	7/0.0159 inch tinned copper	A-1	0.280	Copper, double braid	11A	0.420	0.126	74.0	20.5	Now designated as RG-216/U	100 1000	2.1 7.8	300 3000	3.8 16.0	5,000
14	0.102 inch copper	A-1	0.370	Copper, double braid	11	0.545	0.216	52.0	29.5		100 1000	1.4 6.2	300 3000	2.8 13.0	5,500
*14A	0.102 inch copper	A-1	0.370	Copper, double braid	11A	0.545	0.216	52.0	29.5	Now designated as RG-217/U	100 1000	1.4 6.2	300 3000	2.8 13.0	7,000
15	15 AWG copper-covered steel	A-1	0.370	Copper, double braid	I	0.545	0.197	76.0	20.0		100 1000 3000	0.17 1.58 15.0	10 1000	0.31 6.5	5,000
16	0.125 inch copper tube	A-1	0.460	Copper, single braid	I	0.630	0.254	52.0	29.5						6,000
17	0.188 inch copper	A-1	0.680	Copper, single braid	11	0.870	0.460	52.0	29.5		100 1000	0.85 4.2	300 3000	1.8 10.0	11,000
*17A	0.188 inch copper	A-1	0.680	Copper, single braid	11A	0.870	0.460	52.0	29.5	Now designated as RG-218/U	100 1000	0.85 4.2	300 3000	1.8 10.0	11,000
17B	CANCELLED: REASSIGNED NEW NOMENCLATURE RG-177/U														
18	0.188 inch copper	A-1	0.680	Copper, single braid	11 with Armor	0.945 (max)	0.585	52.0	29.5		100 1000	0.85 4.2	300 3000	1.8 10.0	11,000
*18A	0.188 inch copper	A-1	0.680	Copper, single braid	11A with Armor	0.945 (max)	0.585	52.0	29.5	Now designated as RG-219/U	100 1000	0.85 4.2	300 3000	1.8 10.0	11,000
19	0.250 inch copper	A-1	0.910	Copper, single braid	11	1.120	0.740	52.0	29.5		100 1000	0.68 3.5	300 3000	1.5 7.7	14,000
*19A	0.250 inch copper	A-1	0.910	Copper, single braid	11A	1.120	0.740	52.0	29.5	Now designated as RG-220/U	100 1000	0.68 3.5	300 3000	1.5 7.7	14,000
20	0.025 inch copper	A-1	0.910	Copper, single braid	11 with Armor	1.195 (max)	0.295	52.0	29.5		100 1000	0.68 3.5	300 3000	1.5 7.7	14,000
*20A	0.250 inch copper	A-1	0.910	Copper, single braid	11A with Armor	1.195 (max)	0.925	52.0	29.5	Now designated as RG-221/U	100 1000	0.68 3.5	300 3000	1.5 7.7	14,000
21	0.0508 inch high resistance wire	A-1	0.185	Silver-coated copper, double braid	11	0.332	0.087	53.0	29.0		100 1000	14.0 46.0	300 3000	25.0 82.0	2,700
*21A	0.0508 inch high resistance wire	A-1	0.185	Silver-coated copper, double braid	11A	0.332	0.087	53.0	29.0	Now designated as RG-222/U	100 1000	14.0 46.0	300 3000	25.0 82.0	2,700
22	2-conductor 7/0.0152 inch copper	A-1	0.285	Tinned copper, single braid	I	0.405	0.105	95.0	16.0		30 200	1.7 5.3	100 300	3.6 7.0	1,000
22A	2-conductor 7/0.0152 inch copper	A-1	0.285	Tinned copper, double braid	11	0.420	0.151	95.0	16.0		400	10.5 max.			1,000

RG/U TYPE	INNER CONDUCTOR	DIELECTRIC MATERIAL $\frac{1}{2}$	NOMINAL DIAMETER OF DIELECTRIC (inch)	NUMBER & TYPE OF SHIELDING BRAIDS	PROTECTIVE COVERING $\frac{3}{4}$	NOMINAL OVER-ALL DIAMETER (inch)	WEIGHT (Lb/ft.)	NOMINAL IMPEDANCE (ohms)	NOMINAL CAPACITANCE ($\mu\text{mf/ft.}$)	ENGINEERING DATA	NOMINAL ATTENUATION IN db/100ft. FREQ. (mc) ATTEN.			MAXIMUM OPERATING VOLTAGE (Volts rms)
* 22B	2-conductor 7/0.0152 inch copper	A-1	0.285	Tinned copper, double braid	11A	0.420	0.151	95.0	16.0	Dual coax. balanced cable. Twisted conductors	400 10.5 max.			1,000
23	2-conductors 7/0.0285 inch copper	A-1 2-cores	0.380	Individual inner, common outer, copper	I	0.650 x 0.945	0.490	125.0	12.0		10 0.4 100 1.7 300 3.5	30 0.8 200 2.6		3,000
* 23A	2-conductors 7/0.0285 inch copper	A-1 2-cores	0.380	Individual inner, common outer, copper	11A	0.650 x 0.945	0.490	125.0	12.0		10 0.4 100 1.7 300 3.5	30 0.8 200 2.6		3,000
* 24	2-conductors 7/0.0285 inch copper	A-1 2-cores	0.380	Individual inner, common outer, copper	I with Armor	1.034 x 0.735	0.670	125.0	12.0		10 0.4 100 1.7 300 3.5	30 0.8 200 2.6		3,000
24A	2-conductors 7/0.0285 inch copper	A-1 2-cores	0.380	Individual inner, common outer, copper	11A	1.034 x 0.735	0.670	125.0	12.0	RG-23A/U with Armor	10 0.4 100 1.7 300 3.5	30 0.8 200 2.6		3,000
* 25	19/0.0117 inch tinned copper	D	0.308	Tinned copper, double braid	IV	0.565	0.205	48.0	50.0	Pulse cable				8,000 (peak)
* 25A	19/0.0117 inch tinned copper	E	0.288	Tinned copper, double braid	IV	0.505	0.205	48.0	50.0	Pulse cable				8,000 (peak)
* 26	19/0.0117 inch tinned copper	D	0.308	Tinned copper, single braid	IV with Armor	0.525 (max)	0.189	48.0	50.0	Pulse cable				8,000 (peak)
* 26A	19/0.0117 inch tinned copper	E	0.288	Tinned copper, single braid	IV with Armor	0.505 (max)	0.189	48.0	50.0	Pulse cable				8,000 (peak)
27	19/0.0185 inch tinned copper	D	0.455	Tinned copper single braid	I with Armor	0.675 (max)		48.0	50.0		0.3 0.2 3 1.3	1 0.5 10 3.4		15,000 (peak)
* 27A	19/0.0185 inch Tinned copper	Composite Rubber Type D	0.455	Tinned copper, single braid	IV with Armor	0.595 (max)	0.304	48.0	50.0	High voltage pulse cable	0.3 0.2 3 1.3	1 0.5 10 3.4		15,000 (peak)
28	19/0.0185 inch tinned copper	D	0.455	Double braids; inner, tinned copper; outer, galvanized steel	IV	0.805		48.0	50.0		0.3 0.2 3 1.3	1 0.5 10 3.4		15,000 (peak)
* 28B	19/0.0185 inch tinned copper	D	0.455	Double braids; inner, tinned copper; outer, galvanized steel wire	IV	0.750	0.370	48.0	50.0	High voltage pulse cable	0.3 0.2 3 1.3	1 0.5 10 3.4		15,000 (peak)
* 28A	19/0.0185 inch tinned copper	Rubber	0.400	Tinned copper, single braid	IV over Armor	0.805		50.0	50.0	High voltage pulse cable for use at - 55°C				15,000 (peak)
29	20 AWG copper	A-1	0.116	Tinned copper, single braid	III	0.184 (max)	0.021	53.5	28.5	Replaced by RG-58/U	1 0.33 100 4.8 3000 35.	10 1.3 1000 18.		1,900
30	7/26 AWG copper	B	0.185	Copper, single braid	I	0.250		58.0	27.0	Replaced by RG-58/U				1,500
31	7/21 AWG copper	B	0.285	Copper, single braid	I	0.405	0.106	51.0	31.0	Replaced by RG-8/U				2,000



COAXIAL CABLE

the way you want it

when you want it!

When it comes to coaxial cable — come to TIMES first. You name it — we make it — solid polyethylene and Teflon dielectric, expanded polyethylene dielectric, semi-solid polyethylene dielectric, semi-solid Teflon dielectric. TIMES manufactures over 175 RG/U Type* Coaxial Cables meeting virtually all industrial and military needs. In addition, a customer-service stock is maintained of over 100 RG/U Type Coaxial Cables in most length-requirements, providing immediate delivery.

If you're in a hurry, or you want the best at the right price — check with TIMES first . . .

* Meeting or surpassing MIL-C-17 specifications



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SPECIAL PURPOSE MULTI-CONDUCTOR CABLES—

Combination cables—high and medium temperature hook-up, coaxial, miniaturized coaxial—whatever the application calls for . . .



HOOK-UP WIRE IN ALL TEMPERATURE RANGES—

All types of high and medium temperature hook-up wires for every electronic application.



ENGINEERED WIRE AND CABLE

Design and development facilities for wire and cable requirements from DC to 25,000 MCS under all electrical and environmental conditions . . .

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Save Time *with* Super-Temp

MAGNET WIRE • LEAD WIRE • MINIATURE CABLES
JUMBO CABLES • LACING CORDS • SPECIALTY WIRE

Wire or Cable	Primary Insulation	Colors MIL-Std-104	Operating Temperature	Jackets	Remarks
Cables-Class H	Teflon, Extruded or Tape Wrapped	Solid & Striped	-90°C - +260°C	1. Teflon 2. Impregnated Glass	Any combinations of conductors and shielding required.
Cables-Class A	Teflon, Extruded or Tape Wrapped	Solid & Striped	-54°C - +105°C	Nylon Braid Nylon Ext. PVC	Any combinations of conductors and shielding required.
Cables-Coaxial	Teflon, Extruded	Jackets Only Solid & Striped	-90°C - +260°C	Teflon, Kel-F, Impregnated Glass	Conforms to MIL-C-17B and MIL-C-8721.
Magnet Wire	Teflon Film	Solid Only	-90°C - +260°C	----	Conforms to MIL-W-19583, Type III.
	Silicone or Isonel Film	Natural	to 155°C	----	Conforms to MIL-W-19583, Type II.
High Temperature Hook-up Wire	Teflon, Extruded or Tape Wrapped	Solid & Striped	-90°C - +260°C	----	Conforms to MIL-W-16878, Types E & EE or other special specifications as required.
	Extruded Silicone Rubber	Solid	-55°C - +200°C	Teflon Impregnated Glass, Nylon, Dacron	Conforms to MIL-W-16878 Types F & FF.
Thin Wall Hook-up Wire	Teflon, Extruded or Tape Wrapped	Solid & Striped	-90°C - +260°C	----	Operating voltage 300 v.rms.
Airframe Wire	Teflon Tape Plus Impregnated Glass	Solid Only	-60°C - +205°C	----	Conforms to MIL-W-7139A.
Sub Miniature Hook-up Wire	Teflon Film	Solid Only	-90°C - +260°C	----	Double quad coating for small diameter at 300 v.rms.
Hook-up Wire	Polyvinyl Chloride	Solid & Striped	-55°C - +105°C	----	MIL-W-16878, Types B, C & D. Plain or with Nylon coating.
	Extruded Silicone Rubber	Solid	-55°C - +150°C	Teflon Impregnated Glass, Nylon, Dacron	Conforms to MIL-W-8777A.

Super-Temp also offers the following insulating materials to the electronic industry and producers of wires and cables:

TEFLON TAPES Extruded, both sintered and unsintered, in widths from 1/8" to 3" and thickness from .003" to .010". MIL-Std-104 colors. Impregnated glass fiber, natural or colored.

TEFLON TUBING Tape wrapped for extra flexibility. MIL-Std-104 colors, solid or striped. Extruded spaghetti solid MIL-Std-104 colors. Braided impregnated glass fiber in solid colors.

BONDING TREATMENT

Super-Temp can treat the surface of Teflon Magnet Wire, Cables and Hook-up Wires to increase their bondability for potting and encapsulating.



New Developments
Mica Magnet Wire, with its outstanding thermal characteristics, is typical of the new products being made by Super-Temp. Many other new products are under test for higher temperatures and better performance.

American Super-Temperature Wires, Inc.

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General Sales Office: 195 Nassau Street, Princeton, N. J. • Phone Walnut 4-4450

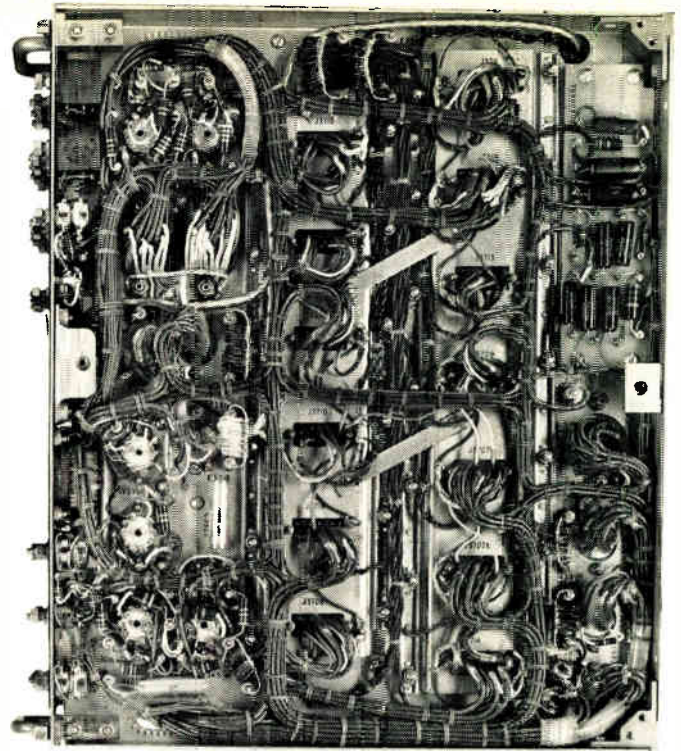
Agents in Principal Electronic Manufacturing Areas

*DuPont's TFE Resin

RG/U TYPE	INNER CONDUCTOR	DIELECTRIC MATERIAL $\frac{1}{2}$	NOMINAL DIAMETER OF DIELECTRIC (inch)	NUMBER & TYPE OF SHIELDING BRAIDS	PROTECTIVE COVERING $\frac{1}{2}$	NOMINAL OVER-ALL DIAMETER (inch)	WEIGHT (Lb./ft.)	NOMINAL IMPEDANCE (ohms)	NOMINAL CAPACITANCE ($\mu\mu\text{f}/\text{ft.}$)	ENGINEERING DATA	NOMINAL ATTENUATION IN db/100ft. FREQ.(mc) ATTEN.	MAXIMUM OPERATING VOLTAGE (Volts rms)	
32	7/21 AWG copper	B	0.285	Copper, single braid	I with Armor	0.465		51.0	29.0	Replaced by RG-10/U		2,000	
33	10 AWG copper	A-1	0.370	None	Lead sheath	0.470	0.390	51.0	30.0			6,000	
34	7/0.0285 copper	A-1	0.455	Copper, single braid	I	0.625	0.224	71.0	21.5		30 0.9 200 2.7 100 1.8 300 3.5	5,200	
*34B	7/0.0249 inch copper	A-1	0.460	Copper, single braid	11A	0.630	0.224	75.0	21.5		400 3.8 max.	6,500	
35	9 AWG copper	A-1	0.680	Copper, single braid	11 with Armor	0.945 (max)	0.525	71.0	21.5		100 0.7 1000 4.2 300 1.8 3000 9.2	10,000	
*35B	0.1045 inch copper	A-1	0.680	Copper, single braid	11A with Armor	0.945 (max)	0.525	75.0	21.5		400 2.8 max.	10,000	
36	0.162 inch copper	A-1	0.910	Copper, single braid	11A with Armor	1.180	0.805	69.0	22.0			13,000	
37	20 AWG tinned copper	C	0.140	Tinned copper, single braid	111	0.210 (max)	0.040	52.5	38.0	Replaced by RG-58/U		750	
38	17 AWG tinned copper	C	0.196	Tinned copper, double braid	111	0.312 (max)	0.110	52.5	38.0	Replaced by RG-5/U		1,000	
39	22 AWG tinned copper covered steel	C	0.196	Tinned copper, double braid	111	0.312 (max)	0.100	72.5	28.0	Replaced by RG-6, 59/U		1,000	
40	22 AWG tinned copper covered steel	C	0.196	Tinned copper, double braid	1V	0.420	0.150	72.5	28.0	Replaced by RG-6/U		1,000	
41	16/30 AWG tinned copper	C	0.250	Tinned copper, single braid	1V	0.425	0.150	67.5	27.0			3,000	
42	21 AWG Resistance wire	A-1	0.196	Silver-coated copper, double braid	11A	0.342	0.050	78.0	20.0	Replaced by RG-21/U	1 1.8 100 17.0 3000 95.0	10 5.6 1000 54.0	2,700
43	2-conductor 7/21 AWG copper	B	0.472	Copper, single braid	I	0.617		95.0	17.0	Replaced by RG-57/U		1,500	
54	7/26 AWG copper	A-1	0.185	Copper, single braid	I	0.275		58.0	27.0	Replaced by RG-54A/U		2,500	
54A	7/0.0152 inch copper	A-1	0.178	Tinned copper, single braid	111	0.250 (max)	0.041	58.0	26.5		1 0.18 100 3.1 3000 21.5	10 0.85 1000 12.0	3,000
55	20 AWG Copper	A-1	0.116	Tinned copper, double braid	111	0.206 (max)	0.032	53.5	28.5		10 1.0 100 4.2 1000 16.0	30 2.0 300 7.9 3000 32.0	1,900
55A	1/0.035 silver covered copper	A-1	0.116	Silver-covered copper, double braid	11A	0.216 (max)	0.034	50	29.0		400 11.7 max.	3000 40.0 max.	1,900
* 55B	0.0320 inch silver covered copper	A-1	0.116	Tinned copper, double braid	111A	0.206 (max)		53.0			400 11.7 max.		1,900

When does 5¢ worth of wire cost \$250.00?

When this installation failed during test, it cost the manufacturer \$250.00 to find the failure and replace the defective conductor with Haveg Engineered Teflon* Wire. Had the manufacturer used Haveg Engineered Teflon Wire in the beginning, his initial cost may have been higher but his improved reliability would have more than saved the difference.



ELECTRONIC DIVISION

wire and cable specialists

HOOK-UP WIRE—EXTRUDED in sizes A.W.G. 10 through A.W.G. 32, per MIL-W-16878B Type E and EE, and NAS 703, Type U Class A and C. Available in fifteen colors and one, two or three stripes. Request Bulletin T-500 for engineering data.

HOOK-UP WIRE—FUSED WRAPPED in sizes A.W.G. 8 through A.W.G. 32 per MIL-W-16878B Type E. Available in ten solid colors and one or two stripes. Request Bulletin T-505 for engineering data.

HOOK-UP WIRE—MINIATURE THIN WALL extruded or fused wrapped insulation of .004 to .007 A.W.G. 22 through A.W.G. 32. Available in ten solid colors and stripes. Request Bulletin T-510 for engineering data.

SHIELDED LEAD WIRE extruded or fused wrapped in sizes A.W.G. 8 through A.W.G. 30 per MIL-W-16878B Type E and EE, and NAS 703, Type S Class A and C. Request Bulletin T-520 for engineering data.

LEAD WIRE—HIGH TEMPERATURE tape wrapped "Teflon"* impregnated fiberglass braid. In sizes A.W.G. 6 through A.W.G. 28 in both 600 Volt (R.M.S.) and 1000 Volt (R.M.S.). Ten solid colors and various braided stripes. Request Bulletin T-530 for engineering data.

MINIATURE CABLES SINGLE OR MULTI-CONDUCTOR extruded or fused wrapped primary insulation, shielded and jacketed with "Teflon", lacquered nylon braid, extruded nylon, silicone, or Teflon lacquered fiberglass or extruded vinyl. Available in sizes A.W.G. 18 through A.W.G. 30. Request Bulletin T-540 for engineering data.

AIR FRAME WIRE tape wrapped with a "Teflon" impregnated fiberglass braid per MIL-W-7139A. Available in sizes A.W.G. 6 through A.W.G. 22 in ten colors. Request Bulletin T-550 for engineering data.

COAXIAL CABLE—Standard items are prepared in accordance with the requirements of MIL-C-17B, but many individual customer requirements can also be produced. All Haveg cables are based on extruded "Teflon" dielectric. Request Bulletin T-555.

MAGNET WIRE—Insulated magnet wire fall into four categories covering four ranges of temperature from -90°C to 350°C and are tested for rigid quality control in accordance with the requirements of MIL-W-19583. Request Bulletin T-600.

MICA INSULATED MAGNET WIRE—Mica insulation has been developed to withstand a minimum of 350°C . for 200 hours. Continuing development is expected to improve the temperature rating and length of operating time.

*Trade Name for Du Pont's Tetrafluoroethylene Resin.



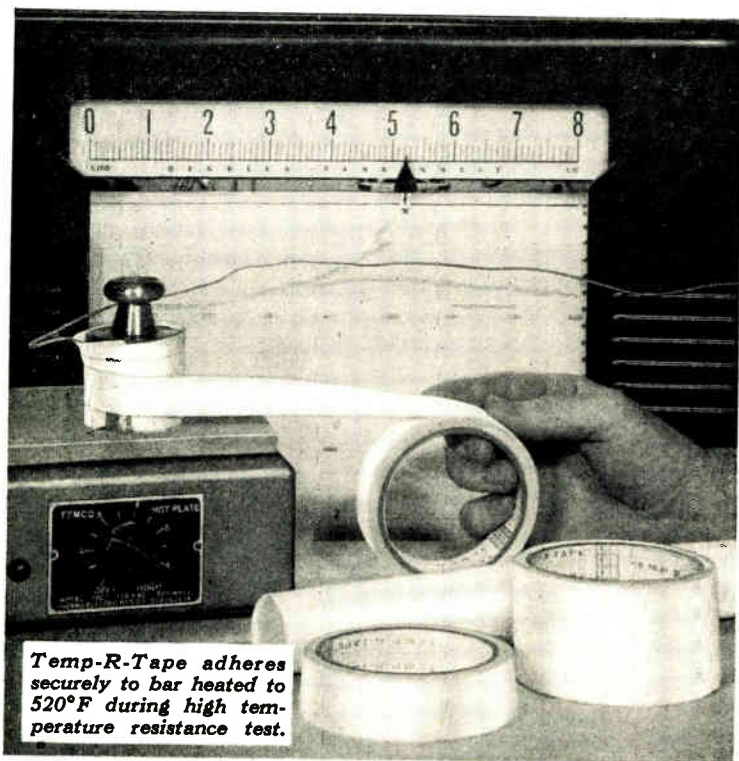
FIRST IN *Engineered* PLASTICS®

HAVEG INDUSTRIES, INC.

900 GREENBANK ROAD • WILMINGTON 8, DELAWARE

RG/U TYPE	INNER CONDUCTOR	DIELECTRIC MATERIAL \checkmark	NOMINAL DIAMETER OF DIELECTRIC (inch)	NUMBER & TYPE OF SHIELDING BRAIDS	PROTECTIVE COVERING \checkmark	NOMINAL OVER-ALL DIAMETER (inch)	WEIGHT (Lb/ft.)	NOMINAL IMPEDANCE (ohms)	NOMINAL CAPACITANCE ($\mu\text{mf/ft.}$)	ENGINEERING DATA	NOMINAL ATTENUATION IN db/100ft. FREQ. (mc) ATTEN.		MAXIMUM OPERATING VOLTAGE (Volts rms)
56	19/0.0117 inch copper	D	0.308	Copper, double braid	I	0.535				Special twist			
57	2-conductors 7/0.0285 copper	A-1	0.472	Tinned copper, single braid	I	0.625	0.225	95.0	17.0		30 1.4 200 4.6	100 3.0 300 5.9	3,000
* 57A	2-conductors 7/0.0285 inch copper	A-1	0.472	Tinned copper, single braid	IIA	0.625	0.225	95.0	17.0		30 1.4 200 4.6	100 3.0 300 5.9	3,000
58	20 AWG copper	A-1	0.116	Tinned copper, single braid	I	0.195	0.029	53.5	28.5		10 1.0 100 4.2 1000 16.0	30 2.0 300 7.9 3000 32.0	1,900
58A	19/0.0071 Tinned copper	A-1	0.116	Tinned copper, single braid	I	0.195	0.029	52	28.5		10 1.3 100 5.3 1000 22.0	30 2.5 300 9.6 3000 45.0	1,900
58B	20 AWG copper	A-1	0.116	Tinned copper, single braid	IIA	0.195	0.029	53.5	28.5		10 1.0 100 4.2 1000 16.0	30 2.0 300 7.9 3000 32.0	1,900
* 58C	19/0.0071 inch tinned copper	A-1	0.116	Tinned copper, single braid	IIA	0.195	0.029	50.0	28.5		10 1.3 100 5.3 1000 22.0	30 2.5 300 9.6 3000 45.0	1,900
59	22 AWG copperweld	A-1	0.146	Copper, single braid	I	0.242	0.032	73.0	21.0		10 1.0 100 3.8 1000 14.0	30 2.0 300 7.0 3000 29.0	2,300
59A	1/0.0230 copperweld	A-1	0.146	Copper, single braid	* IIA	0.242	0.032	75.0	21.5		400 9.0 max.	3000 30.0 max.	2,300
* 59B	0.0230 inch copper-covered steel wire	A-1	0.146	Copper, single braid	IIA	0.242	0.032	75.0	21.0		400 9.0 max.	3000 30.0 max.	* 2,300
60	Stranded copper	C	0.250	Copper, single braid	IV	0.425		50.0					
62	22 AWG copperweld	A-2	0.146	Copper, single braid	I	0.242	0.0382	93.0	13.5		3 0.5 30 1.7 300 5.5 3000 18.0	10 1.0 100 3.1 1000 10.0	750
* 62A	0.0253 inch copper-covered steel wire	A-2	0.146	Copper, single braid	IIA	0.242	0.0382	93.0	14.5 (max)		3 0.5 30 1.7 300 5.5 3000 18.0	10 1.0 100 3.1 1000 10.0	750
62B	7/32 AWG copper-covered steel	A-2	0.146	Copper, single braid	IIA	0.242	0.0283	93.0	14.5		400 5.5 max.		750
* 63B	0.0253 inch copper-covered steel wire	A-2	0.285	Copper, single braid	IIA	0.405	0.0832	125.0	11.0 (max)		400 5.5 max.		1,000
63	22 AWG copperweld	A-2	0.285	Copper, single braid	I	0.405	0.0832	125.0	10.0		3 0.3 30 1.1 300 3.6 3000 12.0	10 0.6 100 2.0 1000 7.0	1,000

Now 4 CHR High Temperature TEFLON[®] Tapes



- -100°F to 500°F applications
- Class H and Class C insulation
- Non-stick and low friction facing
- Chemical resistant facing

TEMP-R-TAPE T is a .006" pressure-sensitive Teflon tape with -100°F to 400°F (-70°C to 200°C) temperature range. It has high dielectric strength, low power factor, negligible moisture absorption, high elongation, is non-corrosive and non-contaminating. Meets Class H Temperature requirements.

TEMP-R-TAPE TH is a .013" pressure-sensitive Teflon tape with -100°F to 400°F temperature range. It is similar to Temp-R-Tape T except that it is made of .010" Teflon film to which .003" silicone polymer adhesive has been added. Often used where a single, thicker dielectric barrier is desired or where a more rigid, abrasion resistant wrap is required.

TEMP-R-TAPE C is a .002" pressure-sensitive, thermal curing Teflon tape with -100°F to 500°F temperature range. It is made with a cast Teflon film which provides dielectric strength (2750 v/m) higher than any other type of Teflon film. When cured in place, it will operate at temperatures up to 500°F and will withstand much higher temperatures for short periods. Meets Class H and Class C temperature requirements.

TEMP-R-TAPE TGV is a thermal curing, pressure-sensitive Teflon impregnated fiberglass tape with -100°F to 500°F temperature range. Although it is used extensively for mechanical and electrical applications, its dielectric strength is lower than other Temp-R-Tapes.

CHR products include:

COHRLastic Aircraft Products — Airframe and engine seals, firewall seals, coated fabrics and ducts

COHRLastic Silicone Rubber Products — Silicone rubber moldings and extrusions, silicone rubber sheets, silicone sponge rubber

Temp-R-Tapes — Pressure sensitive, thermal curing Teflon and silicone tapes

Allied Products — COHRLastic silicone cements and conductive gasketing

Pressure-Sensitive TEFLON Tapes

easy to apply in both electrical and mechanical applications

The electrical uses of Temp-R-Tape include slot lining, inter-layer and interphase insulation, harness bundling, wrapping for microwave components, transformer coils, capacitors and high voltage cables, etc.

As a low friction, non-stick facing, Temp-R-Tape applications range from facings for film guides in sensitive electronic instruments to the facing for heat sealing bars, forming dies, chutes, guide rails, etc.

Chemical resistant facing applications include masking tape in high temperature dipping operations.

All four of these pressure-sensitive Teflon tapes are available from stock in rolls and in sheet form. In addition to Teflon tapes, CHR also makes a fiberglass tape with thermal curing, pressure-sensitive silicone adhesive (Temp-R-Tape GV) and silicone rubber coated fiberglass tape with thermal curing, pressure-sensitive silicone adhesive (Temp-R-Tape SGV).

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Leader In Fabrication of Silicone Rubber

CONNECTICUT HARD RUBBER COMPANY

Main Office: New Haven 9, Connecticut

ELECTRONIC INDUSTRIES • June 1959

RG/U TYPE	INNER CONDUCTOR	DIELECTRIC MATERIAL $\frac{1}{2}$	NOMINAL DIAMETER OF DIELECTRIC (inch)	NUMBER & TYPE OF SHIELDING BRAIDS	PROTECTIVE COVERING $\frac{2}{3}$	NOMINAL OVER-ALL DIAMETER (inch)	WEIGHT (Lb/ft.)	NOMINAL IMPEDANCE (ohms)	NOMINAL CAPACITANCE ($\mu\mu\text{f}/\text{ft.}$)	ENGINEERING DATA	NOMINAL ATTENUATION IN db/100ft. FREQ. (mc) ATTEN.				MAXIMUM OPERATING VOLTAGE (Volts rms)
											3	10	30	100	
63A	22 AWG copper	A-1		Copper, single braid	I	0.415		125.0		Replaced by RG-63B/U	3 0.3 30 1.1 300 3.6 3000 12.0	10 0.6 100 2.0 1000 7.0			
*64	19/0.0117 inch tinned copper	D	0.308	Tinned copper, double braid	IV	0.495	0.205	48.0	50.0	Pulse cable	1 0.7 max.			10,000	
*64A	19/0.0117 inch tinned copper	E	0.288	Tinned copper, double braid	IV	0.475 (max)	0.205	48.0	50.0	Pulse cable	1 0.7			8,000 (peak)	
65	#32 Formex F, 0.128" diameter (Helix)	A-1	0.285	Copper, single braid	I	0.405	0.0832	950.0	44.0		1 5.5 10 21.5	3 10.2 30 40.0		1,000	
*65A	#32 Formex F, 0.128" diameter (Helix)	A-1	0.285	Copper, single braid	IIA	0.405	0.096	950.0	44.0	High impedance delay line video cable	1 5.5 10 21.5	3 10.2 30 40.0		1,000	
71	22 AWG copperweld	A-2	0.146	Tinned copper double braid	III	0.250 (max)	0.0457	93.0	13.5		3 0.5 30 1.7 300 5.5 3000 18.0	10 1.0 100 3.1 1000 10.0		750	
*71B	0.0253 inch copper covered steel	A-2	0.146	Tinned copper, double braid	IIIA	0.250 (max)	0.0457	93.0	14.5 (max)		3 0.5 30 1.7 300 5.5 3000 18.0	10 1.0 100 3.1 1000 10.0		750	
71A	22 AWG copper covered steel	A-2	0.146	Tinned copper, double braid	I	0.250		93.0	13.5		3 0.5 30 1.7 300 5.5 3000 18.0	10 1.0 100 3.1 1000 10.0		750	
72	22 AWG copper covered steel	A-2	0.460	Copper, single braid	I	0.630		150.0							
73	20 AWG copper	A-1	0.116	Copper, double braid	Copper braid	0.275			25.0						
74	10 AWG copper	A-1	0.370	Copper, double braid	II with armor	0.545	0.310	52.0	29.5		100 1.4 1000 6.2	300 2.8 3000 13.0		5,500	
*74A	0.102 inch copper	A-1	0.370	Copper, double braid	IIA with Armor	0.615 (max)	0.310	52.0	29.5		100 1.4 1000 6.2	300 2.8 3000 13.0		7,000	
77	19/0.0117 tinned copper	E	0.288	Tinned copper, double braid	III	0.415 (max)		48.0	50.0		0.3 0.2 3 1.3	1 0.5 10 3.4		8,000	
77A	19/0.0117 inch tinned copper	E	0.288	Tinned copper, double braid	II	0.450 (max)		48.0	50.0	Pulse cable	0.3 0.2 3 1.3	1 0.5 10 3.4		8,000 (peak)	
78	19/0.0117 inch tinned copper	E	0.288	Tinned copper, double braid	III or II	0.385 (max)		48.0	50.0		0.3 0.2 3 1.3	1 0.5 10 3.4		8,000 (peak)	
78A	19/0.0117 inch tinned copper	E	0.288	Tinned copper, single braid	II	0.420		50.0	50.0	Same as RG-77A/U except has single braid	0.3 0.2 3 1.3	1 0.5 10 3.4		8,000 (peak)	
79	22 AWG copperweld	A-2	0.285	Copper, single braid	I	0.405	0.136	125.0	10.0		3 0.3 30 1.1 300 3.6 3000 12.0	10 0.6 100 2.0 1000 7.0		1,000	

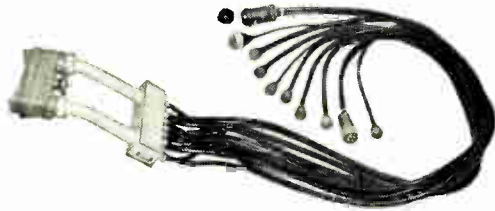
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Specialized designs for the most exacting requirements

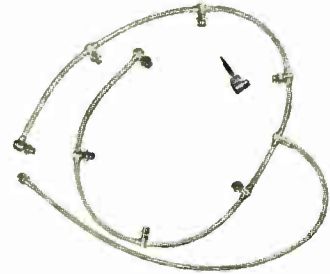
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able for custom designing cable assemblies to meet your specialized requirements on each installation. Cable assemblies shown are typical Scintilla Division developments in cabling for aircraft, electronic and missile applications.

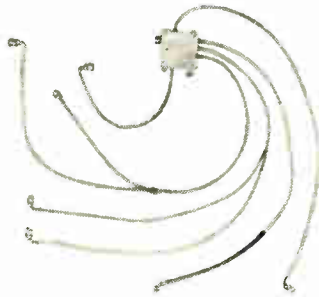
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MISSILE CONTROL CABLE: This cable is fabricated using both Benseal® (a plastic molded covering) and Bendix electrical connectors. Protects vital circuitry controlling the firing of missiles.



THERMOCOUPLE HARNESS: Flexible, completely sealed and suitable for continuous operation in ambient temperatures of -65°F to 1500°F . Thermocouples are singly detachable and the sealed harness eliminates any chance of trouble from altitude, moisture or other contaminants.



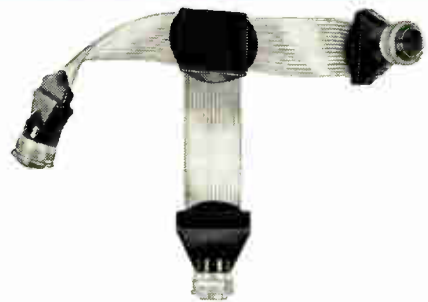
CONTROL HARNESS: This configuration, encased and sealed in metal braid and complete with junction box, can safely withstand the adverse effects of engine environment such as heat, vibration, and oils.



FUEL CELL CABLE: Safely conducts electricity to fuel control valves, pumps, switches and gaging devices immersed within fuel cells. Features: unbroken stainless steel bellows type conduit, double layer protection between current carrying conductors, stainless steel integral connector shells.



HEAVY DUTY CABLE: Ground support cable assembly built and designed for hard usage at missile launching sites. Heavy duty moldings and a tough neoprene tubing combine to resist wear.



RIBBON CABLE: Ribbon type cable terminated to both standard MS or Bendix Pygmy® connectors. Advantages offered by this type of wiring include durability, performance, lightness, plus minimum space requirements.

Export Sales & Service: Bendix International Division, 205 E. 42nd St., New York 17, N.Y. Canadian Affiliate: Aviation Electric Ltd., 200 Laurentien Blvd., Montreal 9, Quebec

SCINTILLA DIVISION
SIDNEY, NEW YORK



RG/U TYPE	INNER CONDUCTOR	DIELECTRIC MATERIAL $\frac{1}{2}$	NOMINAL DIAMETER OF DIELECTRIC (inch)	NUMBER & TYPE OF SHIELDING BRAIDS	PROTECTIVE COVERING $\frac{2}{2}$	NOMINAL OVER-ALL DIAMETER (inch)	WEIGHT (Lb./ft.)	NOMINAL IMPEDANCE (ohms)	NOMINAL CAPACITANCE ($\mu\mu\text{f}/\text{ft.}$)	ENGINEERING DATA	NOMINAL ATTENUATION IN db/100ft. FREQ. (mc) ATTEN.				MAXIMUM OPERATING VOLTAGE (Volts rms)
											3	10	30	100	
* 79B	0.0253 inch copper covered steel wire	A-2	0.285	Copper, single braid	IIA with Armor	0.475 (max)	0.136	125.0	11.0 (max)	RG-63B/U with Armor	3 0.3 30 1.1 300 3.6 3000 12.0	10 0.6 100 2.0 1000 7.0		1,000	
* 81	0.0625 inch copper	Magnesium oxide	0.321	None	Copper tube	0.375	0.172	50.0	37.0	Semi-rigid, high temperature	400 5.5 max.			3,000	
* 82	0.125 inch copper	Magnesium oxide	0.650	None	Copper tube	0.750	0.698	50.0	36.0	Semi-rigid, high temperature	400 3.5 max.			5,000	
83	10 AWG Copper	A-1	0.240	Copper, single braid	I	0.405		35.0	44.0		1 0.23 100 2.8 3000 23.5	10 0.80 1000 9.6		2,000	
* 84A	0.1045 inch copper	A-1	0.680	Copper, single braid	IIA with lead sheath	1.000	1.325	75.0	21.5	RG-35B/U with lead sheath in lieu of Armor	400 2.8 max.			10,000	
* 85A	0.1045 inch copper	A-1	0.680	Copper, single braid	IIA lead sheath & special Armor	1.565 (max)	2.910	75.0	21.5	RG-84A/U with special Armor	400 2.8 max.			10,000	
* 86	2-conductors, 7/0.0285 inch soft copper	A-1	0.300 x 0.650	None	None	0.300 x 0.650		200.0	7.8	Twin lead	100 0.56				
* 87A	7/0.032 inch silver covered copper	F-1	0.280	Silver-coated copper, double braid	V	0.425		50.0	29.5	For replacement purposes only, use RG-225/U	400 5.0 max.			5,000	
* 88A	19/0.0117 inch tinned copper	E	0.288	Tinned copper, four braids	IIA	0.515 (max)		48.0	50.0		1 0.7 max.			10,000	
88B	19/0.0117 inch tinned copper	E	0.288	Tinned copper, four braids	IV	0.565		48.0	50.0		1 0.7 max.			10,000	
89	22 AWG copper covered steel	A-1	0.285	Copper, single braid	I	0.632		125.0	10.0	Low capacitance	100 2.0	1000 6.3		1,000	
90	7/24 AWG tinned or silvered copper	A-1	0.195	Three braids: tinned or silvered copper, galv. steel, tinned or silvered copper	Low Temperature synthetic resin	0.425		50.0	30.8	Carrier frequency communication				3,000	
93	19 strands plain copper, nominal dia. 0.200 inch	F-2	0.574	Copper, single braid	V	0.710	0.475	50.0	29.0	Replaced by RG-117/U				10,000	
* 94	19/0.0255 inch silver covered copper	F-2	0.292	Copper, double braid	V	0.445		50.0	27.0	Now designated as RG-226/U	400 3.8 max.	3000 13.0 max.		7,000	
94A	19/0.0254 silver plated copper	F-2	0.370	Copper, double braid	V	0.500	0.445	50.0	27.0		400 3.8 max.	3000 14.0 max.		7,000	
100	19/0.0147 inch copper	A-1	0.146	Copper, single braid	I	0.242		35.0	44.0					2,000	

RG/U TYPE	INNER CONDUCTOR	DIELECTRIC MATERIAL $\frac{3}{4}$	NOMINAL DIAMETER OF DIELECTRIC (inch)	NUMBER & TYPE OF SHIELDING BRAIDS	PROTECTIVE COVERING $\frac{3}{4}$	NOMINAL OVER-ALL DIAMETER (inch)	WEIGHT (Lb./ft.)	NOMINAL IMPEDANCE (ohms)	NOMINAL CAPACITANCE ($\mu\text{f}/\text{ft.}$)	ENGINEERING DATA	NOMINAL ATTENUATION IN db/100ft. FREQ.(mc) ATTEN.		MAXIMUM OPERATING VOLTAGE (Volts rms)
108	2-conductors 7/28 tinned copper	A-1	0.079 over each conductor	Tinned copper, single braid	I	0.235		78.0	24.5				1,000
* 108A	2-conductors 7/28 AWG tinned copper	A-1	0.079 over each conductor	Tinned copper, single braid	IIA	0.235		78.0	24.5 (max)	Shielded twisted pair			1,000
111	2-conductors, 7/0.0152 copper	A-1	0.285	Tinned copper, double braid	II with Armor	0.490 (max)	0.146	95.0	16.0		400 10.5 max.		1,000
* 111A	Each conductor 7/0.0152 inch copper	A-2	0.285	Tinned copper, double braid	IIA with Armor	0.490 (max)	0.146	95.0	16.0		400 10.5 max.		1,000
114	0.007 inch copperweld	A-1	0.285	Copper, single braid	I	0.405		185.0	6.8 (max)				1,000
114A	0.007 inch copper covered steel wire	A-2	0.285	Copper, single braid	IIA	0.405		185.0	6.8 (max)	Special low capacitance			1,000
* 115	7/0.028 inch silver covered copper	F-2	0.250	Silver coated copper, double braid	V	0.375		50.0	29.5		400 5.6 max.		5,000
115A	7/28 AWG silver covered copper	F-2	0.250	Silver coated copper, double braid	V	0.415		50.0	29.5		400 5.6 max.		4,000
* 116	7/0.032 silver covered copper	F-1	0.280	Silver coated copper, double braid	V	0.475 (max)		50.0	29.5	Now designated as RG-227/U	400 5.0 max.		5,000
* 117	0.118 inch copper	F-1	0.620	Copper, single braid	V	0.730		50.0	29.0	Now designated as RG-211/U	400 2.3 max.		7 kv
* 118	0.118 inch copper	F-1	0.620	Copper, single braid	V	0.780 (max)	0.610	50.0	29.0	Now designated as RG-228/U	400 2.3 max.		7 kv
* 119	0.102 inch copper	F-1	0.332	Copper, double braid	V	0.465		50.0	29.0	High temperature	400 3.8 max.	3000 17.0 max.	6 kv
* 120	0.102 inch copper	F-1	0.332	Copper, double braid	V	0.525 (max)		50.0	29.0	RG-119/U with Armor	400 3.8 max.	3000 17.0 max.	6,000
* 122	27/36 AWG tinned copper	A-1	0.096	Tinned copper, single braid	IIA	0.160		50.0	29.3	Same as RG-58A/U except smaller in size and lighter in weight	400 18.0 max.		1,900
124	22 AWG tinned copper covered steel	F-2	0.135	Tinned copper, single braid	V	0.240		73.0	20.3	Replaced by RG-140/U			2,300
125	26 AWG solid copper-covered steel	A-2	0.460	Copper, single braid	IIA	0.600		150.0	7.8	Special low capacitance			2,000
* 126	7/0.0203 inch Karma wire	F-1	0.185	Karma wire, single braid	V	0.280		50.0	29.0	High attenuation	1000 70	3000 116	3,000

RG/U TYPE	INNER CONDUCTOR	DIELECTRIC MATERIAL $\frac{1}{2}$	NOMINAL DIAMETER OF DIELECTRIC (inch)	NUMBER & TYPE OF SHIELDING BRAIDS	PROTECTIVE COVERING $\frac{2}{2}$	NOMINAL OVER-ALL DIAMETER (inch)	WEIGHT (Lb./ft.)	NOMINAL IMPEDANCE (ohms)	NOMINAL CAPACITANCE ($\mu\mu\text{f}/\text{ft.}$)	ENGINEERING DATA	NOMINAL ATTENUATION IN db/100ft. FREQ.(mc) ATTEN.				MAXIMUM OPERATING VOLTAGE (Volts rms)
* 130	2-conductors, 7/0.0285 inch copper	A-1	0.472	Tinned copper, single braid	I	0.625		95.0	17.0	Same as RG-57A/U except inner conductors are twisted for improved flexibility	400	8.8			8,000
* 131	2-conductors, 7/0.0285 inch copper	A-1	0.472	Tinned copper, single braid	I with alum- inum armor	0.710 (max)		95.0	17.0	Same as RG-130/U except for Armor	400	8.8			8,000
133	21 AWG solid soft copper	A-1		Single copper, braid	I	0.405		95.0	16.2						4,000
* 140	0.025 inch silver-covered copper-covered steel wire	F-1	0.146	Silver coated copper, single braid	V	0.233		75.0	21.0	High temperature similar to RG-59A/U	400	8.0			2,300
141	0.0359 inch silver-plated copperweld	F-1	0.116	Silver coated copper, single braid	V	0.190		50.0	28.5		400	9.0			1,900
* 141A	0.039 inch silver covered copper covered steel wire	F-1	0.116	Silver coated copper, single braid	V	0.190		50.0	28.5	High temperature similar to RG-58C/U	400	9.0			1,900
142	0.0359 inch silver covered copper covered steel wire	F-1	0.116	Silver coated copper, double braid	V	0.206		50.0	28.5		400	9.0			1,900
* 142A	0.039 inch silver covered copper covered steel wire	F-1	0.116	Silver coated copper, double braid	V	0.206		50.0	28.5	High temperature similar to RG-55A/U	400	9.0			1,900
143	0.057 inch silver plated copperweld	F-1	0.185	Silver coated copper, double braid	V	0.325		50.0	28.5		400	6.0			3,000
* 143A	0.059 inch silver covered copper covered steel wire	F-1	0.185	Silver coated copper, double braid	V	0.325		50.0	28.5	High temperature similar to RG-5B/U	400	6.0			3,000
* 144	7/0.0179 inch silver covered copper covered steel wire	F-1	0.285	Silver covered copper, single braid	V	0.410		75.0	20.5	High temperature similar to RG-11/U	400	4.5			5,000
146	0.007 inch copper covered steel	F-3	0.285	Copper, single braid	V	0.375		190.0	6.0	High temperature low capacitance					1,000
147	Single conduc- tor, copper out- er diam. 0.250	A-1		Copper, single braid	I with Armor	1.937		52.0	29.5	RG-19/U with Armor	100	0.68	300	1.5	14,000
148	7/21 AWG copper	A-1		Copper, single braid	I with Armor	0.800		52.0	29.5	RG-8/U with spiral Armor	100	2.1	300	4.2	4,000
											1000	3.5	3000	7.7	
											1000	9.0	3000	18.0	

Another **FIRST** from T & B

NEW NYLON TY-RAP™

Cable ties and straps

Up to **6 Times Faster**
than tying with string!

Ty-Rap Cable Tie. Makes harness tie in seven seconds — gives you **LOWEST INSTALLED COST!**
Ty-Rap Cable Strap. Takes the place of 32 different AN type clamp sizes. One user saved \$6500 in stock bin maintenance costs in the first year!

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SECURE! Special design "locks" Ty-Raps on — they can't loosen.

YOU SAVE ALL WAYS! You use less time and labor at every step — from order department to complete installation — with Ty-Raps.



Free

Have a T&B representative install Ty-Raps on your wire harness in your plant. Write for further information, test date, samples, Bulletin TR2.

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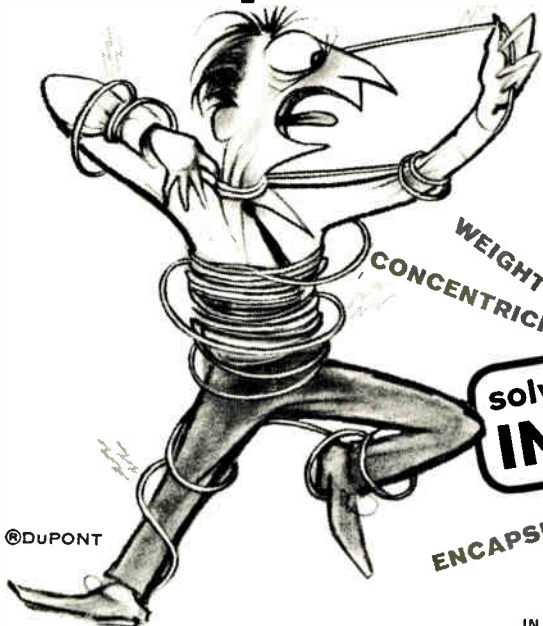
Thomas & Betts, Ltd., Montreal, P.Q., Canada

MANUFACTURERS OF FINE ELECTRICAL FITTINGS SINCE 1898

Circle 8 on Inquiry Card



wire problems?



solved by
INSO

Use the no-problem

INSO Teflon® Insulated wire and cable

MINIATURE TYPE "E" HOOK-UP WIRE (MIL-W-16878C)

Insulation: 6 mil (0.006") wall Fused-Film TEFLON
600 Volts RMS service; dielectric strength 2.2 KV;
AC spark test 3.0 KV

INSO PART NO.	AWG. and Stranding	Diam. over Insulation (nominal)	Weight in lbs. per M ft.
6E-26	26 (19 x 38)	0.033"	1.47
6E-24	24 (19 x 36)	0.038"	2.20
6E-22	22 (19 x 34)	0.0445"	3.18
6E-20	20 (19 x 32)	0.0527"	5.10
6E-18	18 (19 x 30)	0.063"	7.40
6E-16	16 (26 x 30)	0.0745"	10.00
6E-14	14 (37 x 29)	0.0921"	17.10

IN PRODUCTION • IMMEDIATE DELIVERY
All colors, solid and striped

- FUSE-FLEX, a highly flexible Teflon tubing with a thin wall of 6 mils.
- 6 mil wall Type "E" (MIL-W-16878C) . . . passes ALL spec. requirements (with a thinner wall), 600 volt RMS, 2.2 KV test.
- 8 mil wall Type "EE" (MIL-W-16878C) . . . passes ALL spec. requirements (with a thinner wall), 1,000 volt RMS, 3.0 KV test.
- Shielded and jacketed construction with no embedment of braid.
- Special cables engineered to your specific environmental and space requirements.

INSO Electronic Products, Inc. WIRE & CABLE DIVISION

A Subsidiary of

Adam Consolidated Industries, Inc.

1200 Commerce Avenue, Union, N. J.

MUdock 6-4258-9, TWX: UNVL45

RG/U TYPE	INNER CONDUCTOR	DIELECTRIC MATERIAL $\frac{2}{3}$	NOMINAL DIAMETER OF DIELECTRIC (inch)	NUMBER & TYPE OF SHIELDING BRAIDS	PROTECTIVE COVERING $\frac{2}{3}$	NOMINAL OVER-ALL DIAMETER (inch)	WEIGHT (Lb./ft.)	NOMINAL IMPEDANCE (ohms)	NOMINAL CAPACITANCE ($\mu\mu\text{f}/\text{ft.}$)	ENGINEERING DATA	NOMINAL ATTENUATION IN db/100ft. FREQ. (mc) ATTEN.		MAXIMUM OPERATING VOLTAGE (Volts rms)
149	7/26 AWG tinned copper	A-1		Braid copper base finish	I	0.405		75.0		Low noise			
150	7/26 AWG tinned copper	A-1		Braid copper base finish	I			75.0		Same as RG-149/U except Armored			
156	7/21 AWG tinned copper	$\frac{2}{3}$ A-1	$\frac{2}{3}$ 0.285	Three braids; tinned copper, galv. steel, tinned copper	11A	0.540		50.0	30.0	Polyethylene tape inter layer between 2nd braid of outer conductor and braided tinned copper shield		10,000	
157	19/24 AWG tinned copper	$\frac{2}{3}$ A-1	$\frac{2}{3}$ 0.455		11A	0.725		50.0	38.0		15,000		
158	37 strands tinned copper, 0.0284 nominal diameter	$\frac{2}{3}$ A-1	$\frac{2}{3}$ 0.455		11A	0.725		25.0	78.0		15,000		
159	20 AWG silvered copper	F-2		Braid copper, silver plated	V	0.195		50.0	29.0	High temperature equivalent of RG-55/U; replaced by RG-142/U			
160	4 conductors, 19/27 AWG copper wire; 2 plain copper, 2 tinned copper	A-1		Copper, single braid	I	1.055		125.0	12.0	Special flexible 4-conductor twinax		3,000	
161	7/38 AWG silver plated cadmium bronze	F-1	0.057	Single silvered copper	Extruded black nylon	0.090		70.0	20.0	Miniature		1,000	
* 164	0.1045 inch copper	A-1	0.680	Copper, single braid	11A	0.870		75.0			400 2.8	10,000	
* 165	7/0.032 inch silver-covered copper	F-1	0.285	Silver-covered copper; single braid	V	0.410		50.0			400 5.0	5,000	
* 166	7/0.032 inch silver-covered copper	F-1	0.285	Silver-covered copper, single braid	V with Armor	0.460		50.0			400 5.0	5,000	
174	7/34 AWG copperweld	A-1	0.060	Copper, single braid	I	0.100		50.0	30.4		400 19.0	1,500	
176	0.135 helix wound over low-loss magnetic core	A	0.285	Copper wound over core, single braid	I	0.405		2,240.0	49.0	High impedance delay line		2,000	
* 177	0.195 inch copper	A-1	0.680	Silver-covered copper, double braid	11A	0.895		50.0			400 2.8 3000 11.0	11,000	
178	7/0.0039 silver plated copperweld	F-1	0.036	Silver-plated copper, single braid	KEL-F	0.079 (max)	0.0054	50.0	27.9		400 29.0 max.	1,000	
178A	7/0.004 silver covered copper covered steel	F-1	0.034	Silver-plated copper, single braid	KEL-F	0.075		50.0	27.9		400 29.0 max.	1,000	

RG/U TYPE	INNER CONDUCTOR	DIELECTRIC MATERIAL $\frac{2}{3}$	NOMINAL DIAMETER OF DIELECTRIC (inch)	NUMBER & TYPE OF SHIELDING BRAIDS	PROTECTIVE COVERING $\frac{2}{3}$	NOMINAL OVER-ALL DIAMETER (inch)	WEIGHT (Lb./ft.)	NOMINAL IMPEDANCE (ohms)	NOMINAL CAPACITANCE ($\mu\text{f}/\text{ft.}$)	ENGINEERING DATA	NOMINAL ATTENUATION IN db/100ft. FREQ.(mc) ATTEN.	MAXIMUM OPERATING VOLTAGE (Volts rms)
179A	7/0.004 silver covered copper covered steel	F-1	0.063	Silver-plated copper, single braid	KEL-F	0.105		75.0	2.4			1,200
180	7/0.0039 silver-plated copperweld	F-1	0.103	Silver-plated copper, single braid	KEL-F	0.141	0.017	93.0	15.3		400 17.0 max.	1,500
180A	7/0.004 silver covered copper covered steel	F-1	0.102	Silver-plated copper, single braid	KEL-F	0.145		95.0	14.5		400 17.0 max.	1,500
181	2-conductors, 7/26 AWG copper	A	0.210	Copper, single braid	11A	0.640		125.0	12.0	Filled to round; transmission unbalanced cable		3,500
* 187	7/0.004 inch silver covered copper covered steel	F-1	0.060	Silver-covered copper; single braid	Teflon	0.110		75.0		High temperature miniaturized cable	400 21.0 max.	1,200
* 188	7/0.0067 inch silver covered copper covered steel	F-1	0.060	Silver-covered copper; single braid	Teflon	0.110		50.0		High temperature miniaturized cable	400 20.0 max.	1,200
189	0.251 inch copper	Helix		Silver-covered copper; single braid	Poly-ethylene	0.875		50.0	2.3	7/8-inch Styroflex cable		3,500
190	19/25 AWG tinned copper	Similar to type D		Tinned copper outer; galvanized inner double braid	IV	0.700		50.0	50.0	Low noise pulse cable		15 kv
* 195	7/0.004 inch silver covered copper covered steel	F-1	0.102	Silver covered copper; single braid	Teflon	0.155		95.0		High temperature miniaturized cable	400 17.0 max.	1,500
* 196	7/0.004 inch silver covered copper covered steel	F-1	0.034	Silver covered copper; single braid	Teflon	0.080		50.0		High temperature miniaturized cable	400 29.0 max.	1,000
209	19/0.037 inch silver covered copper	F-2	0.500	Silver covered copper; double braid	VI	0.750		50.0			3000 11.0 max.	3,200
210	0.0253 inch silver covered copper covered steel	F-2	0.146	Silver covered copper; single braid	V	0.242		93.0	14.5	Replaces RG-62C/U		750
* 211	0.190 inch copper	F-1	0.620	Copper; single braid	V	0.730		50.0		Formerly RG-117/U		7,000
* 212	0.0556 inch silver covered copper	A-1	0.185	Silver covered copper; double braid	11A	0.332		50.0		Formerly RG-5B/U		3,000
* 213	7/0.0296 inch copper	A-1	0.285	Copper, single braid	11A	0.405		50.0		Formerly RG-8A/U		5,000

RG/U TYPE	INNER CONDUCTOR	DIELECTRIC MATERIAL ^{1/2}	DIAMETER OF DIELECTRIC (inch)	NUMBER & TYPE OF SHIELDING BRAIDS	PROTECTIVE COVERING ^{2/}	NOMINAL OVER-ALL DIAMETER (inch)	WEIGHT (Lb./ft.)	NOMINAL IMPEDANCE (ohms)	NOMINAL CAPACITANCE ($\mu\mu\text{f}/\text{ft.}$)	ENGINEERING DATA	NOMINAL ATTENUATION IN db/100ft. FREQ. (mc) ATTEN.	MAXIMUM OPERATING VOLTAGE (Volts rms)
* 214	7/0.0296 inch silver-covered copper	A-1	0.285	Silver-covered copper; double braid	11A	0.425		50.0		Formerly RG-9B/U		5,000
* 215	7/0.0296 inch copper	A-1	0.285	Copper, single braid	11A	0.475		50.0		Formerly RG-10A/U		5,000
* 216	7/0.0159 inch tinned copper	A-1	0.285	Copper, double braid	11A	0.425		50.0		Formerly RG-13A/U		5,000
* 217	0.106 inch copper	A-1	0.370	Copper; double braid	11A	0.545		50.0		Formerly RG-14A/U		7,000
* 218	0.195 inch copper	A-1	0.680	Copper, single braid	11A	0.870		50.0		Formerly RG-17A/U		11,000
* 219	0.195 inch copper	A-1	0.680	Copper, single braid	11A with Armor	0.945		50.0		Formerly RG-18A/U		11,000
* 220	0.260 inch copper	A-1	0.910	Copper, single braid	11A	1.120		50.0		Formerly RG-19A/U		14,000
* 221	0.260 inch copper	A-1	0.910	Copper, single braid	11A with Armor	1.195		50.0		Formerly RG-20A/U		14,000
* 222	0.0556 inch high resistance wire	A-1	0.185	Silver-covered copper; double braid	11A	0.332		50.0		Formerly RG-21A/U		7,000
* 223	0.035 inch silver-covered copper	A-1	0.116	Silver-covered copper; double braid	11A	0.216		50.0		Formerly RG-55A/U		1,900
* 224	0.106 inch copper	A-1	0.370	Copper, double braid	11A with Armor	0.615		50.0		Formerly RG-74A/U		7,000
* 225	7/0.0312 inch silver-covered copper	F-1	0.285	Silver covered copper, double braid	V	0.430		50.0		Formerly RG-87A/U		5,000
* 226	19/0.0254 silver-covered copper	F-2	0.370	Copper; double braid	V	0.500		50.0		Formerly RG-94A/U		7,000
* 227	7/0.0312 inch silver covered copper	F-1	0.285	Silver covered copper; double braid	V with Armor	0.490 (max)		50.0		Formerly RG-116/U		5,000
* 228	0.190 inch copper	F-1	0.620	Copper, single braid	V with Armor	0.795		50.0		Formerly RG-118/U		7,000

* Covered by Specification MIL-C-178

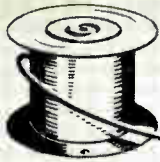
^{1/2} Dielectric materials:

- A-1 - Solid polyethylene
- A-2 - Air-spaced polyethylene
- B - Polyisobutylene mixture
- C - Synthetic-rubber compounds
- D - Layer of Synthetic-rubber dielectric between thin layers of conducting rubber
- E - Layer of conducting rubber plus two layers of synthetic-rubber dielectric
- F-1 - Solid tetrafluorethylene (teflon)
- F-2 - Taped tetrafluorethylene (teflon)
- F-3 - Air-spaced tetrafluorethylene (teflon)

^{2/} Dielectric consists of solid polyethylene with semi-conducting layers. Nominal diameter of dielectric is value over outer semi-conducting layer.

^{3/} Jacket materials:

- I - Low temperature black polyvinylchloride, contaminating type plasticizers
- II - Grey polyvinylchloride, non-contaminating plasticizers
- 11A - Low temperature black polyvinylchloride, non-contaminating plasticizers
- III - Stabilized natural polyethylene
- 111A - High molecular weight black polyethylene
- IV - Black synthetic rubber
- V - High temperature lacquer impregnated fiberglass braid, usually with Teflon tape between shield & jacket
- VI - Polyester fibre impregnated with high temperature lacquer over wrapped or extruded silicone rubber over silicone impregnated fiberglass



Tensolite

RELIABLE HIGH TEMPERATURE WIRE & CABLE

Tensolite facilities are devoted exclusively to the engineering and manufacturing of miniature plastic insulated wire and cable —featuring Teflon insulation for high temperature (—90 deg. C. to +250 deg. C.) applications. 100 percent inspections before, during and after manufacture, part of the most rigid quality control program in the industry, assures reliability of the finished product.

"TEFLON" INSULATED CABLE

From large sizes using 6 AWG wire, down to sub-miniature cables with 36 AWG single conductors, Tensolite makes multi-conductor cables to your specifications. Tensolite cables utilize the maximum number of conductors in a minimum of area — saving weight and space. They're available as ribbon cable or in standard round configurations. For demanding applications, we recommend individual conductors of our FLEXOLON wire.

HOOK-UP WIRE

TYPE E-EE TO MIL-W-16878

FLEXOLON WIRE

A new concept in high temperature insulation developed by Tensolite's research and development laboratories. FLEXOLON wire provides the best properties of wrapped and extruded fluorocarbon insulation. Important features of this versatile hook-up and lead wire are:

- Solid colors and striped combinations.
- Most flexible of all hook-up wire construction.
- High temperature range of —90 deg. C. to +250 deg. C.
- Greatest miniaturization in MIL-SPEC hook-up wire (smallest hook-up wire in the world).
- High dielectric strength (far exceeds required 600 V and 1000 V ratings).
- Consistent concentricity.
- Superior cut-through resistance.

TENSOLON WIRE

Insulated with TFE fluorocarbon high temperature resin.

Choose from:

Spiral wrapped...with special cross-lapped construction and unlimited color coding; striping that meets commercial and military specifications.

Extruded...featuring an extruded homogeneous Teflon TFE resin (solid and inked stripe combinations).

TENSOLEX WIRE

Insulated with extruded vinyl plastic.

Types B and C meet MIL-W-16878. They are high temperature hook-up wires rated for continuous use from —55 deg. C. to +105 deg. C. with or without nylon jackets.

TENSOLEX WIRE

Types WL and SRIR are manufactured in accordance with the joint Army-Navy specification JAN-C-76 (Qualification approval Certificates Nos. 13725 and 13606A).

Types LW and MW are general purpose hook-up wires specifically designed for radio, instrument, and military electronic applications. Designed to meet MIL-W-76A, they are recommended for use at temperatures up to 80 deg. C. in the internal wiring of electrical and electronic equipment.

TENSOLITE WRAPPED VINYL WIRE

Super-flexible wire designed for miniaturization applications at operating temperatures from —40 deg. C. to +60 deg. C.

AIRFRAME WIRE

TENSOLON AIRFRAME WIRE

Insulated with high-temperature resin, it is manufactured in compliance with MIL-W-7139A. Important features are:

- —90 deg. C. to +250 deg. C. temp. range.
- 600 Volt and prescribed overload operation.
- Rugged, abrasion resistant construction.
- Short-time operation in event of fire.
- High resistance to chemicals.
- Excellent flexibility.

COAXIAL CABLE

TENSOLON MINIATURE COAXIAL CABLE

Designed to meet MIL-C-17B, it is ideal for high frequency operation from —90 deg. C. to —250 deg. C. Insulation assures extremely low loss, high dielectric strength, and complete resistance to moisture and chemicals. A great variety of outer jackets permits the selection of cable well suited for many application requirements.

MAGNET WIRE

TUFFLON MAGNET WIRE

High temperature Teflon insulated magnet wire — designed to meet MIL-W-19583 — is ideal for coils and windings requiring high temperature application. It is supplied in wall thicknesses ST, HT, TT and QT and AWG sizes 18 through 44.

OTHER PRODUCTS

Ignition Cable

Low Capacitance Cable

Wire Coated with Teflon

Teflon Inks

Asbestos Wire

Air Dielectric Cable

100X FEP Resin

Bondable Wire

to MIL-C-25038

Low Noise Cable

100% Shielded Wire

Etched Wire

Antenna Wire

Tempered Magnet Wire

Ribbon Cable Shielded

High Flex Wire and Cable

Thermocouple Wire

Double Quad Lead Wire

and Unshielded

Nickel Plated Conductor



Tensolite

INSULATED WIRE CO., INC.

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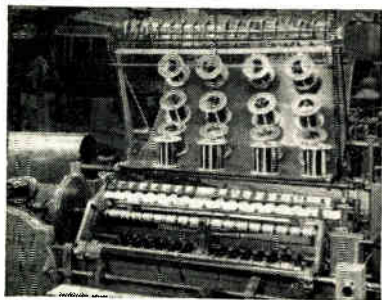
Winding Data Chart

For Round Plain Enameled Copper Wire

—Courtesy of Chicago Standard Transformer Corp.

INSULATION	WIRE	CURRENT	DIA.	AREA	TURNS PER LAYER									WIRE						
					Layer Insulation Thickness (Inches)	A.W.G. No.	Based on 700 Cir. Mils per Amp. (Maximum) (Amperes)	Overall Enameled Wire (Nominal) (Inches)	Bare Copper Wire (Nominal) (Cir. Mils)	Lamination Size (Dimension of Center Leg)									A.W.G. No.	
										0.50"	0.62"	0.75"	0.87"		1.00"	1.12"	1.25"	1.37"		1.50"
.010 Fibre	10	14.90	.1039	10380	...	...	...	9	10	11	12	14	16	10			
"	11	11.80	.0927	8230	...	...	...	10	11	12	14	16	18	11			
"	12	9.35	.0827	6530	...	...	8	11	13	14	16	18	20	12				
"	13	7.42	.0738	5180	...	8	9	13	14	16	18	20	22	13						
.007 Fibre	14	5.87	.0659	4110	7	9	11	14	16	18	20	22	25	14						
"	15	4.66	.0588	3260	8	10	12	16	18	20	22	25	28	15						
"	16	3.69	.0524	2580	9	11	13	18	20	22	25	28	31	16						
.005 Fibre	17	2.93	.0469	2050	10	12	15	20	22	25	28	31	35	17						
"	18	2.31	.0418	1620	11	14	17	23	25	28	31	35	39	18						
.004 Kraft	19	1.84	.0374	1290	12	15	19	25	28	31	35	39	44	19						
"	20	1.46	.0334	1020	14	17	21	28	32	35	39	44	49	20						
"	21	1.16	.0299	810	15	19	23	31	35	39	43	49	55	21						
"	22	0.917	.0267	642	17	22	26	35	39	44	48	55	62	22						
"	23	0.723	.0238	510	20	25	29	39	44	49	54	62	69	23						
"	24	0.578	.0213	404	22	27	33	44	50	55	61	69	77	24						
.003 Kraft	25	0.457	.0190	320	25	31	37	49	55	61	68	77	86	25						
"	26	0.363	.0170	254	27	35	41	55	62	68	76	87	98	26						
"	27	0.289	.0152	202	31	39	46	62	69	77	85	97	108	27						
.002 Kraft	28	0.229	.0136	160	34	43	51	69	77	86	95	108	121	28						
"	29	0.181	.0122	127	38	48	57	77	86	95	115	119	133	29						
"	30	0.144	.0108	101	43	53	64	86	96	107	118	134	151	30						
.0015 Kraft	31	0.114	.0097	79.7	47	60	72	96	107	119	132	150	168	31						
"	32	0.0903	.0088	63.2	52	66	78	105	118	130	143	164	183	32						
"	33	0.0715	.0078	50.1	59	73	88	118	133	147	162	184	207	33						
.001 Kraft	34	0.0568	.0069	39.8	67	83	69	133	150	167	183	209	233	34						
"	35	0.0450	.0061	31.5	75	92	111	150	169	186	205	233	265	35						
"	36	0.0357	.0055	25.0	83	103	125	166	186	206	227	258	293	36						
"	37	0.0283	.0049	19.8	93	115	139	185	209	231	255	290	325	37						
.0008 Kraft	38	0.0224	.0044	15.7	102	127	151	205	230	255	284	322	...	38						
"	39	0.0179	.0038	12.5	118	148	177	237	266	296	330	...	...	39				
"	40	0.0141	.0034	9.89	131	163	197	263	295	329	...	...	...	40			
"	41	0.0120	.0032	8.41	139	174	209	279	312	...	...	...	...	41		
"	42	0.0089	.0028	6.25	158	198	238	...	...	...	...	...	...	42

UNIFORMITY... the common factor in all Auto-Lite Magnet Wire



HIGH-SPEED MACHINES like this Universal require wire of extreme uniformity, both in the drawing of the conductor and in the application of the insulations. Here's where Auto-Lite uniformity pays off with increased production. For continuity, windability, and a reliable space factor, specify "Auto-Lite."

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LectALite®

LectALite, developed especially for hermetic use, is 20° to 25° higher in heat aging than vinyl-acetal coating and has outstanding resistance to chemicals.



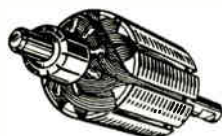
DacrALite

DacrALite is a double wrap of glass-dacron fibers over bare conductor. Available also over film insulations, in square or rectangular.



BondALite®

Coated with a film of thermoplastic bonding material over insulated round copper wire. For use in any coil winding requiring a self-bonding magnet wire.



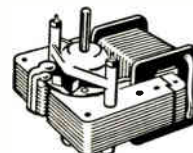
IsALite®

Polyester film insulation having outstanding high-temperature stability. Class F 155°C rating. Test conducted per A1EE-57 and MIL-W-19583.



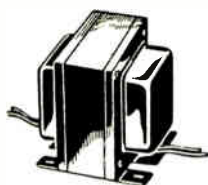
SodALite®

Easily soldered without stripping by conventional dip, iron, torch, or gun methods. Offered in Class A 105°C magnet wire.



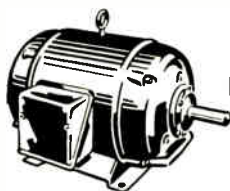
NyALite®

Formvar with nylon over-coat. The Formvar maintains the moisture resistance while nylon adds craze resistance and windability.



ENAMEL

Most economical wire for thousands of Class A applications. Good adherence, flexibility, thermal stability, and solvent resistance. Excellent for use in small relay coils, ignition coils, many types of transformers. Especially satisfactory for coils where layers are separated by paper. Available in all gauges.



FORMVAR

Excellent abrasion resistance and toughness. Film adheres well to the copper conductor and withstands excessive elongation of the wire during winding without rupture. Good space factor and high dielectric strength make Formvar an excellent choice for high-speed operations. Available in all gauges.



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COMPLETE MAGNET WIRE CATALOG

AUTO-LITE

GENERAL PRODUCTS GROUP

WIRE AND CABLE DIVISION • TOLEDO 1, OHIO

® Plants at: Hazleton, Pennsylvania • Port Huron, Michigan

American Wire Gauge

Nominal diameters, cross-sectional areas, weight, and resistance of different hardness copper wires are listed here by AWG sizes.

Size	Diameter	Area	Area	Weight	Soft or Annealed			Medium Hard					Hard Drawn		
					Tensile Strength	Breaking Strength	Maximum DC Resistance at 68°F.	Tensile Strength		Breaking Strength			Tensile Strength	Breaking Strength	Maximum DC Resistance at 68°F.
								Maximum	Minimum	Maximum	Minimum	Maximum DC Resistance at 68°F.			
Awg	Inch	Cir. Mils	Sq. In.	Lbs. per 1,000 Ft.	Lbs. per Sq. In.	Lbs.	Ohms per 1,000 Ft.	Lbs. per Sq. In.	Lbs. per Sq. In.	Lbs.	Lbs.	Ohms per 1,000 Ft.	Lbs. per Sq. In.	Lbs.	Ohms per 1,000 Ft.
4/0	.4600	211,600	.1662	640.5	36,000	5,983	.04901	49,000	42,000	8,143	6,980	.05019	49,000	8,143	.05045
3/0	.4096	167,800	.1318	507.9	36,000	4,745	.06180	50,000	43,000	6,590	5,667	.06329	51,000	6,722	.06361
2/0	.3648	133,100	.1045	402.8	36,000	3,763	.07793	51,000	44,000	5,330	4,599	.07980	52,800	5,519	.08021
1/0	.3249	105,600	.08291	319.5	36,000	2,984	.09827	52,000	45,000	4,310	3,730	.1006	54,500	4,517	.1011
1	.2893	83,690	.06573	253.3	37,000	2,432	.1239	53,000	46,000	3,484	3,024	.1282	56,100	3,688	.1289
2	.2576	66,360	.05212	200.9	37,000	1,929	.1563	54,000	47,000	2,815	2,450	.1617	57,600	3,003	.1625
3	.2294	52,620	.04133	159.3	37,000	1,530	.1970	55,000	48,000	2,274	1,984	.2038	59,000	2,439	.2049
4	.2043	41,740	.03278	126.4	37,000	1,213	.2485	55,330	48,330	1,814	1,584	.2570	60,100	1,970	.2584
5	.1819	33,090	.02599	100.2	37,000	961.9	.3133	55,660	48,660	1,447	1,265	.3241	61,200	1,591	.3258
6	.1620	26,240	.02061	79.46	37,000	762.9	.3951	56,000	49,000	1,155	1,010	.4087	62,100	1,280	.4108
7	.1443	20,820	.01635	63.02	37,000	605.0	.4982	56,330	49,330	921.0	806.6	.5154	63,000	1,030	.5181
8	.1285	16,510	.01297	49.97	37,000	479.8	.6282	56,660	49,660	734.7	643.9	.6499	63,700	826.0	.6533
9	.1144	13,090	.01028	39.63	37,000	380.5	.7921	57,000	50,000	586.0	514.2	.8195	64,300	661.2	.8238
10	.1019	10,380	.008155	31.43	38,500	314.0	.9989	57,330	50,330	467.5	410.4	1.033	64,900	529.2	1.039
11	.0907	8,230	.00646	24.92	38,500	249.0	1.260	57,660	50,660	372.9	327.6	1.303	65,400	422.9	1.310
12	.0808	6,530	.00513	19.77	38,500	197.5	1.588	58,000	51,000	297.5	261.6	1.643	65,700	336.9	1.652
13	.0720	5,180	.00407	15.68	38,500	156.6	2.003	58,330	51,330	237.2	208.8	2.072	65,900	268.0	2.083
14	.0641	4,110	.00323	12.43	38,500	124.2	2.525	58,660	51,660	189.2	166.6	2.613	66,200	213.5	2.626
15	.0571	3,260	.00256	9.858	38,500	98.48	3.184	59,000	52,000	150.9	133.0	3.295	66,400	169.8	3.312
16	.0508	2,580	.00203	7.818	38,500	78.10	4.016	59,330	52,330	120.3	106.2	4.154	66,600	135.1	4.176
17	.0453	2,050	.00161	6.200	38,500	61.93	5.064	59,660	52,660	95.97	84.71	5.239	66,800	107.5	5.266
18	.0403	1,620	.00128	4.917	38,500	49.12	6.385	60,000	53,000	76.54	67.61	6.606	67,000	85.47	6.640
19	.0359	1,290	.00101	3.899	38,500	38.95	8.051	60,300	53,300	61.03	53.95	8.330	67,200	67.99	8.373
20	.0320	1,020	.000804	3.092	38,500	30.89	10.15	60,700	53,700	48.66	43.05	10.50	67,400	54.08	10.56
21	.0285	812.0	.000638	2.452	38,500	24.50	12.80	61,000	54,000	38.81	34.36	13.24	67,700	43.07	13.31
22	.0253	640.0	.000503	1.945	38,500	19.43	16.14	61,300	54,300	30.94	27.41	16.70	67,900	34.26	16.79
23	.0226	511.0	.000401	1.542	38,500	15.41	20.36	61,600	54,600	24.67	21.87	21.06	68,100	27.25	21.17
24	.0201	404.0	.000317	1.223	40,000	12.69	25.67	62,000	55,000	19.67	17.45	26.56	68,300	21.67	26.69
25	.0179	320.0	.000252	.9699	40,000	10.07	32.37	62,300	55,300	15.68	13.92	33.49	68,600	17.26	33.66
26	.0159	253.0	.000199	.7692	40,000	7.983	40.81	62,700	55,700	12.51	11.11	42.22	68,800	13.73	42.44
27	.0142	202.0	.000158	.6100	40,000	6.331	51.47	63,000	56,000	9.970	8.863	53.24	69,000	10.92	53.52
28	.0126	159.0	.000125	.4837	40,000	5.020	64.90	63,300	56,300	7.949	7.070	67.14	69,300	8.698	67.49
29	.0113	128.0	.000100	.3836	40,000	3.981	81.84	63,700	56,700	6.336	5.640	84.66	69,400	6.908	85.10
30	.0100	100.0	.0000785	.3042	40,000	3.157	103.2	64,000	57,000	5.051	4.499	106.8	69,700	5.502	107.3
31	.0089	79.2	.0000622	.2413	40,000	2.504	130.1	64,300	57,300	4.027	3.589	134.6	69,900	4.376	135.3
32	.0080	64.0	.0000503	.1913	40,000	1.986	164.1	64,600	57,600	3.210	2.862	169.8	70,200	3.485	170.6
33	.0071	50.4	.0000396	.1517	40,000	1.575	206.9	65,000	58,000	2.558	2.283	214.1	70,400	2.772	215.2
34	.0063	39.7	.0000312	.1203	40,000	1.249	260.9	65,300	58,300	2.040	1.821	269.9	70,600	2.204	271.3
35	.0056	31.4	.0000246	.09542	40,000	.9904	329.0	65,600	58,600	1.625	1.452	340.4	70,900	1.755	342.1
36	.0050	25.0	.0000196	.07567	40,000	.7854	414.8	66,000	59,000	1.295	1.158	429.2	71,100	1.396	431.4
37	.0045	20.2	.0000159	.06001	40,000	.6228	523.1	66,300	59,300	1.033	.9238	541.2	71,300	1.110	544.0
38	.0040	16.0	.0000126	.04759	40,000	.4939	659.6	66,700	59,700	.8231	.7367	682.4	71,500	.8829	686.0
39	.0035	12.2	.00000962	.03774	40,000	.3917	831.8	67,000	60,000	.6561	.5876	860.5	71,800	.7031	865.0
40	.0031	9.61	.00000755	.02993	40,000	.3106	1,049	67,300	60,300	.5227	.4685	1,085	72,000	.5592	1,091
41	.0028	7.84	.00000616	.02374	40,000	.2464	1,323	67,300	60,300	.4145	.3716	1,368	72,000	.4434	1,375
42	.0025	6.25	.00000491	.01882	40,000	.1954	1,668	67,300	60,300	.3287	.2947	1,725	72,000	.3517	1,734
43	.0022	4.84	.00000380	.01493	40,000	.1549	2,103	67,300	60,300	.2607	.2337	2,176	72,000	.2789	2,187
44	.0020	4.00	.00000314	.01184	40,000	.1229	2,652	67,300	60,300	.2067	.1853	2,743	72,000	.2212	2,758

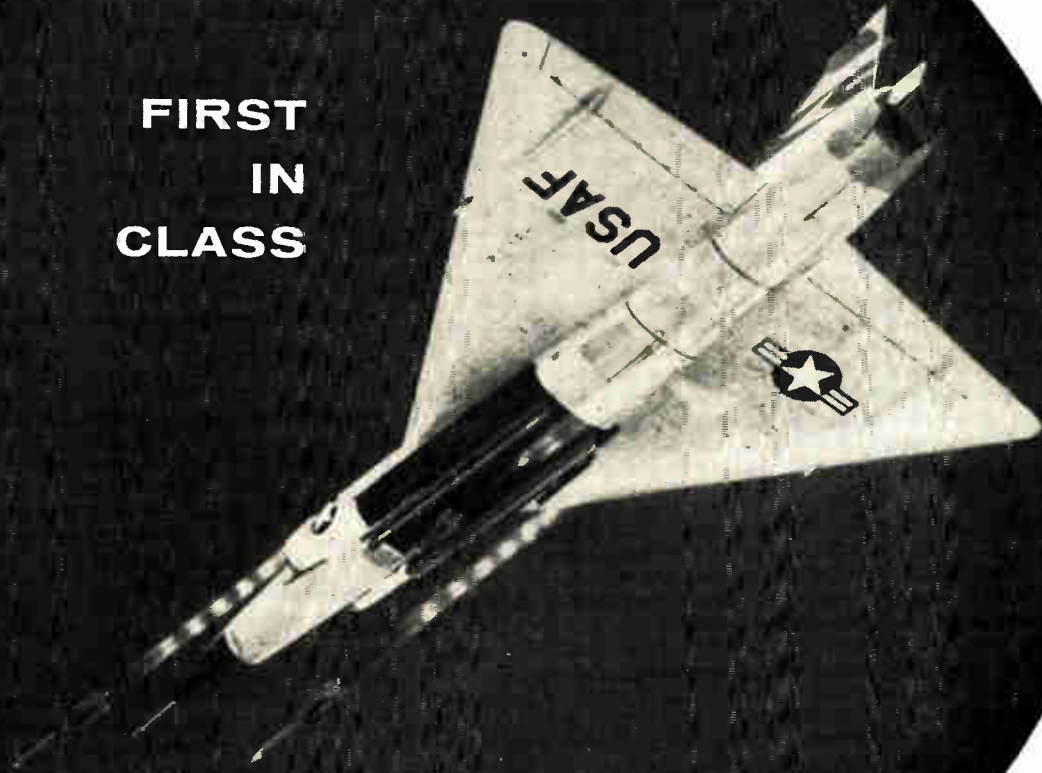
Diameter tolerances:

- (a) Soft or annealed (ASTM Spec. B3) ± 1%.
- (b) Medium hard (ASTM Spec. B2) or hard drawn (ASTM Spec. B1).
- For wires .100 mils in diameter or larger ± 1%.
- For wires less than .100 mils in diameter ± .001.

Resistances of copper wires in above table are maximum values for nominal diameters based on ASTM specifications. There are no ASTM specifications for wire No. 18 Awg or smaller and the resistances shown are based on 96.66% conductivity for medium hard and 96.16% conductivity for hard-drawn wire. Breaking strengths are based on tensile requirements of ASTM Spec. B3 (soft or annealed) for No. 20 Awg and

larger, and on B2 (medium hard) and B1 (hard drawn) for No. 18 Awg and larger. ASTM Spec. B2 (medium hard) or B1 (hard drawn) does not list tensile strength requirements for wire sizes smaller than No. 18 Awg. ASTM Spec. B3 (soft or annealed) does not list tensile strength requirements for wire sizes smaller than No. 20 Awg.

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FALCON MISSILE

Playing follow-the-leader at 50 millisecond intervals, three *Super Falcon* missiles rocket ahead of their diamond-shaped supersonic shock waves. Homing in on radar, these deadly air-to-air missiles locate, track, and destroy their prey, with the same killer instinct of the birds they're named after.

Hughes Aircraft, the developer and manufacturer of these missiles and the Armament Control System that triggers them, specified Hitemp magnet and Teflon* wire for their missile, and Teflon wire for its control system.

Hitemp Wires, Inc., the leading specialist in high temperature insulated wires and cables, proudly answers roll call with those developers and manufacturers enlisted in defending our American birthright—*Freedom*.

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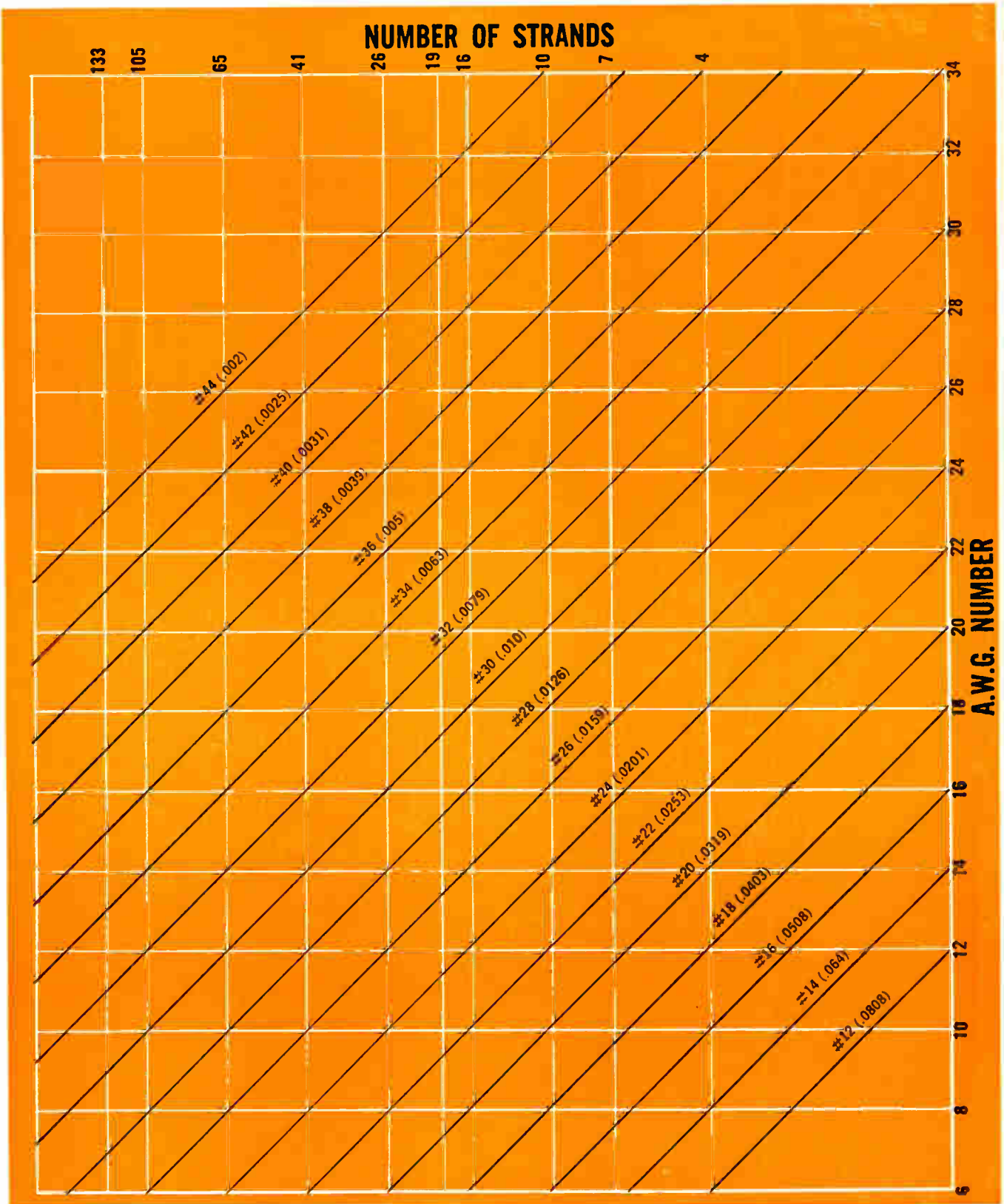
1200 SHAMES DRIVE, WESTBURY, NEW YORK

*Registered trademark for Du Pont fluorocarbon resins.



Wire Stranding Chart

A stranded conductor is made-up of a number of smaller wire strands. This chart shows the size of each strand when the number of strands in the finished wire size is known. Also, the number of strands for a given strand size may be determined for a finished wire gauge size.



Courtesy of Alpha Wire Co.

Types of Magnet Wire Insulation

Listed below are the different types of magnet wire insulations and their temperature ranges according to Mil-W-583A. This specification is mandatory for all service branches. Also included are some of the recommended uses for the various types.

Temperature limitations. The highest temperatures (hot-spot temperature) to which equipments or apparatus wound with various types of insulated magnet-wire may be subjected continuously, with normal life expectancy, are as follows:

Installation	°C
Class O	90
Class A	105
Class B	130
Class H	200

Description of Classes

Class O. Insulation for a class O installation consists of cotton, synthetic fiber, paper, or similar organic materials which have not been impregnated with nor immersed in a liquid dielectric. (Description of insulation for a class O installation is included only because of its relationship to insulation for a class A installation.)

Class A. Insulation for a class A installation consists of the following:

- Cotton, paper, or similar organic materials which have been impregnated with or immersed in a liquid dielectric.
- Materials with cellulose filler, phenolic resins, or other resins of similar properties.
- Films and tapes of cellulose acetate or other cellulose derivative of similar properties.
- Varnish (enamel) as applied to conductors.

An insulation is considered to be "impregnated" when a suitable substance replaces the air between the fibers, even if this substance does not completely fill the spaces between turns. The impregnating substance, in order to be considered suitable, should

- Have good insulating properties;
- Cover the fibers entirely and render them adherent to each other and to the conductor;
- Not produce interstices within itself as a consequence of evaporation of the solvent or through any other cause;
- Not flow during the operation of the machine at full working load or at the temperature limit indicated.

- Not unduly deteriorate under prolonged action of heat.

Class B. Insulation for a class B installation consists of mica, asbestos, glass fiber, or similar inorganic materials in built-up form with organic binding substances. A small proportion of class A materials may be used for structural purposes only. The electrical and mechanical properties of the insulated winding should not be impaired when it is subjected to the temperature permitted for class B material. (The word "impaired" is used here in the sense of causing any change which could disqualify the insulating material for continuous service.) Glass fiber and asbestos magnet-wire insulation included in this temperature class, may include supplementary organic materials, such as polyvinylacetal or polyamide films.

Class H. Insulation for a class H installation consists of the following:

- Mica, asbestos, glass fiber, and similar inorganic materials in built-up form with binding substances composed of silicone compounds or materials with equivalent properties.
- Silicone- and fluorinated hydrocarbon-base compounds in rubbery or resinous forms, or materials with equivalent properties.

A minute proportion of class A materials may be used only where essential for structural purposes during manufacture. The electrical and mechanical properties of the insulated winding should not be impaired when it is subjected to the temperatures permitted for class H material. (The word "impaired" is used here as defined in class B.)

Wire With Single or Multiple Insulations

Type T (synthetic resin insulated). Type T magnet wire is insulated with resins of which vinyl acetal, polyamide (as applied to the smaller sizes) and combination of vinyl acetal and polyamide are representative and in common use, and are intended for use in control equipment, signaling equipment, and similar applications where a tough film-type insulation providing adequate mechanical protection is desired, and where space is an important consideration.

Type P (paper insulated). Type P magnet wire is intended for use in rotating machinery, transformers, and similar applications where high dielectric strength and mechanical strength are of primary importance.

Type C (cotton insulated). Type C magnet wire is intended for use in rotating machinery, control equipment, and similar applications where temperature rises less than those indicated in types AV and GH are normally encountered in service and where space factor is not the primary characteristic determining the suitability of the insulation.

Type S (silk insulated). Type S magnet wire is intended for uses similar to those of cotton-insulated wire but where a better space factor is desired.

Type F (synthetic fiber insulated). Type F magnet wire is intended for use in instruments, signaling equipment, rotating machinery, and for applications similar to those of silk-insulated wire.

Type AV (asbestos insulated). Type AV magnet wire, particularly in the larger sizes, is intended for use in rotating machinery, transformers, and similar equipment where high-temperature rises are normally encountered in service.

Type GH (glass insulated). Type GH magnet wire

is intended for uses similar to those of asbestos-insulated wire. Generally, type GH can be used for solenoids, transformers, and other stationary windings, while type G2H is preferred for coil windings in rotating equipment.

Type Dg (glass fiber and polyester fiber insulated). Type Dg magnet wire is intended for uses similar to those of asbestos- and glass-insulated wire when increased toughness, flexibility, and nonfraying properties are required.

Wire with combination insulations. Magnet wire may be insulated with combinations of insulations of which the following types, (resin and paper, resin and the various fibers (silk, synthetic, glass, cotton), and resin and asbestos) are representative and in common use, and are intended for use in applications where the performance requirements are not wholly met by any single or multiple insulation:

- TP, T2P, TP2, T2P2
- TS, T2S, TS2, T2S2
- TF, T2F, TF2, T2F2
- TGH, T2GH, TG2H, T2G2H
- TAV, T2AV

Note: The numeral following the type designator indicates the thickness of coating of film insulations, or the number of wraps of tape or fibers, as applicable.



NEW REFERENCE BROCHURES NOW READY!

This series of new four-page bulletins has been planned to assist the engineer in determining the proper wire for particular applications, and to help in writing specifications. These brochures are entitled:

- Flexible, 1000° F & 750° F Wire & Cable — Super Jet and Saturated Super Jet — Lead Wire, Hook-up Wire, Coaxial Cable, Multiconductor Cable, Ignition Wire.
- High Performance Cable — Small-diameter, single conductor for special high-voltage, high-temperature applications.
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- TV Camera Cable — Microwave Relay-Link Cable.
- Multiconductors to MIL-C-3432A — Flexible and Extra Flexible Low Temperature Constructions.

We shall be glad to send one or all, and to put your name on our mailing list to receive additional new bulletins as they are issued. Write to us regarding your wire problems.

BOSTON INSULATED WIRE AND CABLE CO., BOSTON 25, MASS.

Wire Conversion Tables

—From ASTM Designation: B 258-57

Note: These factors are applicable to resistivity and conductivity values corrected to 20°C. (68°F.). They are applicable for any temperature when used to convert between volume units only or between weight units only. Values of density, δ , for the common electrical conductor materials are listed in table on adjacent page.

RESISTIVITY AND CONDUCTIVITY CONVERSIONS

Given $N \rightarrow$ Perform indicated operation to obtain \downarrow	Volume Resistivity at 20 C				Weight Resistivity at 20 C		Conductivity at 20 C	
	Ohm—circular mil/ft	Ohm—mm ² /meter	Microhm—inch	Microhm—cm	Ohm—pound/mile ²	Ohm—gram/ meter ²	Per cent IACS (Volume Basis)	Per cent IACS (Weight Basis)
VOLUME RESISTIVITY AT 20 C								
Ohm—circular mil/ft.....	....	$N \times 601.53$	$N \times 15.279$	$N \times 6.0153$	$N \times 0.10535 \times \frac{1}{\delta}$	$N \times 601.53 \times \frac{1}{\delta}$	$\frac{1}{N} \times 1037.1$	$\frac{1}{N} \times 9220.0 \times \frac{1}{\delta}$
Ohm—mm ² /meter.....	$N \times 0.0016624$	....	$N \times 0.025400$	$N \times 0.010000$	$N \times 0.00017513 \times \frac{1}{\delta}$	$N \times \frac{1}{\delta}$	$\frac{1}{N} \times 1.7241$	$\frac{1}{N} \times 15.328 \times \frac{1}{\delta}$
Microhm—inch.....	$N \times 0.065450$	$N \times 39.370$	....	$N \times 0.39370$	$N \times 0.0068950 \times \frac{1}{\delta}$	$N \times 39.370 \times \frac{1}{\delta}$	$\frac{1}{N} \times 67.879$	$\frac{1}{N} \times 603.45 \times \frac{1}{\delta}$
Microhm—cm.....	$N \times 0.16624$	$N \times 100.00$	$N \times 2.5400$	....	$N \times 0.017513 \times \frac{1}{\delta}$	$N \times 100.00 \times \frac{1}{\delta}$	$\frac{1}{N} \times 172.41$	$\frac{1}{N} \times 1532.8 \times \frac{1}{\delta}$
WEIGHT RESISTIVITY AT 20 C								
Ohm—pound/mile ²	$N \times 9.4924 \times \delta$	$N \times 5710.0 \times \delta$	$N \times 145.03 \times \delta$	$N \times 57.100 \times \delta$	....	$N \times 5710.0$	$\frac{1}{N} \times 9844.8 \times \delta$	$\frac{1}{N} \times 875.20$
Ohm—gram/meter ²	$N \times 0.0016624 \times \delta$	$N \times \delta$	$N \times 0.025400 \times \delta$	$N \times 0.010000 \times \delta$	$N \times 0.00017513$	....	$\frac{1}{N} \times 1.7241 \times \delta$	$\frac{1}{N} \times 15.328$
CONDUCTIVITY AT 20 C								
Per cent IACS (volume basis).....	$\frac{1}{N} \times 1037.1$	$\frac{1}{N} \times 1.7241$	$\frac{1}{N} \times 67.879$	$\frac{1}{N} \times 172.41$	$\frac{1}{N} \times 9844.8 \times \delta$	$\frac{1}{N} \times 1.7241 \times \delta$	....	$N \times 0.11249 \times \delta$
Per cent IACS (weight basis).....	$\frac{1}{N} \times 9220.0 \times \frac{1}{\delta}$	$\frac{1}{N} \times 15.328 \times \frac{1}{\delta}$	$\frac{1}{N} \times 603.45 \times \frac{1}{\delta}$	$\frac{1}{N} \times 1532.8 \times \frac{1}{\delta}$	$\frac{1}{N} \times 87520$	$\frac{1}{N} \times 15.328$	$N \times 8.89 \times \frac{1}{\delta}$	....



SHIELDED CABLES

designed for



**STEREO
HI-FI**



These low capacity cables are especially designed for use as leads between amplifiers, speakers and record changers of Stereo HI-FI units. Standard Two Conductor and Single Conductor cables are available and, where required, modifications of these cables can be developed to satisfy specific requirements.



LOW CAPACITY RECORD CHANGER TO AMPLIFIER EXTENSION CABLE

Two Stranded Conductors with clear polyethylene insulation extruded in parallel with a spiral wrapped tinned copper shield and a black extruded plastic jacket. Two styles available, with .030" wall insulation, 24 uuf per foot shield to conductor capacity and .017" wall insulation, 39 uuf per foot shield to conductor capacity.

LOW CAPACITY HI-FI AMPLIFIER INTERNAL SIGNAL CABLE

Two Solid Conductors in parallel with red and clear polyethylene insulation and spiral wrapped tinned copper shield with black extruded plastic jacket with 24 uuf per foot shield to conductor capacity.



STEREO RECORD CHANGER TO SPEAKER CO-AXIAL SINGLE CONDUCTOR LOW CAPACITY CABLE

Single Stranded Copper Conductors with polyethylene insulation, tinned copper full coverage shield and black or gray plastic insulation. Three styles available with shield to conductor capacities of 28, 31 and 33 uuf per foot respectively.

For complete specifications for these and other Lenz Wires and Cables write today for the new Lenz Catalog.



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and

CABLES

In Business Since 1904

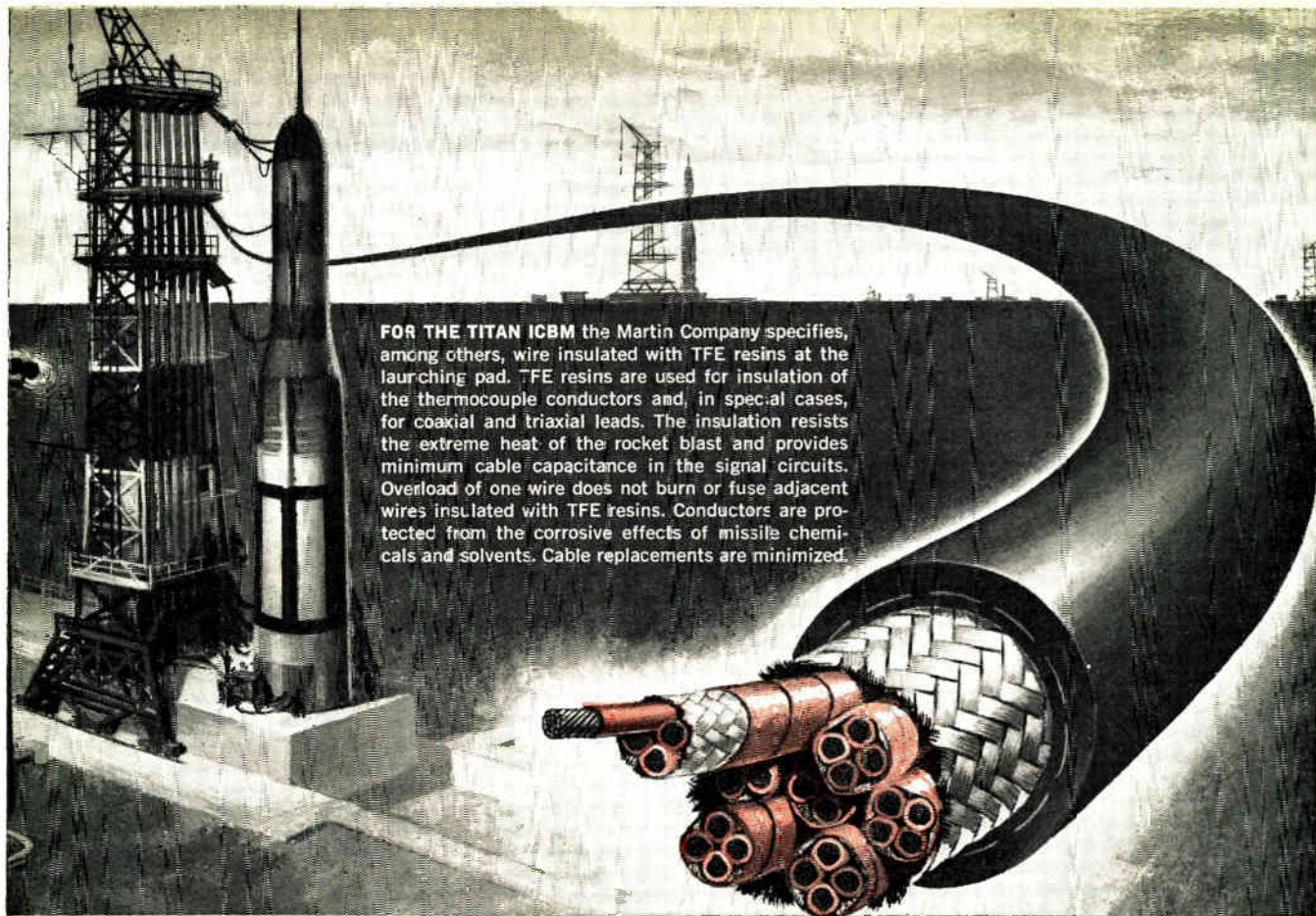
LENZ ELECTRIC MANUFACTURING CO.

1751 No. Western Ave., Chicago 47, Ill.

DENSITY OF ELECTRICAL CONDUCTOR MATERIALS

Densities of various conductors listed were compiled by ASTM (B 258-57). The densities for these materials may be used with the Wire Conversion Tables in the Wire Reference Section.

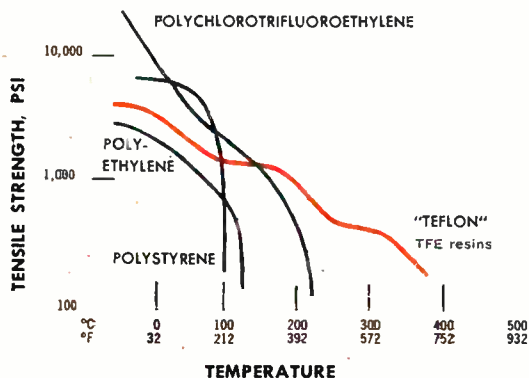
Material	Density, g. per cu. cm. at 20 C.
Copper (ASTM Specifications B 1, B 2, B 3, B 33, B 47 and B 189), Conductivity, per cent IACS:	
100	8.89
97.66	8.89
97.16	8.89
96.66	8.89
96.16	8.89
94.16	8.89
93.15	8.89
Bronze (ASTM Specifications B 9):	
Class A	8.89
Class B	8.89
Class C	8.89
Copper Alloys (ASTM Specifications B 105):	
Grade 8.5	8.78
Grade 13	8.78
Grade 15	8.54
Grade 20	8.89
Grade 30	8.89
Grade 40	8.89
Grade 55	8.89
Grade 65	8.89
Grade 80	8.89
Grade 85	8.89
Aluminum, Grade EC (ASTM Specifications B 230), Volume Conductivity, per cent IACS:	
60.97	2.703
60.6	2.703
Copper-Covered Steel (ASTM Specifications B 227):	
Grade 30 HS	8.15
Grade 30 EHS	8.15
Grade 40 HS	8.15
Grade 40 EHS	8.15
Galvanized Steel (Telephone and Telegraph) (ASTM Specifications A-111):	
Class A Coating:	
Grade EBB (Non-Copper Bearing)	7.78
Grade BB (Copper Bearing)	7.78
Grade BB (Non-Copper Bearing)	7.78
Class B Coating:	
Grade EBB (Non-Copper Bearing)	7.78
Grade BB (Copper Bearing)	7.78
Grade BB (Non-Copper Bearing)	7.78
Class C Coating:	
Grade EBB (Non-Copper Bearing)	7.78
Grade BB (Copper Bearing)	7.78
Grade BB (Non-Copper Bearing)	7.78
Galvanized Steel (Telephone and Telegraph) (ASTM Specifications A 326):	
Class A Coating:	
Grade 85	7.78
Grade 135	7.78
Class B Coating:	
Grade 85	7.78
Grade 135	7.78
Class C Coating:	
Grade 85	7.78
Grade 135	7.78



FOR THE TITAN ICBM the Martin Company specifies, among others, wire insulated with TFE resins at the launching pad. TFE resins are used for insulation of the thermocouple conductors and, in special cases, for coaxial and triaxial leads. The insulation resists the extreme heat of the rocket blast and provides minimum cable capacitance in the signal circuits. Overload of one wire does not burn or fuse adjacent wires insulated with TFE resins. Conductors are protected from the corrosive effects of missile chemicals and solvents. Cable replacements are minimized.

TFE resins outperform all other organic insulations in resistance to temperatures and heat aging

Tensile strength vs. temperature



You can depend on TFE-fluorocarbon resins, because they retain useful mechanical and electrical properties far beyond their continuous service rating of 260°C. In fact, these resins maintain appreciable mechanical strength even past their 327°C. (621°F.) gel point, as the curve at left shows. When you use wire and cable insulated with TFE resins you get an extra factor of safety against high ambient temperatures and conductor overheating due to current overloads. The insulation will not melt, char, burn, embrittle or cut through.

With this type of wire, you can save weight and space, because you can reduce conductor cross-sections and thickness of insulation without sacrificing power ratings. And in production, your electronic assemblies can be soldered rapidly and efficiently without damage to insulation. The outstanding dielectric properties of TFE resins remain virtually unchanged over extremely broad ranges of temperature, frequency and time.

Call your supplier of wire and cable insulated with TFE resins today. He's listed in the Yellow Pages under "Plastics—Du Pont." For additional technical data write to: E. I. du Pont de Nemours & Co. (Inc.), Polychemicals Department, Room T-456, Du Pont Bldg., Wilmington 98, Delaware.

In Canada: Du Pont of Canada Limited, P. O. Box 660, Montreal, Quebec.



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TFE-FLUOROCARBON RESINS

® TEFLON is Du Pont's registered trademark for its fluorocarbon resins, including the TFE (tetrafluoroethylene) resins discussed herein.

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

Glossary of Wire Terms

—Compiled with the assistance of
F. X. Buschman,
Tensolite Insulated Wire Co., Inc.

Abrasion Resistance—A measure of the ability of a wire or wire covering to resist damage by mechanical means. Usually expressed as inches of abrasive tape travel.

Admittance—The measure of the ease with which an alternating current flows in a circuit. It is the reciprocal of impedance.

Armor—usually a metallic cover placed over the insulation of wire or cable to protect from abrasive environments.

Attenuation—The reduction in strength of an electrical impulse, i.e. the power loss in a coaxial cable expressed as decibels per one thousand feet.

AWG—American Wire Gage, the means of specifying wire diameter. The higher the gage number, the smaller the wire conductor diameter.

Braid—A weave of organic or inorganic fiber used as a covering for a conductor or group of conductors.

B & S—Stands for Brown and Shorpe Gauge, a wire diameter standard that's the same as AWG.

WIRE & CABLE

Bunch Stranding—A method of twisting individual wires to form a finished stranded wire. Specifically, a number of wires are twisted together in a common direction and with a uniform pitch (or twist per inch).

Cable—A combination of conductors insulated from one another. Also, a shielded conductor.

Chemical Resistance—The ability of the insulation to withstand the presence of materials which can corrode or otherwise deteriorate a conductor, or if penetrable to the conductor can cause dielectric loss or insulating qualities

Circular Mil—Unit of area equal to the area of a circle whose diameter is 1 mil or 0.001 inch.

Circular Mil Area—The area in circular mils is the square of the diameter in mils. Used to express the cross sectional area of wire.

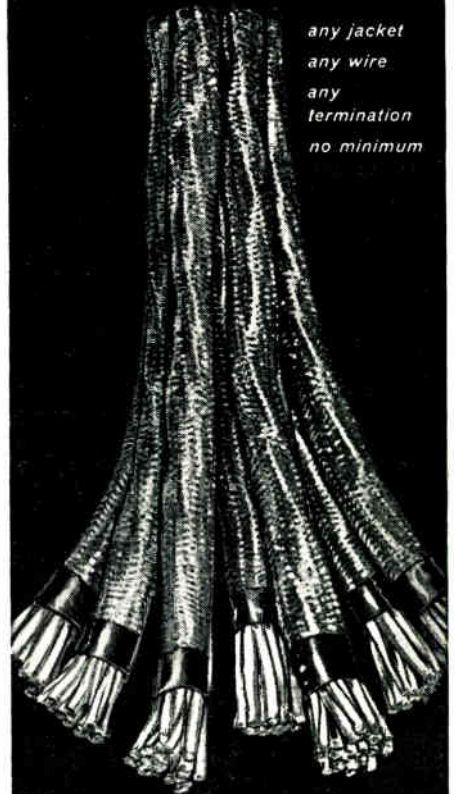
Conductivity—The direct current conductance of a material. Conductivities of other metals are expressed as a percent of the conductivity of copper. Resistivity is the reciprocal of conductivity.

Conductor—The metallic wire used to carry a current. Sometimes the term conductor is used to designate the individual insulated wires in a cable.

(Continued on page 112)

CUSTOM CABLES

—by Alpha Wire



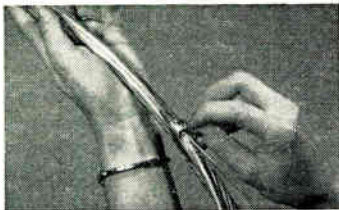
any jacket
any wire
any
termination
no minimum

**ALPHLEX®
ZIPPER
TUBING**

NEWS

FROM ALPHA  WIRE

**NEW CONSTRUCTIONS OF
ALPHLEX® ZIPPER TUBING
PROVIDE GREATER
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stock sizes: 1/2" to 4" I.D.
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Alphlex Zipper Tubing is the modern way to harness, cable and protect wire. Just zip to close—and just zip to re-open! If you wish, permanent seal. Saves you time, labor, money. Strong, flexible, durable. Versatility unlimited.

ZIP-31: polyvinyl sheet made from MIL-I-631C materials. All-purpose type, for general applications to 105°C.

ZIP-44: polyvinyl sheet made from MIL-I-7444A materials. Extremely flexible; for aircraft and low-temperature uses to -67°C.

ZIP-50: "sandwich" of aluminum foil laminated between 2 sheets of polyvinyl. For 100% RF shielding applications to 105°C.

ZIP-90: polyvinyl bonded to woven fiberglass sheet per MIL-I-3190A. For rough usage, abrasion resistance, and high-temperature uses to 130°C.

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Alpha has the unique advantages of

- 38 years creative engineering
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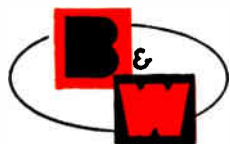
ALPHA WIRE CORPORATION
200 Varick St., New York 14, N. Y.

ALPHA  WIRE

from prototype to mass production

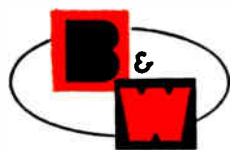
Circle 18 on Inquiry Card

Circle 17 on Inquiry Card



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More than a quarter century of experience—the longest in the industry—is behind these outstanding coils. But we don't stop here: Custom coil designing to operating specifications has always been an essential part of our service, and we can produce efficiently in large or small quantities. If you must solve a special coil application in a hurry, our know-how is as close as your telephone. Call ST 8-5581.



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B&W also design and manufacture filters for: ANTENNAS • RADIO INTERFERENCE • RADIO RANGE • UHF and VHF as well as many special types designed to performance specifications. Available to commercial or military standards.

STANDARD COIL STOCK

Highly efficient air wound coils are stocked in a wide variety of sizes from $\frac{1}{2}$ " diameter. Coils up to 48" in diameter, 7' in length have been produced.



ROTARY INDUCTORS

Ruggedly constructed units are available from stock and on special order. These inductors, fabricated of wire, tubing or edgewound strip, have found wide application in induction and dielectric heaters, antenna phasing networks and radio transmitters.



FIXED INDUCTORS

Designed to performance specifications, for high power transmitters and RF heating applications. Coupling links may be internal, external, fixed or variable.



BAND-SWITCHING PI-NETWORKS

For high efficiency and simplicity in construction of wide range band-switching amplifiers operating from 3.5 through 30 mc. s. Designed for maximum "Q". Stock items.



BALUNS AND BALUN COILS

Stock Items: Model 725 1 KW, frequency coverage 1.5 to 30 mc, matches 75 ohm unbalanced input to 300 ohm balanced output. Model 3976 Balun Coil Kit with mounting bracket. For either 75 ohm unbalanced to 75 ohm balanced or 75 ohm unbalanced to 300 ohm balanced. 250 watts AM—500 watts CW—1 KW SSB.



PI-WOUND AND SOLENOID INDUCTORS

Designed and fabricated to specifications. Universal with single or multiple pi or progressive windings. IF, RF and oscillator coil assemblies, open, canned or hermetically sealed.



TOROIDS

Open, impregnated, tape wrapped, encapsulated or metal cased. In sizes from $\frac{1}{16}$ " diameter center hole to any size specified. Inductances from a fraction of one micro-henry to several thousand. Tolerances: as close as 1% on special order. Designs to meet Grade 5 requirements of MIL T-27A.



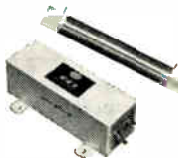
FILTERS

Precisely constructed for any application, high-pass, low-pass, band-pass and band-suppression. Types to commercial standards or to meet MIL T-27A for military use, where temperature and humidity are vital factors.



CHOKES

RF Filament Chokes for grounded grid amplifier applications, for operation on frequencies from 3.5 to 30 mc. RF plate transmitting chokes for series or shunt fed circuits.



Wire Glossary

(Continued from page 111)

Concentricity—The measurement of the centering of the conductor within the insulation.

Copperweld—This is the trademark for copper covered steel wire. It is available in two conductivities, 40% LC and 30% HM. It can be obtained either annealed or hard drawn.

Corona—An electrical discharge at high voltage.

Coverage—A calculated percentage which defines the completeness with which a braid or shield covers the surface of the underlying insulated conductor or conductors.

Concentric Stranding—A method of stranding wire. Specifically, the final wire is built up in mathematical layers so that the inner diameter of a succeeding layer is always equal to the outer diameter of the underlying layer.

Decibel—A unit of relative power voltage or current. The logarithm of the ratio of the power level in question to that of the reference value. Attenuation is expressed in decibels.

Dielectric—Another term for insulation.

Dielectric Constant—The ratio of the capacitance of a condenser having the given material as the dielectric to the capacitance of the same condenser with a vacuum as the dielectric. In the CGS system the dielectric constant of a vacuum is one.

Dielectric Strength—The maximum voltage which a dielectric can withstand without rupture. Usually expressed as volts per mil.

Dip Coating—An insulating coating applied to the conductor by passing conductor through an applicator containing liquid insulating medium. The insulation is then sized and passed through ovens to solidify insulation. This method is common for magnet wire.

Direction of Lay—The lateral direction in which strands or the elements of a cable run over the top of the cable as they recede from the observer. Expressed as right or left hand lay.

End—The number of fibers or wire per carrier in braiding operations.

ETP—A grade of copper which is used in electrical conductors. It is electrolytically refined and referred to as Electrical Tough Pitch.

Extrusion—Basically, the extrusion process consists of flowing plastic insulation material through forming dies and subsequently cooling insulation material to form a homogeneous solid cylinder around wire.

(Continued on page 114)



Belden

WIREMAKER FOR INDUSTRY SINCE 1902
CHICAGO

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THE WIRE YOU NEED

- for EVERY ELECTRONIC application
- Correctly Rated—Quality Controlled

- for positive performance
- for the most complete line for all electronic applications
- for most advanced construction designs, insulations, and shieldings correctly service-rated
- for dependable uniformity under strictest quality control
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- for fast service

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One Wire Source for
Everything Electrical & Electronic

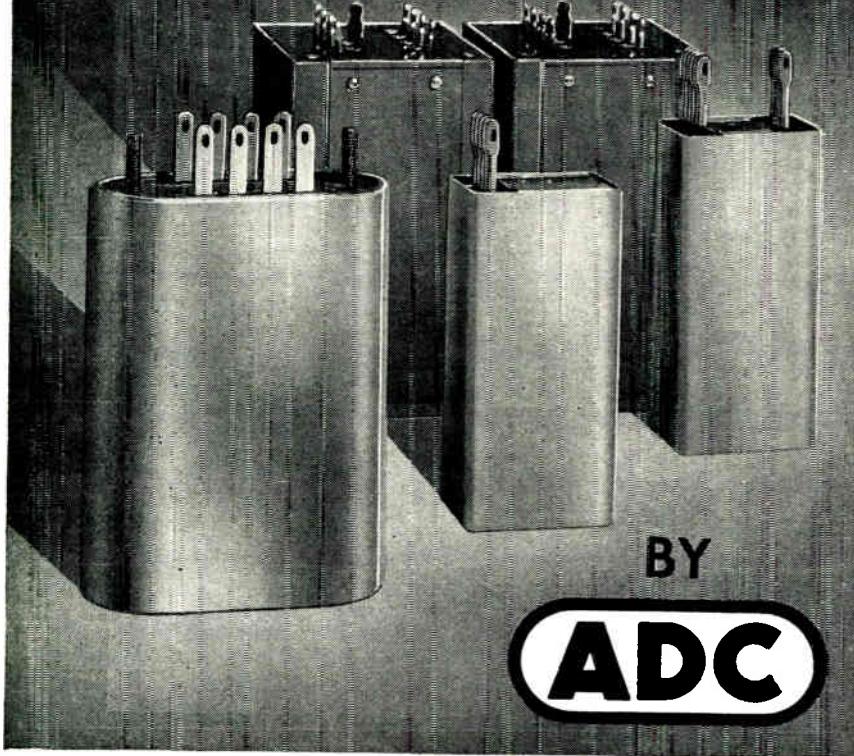


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SINCE 1902
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Magnet Wire • Lead Wire • Power Supply Cords,
Cord Sets and Portable Cord • Aircraft Wires
Electrical Household Cords • Electronic Wires
Welding Cable • Automotive Wire and Cable

8-2-8

Telephone Coils



In addition to their regular stock and custom transformers for the electronic industry, ADC has long been a dependable source of transformers and filters to the telephone and telegraph industry. When Western Electric announced they would no longer supply these components to manufacturers, ADC put their 24 years of experience to use designing and tooling a series of "coils" which are electrically and physically interchangeable with similar components made by The Western Electric Company. Many of these are in stock. If you use such components, we suggest that you write for more information. We believe you'll be pleased with both the price and delivery.

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TRANSFORMERS • REACTORS • FILTERS • JACKS & PLUGS • JACK PANELS

Wire Glossary

(Continued from page 112)

Flex Life—The resistance of a conductor to fatigue failure when repeatedly bent.

Impedance—The total opposition that a circuit offers to the flow of alternating current or any other varying current at a particular frequency. The ohm is the unit of impedance. Admittance is the reciprocal of impedance.

Insulation—A non-conducting material used to prevent the leakage of electricity from a conductor.

Lay—The lay of any helical element of a cable or conductor is the axial length of a turn of the helix of that element.

Microinch—One millionth of an inch. Used to express plating thickness on conductors.

Moisture Absorption—Generally, the amount of moisture, in percentage, that an insulation will absorb. In moist conditions figure should be as low as possible.

OFHC—Trade mark for a grade of electrolytic copper wire known as Oxygen Free High Conductivity.

Percent Plating—The quantity of plating on a conductor expressed as a percentage by weight. The term is misleading as 2½% plating on AWG 40 is 16 microinches thick, while 2½% plating on AWG 30 is 53 microinches thick.

Rope-Lay—A type of that uses both bunch and concentric stranding to build wire diameter to required size. This type of stranding offers the best wire flexibility.

Shield—A conducting or semi-conducting covering over an insulated conductor or conductors. Normally a shield is made by braiding or serving fine wires.

Solid Conductor—A conductor composed of one single strand.

Stranded Conductor—A conductor composed of more than one single strand.

SPC—Silver plated copper.

TC—Tinned copper.

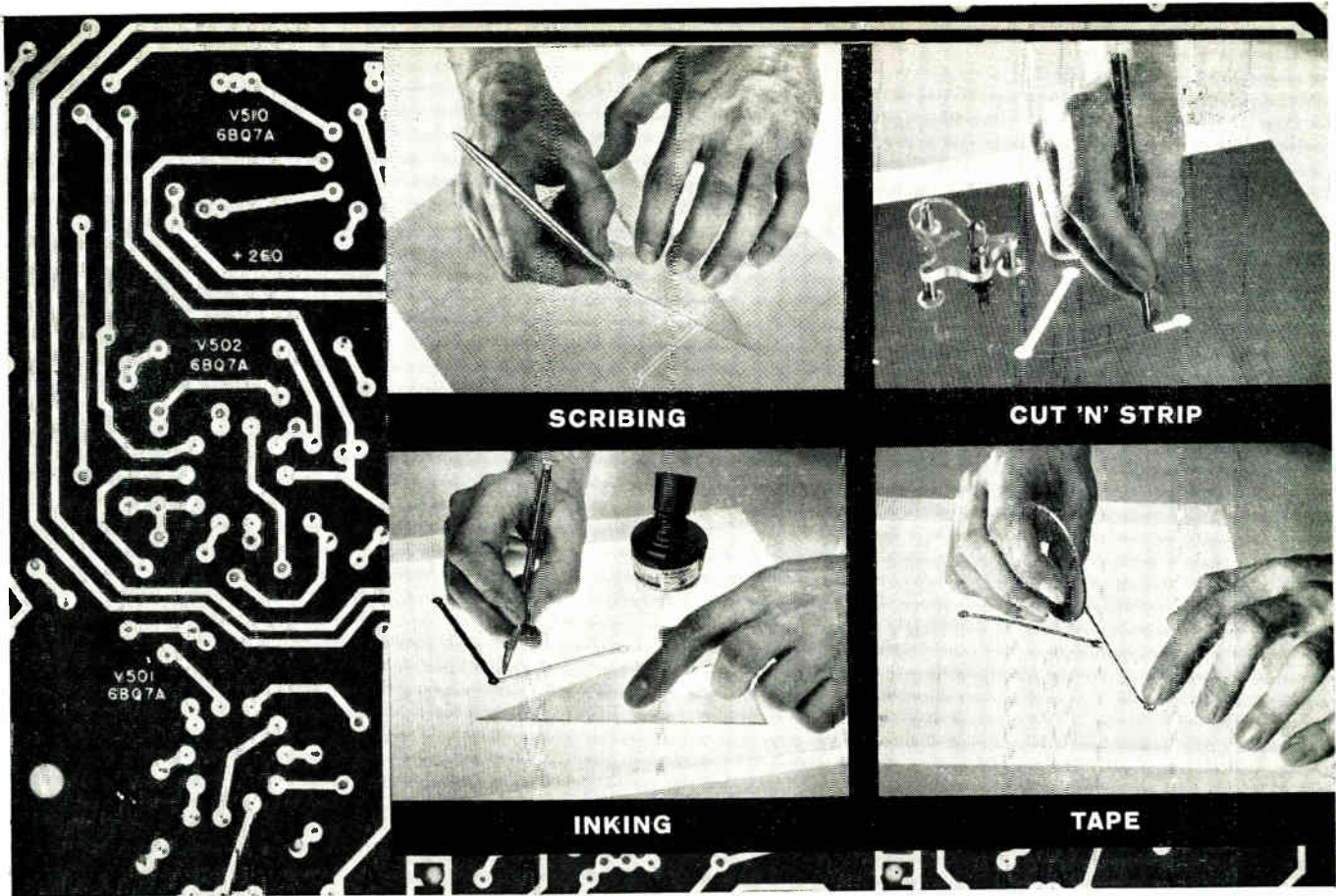
Temperature Rating—The maximum temperature at which the insulating material may be used in continuous operation without loss of its basic properties.

Velocity of Propagation—The speed of a radio frequency wave within a cable as compared with the same wave in free space.

Voltage Breakdown—The voltage necessary to cause insulation failure.

Voltage Rating—The voltage that may be continuously applied to a wire.

Wrapping—The method of insulating wire by serving insulating tapes around a conductor.



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for the newest techniques...and basic methods, too...

STABILENE® Film by K&E gives accurate dependable results

However you make your masters, you can expect better, more uniform results if you start with STABILENE Films. These strong, clear, completely stable films are available in a complete range of surfaces, for traditional preparation methods or the most advanced technique now used.

The Scribing Method—newest and most accurate—is fast and simple, too. The circuit is penciled on the STABILENE surface, then scribed in outline with double lines. Pads are scribed in, and the master copy is ready for transfer to a sensitized Peel-Coat STABILENE, where the lines and pads are simply stripped out.

The scribing method—an exclusive K&E development—is 2 to 3 times faster than taping. All but the most complicated circuits can be prepared one-to-one—eliminating reductions. Scribe points retain

proper sizes, produce accurate lines of constant thickness.

Cut 'N' Strip is another time-saving new K&E technique. If you work one-to-one, it's just one step from master to board—there's no intermediate photography. A rough pencil layout is made on the back of STABILENE Film, using an accurate grid underlay. Then, the sheet is turned face-up, pads are laid out with a modified K&E Drop Bow Compass with blade, and circuit lines are cut with a circuit-path cutting tool. The surface can now be easily peeled off with a knife or tweezers.

One big advantage of Cut 'N' Strip: you can make a positive or a negative from the same basic drawing, depending on which surface you strip off. Corrections are easily made, using K&E opaquing fluid. With it, you can touch up or replace lines, then re-

cut and re-peel. STABILENE Film is actinically opaque, cuts clean, yields sharp, accurate lines.

Stabilene Films For Taping or Inking Methods provide accurate, permanent dimensions. All have outstanding size-holding stability, plus the exclusive K&E "Engineered Surface," which accepts drawn lines clearly and uniformly—without feathering or blurring. STABILENE makes accurate taping easier, too—it lays down absolutely flat.

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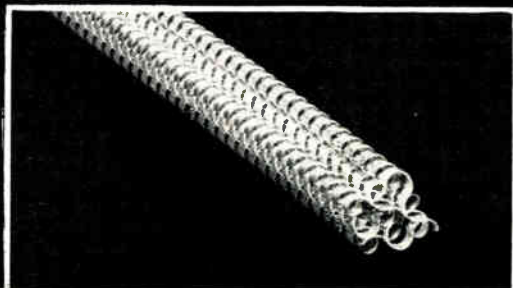
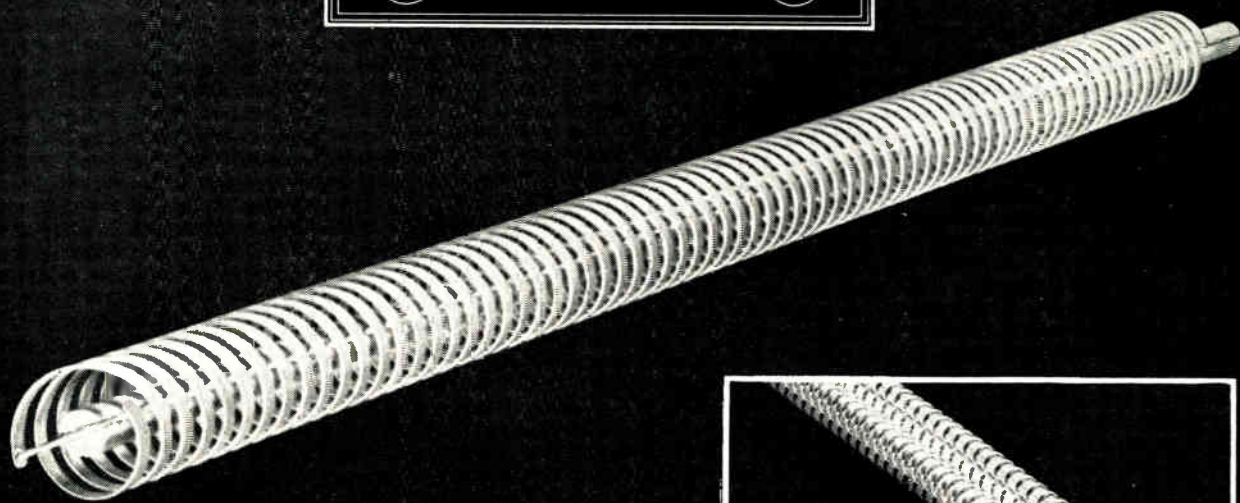
Company & Address: _____

1633

Microwave Component News



from SYLVANIA



Sylvania research in circuit "Components" paves the way for better microwave systems

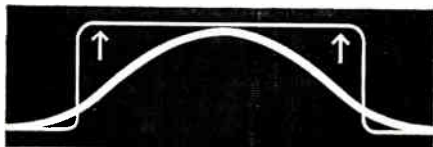
RECOGNIZE THESE special traveling wave tube helices? They were developed through Sylvania's programs of applied research and product development in the continuing search for better microwave components.

Beams and Microwaves—Sylvania has accumulated unequalled experience in the study of the interplay between electron beams and microwaves.

in realizing the full potential of the beam approach to parametric amplifiers, which offers a theoretical noise level of zero.

Major strides are also being made in klystrons, backward-wave magnetrons (Carcinotrons), and low-noise backward-wave amplifiers.

Solid State and Microwaves—Important new research promises better power sources for higher frequencies through harmonic generation, using ferrites. The work has already yielded new ferrite isolators and circulators; microwave control devices are in the development stage.



"Better Power-Bandwidth in TWT's"

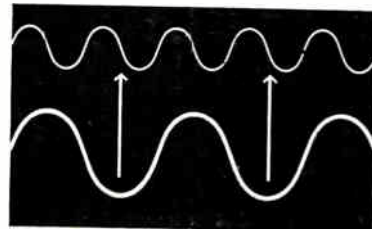
The development of a Traveling Wave Tube with essentially flat power-bandwidth is a classic example of the progress being made through the theoretical investigation of microwave components viewed as RF circuits.

This experience will play a vital role



"Communicating with missiles in flight"

Plasma and Microwaves—Sylvania is also making thorough studies of the interplay between plasmas and microwaves. This area holds the secrets of getting communications through shock waves and exhaust of missiles in flight. And, it provides direction for the development of new microwave components such as high-speed switches and harmonic generators.



"Harmonic Generation"

What are your Special Requirements? Sylvania research and development facilities can be applied in any of these areas to meet your special requirements. We welcome the opportunity to meet with you. Write us at the address below.

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INTO

small packages



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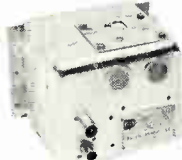
FM/FM or PDM/FM Crystal Controlled
215 to 260 Megacycles

Model 1472



4" x 1.5" x 2.7"
2 Watts

Model 1463



5 1/32" x 3 1/16" x 4"
15 to 30 Watts

Model 1462



6" x 4 1/4" x 3 3/4"
50 to 80 Watts

Model 1466A



6.5" x 4" x 3.25" RF Amplifier
2 watts in — 100 watts out

SUB-CARRIER OSCILLATOR.
Model 800C — 1.5" x 1.9" x 2.45"



Deviation stability $\pm 1\%$ of band width. Deviation linearity less than 1% of band width under all conditions measured from a straight line drawn between end points.

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NEMA Grade	Military Specifications	Grade Description	Suggested Applications	Continuous Maximum Operating Temp. ° F	Thermal Expansion cm/cm/° C x 10 ⁻⁵	Water Absorption % Max. 1/16	Cu. In. Per lb.	AIEE Insulation Class
X	—	phenolic resin paper base, mechanical grade	terminal boards, structural parts, switch bases, washers	225	2.0	6.0	20.4	A
P	—	phenolic resin, paper base, punching grade	terminal boards, switch bases, insulating washers, socket bases	250	2.0	3.6	20.8	A
PG	—	paper base, phenolic resin, cold punching & shearing		200	2.0	5.5	20.6	A
XX	MIL-P-3115B PBG	phenolic resin, paper base, electrical grade	instrument panels, breaker arms, bobbin heads, coil forms	250	2.0	2.0	20.6	A
XXP	—	phenolic resin, paper base, electro-mech. grade	condenser stator brackets, switch rotors and stators, terminal boards	250	2.0	1.8	21.0	A
XXX	MIL-P-3115B PBE	phenolic resin, paper base, electrical grade	high voltage switch gear, radio, television panels radio coil forms, jack spacers	250	2.0	1.4	21.0	A
XXXP	MIL-P-3115B PBE-P B	phenolic resin, paper base, hot punching, electrical grade	condenser stator brackets, wave band switch rotors and stators, terminal boards	250	2.0	1.0	21.3	A
ES-1	—	melamine binder, paper base, black or gray surface, white opaque core	suitable for engraving as name-plates etc.	250	2.0	2.5	19.1	A
ES-2	—	phenolic binder, paper base, white subcore & black core	similar to ES-1 but tougher & made in thicker sheets	250	2.0	—	19.8	A
ES-3	—	phenolic binder, paper base, white or grey surface, black core	similar to ES-1	250	2.0	2.5	20.1	A
C	MIL-P-15035B FBM	phenolic resin, cotton fabric base mechanical grade	gears, pinions, cams, bearings, bobbin heads, chem. pipe fittings	225	2.0	4.4	20.4	A
CE	MIL-P-15035B FBG	phenolic resin, cotton fabric base electro-mech. grade	circuit breaker and switch arms, electrode supports motor bases	250	2.0	2.2	20.8	A
L	MIL-P-15035B FBI	phenolic resin, fine weave cotton fabric base, mechanical grade	small gears and pinions, parts requiring intricate machining, breaker arms	225	2.0	2.5	20.5	A
LE	MIL-P-15035B FBE	phenolic resin, fine weave cotton fabric base, electrical grade	terminal blocks, terminal strips, panels, high humidity applications	250	2.0	1.95	20.8	A
A	—	phenolic resin, asbestos paper base, heat resistant grade	electrical appliance insulation, armature slot insulation and slot wedges	275	1.5	1.5	16.1	B
AA	MIL-P-8059A	phenolic resin, asbestos fabric base, heat resistance, mechanical grade	rotor vanes, water pump thrust washers, caustic resistant applications	275	1.5	3.0	16.3	B
G-2	—	Staple fibre type glass cloth, electrical and heat-resistant	good electrical properties under high humidity, mechanically weakest of glass-base grades, low dielectric loss	275	1.8	1.5	18.5	B
G-3	—	phenolic resin, glass fabric, heat resistant, electro-mech. grade	armature slot wedges, structural parts requiring good electrical properties	290	1.9	2.7	16.8	B
G-5	MIL-P-15037B FMG	melamine resin, glass fabric, heat resistant, electro-mech. grade	arc barriers, switchboard panels, circuit breaker parts	300	1.0	2.7	14.6	B
G-6	—	silicone resin, staple fibre glass cloth, good dielectric loss & insulation resistance, heat & arc resistance	mechanical and electrical applications	400	1.0	0.55	16.8	H
G-7	MIL-P-997B	silicone resin, glass fabric, high heat resistance electro-mech. grade	high temperature electrical applications, high frequency radio equipment	400	1.0	0.55	16.7	H
G-10	MIL-P-18177 GEE	epoxy resin, glass fabric, electro-mech. grade	electrical mechanical applications under high humidity. Good chemical resistance	—	—	0.35	—	—
M-1	MIL-P-15047B NPG	phenolic resin, nylon fabric base, electrical grade	high voltage applications, low loss radio band change switch rotors and stators	165	—	0.6	24.1	A
MC	—	melamine resin binder, purified cotton fabric, good alkali and arc resistance		—	—	0.35	—	—

Average Values Obtained from NEMA Authorized Engineering Information on the Properties of Sheets.

Flexural Strength Flatwise 3/32" (psi min.)		Tensile Strength (psi min.)		Dissipation Factor 10 ⁶ CPS 3/16" Thickness (Cond. D-14/23)	Dielectric Constant 10 ⁶ CPS 3/16" Thickness	Dielectric Strength Parallel to Laminations (Kv min.) 1/32 to 1" Incl.		Insulation Resistance (Megohms) (Cond. C-96/35/90)	Arc-Resistance (sec. - min.) (Cond. A)
Lengthwise	Crosswise	Lengthwise	Crosswise			Cond. A	Cond. D-48/50		
22,000	20,000	20,000	16,000	—	—	—	—	—	—
12,000	10,000	12,000	9,000	—	—	40.0	5.0	—	—
—	—	10,500	—	—	—	—	—	—	—
15,000	13,000	16,000	13,000	0.05	6.00	40.0	5.0	60	—
14,000	12,000	11,000	8,500	0.05	5.20	60.0	8.0	500	—
13,500	11,800	15,000	12,000	0.044	5.70	50.0	6.0	1000	—
12,000	10,500	12,400	9,500	0.035	4.80	60.0	15.0	20,000	—
13,500	13,500	12,000	—	—	—	—	—	—	—
13,500	13,500	13,000	—	—	—	—	—	—	—
13,500	13,500	15,000	—	—	—	—	—	—	—
—	—	11,200	9,500	—	—	15.0	—	—	—
17,000	14,000	12,000	9,000	—	—	35.0	2.5	—	—
15,000	14,000	14,000	10,000	—	—	15.0	—	—	—
15,000	13,500	13,500	9,500	0.07	6.00	40.0	3.0	30	—
13,000	11,000	10,000	8,000	—	—	5.0	—	—	—
16,000	14,000	12,000	10,000	—	—	—	—	—	—
18,000	14,000	—	—	0.06	5.80	30.0	10.0	5,000	—
18,000	16,000	23,000	20,000	—	—	—	—	—	—
55,000	45,000	32,000	30,000	0.08	8.70	23.0	5.0	100	180
18,000	16,000	—	—	0.06	4.80	32.0	15.0	—	180
10,000	8,000	23,000	18,500	0.022	4.20	32.0	15.0	2,500	180
55,000	45,000	45,000	40,000	0.035	5.40	35.0	30.0	350,000	—
10,000	9,500	8,500	8,000	0.039	4.30	60.0	40.0	50,000	—
—	—	—	—	—	—	20.0	5.0	—	100

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①



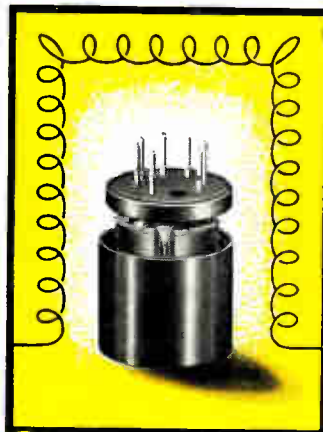
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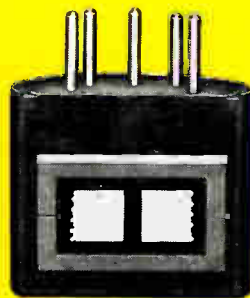
After the component is soldered to the epoxy header, a premeasured pellet is dropped into the cured epoxy shell. The cover and component are then inserted into the shell.

③



The entire package is then heated; the pellet automatically melts and cures, embedding the component and sealing the cover. In cases where encapsulation is desired without embedment, a self-sealing epoxy cover is available.

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Encapsulating and Potting Electronic Components

A fairly small selection of plastics meets the average requirements of Electronic Equipment. Production line techniques can often be used. Techniques are discussed and significant properties of resins are tabulated.

By Walter A. Gammel, Sr.

*Manager, Custom Coils Sales
R-B-M Controls Division
Essex Wire Corporation
Chairman: E.I.A. Professional Group
on Plastics in Electrical Insulation*

THE electronic engineer setting up a plastics section² will probably begin with simple tools and equipment. As electronics, the miracle market for plastics,³ continues to grow he will find himself studying internal strains,⁴ testing resin embedding sample⁵ and transparent thermosets,⁶ calculating stoichiometric proportions of resins and hardeners,⁷ determining cure rates,⁸ considering the relative merits of anhydrides,⁹ and aromatic and aliphatic amines,¹⁰ and studying the failing of dielectrics.¹¹ Then he must consider packaging, instrument sticks,¹² and reactive diluents¹³ and other modifiers.¹⁴ Next, he will need to design and develop¹⁵ methods for producing low cost per unit components.¹⁶ Finally, he will be asked to locate and replace defective components in an assembly already encapsulated because no spare parts are available.¹⁷

Evaluation of Materials & Methods

A recent article²⁰ describes the problems involved in evaluation of class H impregnation systems. Five epoxy resins were compared with an epoxy varnish, a polyester varnish, and a polyester resin. The conclusion was that the resin which passed, and there was only one, was modified to suit a particular purpose. Although the epoxies are excellent, they must be designed for each particular application and are not a panacea for all problems. The requirements of MIL-T-27A, class H, expectancy Y by impregnation rather than encapsulation is an example. In this

instance, impregnation offered advantages over encapsulation including cost reduction, elimination of molds, and lighter weight.

No one resin combines all the best properties and easiest handling characteristics, but the search for an economical and suitable material must be pursued intelligently. The ideal parameters should first be outlined. The materials most closely meeting these requirements can then be systematically investigated. (See chart on the following page.) Finally material handling equipment can be selected.²¹

PROCESSING HINTS

Mold design

Mold design may spell the difference between success and failure of a product. Terminals and parts which are external to the casting proper should be located, if possible, on parting lines. Location of sprues should avoid critical areas, allow sufficient volume to compensate for resin shrinkage during cure, and so designed that the resin gelling in this portion of the mold lags behind that in the mold proper.

Curing

The relationship between pressure, temperature, and time is important. For impregnation, time must be allowed for the resin mixture to penetrate the interstices. For a void-free casting, the curing time and temperature must not initiate gelling before air is removed.

Post degassing

Assemblies are prepared in the normal manner, inserted into a treated mold, preheated to drive off moisture, and then filled with resin. Unfortunately, casting the mold in the open results in temperature losses, so when the resin is poured over the part, air is entrapped.

When the unit is placed in the vacuum chamber, gases try to rise but are restricted by the resin's viscosity and the geometry of the part. The pressure gradient between the bottom and the top of the mold makes removal of air from the bottom difficult. In this case, predegassing and vacuum casting may be required.

Vacuum casting

For void-free, thoroughly impregnated units, centrifuging or vacuum casting are used. Most electronic assemblies are too fragile to stand the tremendous pressures built up in the centrifuge. For these, casting under vacuum is the best solution.

When a resin-hardener system enters the mold under vacuum, most of the entrapped gases are removed from the resin system during pour. By the time the mixture settles in the mold, the material may be sufficiently degassed. If initial results indicate need for it, a very high vacuum may be used with complete safety if a critical time period is not exceeded. Because of the short cycles possible with this method, much higher vacuums may be used than has been possible in the post degassing
(Continued on page 123)

	PHYSICAL PROPERTIES				ELECTRICAL PROPERTIES								
	Specific Gravity	Thermal Expansion 10 ⁻⁶ /°C	Water Absorption	Max.Temp. °F(Cont.)	Volume Resistivity ohm.-cm	Dielectric Strength volts/mil	Dielectric Constant			Dissipation (power) Factor			
							60 cps	10 ³ cps	10 ⁶ cps	60 cps	10 ³ cps	10 ⁶ cps	
Epoxy	Room cure												
	Unfilled	1.11-1.23	45-65	.08-.13	>150	10 ¹² -10 ¹⁷	400-500	3.5-5.0	3.5-4.5	3.3-4.0	.002-.010	.002-.02	.030-.050
	Filled	1.6 -2.0	20-40	.04- .10	>160	10 ¹³ -10 ¹⁶	400-550	3.2-4.5	3.2-4.0	3.0-3.8	.008-.03	.008-.03	.02 -.04
	Moderate cure												
	Unfilled	1.11-1.23	40-65	.07-.14	>200	10 ¹² -10 ¹⁸	400-525	2.9-5.0	2.7-4.5	0.6-4.0	.002-.010	.002-.02	.03 -.05
	Filled	1.5 -2.2	18-40	.03-.12	>210	10 ¹² -10 ¹⁸	400-550	2.8-4.4	2.7-4.0	2.6-3.8	.008-.03	.008-.03	.02 -.04
Heat resistant	Unfilled	1.11-1.25	38-70	.06-.15	>350	10 ¹² -10 ¹⁸	400-550	4.0-5.0	4.1-4.5	3.3-4.1	.003-.01	.002-.01	.03 -.05
	Filled	1.4 -2.5	15-40	.02-.15	>400	10 ¹³ -10 ¹⁸	400-575	3.8-4.8	3.2-4.0	3.0-3.8	.007-.03	.007-.03	.02 -.04
	Semi-Flexible	1.10-1.30	20-100	.25- .5	200-350	10 ¹¹ -10 ¹⁴	225-400	3-6	3-5	3-6	.01 -.04	.012-.05	.018-.09
Polyester	Rigid	1.10-1.50	50-85	.15-.60	275-375	10 ¹⁴	350-500	3.0-4.4	2.7-5.5	2.6-4.0	.003-.03	.004-.03	.006-.02
	Flexible	1.0 -1.2		.50-2.5	260	10 ¹⁰ -10 ¹³	250-400	4.0-8.0	4.0-7.0	4.0-6.0	.015-.035	.02 -.05	.03 -.06
Phenolic	Unfilled	1.3	60-80	.3- .4	160	10 ¹²	250-400	7	6	5	.1	.05	.05
	Filled	1.7	30-70	.12-.36	170-300	>10 ⁸	75-300	20	15	10	.30	.20	.10
Polystyrene	Casting	.95	60	0.5		>10 ¹³	>450	2	2.3	2.3	.0006	.0008	.0008
	Impregnating	1.05	70	0.5		10 ¹⁶	500	2.6	2.6	2.6	.0002	.0003	.0003

*Values will vary with particular formula. Values given are typical. All can be improved by specific design effort.

PHENOLIC

Heat curing under vacuum removes water (condensation by-product). Electrical & mechanical properties satisfactory. Processing somewhat difficult. Chief advantage is low cost. Limited use for electronics. Plaster, wood, plastic, elastomers, rubber, metal may be used for molds.

POLYSTYRENE

Lowest electrical loss. Improved heat resistant form has been developed. Low heat distortion point has been principal drawback. The styrene monomer is difficult to handle, supplier should be consulted. Relatively high cost. Used for capacitor for High Q applications.

EPOXY, ROOM CURE

Resin-hardeners typically gel in 30-60 min. Cure overnight or in 2 hrs. at 225°-250°F.

EPOXY, MODERATE CURE

Best for most encapsulation and potting jobs. Hardeners relatively non-toxic. Viscosity may be reduced for easy handling by heating to 125°F. Moderate price.

EPOXY, HEAT RESISTANT

For exotic applications and best high temperature life (20 yrs. at 300°F possible). Curing cycles may be overnight—stepwise cure usually prescribed. Moderate to high cost.

EPOXY, GENERAL

Their initial handicap, price, has been largely overcome. Have excellent adhesive properties, satisfactory mechanical and electrical properties, superior chemical properties. Improved moldable versions possible.

POLYESTER

Available in wide variety of forms. Electrical and physical properties may be modified readily. Low to moderate cost. Fillers include mica, glass fibers, talc, and ceramic. Used in transformers, insulators, radomes, terminal blocks, and for marine and automotive electrical encapsulation. Handling procedure 18. Good arc resistance.

Encapsulating and Potting

(Continued from page 121)

method where the literature warns that certain catalysts and resins may boil.

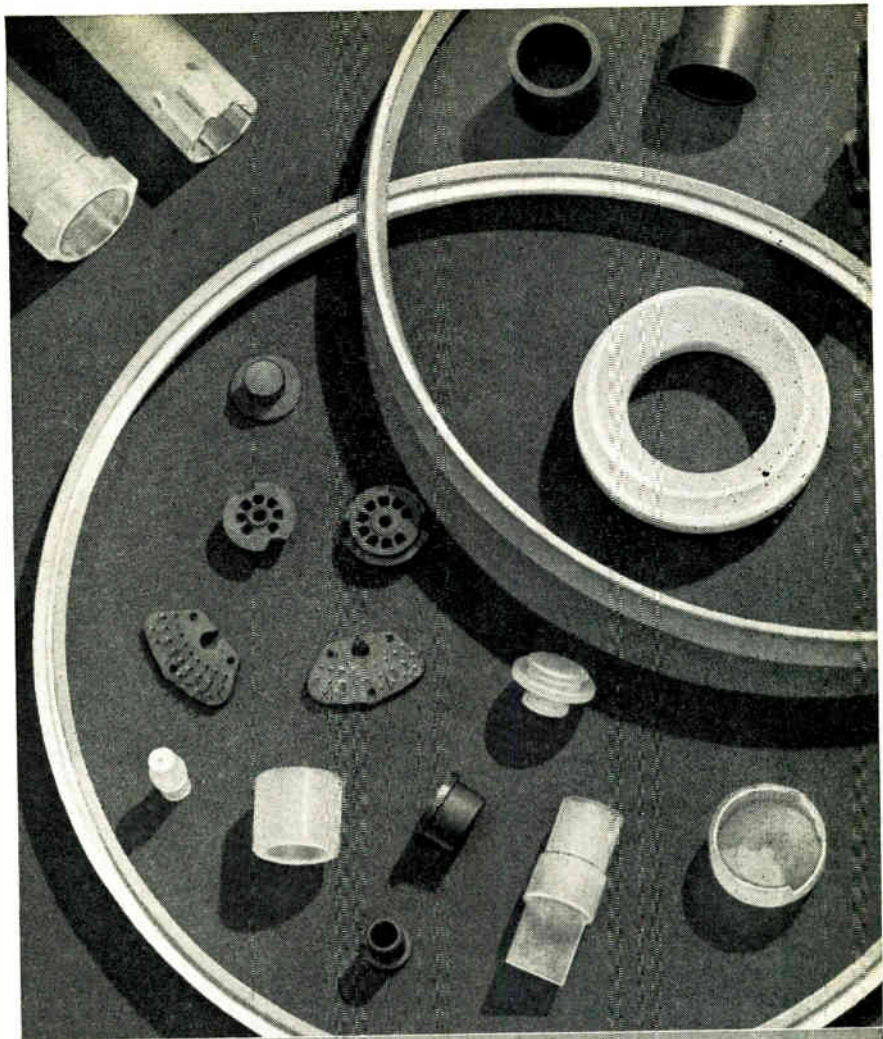
If the resin is handled in a closed system and degassed prior to entering the mold, it will assist in reducing foaming which might otherwise be excessive.

Equipment

Excellent equipment is now available for mixing and dispensing resin systems. Using such equipment should be considered when many units must be encapsulated or potted or when a high quality finished product is desired.²¹

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Glossary of Plastics Terms

Courtesy of ASTM (Designation: D883-58T)

Acrylic Plastics—Plastics based on resins made by the polymerization of acrylic monomers, such as ethyl acrylate and methyl methacrylate.

Air Loss, n—The loss in weight by a plastic on exposure to air at room temperature.

Alkyd Plastics—Plastics based on resins composed principally of synthetic polymeric esters in which the recurring ester groups are an integral part of the main polymer chain. (See Polyester Plastics.)

Allyl Plastics—Plastics based on resins made by the polymerization of monomers containing allyl groups, such as diallyl diglycol carbonate.

Amino Plastics—Plastics based on resins made by the condensation of amines, such as urea and melamine, with aldehydes.

Autothermal Extrusion—A method of extrusion in which the conversion of the drive energy, through friction, is the sole source of heat.

Blocking, n—An adhesion between touching layers of plastic such as that which may develop under pressure during storage or use.

Bulk Factor—The ratio of the volume of a molding compound or powdered plastic to the volume of the solid piece. Also, the ratio of the density of the solid plastic object to the apparent density of the loose molding powder.

Cellulosic Plastics—Plastics based on cellulose compounds, such as esters (cellulose acetate) and ethers (ethyl cellulose).

Cold Flow—See Creep.

Cold Molding—The shaping of compounds in a mold under pressure followed by transfer of the part to a heating medium for curing.

Condensation, n—A chemical reaction in which two or more molecules combine with the separation of water or some other simple substance. If a polymer is formed, the process is called polycondensation. (See also Polymerization.)

Creep, n—The dimensional change with time of a plastic under load, following the instantaneous elastic or rapid deformation. (Also referred to as Cold Flow).

Cross Laminated—See Laminated, Cross.

Cure, v—To change the properties of a plastic or resin by chemical reaction, which for example may be condensation, polymerization, or addition; usually accomplished by the action of either heat or catalyst or both, and with or without pressure.

Degradation, n—A deleterious change in the chemical structure of a plastic. (See also Deterioration.)

Delamination, n—The separation of the layers of material in a laminate.

Deterioration, n—A permanent change in the physical properties of a plastic evidenced by impairment of these properties.

Diffusion, n—The movement of a material in the body of a plastic.

Elastomer, n—A material which at room temperature can be stretched repeatedly to at least twice its original length and, upon immediate release of the stress, will return with force to its approximate original length.

Envenomation, n—The process by which the surface of a plastic close to or in contact with another surface is deteriorated.

Note.—Softening, discoloration, mottling crazing, or other effects may occur.

Epoxy Plastics—Plastics based on resins made by the reaction of epoxides or oxiranes with other materials such as amines, alcohols, phenols, carboxylic acids, acid anhydrides, and unsaturated compounds.

Ethylene Plastics—Plastics based on resins made by the polymerization of ethylene or copolymerization of ethylene with other unsaturated compounds.

Extraction, n—The transfer of a material from a plastic to a surrounding liquid.

Extrusion, n—A method whereby heated or unheated plastic forced through a shaping orifice becomes one continuously formed piece.

Filler, n—A relatively inert material added to a plastic to modify its strength, permanence, working properties, or other qualities, or to lower costs. (See also Reinforced Plastic.)

Film, n—An optional term for sheeting having nominal thickness not greater than 0.010 in.

Furan Plastics—Plastics based on resins in which the furan ring is an integral part of the polymer chain, made by the polymerization or polycondensation of furfural, furfuryl alcohol, or other compounds containing a furan ring, or by the reaction of these furan compounds with other compounds (not over 50 per cent).

Gel, n—A semisolid system exhibiting a yield point and consisting of a network of polymeric solid containing liquid.

Gel, n—(1) A semisolid system consisting of a network of solid aggregates in which liquid is held.

(2) The initial jelly-like solid phase that develops during the formation of a resin from a liquid.

Note.—Both types of gel have very low strengths and do not flow like a liquid. They are soft, flexible and will rupture under their own weight unless supported externally.

Gel Point—The stage at which a liquid system becomes a gel. (See second definition of Gel.)

Note.—This may be caused by such factors as continuing polymerization, change in temperature, or loss of solvent.

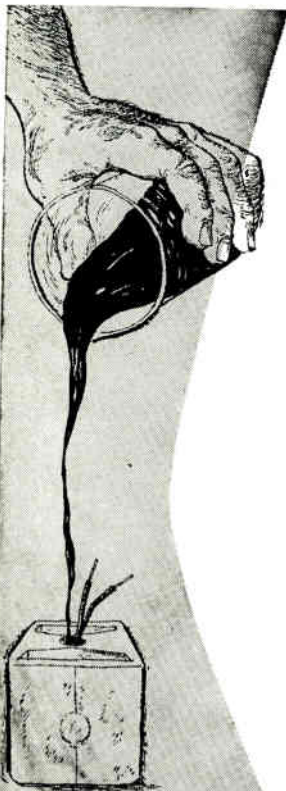
Glass Finish—A material applied to the surface of glass fibers used to reinforce plastics and intended to improve the physical properties of such reinforced plastics over that obtained using glass reinforcement without finish.

Halocarbon Plastics—Plastics based on resins made by the polymerization of monomers composed only of carbon and a halogen or halogens.

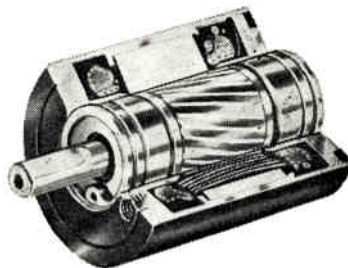
Hydrocarbon Plastics, n—Plastics based on resins composed of carbon and hydrogen alone.

Inhibitor, n—A substance which prevents or retards a chemical reaction.

Insert, n—An object molded or cast into a plastic part for a definite purpose.



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System K-02 features:

- High temperature stability (up to 200°C.)
- Low coefficient of thermal expansion
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makes a good product BETTER!

Isocyanate Plastics, n—Plastics based on resins made by the condensation of organic isocyanates with other compounds.

Laminate, n—A product made by bonding together two or more layers of material or materials. (See also Laminated, Cross, and Laminated, Parallel.)

Lignin Plastics—Plastics based on resins made by the treatment of lignin with heat or by reaction with chemicals or minor amounts of synthetic resins (not over 50 per cent).

Melamine Plastics—Plastics based on resins made by the condensation of melamine and aldehydes.

Metastable, adj—An unstable condition of a plastic evidenced by changes of physical properties not caused by changes in composition or in environment.

Note—Metastable refers, for example, to the temporarily more flexible condition of some plastics after molding. No physical tests should be made while the plastic is in a metastable condition unless data regarding this condition are desired.

Migration, n—The transfer of a material from a plastic body to other contacting solids.

Molding, Bag—A method of molding or laminating which involves the application of fluid pressure, usually by means of air, steam, water or vacuum, to a flexible material which transmits the pressure to the material being molded or bonded.

Molding, Blow—A method of forming objects from plastic masses by inflating with compressed gas.

Molding, Compression—A method of forming objects from plastics by placing the material in a confining mold cavity and applying pressure and usually heat.

Molding, Contact Pressure—A method of molding or laminating in which the pressure is only slightly more than necessary to hold the materials together during the molding operation. This pressure is usually less than 10 psi.

Molding, High-Pressure—Molding or laminating in which the pressure used is greater than 200 psi.

Molding, Injection—A method of forming plastic objects from granular, powdered, plastics by fusing the plastic in a chamber with heat and pressure and then forcing part of the mass into a cooler chamber where it solidifies.

Note—This method is commonly used to form objects from thermoplastics.

Molding, Low-Pressure—Molding or laminating in which the pressure used is 200 psi or less.

Molding, Transfer—A method of forming plastic objects from granular, powdered or preformed plastics by fusing the plastic in a chamber with heat and then forcing essentially the whole mass into a hot chamber where it solidifies.

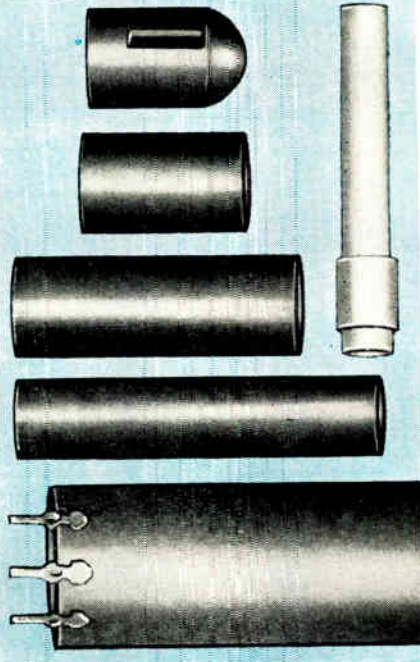
Note—This method is commonly used to form objects from thermosetting plastics.

Nonrigid Plastic—A plastic which has a stiffness or apparent modulus of elasticity of not over 10,000 psi at 23 C when determined in accordance with the Standard Method of Test for Stiffness in Flexure of Plastics (ASTM Designation: D747).

Novolak, n—A phenolic-aldehydic resin which, unless a source of methylene groups is added, remains permanently thermoplastic. (See also Resinoid and Thermoplastic.)

Nylon Plastics—Plastics based on resins composed principally of a long-chain synthetic polymeric amide which has recurring amide groups as an integral part of the main polymer chain.

(Continued on page 490)



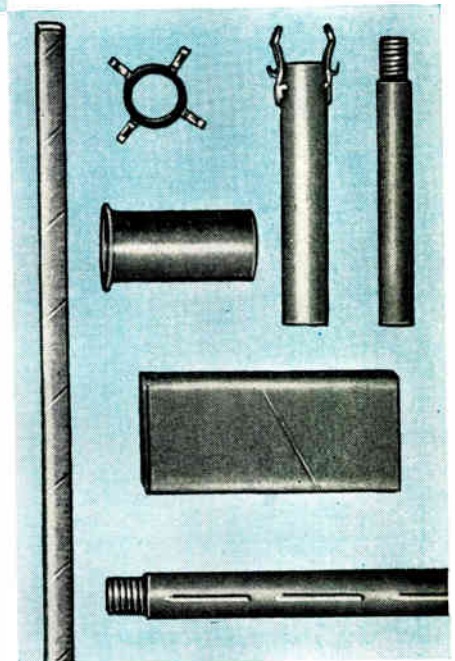
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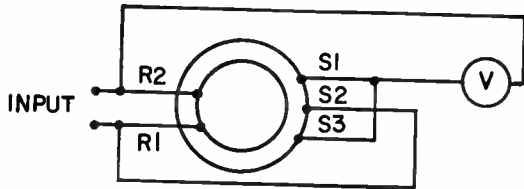
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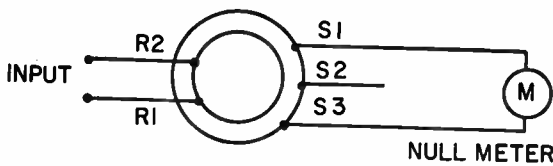
Synchro Zeroing Methods

—This material was compiled with the assistance of H. Thomas Larkins of Clifton Precision Products Co.

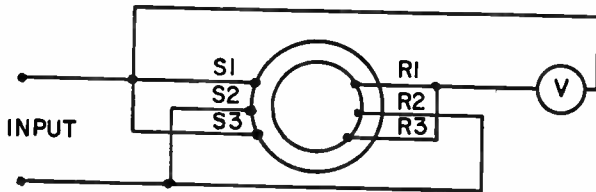


Transmitters & Receivers

APPROXIMATE ZERO: Connect as shown in drawing with proper input voltage and frequency. The synchro shaft will rotate to either of two positions which are 180° apart. The correct position is that one which produces the smaller voltage reading on the voltmeter. Leave the shaft in this position. (Note: Remove power from input to rotate shaft 180° to find lower voltage point.)

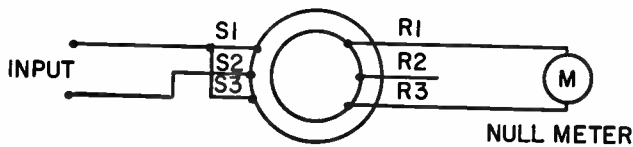


EXACT ZERO: After completing the step above, connect synchro as shown here. Rotate the synchro shaft, about the position obtained above, through the smaller angle that will produce a zero reading on the null meter. That position is the synchro zero position. (Applies to both Mil and SAE specs.)

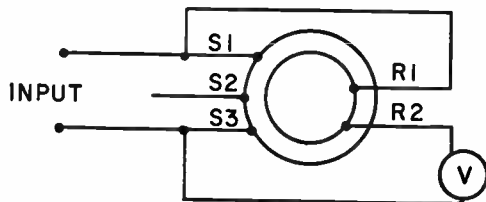


Differential Transmitters & Receivers

APPROXIMATE ZERO: Connect as shown with the proper input voltage and frequency (78 volts or 10.2 volts for 26 volts). The synchro shaft will rotate to either of two positions which are 180° apart. The correct approximate position is the one which produces the smaller voltage reading in volts. Leave shaft in this position. (Note: Remove power from input to rotate shaft 180° to find lower voltage point.)

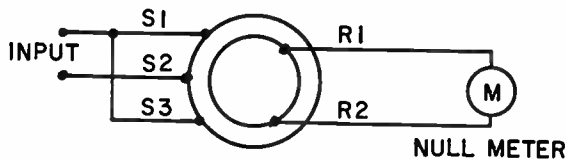


EXACT ZERO: Without rotating shaft after completing step above, connect synchro as shown here. With shaft at position obtained above, rotate for zero voltage on null meter. The synchro is now in its zero position. (Applies to both Mil and SAE specs.)



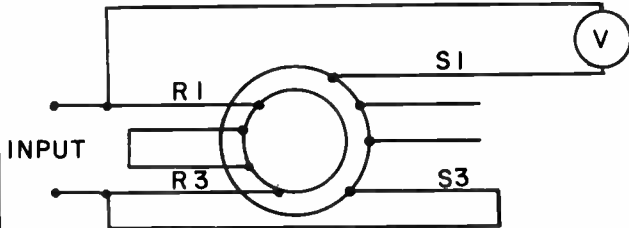
Control Transformers

APPROXIMATE ZERO: Connect as shown with proper input voltage and frequency (78 volts or 10.2). Rotate shaft through the position that will give the minimum voltage reading on the voltmeter. Leave shaft in this position.



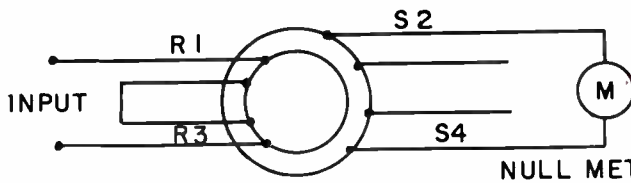
EXACT ZERO: Reconnect as shown after completing the above step. Rotate the synchro shaft, about the position obtained above, through the smaller angle that will produce a zero reading on the null meter. The control transformer is now in its zero position. (This applied to both Mil and SAE specs.)

Quick methods for electrically zeroing synchros are given in tabular form. The only test equipment required are a voltmeter and a null meter or center zero voltmeter. The methods described conform to Mil-S-20708 and SAE recommended practices for synchros, ARP 461A.

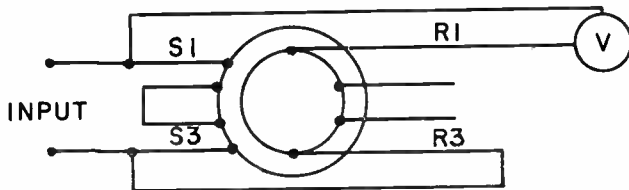


Resolver Transmitters

APPROXIMATE ZERO: Connect as shown in drawing with the proper voltage and frequency. Rotate the resolver shaft to the position that produces the smallest reading on the voltmeter. Leave the resolver shaft in this position.

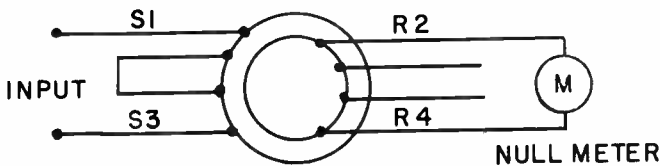


EXACT ZERO: After completing the step above, connect the synchro as shown here. Rotate the resolver shaft, about the position obtained above, through the smaller angle that will provide a zero reading on the null meter. This is the unit's zero position. (This applies to SAE practices.)

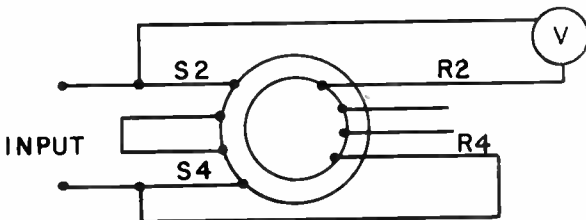


Resolver Differentials

APPROXIMATE ZERO: Connect as shown in drawing with the proper input voltage and frequency. Position resolver shaft to obtain a minimum voltage reading on the voltmeter. Leave shaft in this position.

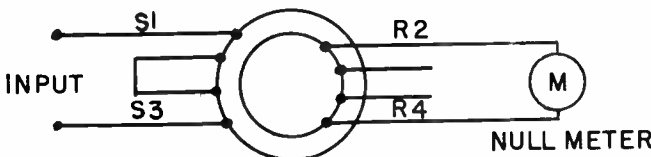


EXACT ZERO: After completing the step above, connect resolver as shown here. Rotate the resolver shaft, about the position obtained above, to the position that produces a zero reading on the null meter. That position is the synchro zero position. (This applies to SAE practices.)



Resolver Control Transformers

APPROXIMATE ZERO: The synchro zero shall be determined by connecting the primary and secondary as shown in drawing. Be sure input is the proper voltage and frequency. Rotate shaft until the smaller peak voltage is read on the voltmeter. Leave the shaft in this position.



EXACT ZERO: Without rotating shaft after completing the above step, connect as shown in drawing. Rotate resolver shaft about position obtained in step above until zero reading is obtained on null meter. This is the unit's zero position. (This applies to SAE practices.)

Synchro Nameplates Their Meaning

On every synchro nameplate there is a series of numbers and letters. This series code describes the synchro unit. The two designation standards are MIL-S-20708 and ARP 461 (SAE). Both designation codes are included.

MIL-S-20708

18	CDX	4	b
Size (1)	Function (2)	Supply Freq. (3)	Modification (4)

(1) Size:

The first digits designate the maximum diameter in tenths of an inch. (There is an exception to this. See example below.) If the diameter is not exactly a whole number of tenths, the next higher tenth is used.

(2) Function:

The letters indicate the synchro function in accordance with the following list.

First Letter	Function	Succeeding Letters	Function
C	Control	D	Differential Receiver
T	Torque	R	Receiver
		T	Transformer
		X	Transmitter
		B	Rotatable stator winding

Note: When two synchros are enclosed within the same housing, the type designation shall indicate both units.

(3) Supply Frequency:

This numeral indicates the frequency of the power source with "6" standing for 60 CPS, and "4" standing for 400 CPS.

(4) Modification

The lower case letter "a" following the frequency digit indicates the original or basic issue of a standard type. The first modification that affects dimensions or electrical characteristics is indicated by "b." Succeeding modifications are indicated by "c," "d," etc.

Example:

18CDX4b indicates the first modification of a 115 volt, 400 cycle, control differential transmitter whose largest diameter is between 1.71 and 1.80 inches. A 26 volt synchro would have the prefix 26V- added to designation (26V-18CDX4b).

Type designation:

All synchros with same type designation shall be interchangeable both electrically and mechanically for all military applications.

ARP 461 (SAE)

10	TX	1	A	3
Frame Size (1)	Function (2)	Power Supply Rating (3)	Variable (4)	Environmental Capabilities (5)

(1) Frame Size:

The first two numerals indicate the maximum diameter of the unit in tenths of an inch. If the diameter is not exactly a whole number of tenths, the next higher tenth is used.

(2) Function:

These two letters indicate the synchro function as shown on following list.

TX	Transmitter—Torque	DR	Differential Receiver
CX	Transmitter—Control	TR	Receiver
CT	Control Transformer	RX	Resolver—Transmitter
TD	Differential Transmitter—Torque	RC	Resolver—Control Transformer
CD	Differential Transmitter—Control	RD	Resolver—Differential

(3) Power Supply Rating:

This number indicates the nominal power supply system utilized as shown below.

	Voltage	Frequency
1	115	60 CPS
2	115	400 CPS
3	26	400 CPS

(4) Variable:

This letter indicates a variable applicable to the particular unit such as leads, shaft, terminals, etc., as shown below.

A	Terminal connection, smooth shaft
B	Flexible leads, smooth shaft
C	Terminal connection, splined shaft
D	Flexible leads, splined shaft
E	Rotatable

(5) Environmental Capabilities:

The numeral indicates the service conditions which the unit is designed to withstand according to the following.

1. Unexposed—Units which are normally installed within protected areas that do not require more than 24 hour humidity check, such as sealed instruments or servos.
2. Exposed—Units installed in unprotected areas that do require more than a 24 hour humidity check, such as unprotected units in computer racks.
3. Hi-Temp—Units that are normally installed in areas subjected to ambients between 71°C and 150°C for periods of 24 hours.
4. Hi Hi-Temp—Units which are normally installed in areas subjected to ambients between 150°C and 300°C for periods of 24 hours.

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ACTUAL SIZE



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Input Power (total) 3.8 watts
Stall Torque .15 oz in min.
.20 oz in nom.
Max. Weight 29 gms.

SERVO MOTOR
Input Power (total) 5.6 watts
Stall Torque .3 oz in min.
No Load Speed 6500 rpm min.

MOTOR GENERATOR
Generator:
Input Voltage 10 v
Output Voltage 0.13 v /1000 rpm max.

DC MOTOR
Output Power 4.0 watts
No Load Speed 20,000 rpm
Input Voltage 28 v DC

LINEAR TRANSFORMER
Linearity .5%
Null E at EZ
Phase Shift .015 v
15 deg. lead

TRANSMITTER
Accuracy 7' error max.
Null 30 mv max.
Phase Shift 8.5 deg. lead

RECEIVER
Accuracy 30' max. error spread
Torque Gradient 2200 mg-mm / deg.
Input Power .54 watts

CONTROL TRANSFORMER
Accuracy 7' error max.
Null 30 mv max.
Phase Shift 8.5 deg. lead

DIFFERENTIAL
Accuracy 7' error max.
Null 30 mv max.
Phase Shift 9 deg. lead

RESOLVER
Accuracy 7' error max.
Null 30 mv max.
Phase Shift 11 deg. lead

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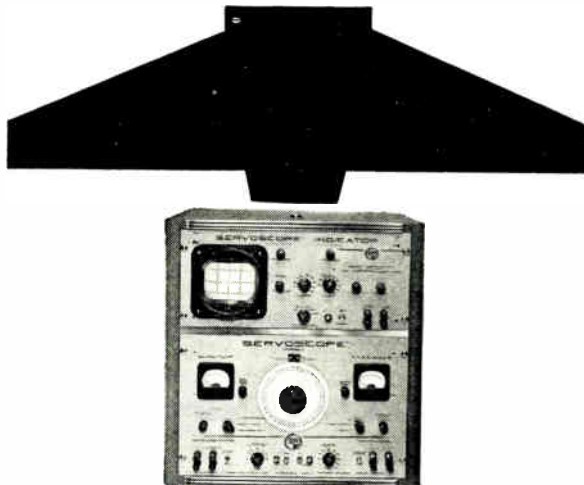
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SYNCHROS

**Color Coding
Of Synchro Leads**

**Terminal and Lead
Wire Identification—
Mil-S-20708**

Transmitters and Receivers

Rotor (Primary)	Stator (Secondary)
R1—Red, white tracer	S1—Blue
R2—Black, white tracer	S2—Black
	S3—Yellow

**Differential Transmitters
and Receivers**

Rotor (Secondary)	Stator (Primary)
R1—Red, white tracer	S1—Blue
R2—Black, white tracer	S2—Black
R3—Yellow, white tracer	S3—Yellow

Control Transformers

Rotor (Secondary)	Stator (Primary)
R1—Red, white tracer	S1—Blue
R2—Black, white tracer	S2—Black
	S3—Yellow

**Lead Wire Identification—
SAE: ARP 461**

**Transmitters, Control Transformers
and Receivers**

Rotor	Stator
R1—Red	S1—Blue
R2—Black	S2—Black
	S3—Yellow

**Differential—
(Transmitters, Receivers)**

Rotor	Stator
R1—Yellow	S1—Blue
R2—Black	S2—Black
R3—Blue	S3—Yellow

**Resolver—(Transmitter, Control
Transformer & Differential)**

Rotor	Stator
R1—Red	S1—Red
R3—Black	S3—Black
R2—Yellow	S2—Yellow
R4—Black	S4—Blue

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CAMERA TUBES

Tube	Type	Sponsor	Application	Resolution	Heater Ratings	Storage Time	Remarks
7226	Vidicon	Gen'l Electrodynamics	Transistorized TV Camera		150 MA		Length — 5¼ inches
7226A	Vidicon	Gen'l Electrodynamics	Transistorized TV Camera	(Identical to 7226 — and tested for shock and vibration)			
7262	Vidicon	RCA	Transistorized TV Camera	600 TV lines			Length — 5½ inches
7263	Vidicon	RCA	Transistorized TV Camera	600 lines	0.6 W		
7290	Vidicon	Westinghouse	Slow speed scanning			450 line res.— 40 sec. 350 line res.—120 sec.	Length — 6 inches
7291	Vidicon	Machlett	TV film pickup	600 lines @ 0.4 MA			
7293	Image Orthicon	Canadian Marconi	Outdoor & Studio				Length — 3 inches
7294	Image Orthicon	Canadian Marconi	Outdoor & Studio				Length — 3 inches
7295	Image Orthicon	Canadian Marconi	Outdoor & Studio				Length — 4½ inches
7325	Vidicon	Gen'l Electrodynamics	Live Telecasts				
7336	Vidicon	Gen'l Electrodynamics	Live Telecasts	(Some as 7325, and includes third grid)			

MULTIPLIER PHOTOTUBES

Tube	Sponsor	Const.	Application	Remarks
6342A	RCA		Scintillation Counters	Spectral response — 3,000–6,500A Max. at 4,400A
6655A	RCA	Head-on	Scintillation Counters	Spectral response — 3,000–6,500A Max. at 4,400A
7264	RCA	Head-on	Scintillation Counters	Spectral response — 3,000–6,500A (S-11), Max. at 4,400A
7265	RCA	Head-on	Scintillation Counters	Spectral response — 3,000–7,500A Max. at 4,200 (S-20)
7326	RCA	Head-on	Scintillation Counters	Spectral response — 3,000–7,500A Max. at 4,200A (S-20)

THYRATRONS

Tube	Sponsor	Constr.	Type
7297	Westinghouse	T-13	Grid-controlled, inert gas-filled, lug-type base
7298	Westinghouse	T-18	
7321	Westinghouse		Grid-controlled, Xenon gas-filled, lug connected base
7322	Edgerton, Germeshausen & Grier		Ceramic-metal envelope

MAGNETRONS

Tube	Type	Sponsor	Operating Band	Power Out (Min.)	Remarks
7006	Tunable	Sylvania	9,000 — 9,600 MC		
7098	Mech. tunable	Sylvania	9,300 — 9,500 MC	60 W	
7110	Tunable	RCA	8,500 — 9,600 MC	230 KW	Pulsed Osc.
7111		RCA	(Same as 7110, except push-to-engage Tuning knob)		
7112		RCA	(Same as 7110, except control tuning via shaft)		

Creative Microwave Technology

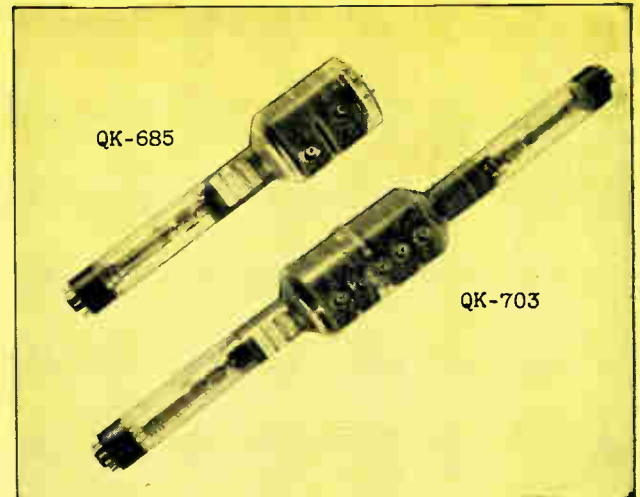
Published by Microwave and Power Tube Division, Raytheon Manufacturing Company, Waltham 54, Mass., Vol. 1, No. 4

NEW KILO-LINE RECORDING STORAGE TUBES SPECIALLY DESIGNED FOR SCAN CONVERSION

To meet the need for low-noise, high-resolution devices for frequency and scan conversion, Raytheon scientists and engineers have developed two new storage tubes: the single-gun QK-685 and the dual-gun QK-703. These tubes are now available in production quantities.

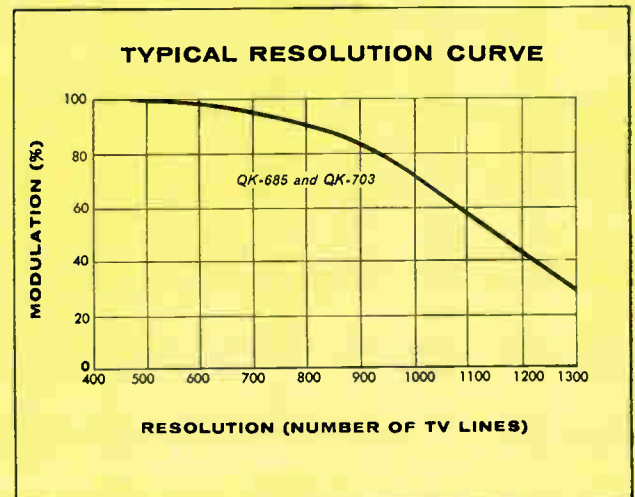
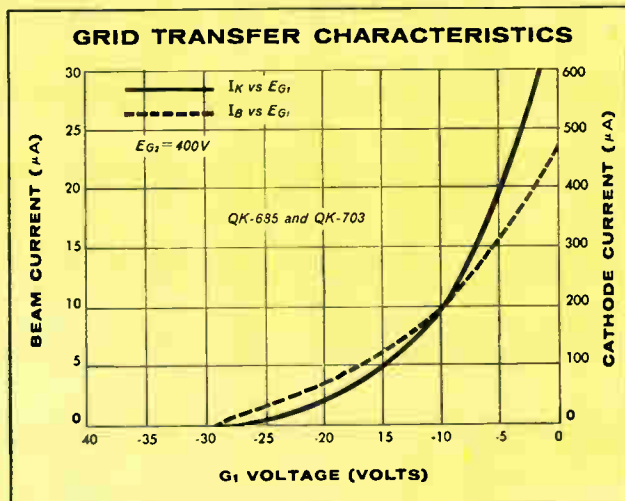
Both types incorporate a specially designed tetrode electron gun for higher resolutions — 1,000 TV lines at 50% modulation — and better control over beam cut-off than conventional triode guns. A new multiple collimating lens improves background uniformity and results in shading-to-signal ratios of less than 10%.

The ability of the dual-gun type to read and write simultaneously makes this tube particularly applicable to slow-down video and conversion from PPI to TV scan patterns for "Bright Display."



Typical Operating Characteristics

	QK-685 and QK-703
Anode Voltage	4,000 Vdc (Max.)
Resolving Power	1,000 Lines (Nom.)
Magnetic Focus	700 Lines (Nom.)
Electrostatic Focus	QK-685—10 μ f (Nom.)
Output Capacitance	QK-703—20 μ f (Nom.)
Maximum Deflection Angle	30°



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TUBE	SPONSOR	TYPE	CONSTRUCTION	APPLICATION	Ep (v)	GRID 2 (v)	GRID 1 (v)
1AN5	Rogers	Pentode	7 Pin Min	IF Amp	120	90	
2EA5	Lansdale	Tetrode	7 Pin Min	TV-RF Amp	250	140	-1.0
2EN5	Lansdale	Duo-Diode	7 Pin Min	TV-Phase Comparator			
2BN4A	Lansdale	Triode	7 Pin Min	TV-RF Amp	150		-6.0
2J2	Edison Swan, Ltd	Diode	9 Pin Min	General Purpose			
3BN4A	Lansdale	Triode	7 Pin Min	TV-RF Amp	150		-6.0
3EA5	Lansdale	Tetrode	7 Pin Min	TV-RF Amp	250	140	-1.0
4BN4	Std Tel. & Cables	Triode	7 Pin Min	TV-RF Amp			
4ES8	Rogers	Duo-Triode	9 Pin Min	TV-Cascade Amp	90		-1.2
4EW6	GE	Pentode	7 Pin Min	TV-IF Amp			
5BW8	GE	Duo-Diode-Pentode	9 Pin Min				
5FV8	Sylvania	Triode-Pentode	9 Pin Min	TV-Osc. Amp	125	125	-1.0
6AF3	Tung-Sol	Diode	9 Pin Min	TV Damper	125		-1.0
6AX4GTA	GE	Diode	T-9	TV Damper			
6BJ6A	Sylvania	Pentode	7 Pin Min	IF, RF Amp			
6BN4A	Lansdale	Triode	7 Pin Min	TV-RF Amp	150		-6.0
6DE4	RCA	Diode	T-9	TV Damper			
6DJ8	Rogers	Duo-Triode	9 Pin Min	TV Cascade Amp	90		-1.3
6DY7	Sylvania	Dual Beam Pentode	T-12	General Purpose Audio	250	250	-12.5
6DZ8	Sonotone	Triode-Pentode	9 Pin Min	AF Amp	120		
6EA5	Lansdale	Tetrode	7 Pin Min	TV-RF Amp	145		120
6EH5	RCA	Pentode	7 Pin Min	Audio Output	250	140	-1.0
6ES6	Rogers	Pentode	7 Pin Min	Amp	110	115	3
					12.6	3.2	-0.7
6ES8	Rogers	Duo-Triode	9 Pin Min	TV Cascade Amp			
6ET6	Rogers	Pentode	7 Pin Min	Amp	12.6	6.3	-0.75
6EZ8	GE	Triple Triode	9 Pin Min	General Purpose	125		-1
6FG6	Rogers	Indicator Triode	9 Pin Min	Tuning, Mod. Control			
6FV8	Sylvania	Triode Pentode	9 Pin Min	TV-Osc. Amp	125		-1.0
					125	125	-1.0
6L6GC	GE	Beam Pentode	T-12	AF Amp	250	250	-14
7DJ8	Rogers	Duo-Triode	9 Pin Min	TV Cascade Amp	90		-1.3
9BR7	Lansdale	Duo-Diode Triode	9 Pin Min	General Purpose	100		-5
9BR8	Std Tel. & Cables	Triode-Pentode	9 Pin Min	TV-Osc. Mixer			
9DZ8	Sonotone	Triode-Pentode	9 Pin Min	AF Amp			
10EB8	Sylvania	Triode-Pentode	9 Pin Min	Video Amp			
12AE6A	Raytheon	Duo-Diode Triode	7 Pin Min	AF Amp (Auto)	12.6		
12AE7	Lansdale	Duo-Triode	9 Pin Min	Audio Output (Auto)	12.6		
					12.6		
12AF3	Tung-Sol	Diode	9 Pin Min	TV Damper			
12AX4GTA	GE	Diode	T-9	TV Damper			
12BR7A	Lansdale	Duo-Diode Triode	9 Pin Min	General Purpose	100	125	-5
12DQ7	GE	Min. Pentode	9 Pin Min	TV-Video Amp	200		-9
12DT7	Raytheon	Duo-Triode	9 Pin Min	Audio	100		-1
12DW7	Sylvania	Duo-Triode	9 Pin Min	Amp & Phase Inverter	250		-2
					250		-8.5
12DW8	Lansdale	Diode Duo-Triode	9 Pin Min	Det-Audio Amp (Auto)	12.6		
					12.6		
12DZ8	Sonotone	Triode-Pentode	9 Pin Min	AF Amp			
12EH5	RCA	Pentode	7 Pin Min	Audio Output	110	115	3
12FK6	RCA	Diode-Triode	7 Pin Min	Det. Amp (Auto)	12.6		
12FM6	Raytheon	Duo-Diode Triode	7 Pin Min	Auto Radios	12.6		
12FT6	CBS-Hytron	Duo-Diode Triode	7 Pin Min	Det-Amp (Auto)	12.6		
13DR7	Sylvania	Duo-Triode	9 Pin Min	TV Defl. Osc. Amp	250		-3
					150		-17.5
17DE4	RCA	Diode	T-9	TV Dampers			
18DZ8	Sonotone	Triode-Pentode	9 Pin Min	AF Amp			
18FW6	Sylvania	Pentode	7 Pin Min	IF or RF AC/DC Radios	100	100	-20
18FX6	Sylvania	Pentagrid Converter	7 Pin Min	AC/DC Radios	100	100	-21
19CS4	Edison Swan, Ltd	Diode	T-9	TV Receivers			
19DE7	Sylvania	Duo-Triode	9 Pin Min	TV Vert. Defl. Amp or Osc.			

Special Purpose Vacuum Tubes

TUBES

I _p (ma)	I _{g2} (ma)	HEATER	R _p (Ω)	G _m	AMP FACTOR	REMARKS	TUBE
10	0.95	1.4v/25 MA 2.3v/600 MA 2.1v/450 MA 2.35v/600 MA 2v/350 MA	150 K 5400	8,000 8,000	43		1AN5 2EA5 2EN5 2BN4A 2J2
9.0 10 15	0.95	3.0v/450 MA 3.0v/450 MA (Identical to 6BN4 except Heater Rating - 4.2v/300 MA) 4v/600 MA (Identical to 6EW6 except Heater Rating - 4.2v/600 MA)	5400 150 K	8,000 8,000 12,500	43		3BN4A 3EA5 4BN4 4ES8 4EW6
14.0 12.0 185	4.0	(Identical to 6BW8 except Heater Rating - 4.7v/600 MA) 4.7v/600 MA 6.3v	200 K	8,000 6,500	40	Triode Sect. Pentode Sect. PIV - 4,500 PIV - 4,400	5BW8 5FV8 6AF3 6AX4GTA
9.0 175 15 50	3.0	(Identical to 6BJ6 except for controls on formation of cathode interface impedance) 6.3v/200 MA 6.3v/1.6 A 6.3v/365 MA 6.3v/1.2 A	28 K	8,000 12,500 6,000	43 33	PIV - 5,000	6BJ6A 6BN4A 6DE4 6DJ8 6DY7
800 45 10 42 0.35	0.95 14.5	6.3v/900 MA 6.3v/200 MA 6.32v/1.2 A 6.3v/300 MA	150 K 11 K 200 K	1,400 7,500 8,000 14,600 1,100	100	Triode Sect. Pentode Sect.	6DZ8 6EA5 6EH5 6ES6
2 4.2 14.0 12.0	4.0	(Identical to 4ES8 except Heater Rating + 6.32v/365 MA) 6.3v/450 MA 6.3v/270 MA 6.3v/450 MA	200 K 200 K	2,000 4,200 8,000 6,500	57 40	Triode Sect. Pentode Sect.	6ES8 6ET6 6EZ8 6FG6 6FV8
15 3.7		6.3v/900 MA 7v/300 MA 9.4v/300 MA (Identical to 6BR8 except Heater Rating - 9.45v/300 MA) (Identical to 6DZ8 except Heater Rating - 9.0v/600 MA)	22.5 K 15 K	6,000 12,500 4,000	33 60		6L6GC 7DJ8 9BR7 9BR8 9DZ8
1.0 1.9 7.5		(Identical to 6EB8 except Heater Rating - 10.5v/450 MA) 12.6v/150 MA 12.6v/450 MA (Identical to 6AF3 except Heater Rating - 12.6v/600 MA)	13 K	1,300 4,000 6,500	16.7 13.0 6.4	Triode # 1 Triode # 2 Controlled Warmup	10EB8 12AE6A 12AE7 12AF3
1000 3.7 26 0.5 1.2 -10.5	5.6	6.3 v 12.6v/225 MA 12.6v/300 MA 12.6v/150 MA 12.6v/150 MA	15 K 80 K 62.5 K 7700	4,000 10,500 1,250 1,600 2,200	60 100 100 17	PIV - 4,400 Controlled Warmup Triode # 1 Triode # 2	12AX4GTA 12BR7A 12DQ7 12DT7 12DW7
1.9 7.5 42 1.3	14.5	12.6v/450 MA (Identical to 6DZ8 except Heater Rating - 12.0v/450 MA) 12.6v/600 MA 12.6v/150 MA	11 K 6200	2,700 6,500 14,600 1,200	9.5 6.4 7.4	Triode # 1 Triode # 2	12DW8 12DZ8 12EH5 12FK6
1 2 1.4 35 175		12.6v/150 MA 12.6v/150 MA 13v/450 MA 6.3 v	7600 40 K 925	1,300 1,900 1,600 6,500	10 15 68 6.0	Triode # 1 Triode # 2	12FM6 12FT6 13DR7 17DE4
9 2.3 120	3.9 6.2	(Identical to 6DZ8 except Heater Rating - 18.0v/300 MA) 18v/100 MA 18v/100 MA 19 v (Identical to 6DE7 except Heater Rating - 19.4v/300 MA)	250 K 400 K	4,100 480		PIV - 4,500	18DZ8 18FW6 18FX6 19CS4 19DE7



Burroughs components and instruments

LITERATURE AVAILABLE

BEAM SWITCHING TUBES

- A. Beam Switching Tube Brochure
- B. Comparison of Beam Switching Tube with Transistor Circuitry
- C. Basic Beam Switching Tube Circuit Design
- D. Life and Reliability
- E. Binary to Digital/Analog Conversion
- F. Tube Tester Data Sheet
- G. Decade Counter Bulletin 826A
- H. Transistor Circuits for Use with Beam Switching Tubes
- I. MIL-E-1/1058A Specification Sheet

NIXIE INDICATOR TUBES

- J. Nixie Indicator Tube Specification and Circuit Design Data (Including 25,000 hr. Ultra Long Life Types)

DECADE COUNTERS

- K. Bulletin 826A — Technical Information, Schematics and Associated Circuits

UNITIZED PULSE CONTROL INSTRUMENTS

- L. Unitized Pulse Control Instruments Catalog
- M. (Article) What Pulse Can Do For You
- N. BCT 301 Core Tester Data Sheet

CHEN COUNTER

- O. Chen Counter Data Sheet

LENTICULAR DISPLAY

- P. Lenticular Display Data Sheet

BEAM SWITCHING TUBE TESTER

- Q. Tube Tester Data Sheet

BEAMPLEXER

- R. Beamplexer Specifications

ELECTRONIC CONTRIBUTIONS BY

Burroughs Corporation

ELECTRONIC TUBE DIVISION
Plainfield, New Jersey

**BEAM
SWITCHING
TUBES**

**NIXIE®
INDICATOR
TUBES**

**DECADE
COUNTERS**

**UNITIZED
PULSE CONTROL
INSTRUMENTS**

**SPECIAL
PRODUCTS**

The Beam Switching Tube is a high-speed, ten position, high-vacuum, constant current distributor. It has applications in fields of electronic switching and distribution such as counting, timing, sampling, frequency dividing, coding, matrixing, telemetering and controlling.



GENERAL PURPOSE — 6700*
LOW VOLTAGE — 6701
HIGH SPEED — MO-10R
HIGH CURRENT — BD-311
*AVAILABLE TO MIL-E-1058A



SHIELDED GENERAL PURPOSE — BD-301
SHIELDED LOW VOLTAGE — BD-308
SHIELDED MO-10R — BD-309



MINIATURE — BD-203



SHIELDED MINIATURE — BD-316

The Nixie and the Ultra Long Life Nixie are gas-filled, cold-cathode, ten-digit ("0" through "9") numerical indicator tubes with a common anode. They are all-electronic, in-line, readout devices and are ideal for converting electro-mechanical or electronic signals directly to readable characters. Alphabet-Numerical combinations available on special order.



MINIATURE
TYPES 7003, B4021
TYPE B4032



STANDARD
TYPE 6844A
TYPE BS031



SUPER
TYPE 7153
TYPE B6033



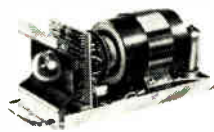
JUMBO
TYPE B7011
TYPE B7031

REGULAR TYPE →
ULTRA LONG LIFE TYPE →

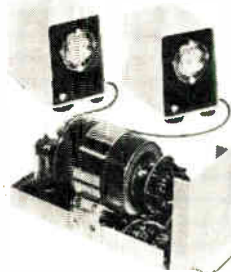
Burroughs Visual and Electronic Error-Free Decade counters are based on the unique properties of the Beam Switching Tube wherein a single cathode controls an electron beam to 10 outputs. No other counters provide directly 10 individual outputs, multiple remote readout, variable count, and Ultra Long Life Nixie® Tube in-line readout.



DC 101



DC 105, DC 106A



DC 106B



DC 130 MIL COUNTER

Unitized Pulse Control Instruments consist of a complete line of pulse shaping, generating, gating, and delaying modules. There are 21 matched units each having the ability to be connected together to form digital logic.



1006 WIDE RANGE PULSE GENERATOR
PUSH BUTTON TO 4.5 USEC.



1105 TWIN FLIP-FLOP



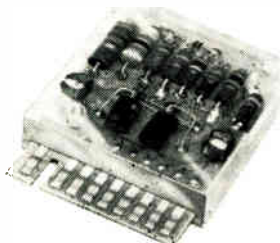
1301 PULSE DELAY
1.80,000 USEC.



1751 MEGACYCLE VARIABLE SCALE COUNTER

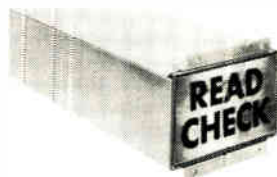


1050 HIGH FREQUENCY 1.6 MC TO ABOVE TEN MEGACYCLES



CHEN COUNTER

DC 190-195-
A SOLID STATE DECIMAL DIVIDER UTILIZING MINIATURE CORES AND TRANSISTORS TO PROVIDE ACCURATE FREQUENCY DIVIDING OR TIMING PULSES TO 100 KC.



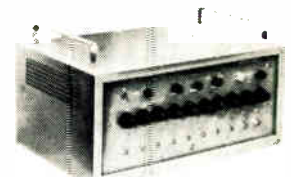
MULTI-MESSAGE DISPLAY UNITS — LENTICULAR

LD 35 AND LD 22 — UP TO 20 DISTINCT MESSAGES — DIGITS, LETTERS, WORDS, CHARTS, OR LINE PHOTOGRAPHS — CAN BE DISPLAYED IN A COMMON (3" x 5" OR 2 1/2" x 2 1/2") VIEWING AREA.



BEAM SWITCHING TUBE TESTER

MODEL 600 — FOR STATICALLY AND DYNAMICALLY CHECKING TYPES 6700 AND BD 301 TUBES.



BEAMPLEXER

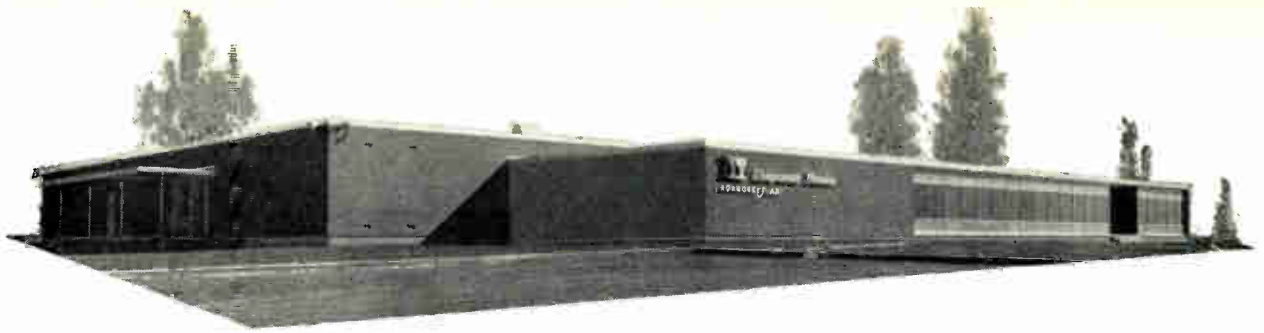
MODEL 6001/7004 — A TEN-POSITION ELECTRONIC SWITCH UTILIZING THE BEAM SWITCHING TUBE WHICH PROVIDES A MEANS OF DISPLAYING UP TO TEN SEPARATE SIGNALS ON A CONVENTIONAL SINGLE-BEAM OSCILLOSCOPE.

TUBE	SPONSOR	TYPE	CONSTRUCTION	APPLICATION	Ep (v)	GRID 2 (v)	GRID 1 (v)
22DE4	Sylvania	Diode	T-9	TV Damper			
25D4	Sylvania	Diode	T-9	TV Damper			
25D26A	Sylvania	Beam Pentode	T-12	TV Hor. Defl. Amp			
25DT5	Sylvania	Beam Pentode	9 Pin Min	TV Vert. Defl. Amp			
25EH5	RCA	Pentode	7 Pin Min	Audio Output	110	115	3
32ET5	Sylvania	Beam Pentode	7 Pin Min	Audio Amp	110	110	-7.5
35DZ8	Sanotane	Triode Pentode	9 Pin Min	AF Amp			
36AM3	Sylvania	Diode	7 Pin Min	Current Limiting			
50BM8	Rogers	Triode-Pentode	9 Pin Min	AF Amp-Output	100 200	200	-16
50DC4	GE	Diode	7 Pin Min	Line Oper. Equip			
50EH5	RCA	Pentode	7 Pin Min	Audio Output	110	115	3
6771	GE	Triode	Parallel Plane	RF Amp. Osc. Freq Mult.			
6FV6	RCA	Tetrode	7 Pin Min	TV-RF Amp	125	80	-1
6922	Rogers	Duo-Triode	9 Pin Min	Cascade Circuits	90		
6952	RCA	Beam Power	Coaxial	Grid-Driven Pulse Amp			
6961	Amperex	Triode	Forced Air-Cooled	RF Generators & Transmitters			
7001	Std Tel. & Cables	Tetrode	7 Pin Min	40-50 MC Amp	120	120	
7032	Std Tel. & Cables	Heptode	7 Pin Min	Computer Amp			
18FY6	Sylvania	Duo-Diode Triode	7 Pin Min		100		-1
7054	RCA	Pentode	9 Pin Min	Amp or Osc. (Mobile)	250	150	
7055	RCA	Twin Diode	7 Pin Min	AM-FM Detector (Mobile)			
7056	RCA	Pentode	7 Pin Min	IF, RF Amp (Mobile)	200	150	-7
7057	RCA	Twin Triode	9 Pin Min	RF Amp (Mobile)	150		-12
7058	RCA	Twin Triode	9 Pin Min	Amp Osc. (Mobile)	250		-2
7059	RCA	Triode Pentode	9 Pin Min	Osc.-Mix (Mobile)	150 250	110	-12 -10
7060	RCA	Triode-Pentode	9 Pin Min	Mod-Amp (Mobile)	150 200	125	-6.5 -8
7061	RCA	Beam Pentode	9 Pin Min	AF Power Amp (Mobile)	200 200	200	-10
7119	Rogers	Duo-Triode	9 Pin Min	Computer	120		-2
7167	Westinghouse	Tetrode	7 Pin Min	Mobile Equip	125	80	-1
7189	Amperex	Pentode	9 Pin Min	Audio Power Amp	250	250	-7.3
7199	RCA	Triode-Pentode	9 Pin Min	Low Hum Audio	215 100	50	-8.5
7203	RCA	Beam Power	Coaxial				
7204	RCA	Beam Power	Coaxial				
7213	RCA	Beam Power		RF Power Amp			
7227	Std Tel. & Cables	Pentode	9 Pin Min	Mobile	27.5	27.5	-2.5
7236	Tung-Sol	Duo-Triode	T-12	Computer Power Amp	120		-14
7237	Amperex	Triode	Air-Cooled	Transmitting			
7241	Tung-Sol	Triode High Power		Passing Tube			
7242	Tung-Sol	Triode High Power		Passing Tube			
7244A	Sylvania	Duo-Triode	7 Pin Min				
7245	Sylvania	Triode	7 Pin Min		150		-15
7245A	Sylvania	Triode	7 Pin Min				
7318	CBS-Hytron	Duo-Triode	9 Pin Min	Pulse Amp	300		-25
7320	Compagnie Indus.	Pentode	9 Pin Min	Mobile AF Amp	250	250	-7.3
7327	Sylvania	Duo-Triode	T-3	Pulse			
7432	Mullard	Pentode	T-3	Ruggedized	100	100	
7433	Mullard	Pentode	T-3	Ruggedized	100	100	
7434	Mullard	Pentode	T-3	Ruggedized	100	100	
7435	Mullard	Diode	Sub Min	Ruggedized			
7436	Mullard	Diode	Sub Min	Ruggedized			
7437	Mullard	Triode	T-3	Ruggedized	100		
7438	Mullard	Pentode	T-3	Ruggedized	100	100	

Special Purpose Vacuum Tubes

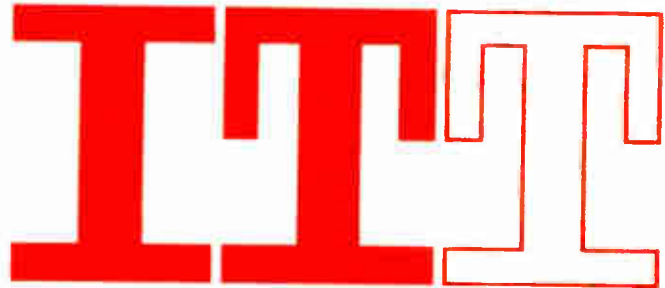
TUBES

Ip (ma)	I _{g2} (ma)	HEATER	R _p (Ω)	G _m	AMP FACTOR	REMARKS	TUBE	
42	14.5	25v/300 MA	11 K	14,600		(Identical to 6DE4 except Heater Rating - 22.4v/450 MA) (Identical to 12D4A except Heater Rating 25v/300 MA) (Identical to 6D26A except Heater Rating - 25v/300 MA) (Identical to 6DT5 except Heater Rating 25v/300 MA)	22DE4 25D4 25D26A 25DT5 25EH5	
30	2.8	32v/100 MA	21.5 K	5,500		PIV - 365 Triode Sect. Pentode Sect.	32ET5 35DZ8 36AM3 50BM8	
82		36 v			70			
3.5		50v/100 MA		2,500				
35	7		20 K	6,400				
120		50				PIV - 330	50DC4 50EH5 6771 6FV6 6922	
42	14.5	50v/150 MA	11 K	14,600				
10	1.5	6.3v/200 MA	100 K	8,000	33			
12		6.3v/300 MA		11,500				
35	4	6.3v/450 MA				174-600 MC	6952 6961 7001 7032 18FY6	
0.6		18v/100 MA		1,300	100			
19	3.5	13.5v/275 MA	100 K	11,500		PIV - 350	7054 7055 7056 7057 7058	
10		13.5v/155 MA			36			
9.5	2.8	13.5v/150 MA	600 K	6,200				
10		13.5v/180 MA	5300	6,800			100	
1.25		13.5v/155 MA	61 K	1,650				
18		13.5v/195 MA	4700	8,500	40	Triode Sect.	7059	
10	3.5		400 K	5,200		Pentode Sect.		
9		13.5v/280 MA	8200	4,900	40	Triode Sect.	7060	
15	3.4		150 K	7,000		Pentode Sect.		
38	7.5	13.5v/210 MA	60 K	4,200			7061	
36		12.6v/320 MA		15,000	24		7119 7167 7189 7199	
10	1.4	13.5v/90 MA	125 K	8,000		Triode Sect. Pentode Sect.		
48	5.5	6.3v/760 MA	40 K	11,300	17			
9.0		6.3v/450 MA		2,100				
1.1	0.35		1.0 M	1,500				
11	1.1	6.0v/2600 MA 26.5v/580 MA					7203 7204 7213 7227 7236	
100		27.5v/175 MA 6.3v/2.4v	8 K	5,500 12,500	4.8			
13.5		(Identical to 6961 but requires one-half the airflow) 6.3v/7.5 A	67 Ω 82 Ω	40,000 110,000	2.7 9.0		7237 7241 7242 7244A 7245	
		(Identical to 7244 except for shorter bulb) 6.3v/400 MA		11,000	50			
48	5.5	(Identical to 7245 except for shorter bulb) 12.6v/175 MA 6.3v/760 MA	38 K	11,300			7245A 7318 7320 7327 7432	
7.0	2.2	6.3v/300 MA 6.3v/175 MA		5,000				
7.5	2.5	6.3v/200 MA		5,500		PIV - 460 PIV - 930	7433 7434 7435 7436 7437 7438	
7.0	2.4	6.3v/200 MA		3,100	20			
10		6.3v/150 MA						
50								
8		6.3v/150 MA		4,200				
3.0	2.25	6.3v/175 MA		2,500				



ROANOKE, VA.

This new, ultra modern plant, formally dedicated March 17, 1959 as the newest link in the ITT Components Division manufacturing network, is devoted to the development and production of ITT Traveling Wave Tubes and Iatron* Storage Tubes.



INTERNATIONAL TELEPHONE

©N



A.

POWER TRIODE



B.

IATRON* STORAGE TUBE



C.

TRAVELING WAVE TUBE



D.

KU 73 CERAMIC THYRATRON



E.

HIGH DISSIPATION POWER TRIODE



F.

SUPER-POWER TRIODE

ITT Components Division provides a wide range of special purpose tubes for communications, industrial and military requirements, backed by the research, development and manufacturing experience of the worldwide International Telephone and Telegraph Corporation.

- A. ITT Power Triodes, for CW and pulse operation are used as modulators, amplifiers and oscillators in communications or industrial service. Water cooled and air cooled types.
- B. Iatron* Storage Tubes, recently developed by ITT Components Division, have high-persistence screens for radar and display devices where extreme brightness is required.
- C. Traveling Wave Tubes, developed by ITT and manufactured by ITT Components Division for microwave communications, and military applications.
- D. Kuthe KU-73 ceramic envelope hydrogen thyratron, an essential element in radar modulation, is one of many hydrogen filled tubes available.
- E. Evaporative Cooled Power Triodes feature high anode dissipation, exceptionally high anode overload capacity—greatly reduces liquid cooling requirements.
- F. Super-powered Triodes, developed by ITT and manufactured by ITT Components Division for use as modulators, amplifiers and oscillators in communication or industrial services.

*IATRON - Trademark of International Telephone & Telegraph Corporation.



NEWARK, N. J.

the Laboratories, Inc., Newark, N. J. a
 nit of ITT Components Division, is the
 world's largest manufacturer of hydrogen
 yratrons and hydrogen diodes.



CLIFTON, N. J.

ITT Power Tubes, selenium and silicon recti-
 fiers are among the products manufactured
 at the ITT Components Division plant in
 Clifton, N. J.



PALO ALTO, CALIFORNIA

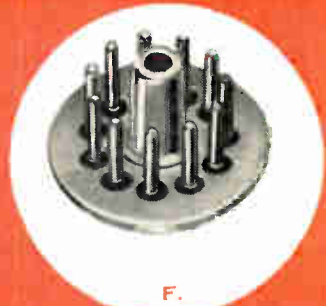
Specialized research and production facili-
 ties in Palo Alto, California, are the source of
 ITT tantalum capacitors and seals manufac-
 tured by techniques developed over years of
 experience and research.

Components Division

AND TELEGRAPH CORPORATION

ITT Components Division products—Silicon Rectifiers, Selenium Rectifiers and Diodes; Tantalum Capacitors and Seals—are widely used in specialized military and industrial equipment where rugged construction, minimum size, maximum operating efficiency and temperature stability are critical, as well as in home entertainment appliance devices requiring economy, ease of assembly and minimum space.

- A.** ITT Silicon Power Rectifiers feature dual positive hermetic sealing—high temperature stability—advanced diffusion techniques—compactness and high efficiency.
- B.** ITT Wet and Solid Anode Tantalum Capacitors are superior products, competitively priced, readily available through a nationwide network of industrial distributors. Glass to metal positive seals, small, light-weight, yet able to withstand shock and vibration, without loss of electrical stability.
- C.** Over 20,000 designs of custom built and standard ITT high density selenium rectifier stacks feature exceptional output to size and weight ratio, in all types of industrial and military service.
- D.** ITT high voltage selenium rectifiers are enclosed units for any required voltage rating and current ratings from 5 to 40 ma, with paper, phenolic, glass, or metal hermetically sealed enclosures.
- E.** Silicon Zener Regulators are designed for severe commercial and military requirements. Each unit is fully evaluated to insure stability of characteristics over the temperature range from -65°C to 165°C . Hermetically sealed for environmental protection.
- F.** Compression seals, solder seals, pressure, stand-off and speed-nut terminals, condenser end seals and transistor closures, designed for uniform seal integrity under severe conditions.



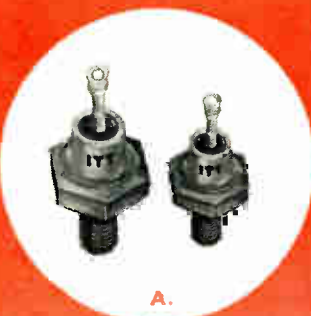
F.
GLASS SEALS



E.
ZENER DIODES



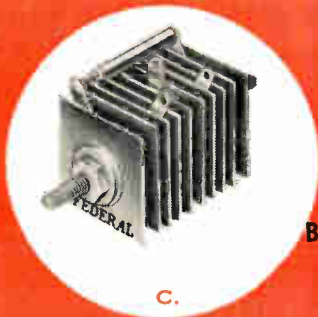
D.
HIGH VOLTAGE RECTIFIERS



A.
SILICON POWER RECTIFIERS



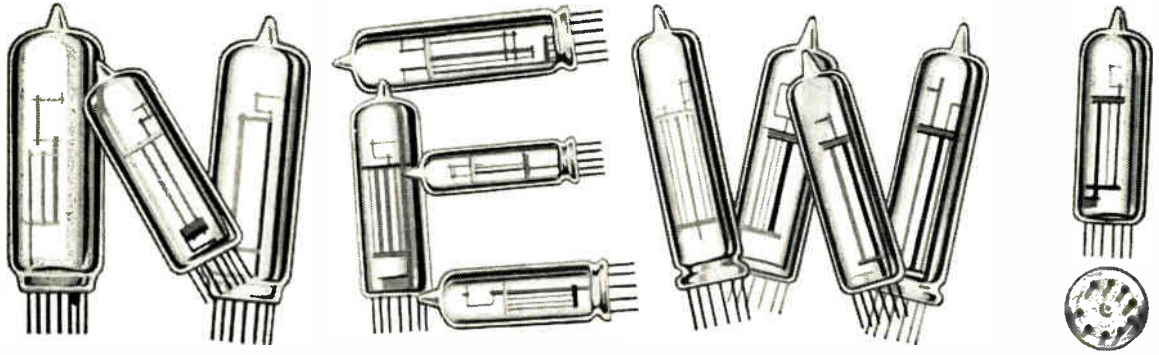
B.
TANTALUM CAPACITORS
WET AND SOLID ANODE



C.
HIGH TEMPERATURE RECTIFIERS

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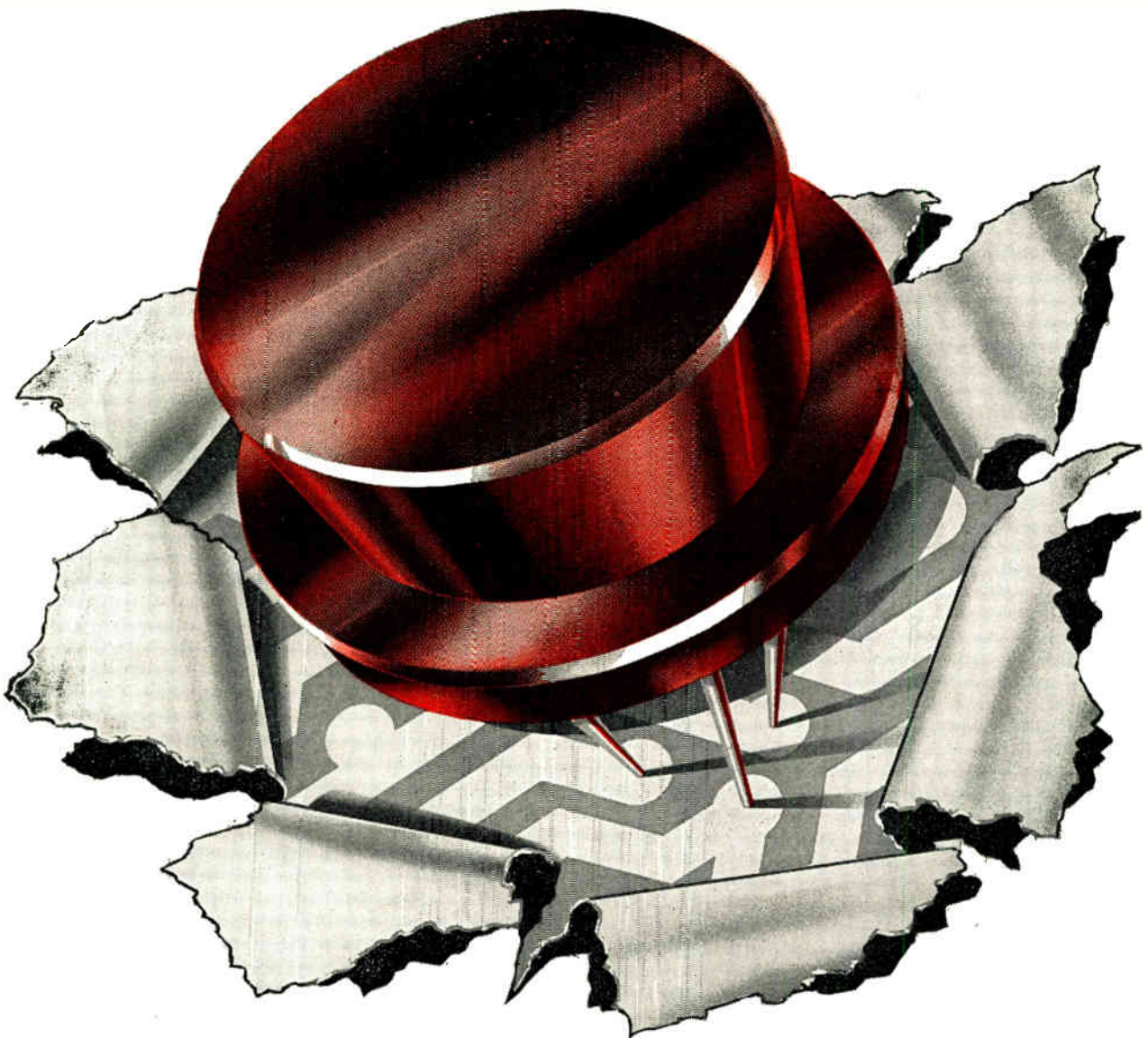
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1AJ4	6AX4GT	6K6GT	35DZ8	ECC85/6AQ8
1B3GT	6BL7GTA	6N8	35W4	ECF82/6U8
1L4	6BM8	6S4A	50BM8	ECH81/6AJ8
2AF4A	6BO5	6SN7GTB	50C5	ECL80/6AB8
2AF4B	6BQ6GTB/6CU6	6T8	5928-6267	ECL82/6BM8
3AF4A	6BQ7A	6U8	7025	EF80/6BX6
3V4	6BR5	6V4	0Z4	EF85/6BY7
5AR4	6BR6	6W4GT	DC90	EF86/5928-6267
5J6	6BY7	9AQ8	DF96/1AJ4	EF89/6DA6
5U4GB	6BZ7	9DZ8	DK92/1L4	EL34/6CA7
6AB4	6CA7	12AT7	DL94/3V4	EL84/6BQ5
6AB8	6CA7	12AU7	EAA-EB91/6AL5	EL95
6AF4	6CB6	12AU7A	EABC80/6T8	EM80/6BR5
6AF4A	6CG7	12AX7	EBC91/6AV6	EM84/6FG6
6AJ8	6DA6	12AX7A	EBF80/6N8	EZ80/6V4
6AL5	6DC8	12BA6	EBF89/6DC8	EZ81/6CA4
6AN8	6DZ8	12BE6	EC92/6AB4	GZ34/5AR4
6AQ8	6FG6	12SN7GT	ECC81/12AT7	PCC85/9AQ8
6AU6	6J6	16A8	ECC83/12AX7	PCL82/16A8
6AV6	6J6A	18DZ8	ECC84	UCL82/50BM8

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1959-1960

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MADT FAMILY APPLICATIONS DATA

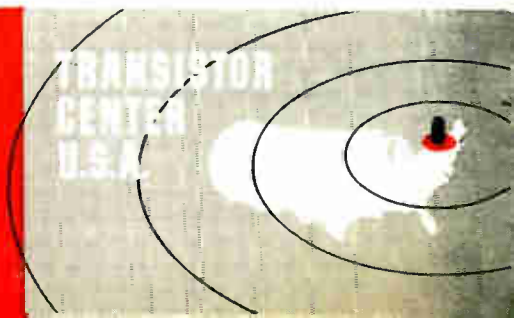
TYPE*	f _{max}	Power Gain	Class of Use
2N499	320 mc	10 db at 100 mc	amplifier to 125 mc
2N501	Ultra high-speed switch typical t _r = 13 μsec; (18 max.); t _s = 7 μsec; (12 max.); t _f = 7 μsec; (10 max.) in circuit with current gain of 10 and voltage turnoff.		
2N501A is 100°C version of 2N501			
2N502†	700 mc	10 db at 200 mc	amplifier to 250 mc
2N503†	420 mc	12.5 db at 100 mc	amplifier to 175 mc
2N504	50 mc (min.)	46 db at 455	high gain IF amplifier
2N588	250 mc	14 db at 50 mc	Oscillator and amplifier to 80 mc

*Available in voltage ratings up to 35 V and dissipation ratings to 30 mw at 45°C.
†In TO-9 Case.

PHILCO®

LANSDALE TUBE COMPANY DIVISION
LANSDALE, PENNSYLVANIA

Circle 73 on Inquiry Card



TRANSISTORS

TYPE	CASE	CLASS	MAT	APP	TYPICAL OPERATION					MAXIMUM RATINGS						
					I _{CO} μa	I _{EO} μa	PG db	α or β	T °C	f _α mc	V _{EB} v	V _{CE} v	V _{CB} v	I _C ma	P _C mw	T _J °C	K °C/mw

ADVANCED RESEARCH ASSOCIATES, INC., 4130 Howard Ave., Kensington, Md.

2N626	A	NPN	G	B-Amp, Af, Pwr, Sw	<1			25,000	71	0.1	30	30	30	3a	10w	100	
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AMPEREX ELECTRONIC CORP., 230 Duffy Ave., Hicksville L. I., N. Y.

2N109	A	PNP	G	Af	4.5	4.5	32	70	25	0.35		32	32	70	125	75	0.4
2N115	E	PNP	G	Af, B-Amp, Pwr, Sw	20	50		40	25	0.2		32	32	3a	50w	75	1
2N217	A	PNP	G	Af	4.5	4.5	32	70	25	0.35		32	32	70	125	75	0.4
2N279	A	PNP	G	Af	5			30	25	0.3		30	30	50	125	75	0.4
2N280	A	PNP	G	Af	4.5		40	47	25	0.3		30	30	50	125	75	0.4
2N281	B	PNP	G	Af, B-Amp	4.5	4.5	32	70	25	0.35		32	32	125	167	75	0.3
2N282	B	PNP	G	Af, B-Amp	4.5	4.5	32	70	25	0.35		32	32	125	167	75	0.3
2N283	A	PNP	G	Af	3.5	3.5		40	25	0.5		30	32	10	125	75	0.4
2N284	B	PNP	G	Af, Sw	4.5	4.5		45	25	0.35		32	32	250	167 ¹	75	0.3
2N284A	B	PNP	G	Af, Sw	4.5	4.5		45	25	0.35		60	60	250	167 ¹	75	0.3
OC16-D	E	PNPA	G	Af, Pwr, Sw	-20			22	25	5.5kc		-13		2a		75	.001
OC16-E	E	PNPA	G	Af, Pwr, Sw	-20			30	25	5.5kc		-26	-30	2a		75	.001
OC16-G	E	PNPA	G	Af, Pwr, B-Amp, Sw	-20	-10		40	25	5.5kc		-8	-26	-30	2a	75	.001
OC30		PNP	G	Af, Pwr, Sw	10	10		36	25	0.3		32	32	1.4a	6.6w	75	7.5
OC44	C	PNP	G	if, rf	0.5	0.4	28	100	25	15		15	15	10	100 ¹	75	0.5
OC45	C	PNP	G	if, rf	0.5	0.4	59	40	25	6		15	15	10	100 ¹	75	0.5
OC65	D	PNP	G	Af	5			30	25	0.45		10	10	10	50 ¹	75	0.65
OC66	D	PNP	G	Af	5			47	25	0.47		10	10	10	50 ¹	75	0.65

1. With appropriate heat sink. 2. Matched pair of 2N281

BENDIX AVIATION CORP., Semiconductor Products, Red Bank Div., Long Branch, N. J.

2N155	A	PNPA	G	Af, B-Amp, Pwr	0.180	.060	33	40	25	.14		30	3	3	8.5	85	3°C/W
2N156	A	PNPA	G	Af, B-Amp, Pwr	3		36	45	20	5kc		30	40	3	10	90	1°C/W
2N234A	A	PNPA	G	Af, Pwr, Sw	0.42		34	25	25	0.3		30	30	3a	25w	90	2°C/W
2N235A	A	PNPA	G	Af, Pwr, Sw	0.42		36	40	25	0.3		40	50	3a	25w	90	2°C/W
2N235B	A	PNPA	G	Af, Pwr	0.42		38	60	25	0.3		40	50	3a	25w	90	2°C/W
2N236A	A	PNPA	G	Af, Pwr, Sw	0.76		35	40	25	0.3		40	50	3a	25w	95	2°C/W
2N236B	A	PNPA	G	Af, Pwr	0.76		37	60	25	0.3		40	50	3a	25w	95	2°C/W
2N242	A	PNPA	G	Pwr	0.2		35		25	5kc		45	45	2	25	100	3°C/W
2N255	A	PNPA	G	Pwr	0.18	0.06	19-26	30-39	25	0.18		15	15	3	8.5	85	3°C/W
2N256	A	PNPA	G	Pwr	0.18	0.06	22-29	30-39	25	0.18		30	30	3	8.5	85	3°C/W
2N257	A	PNPA	G	Af, Pwr, Sw			33		50	0.3		40	40	3	30	90	2°C/W
2N268	A	PNPA	G	Af, Pwr, Sw			35		50	0.3			80	3	30	90	2°C/W
2N268A	A	PNPA	G	Af, B-Amp, Pwr, Sw	1				25			60	80		10	90	
2N285A	A	PNPA	G	Af, Pwr, Sw	0.42		39	150	25	0.4		40	50	3	25w	95	2°C/W
2N297	A	PNPA	G	Af, Pwr, Sw				25-100	25	0.3			80	3	15	90	1°C/W
2N297A*	A	PNPA	G	Af, B-Amp, Pwr, Sw	3**			20@I _C =2a	25			50	60	5	35	95	2°C/W
2N301	A	PNPA	G	Af, Pwr, Sw	0.22**		30		25			40	1	12	85	1°C/W	
2N301A	A	PNPA	G	Af, Pwr, Sw	0.22**		30		25			60	1	12	85	1°C/W	
2N307	A	PNPA	G	B-Amp, Sw	0.25			20@I _C =2a	25	0.3		35	35	1	15	75	5°C/W
2N307A	A	PNPA	G	B-Amp, Sw	0.25			20@I _C =2a	25	.03		35	35	2	15	75	3°C/W
2N331*	A	PNPA	G	Af, Sw	0.016**				25			30		0.2	0.2	85	0.3°C/W
2N399	A	PNPA	G	Af, B-Amp, Pwr	1.5		33	40	25	0.3		40		3a	25w	90	2°C/W
2N400	A	PNPA	G	Af, Pwr	1.3		35	50	25	0.3		40	50	3a	25w	95	2°C/W
2N401	A	PNPA	G	Af, B-Amp, Pwr	1.3		30	40	25	0.3		40		3a	20w	90	2°C/W
2N418	A	PNPA	G	Pwr, Sw	1.5			40	25	0.4		80	100	5a	25w	100	2°C/W
2N419	A	PNPA	G	Pwr, Sw	0.5			75	25	0.4		45	55	3a	25w	95	2°C/W
2N420	A	PNPA	G	Sw	0.5			40	25	0.4		45	65	5a	25w	100	2°C/W
2N420A	A	PNPA	G	Pwr, Sw	1.5			40	25	0.4		70	90	5a	25w	100	2°C/W
2N637	A	PNPA	G	Af, Pwr, Sw	0.5			40@I _C =3a	25	0.4		40		5a	25w	100	2.0°C/W
2N637A	A	PNPA	G	Af, Pwr, Sw	2			40@I _C =3a	25	0.4		70		5a	25w	100	2.0°C/W
2N637B	A	PNPA	G	Af, Pwr, Sw	2			40@I _C =3a	25	0.4		80		5a	25w	100	2.0°C/W
2N638	A	PNPA	G	Af, Pwr, Sw	0.5			30@I _C =3a	25	0.4		40		5a	25w	100	2.0°C/W
2N638A	A	PNPA	G	Af, Pwr, Sw	2			30@I _C =3a	25	0.4		70		5a	25w	100	2.0°C/W
2N638B	A	PNPA	G	Af, Pwr, Sw	2			30@I _C =3a	25	0.4		70		5a	25w	100	2.0°C/W
2N639	A	PNPA	G	Af, Pwr, Sw	0.5			20@I _C =3a	25	0.4		40		5a	25w	100	2.0°C/W
2N639A	A	PNPA	G	Af, Pwr, Sw	2			20@I _C =3a	25	0.4		70		5a	25w	100	2.0°C/W
2N639B	A	PNPA	G	Af, Pwr, Sw	2			20@I _C =3a	25	0.4		80		5a	25w	100	2.0°C/W
2N677	A	PNPA	G	Af, Pwr, Sw	1			40@I _C =10a	25	0.4		30	50	15a	50w	100	1.0°C/W
2N677A	A	PNPA	G	Af, Pwr, Sw	1			40@I _C =10a	25	0.4		40	60	15a	50w	100	1.0°C/W
2N677B	A	PNPA	G	Af, Pwr, Sw	2			40@I _C =10a	25	0.4		70	90	15a	50w	100	1.0°C/W
2N677C	A	PNPA	G	Af, Pwr, Sw	2			40@I _C =10a	25	0.4		80	100	15a	50w	100	1.0°C/W
2N678	A	PNPA	G	Af, Pwr, Sw	1			75@I _C =10a	25	0.4		30	50	15a	50w	100	1.0°C/W
2N678A	A	PNPA	G	Af, Pwr, Sw	1			75@I _C =10a	25	0.4		40	60	15a	50w	100	1.0°C/W
2N678B	A	PNPA	G	Af, Pwr, Sw	2			75@I _C =10a	25	0.4		70	90	15a	50w	100	1.0°C/W
2N678C	A	PNPA	G	Af, Pwr, Sw	2			75@I _C =10a	25	0.4		80	100	15a	50w	100	1.0°C/W
2N1008	D	PNPA	G	Af	.005			100@I _C =10ma	25	1.0		20	20	0.3a	0.4w	85	0.15



TRANSISTOR applications

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TRANSISTORS

TYPE	CASE	CLASS	MAT	APP	TYPICAL OPERATION					MAXIMUM RATINGS								
					I _{co} μa	I _{eo} μa	PG db	α or β	T °C	f _α mc	V _{EB} v	V _{CE} v	V _{CB} v	I _c ma	P _c mw	T _J °C	K °C/mw	
BENDIX AVIATION CORP. (Cont.) Semiconductor Products, Red Bank Div., Long Branch, N. J.																		
2N1008A	D	PNPA	G	Af	0.005			100@I _c =10ma	25			40	40	0.3	0.4	85	0.15°C/W	
2N1008B	D	PNPA	G	Af	0.007			100@I _c =10ma	25			60	60	0.3	0.4	85	0.15°C/W	
2N1011		PNPA	G	Af, B-Amp, Pwr	15**			75 Max@I _c =3a	25				80	5	35	95	1.2°C/W	
2N1029	B	PNPA	G	Af, Pwr, Sw	1			40@I _c =10a	25	0.4		30	50	15a	50w	100	1.0°C/W	
2N1029A	B	PNPA	G	Af, Pwr, Sw	1			40@I _c =10a	25	0.4		40	60	15a	50w	100	1.0°C/W	
2N1029B	B	PNPA	G	Af, Pwr, Sw	2			40@I _c =10a	25	0.4		70	90	15a	50w	100	1.0°C/W	
2N1029C	B	PNPA	G	Af, Pwr, Sw	2			40@I _c =10a	25	0.4		80	100	15a	50w	100	1.0°C/W	
2N1030	B	PNPA	G	Af, Pwr, Sw	1			75@I _c =10a	25	0.4		30	50	15a	50w	100	1.0°C/W	
2N1030A	A	PNPA	G	Af, Pwr, Sw	1			75@I _c =10a	25	0.4		40	60	15a	50w	100	1.0°C/W	
2N1030B	B	PNPA	G	Af, Pwr, Sw	2			75@I _c =10a	25	0.4		70	90	15a	50w	100	1.0°C/W	
2N1030C	B	PNPA	G	Af, Pwr, Sw	2			75@I _c =10a	25	0.4		80	100	15a	50w	100	1.0°C/W	
2N1031	C	PNPA	G	Af, Pwr, Sw	1			40@I _c =10a	25	0.4		30	50	15a	50w	100	1.0°C/W	
2N1031A	C	PNPA	G	Af, Pwr, Sw	1			40@I _c =10a	25	0.4		40	60	15a	50w	100	1.0°C/W	
2N1031B	C	PNPA	G	Af, Pwr, Sw	2			40@I _c =10a	25	0.4		70	90	15a	50w	100	1.0°C/W	
2N1031C	C	PNPA	G	Af, Pwr, Sw	2			40@I _c =10a	25	0.4		80	100	15a	50w	100	1.0°C/W	
2N1032	C	PNPA	G	Af, Pwr, Sw	1			75@I _c =10a	25	0.4		30	50	15a	50w	100	1.0°C/W	
2N1032A	C	PNPA	G	Af, Pwr, Sw	1			75@I _c =10a	25	0.4		40	70	15a	50w	100	1.0°C/W	
2N1032B	C	PNPA	G	Af, Pwr, Sw	2			75@I _c =10a	25	0.4		70	90	15a	50w	100	1.0°C/W	
2N1032C	C	PNPA	G	Af, Pwr, Sw	2			75@I _c =10a	25	0.4		80	100	15a	50w	100	1.0°C/W	
2N1073	C	PNPA	G	Af, B-Amp, Pwr, Sw	1			40@I _c =5a	25		1.0	40	40	10	35	100	1.2°C/W	
2N1073A	C	PNPA	G	Af, B-Amp, Pwr, Sw	2			40@I _c =5a	25		1.0	80	80	10	35	100	1.2°C/W	
2N1073B	A	PNPA	G	Af, B-Amp, Pwr, Sw	5			40@I _c =5a	25		1.0	120	120	10	35	100	1.2°C/W	
2N1120*	A	PNPA	G	Af, B-Amp, Pwr	15**			50 Max@I _c =10a	25	0.4			80	15	40	95	1.2°C/W	
2N1136	A	PNPA	G	Af, Pwr, Sw	0.5			50-100@I _c =3a	25	0.4		40	60	6	60	100	1.2°C/W	
2N1136A	A	PNPA	G	Af, P, Pwr	2			50-100@I _c =3a	25	0.4		70	90	6	60	100	1.2°C/W	
2N1136B	A	PNPA	G	Af, Sw, Pwr	2			50-100@I _c =3a	25	0.4		80	100	6	60	100	1.2°C/W	
2N1137	A	PNPA	G	Af, Sw, Pwr	0.5			75-150@I _c =3a	25	0.4		40	60	6	60	100	1.2°C/W	
2N1137A	A	PNPA	G	Af, Sw, Pwr	2			75-150@I _c =3a	25	0.4		70	90	6	60	100	1.2°C/W	
2N1137B	A	PNPA	G	Af, Sw, Pwr	2			75-150@I _c =3a	25	0.4		80	100	6	60	100	1.2°C/W	
2N1138	A	PNPA	G	Af, Pwr, Sw	0.5			100-200@I _c =3a	25	0.4		40	60	6	60	100	1.2°C/W	
2N1138A	A	PNPA	G	Af, Pwr, Sw	2			100-200@I _c =3a	25	0.4		70	90	6	60	100	1.2°C/W	
2N1138B	A	PNPA	G	Af, Pwr, Sw	2			100-200@I _c =3a	25	0.4		80	100	6	60	100	1.2°C/W	
2N1176	D	PNPA	G	Af	.01			hfe=20@I _c =10ma	25	fae 15kc		15	15	0.3	0.3	0.4	0.4°C/W	
2N1176A	D	PNPA	G	Af	.012			hfe=20@I _c =10ma	25	fae 15kc		40	40	0.3	0.3	0.4	0.4°C/W	
2N1176B	D	PNPA	G	Af	.015			hfe=20@I _c =10ma	25	fae 15kc		60	60	0.3	0.3	0.4	0.4°C/W	
B177	A	PNPA	G	Af, Pwr, Sw	0.5		33	150@I _c =0.5a				30	40	3a	25w	90	2°C/W	
B178	A	PNPA	G	Af, Pwr, Sw	0.5		30	40@I _c =0.5a				30	40	3a	25w	90	2°C/W	
B179	A	PNPA	G	Af, Pwr, Sw	0.5		28	25@I _c =0.5a				40	50	3a	25w	90	2°C/W	
* Military Type ** Maximum Value																		
BOGUE ELECTRIC MFG. CO. 100 Pennsylvania Ave., Paterson, N. J.																		
2N97	A	NPN	G	Af, If, Rf			1ma	20	15	1.0		30	30	10	50	75	0.5	
2N103	A	NPN	G	Af, if, rf			1ma	22	5	0.75		35	35	10	50	75	0.5	
2N160	A	NPNG	Si	Af, if, rf			2ma	34	15	50	4	1.0	40	40	25	150	200	1
2N161	A	NPNG	Si	Af, if, rf			2ma	37	30	50	5	1.0	40	40	25	150	200	1
2N162	A	NPNG	Si	Af, if, rf			2ma	38	50	50	8	1.0	40	40	25	150	200	1
2N163	A	NPNG	Si	Af, if, rf			2ma	40	50	50	6	1.0	40	40	25	150	200	1
2N332	C	NPNG	Si	Af, if, rf			2ma	35	15	50	4	1.0	45	45	25	150	175	1
2N333	C	NPNG	Si	Af, if, rf			2ma	39	33	50	5	1.0	45	45	25	150	175	1
2N334	C	NPNG	Si	Af, if, rf			2ma	39	40	50	8	1.0	45	45	25	150	175	1
2N335	C	NPNG	Si	Af, if, rf			2ma	42	49	50	6	1.0	45	45	25	150	175	1
2N336	C	NPNG	Si	Af, if, rf			2ma	42.5	100	50	7	1.0	45	45	25	150	175	1
2N347	B	NPNG	Si	Af, Pwr, if, rf			3ma	35	25	50	5	1.0	60	60	60	750	175	0.25
2N348	B	NPNG	Si	Af, Pwr, if, rf			3ma	35	25	50	5	5	90	90	50	750	175	0.25
2N348A	B	NPNG	Si	Af, if, rf			3ma	35	25	50	5	5	90	90	50	750	175	0.25
2N349	B	NPNG	Si	Af, if, rf			3ma	35	25	50	5	1.0	1.5	1.5	40	750	175	0.25
2N1095	B	NPNG	Si	Af, if, rf			3	35	25	50	5	1.0	60	60	60	500	175	0.25
2N1096	B	NPNG	Si	Af, if, rf			3	35	25	50	5	1.0	90	90	50	500	175	0.25
X30A	A	NPN	Si	Af, B-Amp, Pwr, Sw			50ma	25	15	75	2		60	60	200	10w	175	2°C/W
X31A	A	NPN	Si	Af, B-Amp, Pwr, Sw			40ma	25	15	75	2		90	90	160	10w	175	2°C/W
X32A	A	NPN	Si	Af, B-Amp, Pwr, Sw			30ma	25	15	75	2		125	125	140	10w	175	2°C/W
C. B. S. -HYTRON , 900 Chelmsford St., Lowell, Mass.																		
2N156	A	PNPA	G	Af, Pwr, Sw	300	100			352	25	5kc ³	15	30	3a	3a	20w	85	3°C/W
2N157	B	PNPA	G	Af, Pwr, Sw	300	100			352	25	5kc ³	15	60	60	3a	20w	85	3°C/W
2N157A	B	PNPA	G	Af, Pwr, Sw	300	100			352	25	5kc ³	15	90	100	3a	20w	85	3°C/W
2N158	A	PNPA	G	Af, Pwr, Sw	300	100			352	25	5kc ³	30	60	60	3a	20w	85	3°C/W
2N158A	A	PNPA	G	Af, Pwr, Sw	300	100			352	25	5kc ³	30	60	80	3a	20w	85	3°C/W
2N255A	B	PNPA	G	Af, Pwr, Sw	400	200	100		25	25	5kc ³	10	15	15	3a	25w	85	3°C/W
2N256A	B	PNPA	G	Af, Pwr, Sw	400	200	100		25	25	5kc ³	15	30	30	3a	25w	85	3°C/W

TRANSISTORS

TYPE	CASE	CLASS	MAT	APP	TYPICAL OPERATION					MAXIMUM RATINGS						
					I _{CO} μa	I _{EO} μa	PG db	α or β	T °C	f _α ma	V _{EB} v	V _{CE} v	V _{CB} v	I _C ma	P _C mw	T _J °C	K °C/mw

C. B. S. -HYTRON (Cont.) 900 Chelmsford St., Lowell, Mass.

2N326	B	NPNA	G	Af, Pwr	200	200		45 ²	25	15	15	35	35	3a	7w	85	8°C/W
2N356	E	NPNA	G	if, rf, Sw	5	5		20-30	25	3	20	18	20	100	100	85	0.5
2N377	E	NPNA	G	if, rf, Sw	5	5		30 ²	25	6	15	20	25	200	150	100	0.5
2N385	E	NPNA	G	if, rf, Sw	5	5		40 ²	25	44	15	25	25	200	150	100	0.5
2N386	E	NPNA	G	if, rf, Sw	5	5		80 ²	25	8	15	20	25	200	150	100	0.5
2N438 ¹	E	NPNA	G	if, rf, Sw	5	5		25 ²	25	2.5 ⁴	25	25	30	100	100	85	0.5
2N439 ¹	E	NPNA	G	if, rf, Sw	5	5		45 ²	25	5 ⁴	25	20	30	100	100	85	0.5
2N440 ¹	E	NPNA	G	if, rf, Sw	5	5		70 ²	25	10 ⁴	25	15	30	100	100	85	0.5
LT11	A	PNPA	G	Af, Pwr, Sw	400	200		35 ²		5kc ³	30	80	80	3a	20w	85	3°C/W
LT11	A	PNPA	G	Af, Pwr, Sw	400	200		35 ²		5kc ³	30	100	100	3a	20w	85	3°C/W
LT12	A	PNPA	G	Af, Pwr, Sw	400	200		35 ²		5kc ³	30	120	120	3a	20w	85	3°C/W
LT13	A	PNPA	G	Af, Pwr, Sw	400	200		35 ²		5kc ³	30	150	150	3a	20w	85	3°C/W
LT14	A	PNPA	G	Af, Pwr, Sw	400	200		35 ²		5kc ³	30	200	3a	20w	85	3°C/W	
LT1521	D	PNPA	G	Af, Pwr, Sw	300	100		30 ²	25	5kc ³	15	30	30	3a	20w	85	3°C/W
LT5022	B	PNPA	G	Af, Pwr, Sw	300	100		30 ²	25	5kc ³	15	30	30	3a	20w	85	3°C/W
LT5023	C	PNPA	G	Af, Pwr, Sw	300	100		50 ²	25	5kc ³	15	30	30	3a	20w	85	3°C/W
LT5024	D	PNPA	G	Af, Pwr, Sw	300	100		50 ²	25	5kc ³	15	30	30	3a	20w	85	3°C/W
LT5025	B	PNPA	G	Af, Pwr, Sw	300	100		50 ²	25	5kc ³	15	30	30	3a	20w	85	3°C/W
LT5026	C	PNPA	G	Af, Pwr, Sw	300	100		70 ²	25	5kc ³	15	30	30	3a	20w	85	3°C/W
LT5027	D	PNPA	G	Af, Pwr, Sw	300	100		70 ²	25	5kc ³	15	30	30	3a	20w	85	3°C/W
LT5028	B	PNPA	G	Af, Pwr, Sw	300	100		70 ²	25	5kc ³	15	30	30	3a	20w	85	3°C/W
LT5029	C	PNPA	G	Af, Pwr, Sw	300	100		50 ²	25	5kc ³	15	60	60	3a	20w	85	3°C/W
LT5030	D	PNPA	G	Af, Pwr, Sw	300	100		50 ²	25	5kc ³	15	60	60	3a	20w	85	3°C/W
LT5031	B	PNPA	G	Af, Pwr, Sw	300	100		50 ²	25	5kc ³	15	60	60	3a	20w	85	3°C/W
LT5032	C	PNPA	G	Af, Pwr, Sw	300	100		70 ²	25	5kc ³	15	60	60	3a	20w	85	3°C/W
LT5033	D	PNPA	G	Af, Pwr, Sw	300	100		60 ²	25	5kc ³	15	60	60	3a	20w	85	3°C/W
LT5034	B	PNPA	G	Af, Pwr, Sw	300	100		70 ²	25	5kc ³	15	60	60	3a	20w	85	3°C/W
LT5035	C	PNPA	G	Af, Pwr, Sw	300	100		30 ²	25	5kc ³	15	90	100	3a	20w	85	3°C/W
LT5036	D	PNPA	G	Af, Pwr, Sw	300	100		30 ²	25	5kc ³	15	90	100	3a	20w	85	3°C/W
LT5037	C	PNPA	G	Af, Pwr, Sw	300	100		50 ²	25	5kc ³	15	90	100	3a	20w	85	3°C/W
LT5038	D	PNPA	G	Af, Pwr, Sw	300	100		50 ²	25	5kc ³	15	90	100	3a	20w	85	3°C/W
LT5039	B	PNPA	G	Af, Pwr, Sw	300	100		50 ²	25	5kc ³	15	90	100	3a	20w	85	3°C/W
LT5040	C	PNPA	G	Af, Pwr, Sw	300	100		70 ²	25	5kc ³	15	90	100	3a	20w	85	3°C/W
LT5041	D	PNPA	G	Af, Pwr, Sw	300	100		70 ²	25	5kc ³	15	90	100	3a	20w	85	3°C/W
LT5042	B	PNPA	G	Af, Pwr, Sw	300	100		70 ²	25	5kc ³	15	90	100	3a	20w	85	3°C/W
LT5043	C	PNPA	G	Af, Pwr, Sw	300	100		30 ²	25	5kc ³	15	100	120	3a	20w	85	3°C/W
LT5044	D	PNPA	G	Af, Pwr, Sw	300	100		30 ²	25	5kc ³	15	100	120	3a	20w	85	3°C/W
LT5045	B	PNPA	G	Af, Pwr, Sw	300	100		30 ²	25	5kc ³	15	100	120	3a	20w	85	3°C/W
LT5046	C	PNPA	G	Af, Pwr, Sw	300	100		50 ²	25	5kc ³	15	100	120	3a	20w	85	3°C/W
LT5047	D	PNPA	G	Af, Pwr, Sw	300	100		50 ²	25	5kc ³	15	100	120	3a	20w	85	3°C/W
LT5048	B	PNPA	G	Af, Pwr, Sw	300	100		50 ²	25	5kc ³	15	100	120	3a	20w	85	3°C/W
LT5049	C	PNPA	G	Af, Pwr, Sw	300	100		70 ²	25	5kc ³	15	100	120	3a	20w	85	3°C/W
LT5050	D	PNPA	G	Af, Pwr, Sw	300	100		70 ²	25	5kc ³	15	100	120	3a	20w	85	3°C/W
LT5051	B	PNPA	G	Af, Pwr, Sw	300	100		70 ²	25	5kc ³	15	100	120	3a	20w	85	3°C/W
LT5052	C	PNPA	G	Af, Pwr, Sw	400	100		40 ²	25	5kc ³	15	30	30	4a	30w	85	2°C/W
LT5053	D	PNPA	G	Af, Pwr, Sw	400	100		40 ²	25	5kc ³	15	30	30	4a	30w	85	2°C/W
LT5054	B	PNPA	G	Af, Pwr, Sw	400	100		40 ²	25	5kc ³	15	30	30	4a	30w	85	2°C/W
LT5055	C	PNPA	G	Af, Pwr, Sw	400	100		80 ²	25	5kc ³	15	30	30	4a	30w	85	2°C/W
LT5056	D	PNPA	G	Af, Pwr, Sw	400	100		80 ²	25	5kc ³	15	30	30	4a	30w	85	2°C/W
LT5057	B	PNPA	G	Af, Pwr, Sw	400	100		80 ²	25	5kc ³	15	30	30	4a	30w	85	2°C/W
LT5058	C	PNPA	G	Af, Pwr, Sw	400	100		80 ²	25	5kc ³	15	30	30	4a	30w	85	2°C/W
LT5059	D	PNPA	G	Af, Pwr, Sw	400	100		110 ²	25	5kc ³	15	30	30	4a	30w	85	2°C/W
LT5060	B	PNPA	G	Af, Pwr, Sw	400	100		110 ²	25	5kc ³	15	30	30	4a	30w	85	2°C/W
LT5061	C	PNPA	G	Af, Pwr, Sw	400	100		45 ²	25	5kc ³	15	60	60	4a	30w	85	2°C/W
LT5062	D	PNPA	G	Af, Pwr, Sw	400	100		45 ²	25	5kc ³	15	60	60	4a	30w	85	2°C/W
LT5063	B	PNPA	G	Af, Pwr, Sw	400	100		45 ²	25	5kc ³	15	60	60	4a	30w	85	2°C/W
LT5064	C	PNPA	G	Af, Pwr, Sw	400	100		80 ²	25	5kc ³	15	60	60	4a	30w	85	2°C/W
LT5065	D	PNPA	G	Af, Pwr, Sw	400	100		80 ²	25	5kc ³	15	60	60	4a	30w	85	2°C/W
LT5066	B	PNPA	G	Af, Pwr, Sw	400	100		80 ²	25	5kc ³	15	60	60	4a	30w	85	2°C/W
LT5067	C	PNPA	G	Af, Pwr, Sw	400	100		110 ²	25	5kc ³	15	60	60	4a	30w	85	2°C/W
LT5068	D	PNPA	G	Af, Pwr, Sw	400	100		110 ²	25	5kc ³	15	60	60	4a	30w	85	2°C/W
LT5069	B	PNPA	G	Af, Pwr, Sw	400	100		110 ²	25	5kc ³	15	60	60	4a	30w	85	2°C/W
LT5070	C	PNPA	G	Af, Pwr, Sw	400	100		45 ²	25	5kc ³	15	75	80	4a	30w	85	2°C/W
LT5071	D	PNPA	G	Af, Pwr, Sw	400	100		45 ²	25	5kc ³	15	75	80	4a	30w	85	2°C/W
LT5072	B	PNPA	G	Af, Pwr, Sw	400	100		45 ²	25	5kc ³	15	75	80	4a	30w	85	2°C/W
LT5073	C	PNPA	G	Af, Pwr, Sw	400	100		80 ²	25	5kc ³	15	75	80	4a	30w	85	2°C/W
LT5074	D	PNPA	G	Af, Pwr, Sw	400	100		80 ²	25	5kc ³	15	75	80	4a	30w	85	2°C/W
LT5075	B	PNPA	G	Af, Pwr, Sw	400	100		80 ²	25	5kc ³	15	75	80	4a	30w	85	2°C/W
LT5076	C	PNPA	G	Af, Pwr, Sw	400	100		110 ²	25	5kc ³	15	75	80	4a	30w	85	2°C/W
LT5077	D	PNPA	G	Af, Pwr, Sw	400	100		110 ²	25	5kc ³	15	75	80	4a	30w	85	2°C/W

TYPE	CASE	CLASS	MAT	APP	TYPICAL OPERATION					MAXIMUM RATINGS						
					I_{CO} μA	I_{EO} μA	PG db	α_{01} β	T $^{\circ}C$	f_{α} mc	V_{EB} V	V_{CE} V	V_{CB} V	I_C ma	P_C mw	T_J $^{\circ}C$	$K$ $^{\circ}C/mw$

C. B. S. -HYTRON (Cont.) 900 Chelmsford St., Lowell, Mass.

LT5078	B PNPA	G Af, Pwr, Sw	400	100	1102	25	5kc ³	15	75	80	4a	30w	85	2°C/W
LT5079	C PNPA	G Af, Pwr, Sw	400	100	452	25	5kc ³	25	90	100	4a	30w	85	2°C/W
LT5080	D PNPA	G Af, Pwr, Sw	400	100	452	25	5kc ³	15	90	100	4a	30w	85	2°C/W
LT5081	B PNPA	G Af, Pwr, Sw	400	100	452	25	5kc ³	15	90	100	4a	30w	85	2°C/W
LT5082	C PNPA	G Af, Pwr, Sw	400	100	802	25	5kc ³	15	90	100	4a	30w	85	2°C/W
LT5083	D PNPA	G Af, Pwr, Sw	400	100	802	25	5kc ³	15	90	100	4a	30w	85	2°C/W
LT5084	B PNPA	G Af, Pwr, Sw	400	100	802	25	5kc ³	15	90	100	4a	30w	85	2°C/W
LT5085	C PNPA	G Af, Pwr, Sw	400	100	1102	125	5kc ³	15	90	100	4a	30w	85	2°C/W
LT5086	D PNPA	G Af, Pwr, Sw	400	100	1102	25	5kc ³	15	90	100	4a	30w	85	2°C/W
LT5087	B PNPA	G Af, Pwr, Sw	400	100	1102	25	5kc ³	15	90	100	4a	30w	85	2°C/W
LT5088	C PNPA	G Af, Pwr, Sw	500	100	602	25	5kc ³	15	90	30	5a	40w	85	1.5°C/W
LT5089	D PNPA	G Af, Pwr, Sw	500	100	602	25	5kc ³	15	90	30	5a	40w	85	1.5°C/W
LT5090	B PNPA	G Af, Pwr, Sw	500	100	602	25	5kc ³	15	30	30	5a	40w	85	1.5°C/W
LT5091	C PNPA	G Af, Pwr, Sw	500	100	1202	25	5kc ³	15	30	30	5a	40w	85	1.5°C/W
LT5092	D PNPA	G Af, Pwr, Sw	500	100	1202	25	5kc ³	15	30	30	5a	40w	85	1.5°C/W
LT5093	B PNPA	G Af, Pwr, Sw	500	100	1202	25	5kc ³	15	30	30	5a	40w	85	1.5°C/W
LT5094	C PNPA	G Af, Pwr, Sw	500	100	1852	25	5kc ³	15	30	30	5a	40w	85	1.5°C/W
LT5095	D PNPA	G Af, Pwr, Sw	500	100	1852	25	5kc ³	15	30	30	5a	40w	85	1.5°C/W
LT5096	B PNPA	G Af, Pwr, Sw	500	100	1852	25	5kc ³	15	30	30	5a	40w	85	1.5°C/W
LT5097	C PNPA	G Af, Pwr, Sw	500	100	602	25	5kc ³	15	30	60	5a	40w	85	1.5°C/W
LT5098	D PNPA	G Af, Pwr, Sw	500	100	602	25	5kc ³	15	60	60	5a	40w	85	1.5°C/W
LT5099	B PNPA	G Af, Pwr, Sw	500	100	602	25	5kc ³	15	60	60	5a	40w	85	1.5°C/W
LT5100	C PNPA	G Af, Pwr, Sw	500	100	1202	25	5kc ³	15	60	60	5a	40w	85	1.5°C/W
LT5101	D PNPA	G Af, Pwr, Sw	500	100	1202	25	5kc ³	15	60	60	5a	40w	85	1.5°C/W
LT5102	B PNPA	G Af, Pwr, Sw	500	100	1202	25	5kc ³	15	60	60	5a	40w	85	1.5°C/W
LT5103	C PNPA	G Af, Pwr, Sw	500	100	1852	25	5kc ³	15	60	60	5a	40w	85	1.5°C/W
LT5104	D PNPA	G Af, Pwr, Sw	500	100	1852	25	5kc ³	15	60	60	5a	40w	85	1.5°C/W
LT5105	B PNPA	G Af, Pwr, Sw	500	100	1852	25	5kc ³	15	60	60	5a	40w	85	1.5°C/W
LT5106	C PNPA	G Af, Pwr, Sw	500	100	602	25	5kc ³	15	75	80	5a	40w	85	1.5°C/W
LT5107	D PNPA	G Af, Pwr, Sw	500	100	602	25	5kc ³	15	75	80	5a	40w	85	1.5°C/W
LT5108	B PNPA	G Af, Pwr, Sw	500	100	602	25	5kc ³	15	75	80	5a	40w	85	1.5°C/W
LT5109	C PNPA	G Af, Pwr, Sw	500	100	1202	25	5kc ³	15	75	80	5a	40w	85	1.5°C/W
LT5110	D PNPA	G Af, Pwr, Sw	500	100	1202	25	5kc ³	15	75	80	5a	40w	85	1.5°C/W
LT5111	B PNPA	G Af, Pwr, Sw	500	100	1202	25	5kc ³	15	75	80	5a	40w	85	1.5°C/W
LT5112	C PNPA	G Af, Pwr, Sw	500	100	1852	25	5kc ³	15	75	80	5a	40w	85	1.5°C/W
LT5113	D PNPA	G Af, Pwr, Sw	500	100	1852	25	5kc ³	15	75	80	5a	40w	85	1.5°C/W
LT5114	B PNPA	G Af, Pwr, Sw	500	100	1852	25	5kc ³	15	75	80	5a	40w	85	1.5°C/W
LT5165	B NPNA	G Af, Pwr, Sw	200	200	452	25	0.15	15	45	60	3a	12w	85	5°C/W
LT5164	B NPNA	G Af, Pwr, Sw	200	200	452	25	0.15	15	60	80	3a	12w	85	5°C/W
LT5165	B NPNA	G Af, Pwr, Sw	200	200	452	25	0.15	15	30	35	3a	12w	85	5°C/W

1. "A" version = 150mw 2. h/e 3. jae 4. Min. 5. Add suffix "L" for use with inductive load

CLEVITE TRANSISTOR PRODUCTS, 241-257 Crescent St., Waltham 54, Mass.

2N155	A PNPA	G Af, Pwr	2ma	34@2w		25	0.3	30		30	3a	5w	85	3°C/W
2N235A	A PNPA	G Af, Pwr	7ma	35@1.2w		25	0.3	30		40	3a	10w	90	2°C/W
2N242	A PNPA	G Af, Pwr	1ma	35@2.5w		25	0.3		45	45	2a	5w	85	3°C/W
2N250	A PNPA	G Af, Pwr	1ma	35@1.5w		25	0.3		30	30	3a	10w	85	1.5°C/W
2N255	A PNPA	G Af, Pwr	3ma	23@0.5w		25	0.3	15	15	15	3a	5w	85	3°C/W
2N256	A PNPA	G Af, Pwr	3ma	25@1.2w		25	0.3	30	30	30	3a	5w	85	3°C/W
2N257	A PNPA	G Af, Pwr	2ma	35@2w		25	0.3	10	40	40	3a	14w	90	1.5°C/W
2N268	A PNPA	G Af, Pwr	2ma	33@1.2w		25	0.3	40	60	80	3a	14w	90	1.5°C/W
2N268A	A PNPA	G Pwr, Sw	2ma		20-80	25	0.3	20	60	80	3a	14w	90	1.5°C/W
2N297A	A PNPA	G Pwr, Sw	3ma		40-100	25	0.3	40	50	60	5a	13w	95	2°C/W
2N301	A PNPA	G Pwr, Sw	5ma	32@2.5w		25	0.3	12	30	40	3a	14w	90	1.5°C/W
2N301A	A PNPA	G Af, Pwr, Sw	5ma	36@2.5w		25	0.3	12	45	60	3a	14w	90	1.5°C/W
2N1146	A PNPA	G Af, Pwr, Sw	15ma		60-150	25	0.2	30	40	40	15a	25w	95	1°C/W
2N1146A	A PNPA	G Hi-Pwr, Sw	15ma		60-150	25	0.2	30	60	60	15a	25w	95	1°C/W
2N1146B	A PNPA	G Hi-Pwr, Sw	15ma		60-150	25	0.2	30	80	80	15a	25w	95	1°C/W
2N1146C	A PNPA	G Hi-Pwr, Sw	15ma		60-150	25	0.2	30	100	100	15a	25w	95	1°C/W
2N1147	B PNPA	G Hi-Pwr, Sw	15ma		60-150	25	0.2	30	40	40	15a	25w	95	1°C/W
2N1147A	B PNPA	G Hi-Pwr, Sw	15ma		60-150	25	0.2	30	60	60	15a	25w	95	1°C/W
2N1147B	B PNPA	G Hi-Pwr, Sw	15ma		60-150	25	0.2	30	80	80	15a	25w	95	1°C/W
2N1147C	B PNPA	G Hi-Pwr, Sw	15ma		60-150	25	0.2	30	100	100	15a	25w	95	1°C/W
CTP1104	A PNPA	G Af, Hi-Pwr	2ma	28@1.2w		25	0.3	10	40	40	3a	15w	85	1°C/W
CTP1108	A PNPA	G Af, Pwr	2ma	25@0.6w		25	0.3	10	20	20	3a	15w	85	1°C/W
CTP1109	A PNPA	G Af, Pwr	2ma	32@0.6w		25	0.3	10	20	20	3a	10w	90	2°C/W
CTP1111	A PNPA	G Af, Pwr	5ma	28@1.2w		25	0.3	40	60	80	3a	10w	90	2°C/W
CTP1112	A PNPA	G Pwr, Sw	2ma		10(min)	25	0.3	30	75	100	3a	10w	90	2°C/W
CTP1117	A PNPA	G Af, Pwr	2ma	35@0.4w		25	0.3	10	40	40	4a	14w	90	1.5°C/W
CTP1133	A PNPA	G Af, Pwr	5ma	30@1.2w		25	0.3	6	35	40	3a	14w	90	1.5°C/W

PC measured at 70°C - Mounting Base Temp.

TRANSISTORS

TYPE	CASE	CLASS	MAT	APP	TYPICAL OPERATION					MAXIMUM RATINGS								
					I _{CO} μa	I _{EO} μa	PG db	α or β	T °C	f _α ma	V _{EB} V	V _{CE} V	V _{CB} V	I _C ma	P _C mw	T _J °C	K °C/mw	
DELCO RADIO DIV., General Motors Corp., Kokomo, Indiana																		
2N173	A	PNPA	G	Af, B-Amp, Pwr, Sw	100	1ma						40	50	60			95	1°C/W
2N174	A	PNPA	G	Af, B-Amp, Pwr, Sw	100	1ma						60	-70	80			95	0.8°C/W
2N174A	A	PNPA	G	Pwr, Sw	100	1ma						60	70	80			95	0.8°C/W
2N277	A	PNPA	G	Af, B-Amp, Pwr, Sw	100	1ma						20	40	40			95	1°C/W
2N278	A	PNPA	G	Af, B-Amp, Pwr, Sw	100	1ma						30	45	50			95	1°C/W
2N297A	C	PNPA	G	Sw, Pwr,	12	0.5ma						40	40	60			95	2°C/W
2N392	B	PNPA	G	Af, Pwr	80							40	40	60			95	1.5°C/W
2N441	A	PNPA	G	Af, B-Amp, Pwr, Sw	100	1ma						20	40	40			95	1°C/W
2N442	A	PNPA	G	Af, B-Amp, Pwr, Sw	100	1ma						30	45	50			95	1°C/W
2N443	A	PNPA	G	Af, B-Amp, Pwr, Sw	100	1ma						40	50	60			95	1°C/W
2N553	B	PNPA	G	Pwr, Sw	12	0.2ma						40	-	80			95	1°C/W
2N665	C	PNPA	G	Pwr, Sw	12							40	40	80			95	2°C/W
2N1099	A	PNPA	G	Pwr, Sw	100	1						40	60	80			95	0.8°C/W
2N1100	A	PNPA	G	Pwr, Sw	100	1						80	-65	100			95	0.8°C/W
2N1159	B	PNPA	G	Pwr, Sw	65							20	-60	80			95	1.2°C/W
2N1160	B	PNPA	G	Pwr, Sw	65							20	-60	80			95	1.2°C/W
2N1168	B	PNPA	G	Af, Pwr	2							20	50	50			95	1.5°C/W
2N1172	D	PNPA	G	Af, Pwr								20	-30	40			95	15°C/W
FAIRCHILD SEMICONDUCTOR CORP., 844 Charleston Rd., Palo Alto, Calif.																		
2N696	A	NPNm	Si	B-Amp, Pwr, if, rf, Sw	1 ¹		172		20-60 ³	150	5	40 ⁴	60	500		2w	175	75
2N697	A	NPNm	Si	B-Amp, Pwr, if, rf, Sw	1 ¹		172		40-120 ³	150	5	40 ⁴	60	500		2w	175	75
2N1131	A	NPNm	Si	B-Amp, Pwr, if, rf, Sw	1 ¹		172		15-45 ³	80	-5	30 ⁴	40	600		2w	175	75°C/W
2N1132	A	NPNm	Si	B-Amp, Pwr, if, rf, Sw	1		172		30-90 ³	80	-5	30 ⁴	40	600		2w	175	75°C/W
1. Max. @ 30v. 2. CE neutralized 30mc. 3. hef 4. Base to emitter resistance.																		
GENERAL ELECTRIC CO., Semi-conductor Dept., Syracuse, N. Y.																		
2N43	A	PNPA	G	Af	-8	-4				25	1.3	-5	-30	-45	-300		85	
2N44	A	PNPA	G	Af	-8	-4				25	1.0	-5	-30	-45	-300		85	
2N78	B	NPNG	G	rf, if	0.7		30			25	9	15	15	15	20	65	85	
2N123	C	PNPA	G	Sw	-2	-2				25		-10	-15	-20	-125		85	
2N167	B	NPN	G	Sw	0.6	0.35				25		5	30	30	75	65	85	0.8
2N168A	B	NPNG	G	if, rf	0.5		3			25	8		15	15	1	65	85	0.9
2N169	B	NPNG	G	if	0.5		27			25	455kc		15	15	-20	65	85	0.9
2N186	C	PNP	G	Af, B-Amp	16	10	28			25	0.8	-5	-25	-25	200	100	60	0.33
2N186A	C	PNP	G	Af, B-Amp	16	10	30			25	0.8	-5	-25	-25	200	200	75	0.25
2N187	C	PNP	G	Af, B-Amp	16	10	30			25	1	-5	-25	-25	200	100	60	0.33
2N187A	C	PNP	G	Af, B-Amp	16	10	32			25	1	-5	-25	-25	200	200	75	0.25
2N188	C	PNP	G	Af, B-Amp	16	10	32			25	1.2	-5	-25	-25	200	100	60	0.33
2N188A	C	PNP	G	Af, B-Amp	16	10	34			25	1.2	-5	-25	-25	200	200	75	0.25
2N189	C	PNPA	G	Af, Pwr	16		37			25	0.8	-25		50	75	60	0.5	
2N190	C	PNPA	G	Af, Pwr	16		39			25	1.0	-25		50	75	60	0.5	
2N191	C	PNPA	G	Af, Pwr	16		41			25	1.0	-25		50	75	60	0.5	
2N192	C	PNPA	G	Af, Pwr	16		43			25	1.5	-25		50	75	60	0.5	
2N241	C	PNP	G	Af, B-Amp			35			25	1.3	-5	-25	-25	200	100	60	0.3
2N241A	C	PNP	G	Af, B-Amp			35			25	1.3	-5	-25	-25	200	200	75	0.25
2N265	C	PNPA	G	Af, Pwr	16		45			25	1.5	-25	-5	50	75	60	0.5	
2N292	B	NPNG	G	if, amp						25	5	15	15	-20	65	85	0.9	
2N293	B	NPNG	G	if, amp						25	8	15	15	-20	65	85	0.9	
2N319	D	PNPA	G	Af	-16	-10				25	2	-3	-1	-5		85		
2N320	D	PNPA	G	Af	-16	-10				25	2.5	-3	-1	-5		85		
2N321	D	PNPA	G	Af	-16	-10				25	3.0	-3	-1	-5		85		
2N322	D	PNPA	G	Af, Pwr	-16					25	2	-16	-16	-100	140	60	0.25	
2N323	D	PNPA	G	Af, Pwr	-16					25	2.5	-16	-16	-100	140	60	0.25	
2N324	D	PNPA	G	Af, Pwr	-16					25	3	-16	-16	-100	140	60	0.25	
2N332	E	NPNG	Si	Af, if, Sw			35			25	10	1	45	25	150	175		
2N333	E	NPNG	Si	Af, if, Sw			39			25	12	1	45	25	150	175		
2N334	E	NPNG	Si	Af, if, Sw			40			25	13	1	45	25	150	175		
2N335	E	NPNG	Si	Af, if, Sw			42			25	14	1	45	25	150	175		
2N336	E	NPNG	Si	Af, if, Sw			43			25	15	1	45	25	150	175		
2N337	E	NPNG	Si	Af, rf, Sw						25	30	1	45	20	125	150	1	
2N338	E	NPNG	Si	Af, rf, Sw						25	45	1	45	20	125	150	1	
2N394	E	PNPA	G	Sw	-2.5	-2				25	9	-20	-10	-30	-200	150	85	
2N395	E	PNPA	G	Sw						25	4.5	-20	-15	-30	-200	200	100	
2N396	E	PNPA	G	Sw						25	8	-20	-20	-30	-200	200	100	
2N397	E	PNPA	G	Sw						25	12	-20	-15	-30	-200	200	100	
2N404	E	PNPA	G	Sw						25	8	-12	-24	-25	-100	120	85	
2N448	B	NPNG	G	if						25	5	15	15	-20	65	85	0.9	
2N449	B	NPNG	G	if	0.5		24.5			25	8	15	15	-20	65	85		
2N450	C	PNPA	G	Sw	-6	-6				25	5	-10	-12	-20	-125	150	85	
2N454	F	NPND	Si	Pwr						25	2kc	10	65	65	500	85w	150	

TRANSISTORS

TYPE	CASE	CLASS	MAT	APP	P _{AV}	BV _{BB}	I _E	J _{STG}	η	f _{MAX}	R _{BBO}	V _{E(SAT)}	I _{B2(MOD)}	I _{EO}	@V _{EB}	T _J	K °C/mw
2N489*	F	PN	Si		350	45	50	200	0.56	0.9	5.6	2.2	12	1	60	200	0.5
2N490*	F	PN	Si		350	55	50	200	0.56	0.7	7.5	2.4	12	1	60	200	0.5
2N491*	F	PN	Si		350	45	50	200	0.62	0.8	5.6	2.6	12	1	60	200	0.5
2N492*	F	PN	Si		350	55	50	200	0.62	0.7	7.5	2.8	12	1	60	200	0.5
2N493*	F	PN	Si		350	45	50	200	0.68	0.7	5.6	3.0	12	1	60	200	0.5
2N494*	F	PN	Si		350	55	50	200	0.68	0.65	7.5	3.2	12	1	60	200	0.5

GENERAL ELECTRIC CO., (Cont.) Semi-conductor Dept., Syracuse, N. Y.

TYPE	CASE	CLASS	MAT	APP	TYPICAL OPERATION					MAXIMUM RATINGS								
					I _{CO} μa	I _{EO} μa	PG db	α or β	T °C	f _α ma	V _{EB} v	V _{CE} v	V _{CB} v	I _C ma	P _C mw	T _J °C	K °C/mw	
2N508	D	PNPA	G	Af, Pwr	-16					25	3.5	-16	-16	-100	140	60	0.25	
2N518	C	PNPA	G	Sw	-6	-6				25	10	-30	-12	-125	150	85	0.4	
2N524	D	PNPA	G	Sw	-5	-4				25	2	15	-30	-45	-500	225	85	0.27
2N525	D	PNPA	G	Sw	-5	-4				25	2.5	15	-30	-45	-500	225	85	0.27
2N526	D	PNPA	G	Sw	-5	-4				25	3	15	-30	-45	-500	225	85	0.27
2N527	D	PNPA	G	Sw	-5	-4				25	3.3	15	-30	-45	-500	225	85	0.27
2N634	D	NPNA	G	Sw	5					25	8	15	20	20	300	150	85	0.4
2N635	D	NPNA	G	Sw	5					25	12	15	20	20	300	150	85	0.4
2N636	D	NPNA	G	Sw	5					25	17	15	20	20	300	150	85	0.4
2N1056	A	PNPA	G	Sw	-25	-16				25	1	-15	-50	-70	-300	240	85	0.25
2N1057	A	PNPA	G	Sw	-16	-10				25	3	-5	-45	-45	-300	240	85	0.25
2N1086	B	NPNG	G	OSC	0.5					25		9	9	-20	65	85	0.9	
2N1086A	B	NPNG	G	OSC	0.5					25		9	9	-20	65	85	0.9	
2N1087	B	NPNG	G	OSC	0.5					25		9	9	-20	65	85	0.9	
2N1097	D	PNPA	G	Af						25		-16	-16	-100	140	60	0.25	
2N1098	D	PNPA	G	Af						25		-16	-16	-100	140	60	0.25	
2N1121	B	NPNG	G	if	0.5		29.5			25	455kc	15	15	-20	65	85	0.9	
2N1144	A	PNPA	G	Af						25		-16	-16	-100	140	60	0.25	
2N1145	A	PNPA	G	Af						25		-16	-16	-100	140	60	0.25	
3N36**	G	NPN	G	Af	3		11.5			25	50	2	6	7	20	30	85	2
3N37**	G	NPN	G	Af	3		9			25	90	2	6	7	20	30	85	2
ZJ47-1		NPNG	Si	rf			20			25		1		45	20	125	150	1
4JD1A17	B	PNP	G	Af, Sw	8	4	39		43		1.1	-30	-45	-300	155	100	0.33	
4JD1B21	B	PNP	G	Af, Sw	5	5			12.5		0.7	-30	-30	-1a	200	85	0.33	
4JD1B31	B	PNP	G	Af, Sw	5	5			17		0.7	-30	-30	-1a	200	85	0.2	
4JD1B41	B	PNP	G	Af, Sw	5	5			25		0.7	-30	-30	-1a	200	85	0.2	


GENERAL TRANSISTOR CORP., 91-27 138th Place, Jamaica 35, N. Y.


2N432	C	PNPA	G	Af, Sw	8	8				50	25	1.3	45	30	45	300	150	100 ⁴	0.5
2N43A2	C	PNPA	G	Af, Sw	8	8				30-60	25	1	45	30	45	300	150	100 ⁴	0.5
2N442	C	PNPA	G	Af, Sw	8	8				18-43	25	.05-.03	45	30	45	300	150	100 ⁴	0.5
2N452	C	PNPA	G	Af, Sw	8	8				15	25		45	30	45		150	100 ⁴	0.5
2N311	A	PNPA	G	Af, Sw	4	4				25-75	25		15	15	45		150	100 ⁴	0.5
2N312	A	NPNA	G	Af, Sw	4	4				25-75	25		15	15	15		150	100 ⁴	0.5
2N315	A	PNPA	G	Sw	2	2				15-30	25	5	20	20	500	100	85 ⁴	0.5	
2N315A	A	PNPA	G	Sw	2	2				20-50	25	5	30	20	30	500	150	100 ⁴	0.5
2N316	A	PNPA	G	Sw	2	2				20-50	25	12	15	20	500	100	85 ⁴	0.5	
2N316A	A	PNPA	G	Sw	2	2				20-50	25	12	30	18	30	500	150	100 ⁴	0.5
2N317	A	PNPA	G	Sw	2	2				20-60	25	20	10	20	500	100	85 ⁴	0.5	
317A	A	PNPA	G	Sw	2	2				20-60	25	20	20	12	25	500	150	100	0.5
2N331	A	PNPA	G	Af	3	3				30-70	25	0.5	12	30		75	85 ⁴	0.8	
2N356	A	NPNA	G	Sw	3	3				20-50	25	3	20	20	500	100	85 ⁴	0.5	
2N356A	A	NPNA	G	Sw	3	3				20-50	25	3	30	25	30	500	150	100 ⁴	0.5
2N357	A	NPNA	G	Sw	3	3				20-50	25	6	18	20	500	100	85 ⁴	0.5	
2N357A	A	NPNA	G	Sw	3	3				25-75	25	6	30	25	30	500	150	100 ⁴	0.5
2N358	A	NPNA	G	Sw	3	3				20-50	25	9	15	20	500	100	85 ⁴	0.5	
2N358A	A	NPNA	G	Sw	3	3				20-75	25	9	30	20	30	500	150	100 ⁴	0.5
2N404	A	PNPA	G	Sw	3	2				50	25	4.5	12	24	25		150	100 ⁴	0.5
2N425	A	PNPA	G	Sw	5	5				20-40	25	4	20	30	30		150	100 ⁴	0.5
2N426	A	PNPA	G	Sw	5	5				30-60	25	6	20	25	30		150	100 ⁴	0.5
2N427	A	PNPA	G	Sw	4	4				40-80	25	11	20	20	30		150	100 ⁴	0.5
2N428	A	PNPA	G	Sw	3	3				80	25	17	20	15	30		150	100 ⁴	0.5
2N438	A	NPNA	G	if, rf, Sw	5	5				70	25	3	25	25	30		150	100 ⁴	0.5
2N439	A	NPNA	G	if, rf, Sw	5	5				120	25	7	25	20	30		150	100 ⁴	0.5
2N440	A	NPNA	G	if, rf, Sw	3	3				150	25	11	25	15	30		150	100 ⁴	0.5
2N444	A	NPNA	G	if, rf, Sw	2	2				15	25	1	15	15	15		100	85 ⁴	0.6
2N444A	A	NPNA	G	if, rf, Sw	4	3				25	25	1	10	15	40		150	100 ⁴	0.5
2N445	A	NPNA	G	if, rf, Sw	2	2				35	25	3	12	15			100	85 ⁴	0.6
2N445A	A	NPNA	G	if, rf, Sw	3	2				75	25	4	10	18	30		150	100 ⁴	0.5


Transitron offers ...


INDUSTRY'S MOST COMPLETE LINE


SILICON TRANSISTORS

JAN TRANSISTOR		Minimum Current Gain (B)	Maximum Collector Voltage (Volts)	Typical Cut-off Frequency (MC)	Maximum I_{CO} @ 25°C and V_C Max. (μ a)	FEATURES
	JAN-2N118	10	30	10	1	• Only Jan Silicon Transistor

SMALL SIGNAL		Minimum Current Gain (B)	Maximum Collector Voltage (Volts)	Typical Cut-off Frequency (MC)	Maximum I_{CO} @ 25°C and V_C Max. (μ a)	FEATURES
	2N333	18	45	7	50	<ul style="list-style-type: none"> • Low I_{CO} • Operation to 175°C • 200 mw Power Dissipation
	2N335	37	45	10	50	
	2N480	40	45	11	.5	
	2N543	80	45	15	.5	
	ST905	36	30	10	10	

HIGH SPEED SWITCHING		Typical Cut-off Freq. (MC)	Maximum Collector Voltage (Volts)	Maximum Collector Saturation Resistance (ohms)	Max. Power Dissipation @ 100°C ambient (MW)	FEATURES
	2N1139	150	15	60	500	<ul style="list-style-type: none"> • High Frequency Operation • Low Saturation Resistance • Low I_{CO}
	2N337	20	45	150	50	
	2N338	30	45	150	50	

MEDIUM POWER		Max. Power Dissipation @ 25°C Case (Watts)	Maximum Collector Voltage (Volts)	Minimum DC Current Gain (B)	Typical Rise Time (μ sec)	Typical Fall Time (μ sec)	FEATURES
	2N545	5	60	15	.3	.5	<ul style="list-style-type: none"> • Fast Switching • High V_C • Rugged Construction
	2N547	5	60	20			
	2N498	4	100	12			
	2N551	5	60	20			
	2N1140	3	40	20	.2	.1	

HIGH POWER		Maximum Power Dissipation @ 25°C Case (Watts)	Minimum DC Current Gain (B)	Typical Collector Saturation Resistance (Ohms)	Maximum Collector Voltage (Volts)	FEATURES
	ST410	85	15 @ 2 Amps	1.5 @ 2 Amps	60	<ul style="list-style-type: none"> • High Current Handling Ability • Low Saturation Resistance • Rugged Construction
	ST401	85	20 @ 2 Amps	1.5 @ 2 Amps	45	
	2N389	85	12 @ 1 Amp	3.5 @ 1 Amp	60	
	2N424	85	12 @ 1 Amp	6.0 @ 1 Amp	80	

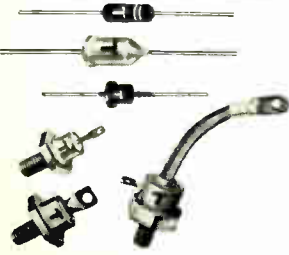
Write for Bulletins: TE-1353 and TE-1355

SILICON DIODES

FEATURES	Fast Switching and High Frequency Types Ratings @ 25°C				Military and High Conductance Types Ratings @ 150°C			
	Max. Inverse Voltage (Volts)	Max. Average Fwd. Current (ma)	Inverse Recovery Time (μ sec)		Max. Inverse Voltage (Volts)	Max. Average Fwd. Current (ma)	Max. Inverse Current (μ a) @ V	
<ul style="list-style-type: none"> • Recovery Times Under 15 μsec • High Conductance Combined With Fast Switching • Subminiature Size • High Inverse Resistance 	1N808	100	100	.3	JAN 1N457	60	25	5 @ 60
	1N809	200	100	.3	JAN 1N458	125	25	5 @ 125
	1N658	120	200	.3	JAN 1N459	175	25	5 @ 175
	1N659	55	100	.3	1N485B	180	50	5 @ 175
	1N643	110	100	.3	1N488A	380	50	25 @ 380
	JAN 1N251	30	75	.15	1N464	175	40	30 @ 125

Write for Bulletin TE-1350

SILICON RECTIFIERS

Ratings @ 150°C Case Temperature		Peak Recurrent Inverse Voltage (Volts)	Maximum Average Forward Current (ma)	Maximum Inverse Current (ma)	FEATURES
	Subminiature Glass	1N689 1N649	600 150	0.2 0.2 (@ 25°C)	<ul style="list-style-type: none"> • Reliability at High Temperatures • High Efficiency • Rugged Construction • Hermetic Sealing • Low Thermal Resistance
	Miniature	TJ60A TJ30A	600 300	200 200	
	Axial Leads	SL715 1N547	1500 600	100 250	
	Military	JAN 1N256	570	200	
	Stud Mounted	TM155 TM67	1500 600	400 3000	
	Medium Power	TR402 TR601	400 600	Amps 20 10	
	High Power	TH402B	400	50	

Write for Bulletin TE-1351

SILICON REGULATORS AND REFERENCES

		Voltage Range (Volts)	Maximum Dynamic Resistance (ohms)	Maximum Current @ 25°C (ma)	Maximum Current @ 125°C (ma)	FEATURES <ul style="list-style-type: none"> • Long-term stability • Operation up to 150°C • Small size, easy mounting • Hermetically sealed
	Subminiature — SV-5	4.3-5.4	55	50	10	
	Miniature — SV-815	13.5-18	120	40	8	
	Power — SV-924	20-27	8	55°C (amps)*	(ma)*	
	Stabistor — SG-22	.64	40	150	25	
	Reference — SV-3176	8-8.8	15	Temp. Coefficient ±.001%/°C		
Ref.-Amp — 3N44	8.3-9.8		±.002%/°C			

*Case temperature ratings

SILICON CAPACITORS

Write for Bulletin TE-1352

	Ultra High Frequency Types — Ratings (at 25°C)						FEATURES <ul style="list-style-type: none"> • Subminiature Size • High Q • High Temperature Operation 	
		Cut-off Freq. (mc)	Capacity (μf) @ V Max.	@ -0.1V	Q @ -4V @ 50Mc	@ 100Mc		Maximum Working Voltage
	SCH-51	5000	.35	2	100	50		10
SCH-52	5000	.8	4	100	50	7		
	High Frequency Types							
					Q @ -4V At 5mc	At 50mc		
	SC-1		4.4	24	350	35	22	
	SC-5		25	120	350	35	11	
	SC-15		120	360	350	35	6	

Write for Bulletin PB-45

GERMANIUM DIODES

Specifications and Ratings at 25°C		Forward Current @ +1V (ma)	Inverse Current at Specified Voltage (μa @ V)	Max. Oper. Voltage (volts)	Description
	JAN-1N270	200	100 @ -50	80	JAN TYPES
	JAN-1N277	100	250 @ -50 @ 75°C 75 @ -10	100	
	JAN-1N281	40	500 @ -50 30 @ -50	60	
	JAN-1N126	5	500 @ -50 30 @ -10	60	COMPUTER TYPES
	JAN-1N198	5	250 @ -50 @ 75°C 75 @ -10	50	
	1N283	200	20 @ -10	20	
FEATURES <ul style="list-style-type: none"> • Milli Microsecond Switching • Superior Forward Conductance • High Inverse Resistance • Uniformity and Stability • Gold Bonded Construction 	T16G	40	100 @ -50	60	HI-TEMPERATURE TYPES
	1N278	20	125 @ -50 @ 75°C	50	
	T22G	40	20 @ -10 @ 75°C	15	HI-RESISTANCE TYPES
	T9G	100	20 @ -50 2 @ -10	60	
	1N67A	5	50 @ -50 5 @ -5	80	
T8G	100	20 @ -100 5 @ -10	100		
S570G	10		30 @ 6	Recovery Time .002 (μsec)	MILLI-MICROSECOND SWITCHING

Write for Bulletin TE-1300 & TE-1319

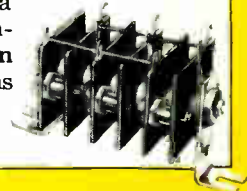
GERMANIUM COMPUTER TRANSISTORS

		Minimum Current Gain (B)	Maximum Collector Voltage (volts)	Typical Cutoff Freq. (MC)	FEATURES <ul style="list-style-type: none"> • High Frequency Switching • Low Saturation Resistance • Uniform Input Characteristics
	2N427	40	15	8	
	2N428	60	12	13	

Your local authorized TRANSITRON DISTRIBUTOR now carries in-stock inventories for immediate delivery.

Transitron's TD series of rectifier stacks offer a wide range of ratings in seven standard circuit configurations. High voltage cartridges, quads, plug-in assemblies, and many other special encapsulations are also available. Your inquiries are invited.

Write for Bulletin TE-1342.



Transitron

electronic corporation • wakefield, massachusetts



Circle 75 on Inquiry Card

TRANSISTORS

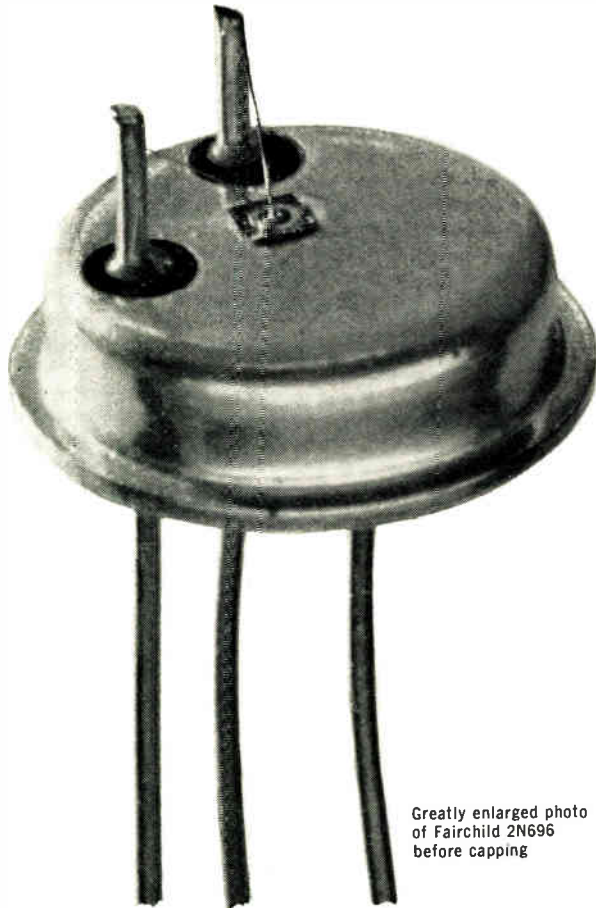
TYPE	CASE	CLASS	MAT	APP	TYPICAL OPERATION					MAXIMUM RATINGS						
					I_{CO} μa	I_{EO} μa	PG db	ω_{or} β	T $^{\circ}C$	f_{α} mc	V_{EB} v	V_{CE} v	V_{CB} v	I_C ma	P_C mw	T_J $^{\circ}C$	K $^{\circ}C/mw$

GENERAL TRANSISTOR CORP., (Cont.) 91-27 138th Place, Jamaica 35, N. Y.

2N446	A	NPNA	G	if, rf, Sw	2	2			60	25	6		10	15		100	85	0.6
2N446A	A	NPNA	G	if, rf, Sw	3	2			120	25	6	10	15	30		150	100 ⁴	0.5
2N447	A	NPNA	G	if, rf, Sw	2	2			125	25	10		6	15		100	85 ⁴	0.6
2N447A	A	NPNA	G	if, rf, Sw	3	2			150	25	10	10	12	30		150	100 ⁴	0.5
2N469	E	PNPA	G	Sw	5	5			50	25	1		6	6		50	75 ⁴	1.0
2N519	A	PNPA	G	if, rf, Sw	2	2			25	25	1.5		15	15		100	85 ⁴	0.6
2N519A	A	PNPA	G	if, rf, Sw	2	2			25	25	2		18	25		150	100 ⁴	0.5
2N520	A	PNPA	G	if, rf, Sw	2	2			40	25	5		12	15		100	85 ⁴	0.6
2N520A	A	PNPA	G	if, rf, Sw	2	2			100	25	5	10	15	25		150	100 ⁴	0.5
2N521	A	PNPA	G	if, rf, Sw	2	2			70	25	10		10	15		100	85 ⁴	0.6
2N521A	A	PNPA	G	if, rf, Sw	2	2			150	25	10	10	12	25		150	100 ⁴	0.5
2N522	A	PNPA	G	if, rf, Sw	2	2			120	25	10		8	15		100	85 ⁴	0.6
2N522A	A	PNPA	G	if, rf, Sw	1	1			200	25	16	10	10	25		150	100 ⁴	0.5
2N523	A	PNPA	G	if, rf, Sw	2	2			200	25	21		6	15		100	85 ⁴	0.6
2N523A	A	PNPA	G	if, rf, Sw	1	1			300	25	22		6			150	100 ⁴	0.5
2N529	A	both	G	Amp, Sw	3				15-20	25	2.5		15	15		100	85 ⁴	0.5
2N530	A	both	G	B-Amp, Sw	3				25-25	25	3		15	15		100	85 ⁴	0.5
2N531	A	both	G	B-Amp, Sw	3				25-30	25	3.5		15	15		100	85 ⁴	0.5
2N532	A	both	G	B-Amp, Sw	3				30-35	25	4		15	15		100	85 ⁴	0.5
2N533	A	both	G	B-Amp, Sw	3				35-40	25	4.5		15	15		100	85 ⁴	0.5
2N56	C	PNPA	G	Af, Sw	3	3			25	25	0.8	10	25	30	300	150	85 ⁴	0.4
2N564	A	PNPA	G	Af, Sw	3	3			25	25	0.8	10	25	30	300	120	85 ⁴	0.5
2N565	C	PNPA	G	Af, Sw	3	3			55	25	1	10	25	30	300	150	85 ⁴	0.4
2N566	A	PNPA	G	Af, Sw	3	3			55	25	1	10	25	30	300	120	85 ⁴	0.5
2N567	C	PNPA	G	Af, Sw	3	3			100	25	1.5	10	25	30	300	150	85 ⁴	0.4
2N568	A	PNPA	G	Af, Sw	3	3				25	1.5	10	25	30	300	120	85 ⁴	0.5
2N269	C	PNPA	G	Af, Sw	3	3			150	25	2	10	15	30	300	150	85 ⁴	0.4
2N570	A	PNPA	G	Af, Sw	3	3			150	25	2	10	15	30	300	120	85 ⁴	0.5
2N571	C	PNPA	G	Af, Sw	3	3			200	25	3	10	10	30	300	150	85 ⁴	0.4
2N572	A	PNPA	G	Af, Sw	3	3			200	25	3	10	10	30	300	120	85 ⁴	0.5
2N592 ¹	A	PNPA	G	Sw	2				25	25	0.4	20	20	20		150	100 ⁴	0.5
2N593 ¹	A	PNPA	G	Sw	2				35	25	0.6	35	25	35		150	100 ⁴	0.5
2N594 ¹	A	PNPA	G	Sw	2				35	25	2	20	20	20		100	85 ⁴	0.6
2N595 ¹	A	PNPA	G	Sw	2				50	25	4	20	15	15		100	85 ⁴	0.6
2N596 ¹	A	PNPA	G	Sw	2				70	25	6	20	10	10		100	85 ⁴	0.6
2N602	A	PNPA	G	if, rf, Sw	3	5			20-80	25	25	1	20	20	50	120	85 ⁴	0.5
2N603	A	PNPA	G	if, rf, Sw	3	5			30-100	25	35	1	30	30	75	120	85 ⁴	0.5
2N604	A	PMPD	G	if, rf, Sw	3	5			40-140	25	45	2	30	30	100	120	85 ⁴	0.5
2N605	A	PMPD	G	Af, if, rf, Sw	2	5	28		13	25	25		30	30	120	120	85 ⁴	0.5
2N606	A	PMPD	G	Af, if, rf, Sw	2	5	28		18	25	30		30	30	120	120	85 ⁴	0.5
2N607	A	PMPD	G	Af, if, rf, Sw	2	5	33		25	25	35		30	30	120	120	85 ⁴	0.5
2N608	A	PMPD	G	Af, if, rf, Sw	2	5	38		30	25	40		30	30	120	120	85 ⁴	0.5
2N1000	A	NPNA	G	Sw	10	10			50	25	8	40	30	40		150	100 ⁴	0.5
2N1012	A	NPNA	G	Sw	7	7			50	25	4	35	22	40		150	100 ⁴	0.5
2N1065	A	PMPD	G	Sw	3	5			20-80	25	30	1	20	40		120	85 ⁴	0.5
2N1219	A	PNPA	Si	Sw	.05	.05			20	25	6		25	30	100	150	150 ⁴	0.83
2N1220	A	PNPA	Si	Sw	.05	.05			10	25	3		25	30	100	150	150 ⁴	0.83
2N1221	A	PNPA	Si	Af, if, rf	.05	.05			20	25	6		25	30	150	150	150 ⁴	0.83
2N1222	A	PNPA	Si	Af, if, rf	.05	.05			10	25	3		25	30	100	150	150 ⁴	0.83
2N1223	A	PNPA	Si	Af, Sw	1	1			10	25	2		40	40	100	150	150 ⁴	0.83
GT20 ³	A	PNPA	G	Af	5	5	40		30-49	25			25	25		150	100 ⁴	0.5
GT34 ³	A	PNPA	G	Af	5	5	32		10-30	25			25	25		150	100 ⁴	0.5
GT34HV ³	A	PNPA	G	Af, Sw			36		10-45	25				50		150	100 ⁴	0.5
GT34N ³	A	PNPA	G	Af, Sw					10-34	25				100		150	100 ⁴	0.5
GT34S	A	PNPA	G	Af, Sw	5	5	32		10-30	25			30	40		150	100 ⁴	0.5
GT35	A	NPNA	G	Af, Sw	5		40		20-80	25			15	25		150	100 ⁴	0.5
GT74 ³	A	PNPA	G	Af	5		42		50-99	25			25	25		150	100 ⁴	0.5
GT75 ³	A	PNPA	G	Af	5		44		100-199	25			15	25		150	100 ⁴	0.5
GT81 ³	A	PNPA	G	Af	5		42		50-99	25				25		150	100 ⁴	0.5
GT81HS	A	PNPA	G	Af	5		42		50-99	25				25		200	100 ⁴	0.5
GT82 ³	A	PNPA	G	Af	5		46		100-199	25				25		150	100 ⁴	0.5
GT109 ³	A	PNPA	G	Af, B-Amp	5		42		80-140	25				25		150	100 ⁴	0.5
GT122	A	PNPA	G	Af, Sw	5		44		90	25	2		15	25		150	100 ⁴	0.5
GT123	A	PNPA	G	Sw	3	3			30-150	25	6		15	20		150	100 ⁴	0.5
GT167	A	NPNA	G	Sw	5	5			65	25	6			25		150	100 ⁴	0.5
GT222	A	PNPA	G	Af	10		30		20	25			15			125	85 ⁴	0.5
GT229	A	NPNA	G	Sw	10		30		20	25			15			100	85 ⁴	0.6
GT758	A	PNPA	G	Sw	3	3	20		15	25	0.5		20	20		100	85 ⁴	0.6
GT759R	A	PNPA	G	if, rf	6		25		25	25	2		10	10		90	85 ⁴	0.55
GT760R	A	PNPA	G	if, rf	6		28		30-180	25	6		10	15		90	85 ⁴	0.55

FAIRCHILD SILICON MESA TRANSISTORS IN BOTH POLARITIES

Four models of great importance to the computer-circuit designer



Greatly enlarged photo of Fairchild 2N696 before capping

PNP

Important — because for high-speed switching, Fairchild's 2N696, 2N697, 2N1131 and 2N1132 are the most advanced transistors available. They are solid-state diffusion devices, a type that is certain to dominate computer-circuit applications in the future because of its superior combination of speed, power and reliability. Fairchild Semiconductor Corporation was first to offer solid-state diffused NPN silicon transistors of such high performance — and again first in offering PNP silicon transistors closely matching these NPN transistors in both high frequency and DC characteristics. All are in quantity production and available from stock.

Speed and power in combination

80 milli-micro-second rise time is typical. Two-watts dissipation at 25° C. and 10 ohms maximum saturation resistance provide high-current capability even at elevated junction temperatures.

Utmost reliability

Storage at 300° C. in excess of 1000 hours caused no serious changes in these transistors, assuring a large safety factor at operating temperatures. Mesa construction as shown in enlarged photograph provides extraordinary ruggedness by eliminating suspension of any significant masses. Units have survived 22,000g, 4-millisecond duration shock test without damage.

NPN and PNP closely matched

The circuit designer need no longer be limited by unavailability of PNP transistors. Fairchild has them. And they are closely matched to the NPN transistors in DC characteristics, affording opportunities for circuit designs based on complementary symmetry.

NPN

ABSOLUTE MAXIMUM RATINGS (25° C.)

V _{CE}	Collector to emitter voltage	30v
V _{CB}	Collector to base voltage	40v
V _{EB}	Emitter to base voltage	5v
Total dissipation at case temperature 25° C.		2 watts
at case temperature 100° C.		1 watt

ELECTRICAL CHARACTERISTICS (25° C.)

SYMBOL	CHARACTERISTIC	MIN.	TYPICAL	MAX.	TEST CONDITIONS
h _{FE}	D. C. pulse current gain	2N1131	15	45	I _C =150mA V _C =10V
		2N1132	30	90	
V _{BE SAT.}	Base saturation voltage	1.0V	1.5V		I _C =150mA I _B =15mA
V _{CE SAT.}	Collector saturation voltage	0.9V	1.5V		I _C =150mA I _B =15mA
h _{fe}	Small signal current gain at f=20mc	2.5			I _C =50mA V _C =10V
C _{ob}	Collector capacitance	35μmf	45μmf		I _E =0mA V _C =10V
I _{CB}	Collector cutoff current	.01μA	1.0μA		V _C =30V T=25° C.
		5.0μA	100μA		V _C =30V T=150° C.

ABSOLUTE MAXIMUM RATINGS (25° C.)

V _{CE}	Collector to emitter voltage	40v
V _{CB}	Collector to base voltage	60v
V _{EB}	Emitter to base voltage	5v
Total dissipation at case temperature 25° C.		2 watts
at case temperature 100° C.		1 watt

ELECTRICAL CHARACTERISTICS (25° C.)

SYMBOL	CHARACTERISTIC	MIN.	TYPICAL	MAX.	TEST CONDITIONS
h _{FE}	D. C. pulse current gain	2N696	20	60	I _C =150mA V _C =10V
		2N697	40	120	
V _{BE SAT.}	Base saturation voltage	1.0V	1.3V		I _C =150mA I _B =15mA
V _{CE SAT.}	Collector saturation voltage	0.5V	1.5V		I _C =150mA I _B =15mA
h _{fe}	Small signal current gain at f=20mc	5			I _C =50mA V _C =10V
C _{ob}	Collector capacitance	20μmf	35μmf		I _E =0mA V _C =10V
I _{CB}	Collector cutoff current	.01μA	1.0μA		V _C =30V T=25° C.
		5.0μA	100μA		V _C =30V T=150° C.

For specification sheets, write Dept. J-6

844 CHARLESTON ROAD • PALO ALTO, CALIFORNIA • DA 6-6695



TRANSISTORS

TYPE	CASE	CLASS	MAT	APP	TYPICAL OPERATION					MAXIMUM RATINGS						
					I_{CO} μa	I_{EO} μa	PG db	α or β	T $^{\circ}C$	f_{α} ma	V_{EB} v	V_{CE} v	V_{CB} v	I_C ma	P_C mw	T_J $^{\circ}C$	K $^{\circ}C/mw$

GENERAL TRANSISTOR CORP. (Cont.) 91-27 138th Place, Jamaica 35, N. Y.

GT761R	A	PNPA	G	if, rf	6		32	50-250	25	10	10	15		90	85 ⁴	0.55
GT762R	A	PNPA	G	if, rf	6		34	120	25	17	6	10		90	85 ⁴	0.55
GT792	A	NPNA	G	Sw	3			37-160	25	6		20		100	85 ⁴	0.6
GT792R	A	NPNA	G	if, rf	6		30		25	5-7	10	10		125	85 ⁴	0.5
GT903	A	NPNA	G	Sw	10	5		35-70	25		20	20		150	100 ⁴	0.5
GT904	A	NPNA	G	Sw	10	5		40	25	4	15	20		150	100 ⁴	0.5
GT905	A	NPNA	G	Sw	10	5		20-40	25		20	20		150	100 ⁴	0.5
GT947	A	NPNA	G	Sw	5	5		50	25		15	15		150	100 ⁴	0.5
GT948	A	NPNA	G	Sw	5	5		40	25	5	15	20		150	100 ⁴	0.5
GT948R	A	NPNA	G	if, rf	6		25		25	3-5	10	10		125	85 ⁴	0.5
GT949	A	NPNA	G		10	10		30	25	1	20	30		150	100 ⁴	0.5
GT1079	A	NPNA	G	Sw	5	5		20-60	25		15	20		150	100 ⁴	0.5
GT1200	A	NPNA	G	Af, Sw	10	10		25	25		20	90	90	120	85 ⁴	0.5

1. Specifications identical in both directions. 2. Also available in case #A (JEDEC #30) TO-9. 3. Also available in case #C. 4. Storage temperature.

HUGHES AIRCRAFT CO., Semiconductor Div., Los Angeles, 45, Calif.

2N356	B	NPN	G	Sw	5	5		30	25	4	18	20	100	150	85	0.4
2N357	B	NPN	G	Sw	5	5		30	25	7	15	20	200	150	85	0.4
2N358	B	NPN	G	Sw	5	5		30	25	8	12	20	300	150	85	0.4
2N388	B	NPN	G	Sw	5	5		80	25	8	20	20	300	150	85	0.4
2N404	B	PNP	G	Sw	-5	2		40	25	12	24	25	100	150	85	0.4
2N425	B	PNP	G	Sw	2	1.5		30	25	4	20	30	400	150	85	0.4
2N426	B	PNP	G	Sw	2	1.5		40	25	6	18	30	400	150	85	0.4
2N427	B	PNP	G	Sw	2	1.5		55	25	11	15	30	400	150	85	0.4
2N428	B	PNP	G	Sw	2	1.5		80	25	17	12	30	400	150	85	0.4
2N1228	B	PNPA	Si	Af	.05	0.05		14	25	1.0	15	15	15	250	160	0.6
2N1229	B	PNPA	Si	Af	.05	0.05		24	25	1.2	15	15	15	250	160	0.6
2N1230	B	PNPA	Si	Af	0.05	0.05		14	25	0.8	35	35	35	250	160	0.6
2N1231	B	PNPA	Si	Af	0.05	0.05		24	25	1.0	35	35	35	250	160	0.6
2N1232	B	PNPA	Si	Af	0.05	0.05		14	25	0.8	65	65	65	250	160	0.6
2N1233	B	PNPA	Si	Af	0.05	0.05		24	25	1.0	65	65	65	250	160	0.6
2N1234	B	PNPA	Si	Af	0.05	0.05		24	25	0.8	110	110	110	250	160	0.6
2N1238	A	PNPA	Si	Af	0.05	0.05		14	25	1.0	15	15	15	1000	160	0.15
2N1239	A	PNPA	Si	Af	0.05	0.05		24	25	1.2	15	15	15	1000	160	0.15
2N1240	A	PNPA	Si	Af	0.05	0.05		14	25	0.8	35	35	35	1000	160	0.15
2N1241	A	PNPA	Si	Af	0.05	0.05		24	25	1.0	35	35	35	1000	160	0.15
2N1242	A	PNPA	Si	Af	0.05	0.05		14	25	0.8	65	65	65	1000	160	0.15
2N1243	A	PNPA	Si	Af	0.05	0.05		24	25	1.0	65	65	65	1000	160	0.15
2N1244	A	PNPA	Si	Af	0.05	0.05		24	25	0.8	110	110	110	1000	160	0.15
2N1254	B	PNPDm	Si	Sw	0.05	0.05		15	25	55	5	15	15	200	250	160
2N1255	B	PNPDm	Si	Sw	0.05	0.05		40	25	55	5	15	15	200	250	160
2N1256	B	PNPDm	Si	Sw	0.05	0.05		15	25	55	5	30	30	200	250	160
2N1257	B	PNPDm	Si	Sw	0.05	0.05		40	25	55	5	30	35	200	250	160
2N1258	P	PNPDm	Si	Sw	0.05	0.05		15	25	55	5	50	50	200	250	160
2N1259	P	PNPDm	Si	Sw	0.05	0.05		40	25	55	5	50	50	2000	250	160

INDUSTRO. TRANSISTOR CORP., 35-10, 36th Ave Long Island City, N. Y.

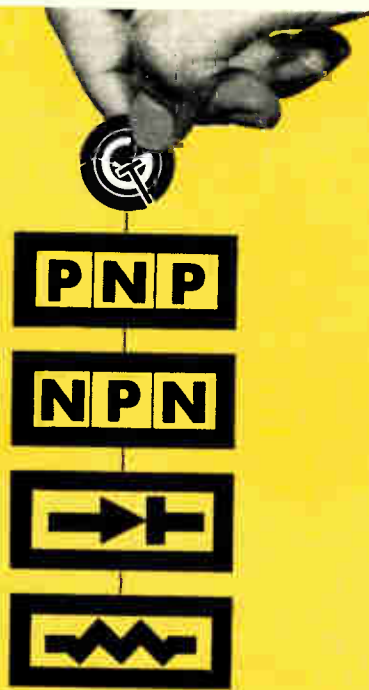
2N311	PNPA	G	Sw	60	60		50	25		15	15	15	100	200	100	0.375	
2N315	PNPA	G	Sw	1	1		20	25		5	20	15	20	400	200	100	0.375
2N315A	PNPA	G	Sw	1	1		20	25		5	20	20	25	400	200	100	0.375
2N316	PNPA	G	Sw	1	1		30	25		12	20	10	20	400	200	100	0.375
2N316A	PNPA	G	Sw	1	1		30	25		12	20	15	25	400	200	100	0.375
2N317	PNPA	G	Sw	1	1		30	25		20	20	6	20	400	200	100	0.375
2N317A	PNPA	G	Sw	1	1		30	25		20	20	10	20	400	200	100	0.375
2N331	PNPA	G	Sw	5	5		50	25		1	12		30	200	200	100	0.375
2N359	PNPA	G	Af, B-Amp	10	10		150	25		1	6	20	25	200	200	100	0.375
2N360	PNPA	G	Af, B-Amp	10	10		100	25		1	6	20	25	200	200	100	0.375
2N361	PNPA	G	Af, B-Amp	10	10		70	25		1	6	20	25	200	200	100	0.375
2N362	PNPA	G	Af, B-Amp	10	25	41	100	25		1	6	20	25	100	200	100	0.375
2N363	PNPA	G	Af, B-Amp	10	25	37	50	25		1	6	20	25	100	200	100	0.375
2N404	PNPA	G	Sw	2	1		40	25		12	12	24	25	100	200	100	0.375
2N413	PNPA	G	if, rf	2	2	10	30	25		2.5	20	18	30	200	200	100	0.375
2N414	PNPA	G	if, rf	2	2	16	60	25		7	20	15	30	200	200	100	0.375
2N416	PNPA	G	if, rf	2	2	20	80	25		10	20	12	30	200	200	100	0.375
2N417	PNPA	G	if, rf	2	2	27	140	25		20	20	10	30	200	200	100	0.375
2N422	PNPA	G	Af	6		38	50	25		0.8	12	20	35	100	200	100	0.375
2N425	PNPA	G	Sw	2	1.5		30	25		4	20	20	30	400	200	100	0.375
2N426	PNPA	G	Sw	2	1.5		40	25		6	20	18	30	400	200	100	0.375
2N427	PNPA	G	Sw	2	1.5		55	25		11	20	15	30	400	200	100	0.375
2N428	PNPA	G	Sw	2	1.5		80	25		17	20	20	30	400	200	100	0.375

TRANSISTORS

TYPE	CASE	CLASS	MAT	APP	TYPICAL OPERATION						MAXIMUM RATINGS							
					I_{CO} μa	I_{EO} μa	PG db	α or β	T $^{\circ}C$	f_{α} ma	V_{EB} v	V_{CE} v	V_{CB} v	I_C ma	P_C mw	T_J $^{\circ}C$	K $^{\circ}C/mw$	
INDUSTRO TRANSISTOR CORP., (Cont.) 35-10, 36th Ave. Long Island City, N. Y.																		
2N464	PNPA	G	Af		6		40		26	25	0.7	12	40	45	100	200	100	0.375
2N465	PNPA	G	Af		6		42		45	25	0.8	12	30	45	100	200	100	0.375
2N466	PNPA	G	Af		6		44		90	25	1	12	30	35	100	200	100	0.375
2N467	PNPA	G	Af		6		45		180	25	1.2	12	15	35	100	200	100	0.375
2N481	PNPA	G	Af, if, rf		3	2			25	25	3	12	12	30	20	200	100	0.375
2N482	PNPA	G	if, rf		3	2	31		25	25	3.5	12	12	30	20	200	100	0.375
2N483	PNPA	G	if, rf		3	2	35		40	25	4.5	12	12	30	20	200	100	0.375
2N485	PNPA	G	if, rf		3	2	26		40	25	7.5	12	12	30	20	200	100	0.375
2N486	PNPA	G	if, rf		3	2	30		60	25	12	12	12	30	20	200	100	0.375
2N505	PNPA	G	Sw		2	2			40	25	8	40	20	40	400	200	100	0.375
2N519	PNPA	G	if, rf, Sw		2	2			25	25	1.5	10	15	15	100	200	100	0.375
2N519A	PNPA	G	if, rf, Sw		1	1			25	25	1.5	10	18	20	150	200	100	0.375
2N520	PNPA	G	if, rf, Sw		2	2			40	25	4.5	10	12	15	100	200	100	0.375
2N520A	PNPA	G	if, rf, Sw		1	1			100	25	4.5	10	15	20	150	200	100	0.375
2N521	PNPA	G	if, rf, Sw		2	2			20	25	10	10	10	15	100	200	100	0.375
2N521A	PNPA	G	if, rf, Sw		1	1			150	25	10	10	12	20	150	200	100	0.375
2N522	PNPA	G	if, rf, Sw		2	2			120	25	18	10	8	15	100	200	100	0.375
2N522A	PNPA	G	if, rf, Sw		1	1			200	25	18	10	10	20	150	200	100	0.375
2N523	PNPA	G	if, rf, Sw		2	2			200	25	24	10	6	15	100	200	100	0.375
2N523A	PNPA	G	if, rf, Sw		1	1			300	25	24	10	6	15	150	200	100	0.375
2N564	PNPA	G	Af, Sw		3	3			25	25	0.8	10	25	30	300	200	100	0.375
2N566	PNPA	G	Af, Sw		3	3			40	25	1	10	25	30	300	200	100	0.375
2N568	PNPA	G	Af, Sw		3	3			60	25	1.5	10	25	30	300	200	100	0.375
2N570	PNPA	G	Af, Sw		3	3			85	25	2	10	20	30	300	200	100	0.375
2N572	PNPA	G	Af, Sw		3	3			150	25	3	10	10	30	300	200	100	0.375
2N578	PNPA	G	Sw		3	3			15	25	5	12	14	20	400	200	100	0.375
2N579	PNPA	G	Sw		3	3			30	25	8	12	14	20	400	200	100	0.375
2N580	PNPA	G	Sw		3	3			45	25	15	12	14	20	400	200	100	0.375
2N631	PNPA	G	Af, B-Amp		10	25	33		150	25	1.2	6	20	25	50	200	100	0.375
2N632	PNPA	G	Af, B-Amp		10	25	30		100	25	1.0	6	20	25	50	200	100	0.375
2N633	PNPA	G	Af, B-Amp		10	25	27		60	25	0.8	6	20	25	50	200	100	0.375
2N650	PNPA	G	Af, Sw		1	8	42		40	25	2	25	25	45	250	250	100	0.375
2N651	PNPA	G	Af, Sw		1	8	44		75	25	2.5	25	25	45	250	200	100	0.375
2N652	PNPA	G	Af, Sw		1	8	46		160	25	3	25	25	45	250	200	100	0.375
2N653	PNPA	G	Af, Sw		1	8	42		40	25	2	25	15	30	250	200	100	0.375
2N654	PNPA	G	Af, Sw		1	8	44		75	25	2.5	25	15	30	250	200	100	0.375
2N655	PNPA	G	Af, Sw		1	8	46		160	25	3	25	15	30	250	200	100	0.375
TR-34	PNPA	G	Af		10		32		15	25	1	10	20	30	125	200	100	0.375
TR-81	PNPA	G	Af		6		42		75	25	1	10	25	25	125	200	100	0.375
TR-123	PNPA	G	Sw		2	2			50	25	8	10	15	20	125	200	100	0.375
TR-269	PNPA	G	Sw		2	1			40	25	12	12	25	25	100	200	100	0.375
TR-320	PNPA	G	Af, B-Amp		10	5	31		50	25	3.5	12	20	30	200	200	100	0.375
TR-321	PNPA	G	Af, B-Amp		10	5	32		80	25	3.5	12	20	30	200	200	100	0.375
TR-381	PNPA	G	B-Amp		10	5	31		50	25	1.2	10	25	25	200	200	100	0.375
TR-382	PNPA	G	B-Amp		10	5	33		75	25	1.5	10	25	25	200	200	100	0.375
TR-383	PNPA	G	B-Amp		10	5	35		100	25	1.8	10	25	25	200	200	100	0.375
TR-396	PNPA	G	Sw		3	3			80	25	8	10	20	20	200	200	100	0.375
TR-460	PNPA	G	Af		6	6	34			25	1.2	10	30	45	400	200	100	0.375
TR-461	PNPA	G	Af		6	6	37			25	1.2	10	30	45	400	200	100	0.375
TR-524	PNPA	G	Af, Sw		5	4			30	25	2	15	30	45	500	200	100	0.375
TR-525	PNPA	G	Af, Sw		5	4			44	25	2.5	15	30	45	500	200	100	0.375
TR-526	PNPA	G	Af, Sw		5	4			64	25	3	15	30	45	500	200	100	0.375
TR-527	PNPA	G	Af, Sw		5	4			81	25	3.3	15	30	45	500	200	100	0.375
TR-721	PNPA	G	Af, B-Amp		10		48		45	25	1	15	20	30	200	200	100	0.375
TR-722	PNPA	G	Af, B-Amp		10		38		22	25	1	15	24	45	200	200	100	0.375

MINNEAPOLIS-HONEYWELL REGULATOR CO., Semiconductor Products, 2747 Fourth Ave., South, Minneapolis 8, Minn.

2N538	A PNP	G	Af, B-Amp, Pwr, Sw	0.1ma	.03ma			302		0.25	-28	60 ⁶	80	3a	32w	95	2.2 ^o C/W
2N538A	A PNP	G	Af, B-Amp, Pwr, Sw	0.1ma	.03ma			302		0.25	-28	60 ⁶	80	3a	32w	95	2.2 ^o C/W
2N539	A PNP	G	Af, B-Amp, Pwr, Sw	0.1ma	.03ma			432		0.25	-28	60 ⁶	80	3a	32w	95	2.2 ^o C/W
2N539A	A PNP	G	Af, B-Amp, Pwr, Sw	0.1ma	.03ma			432		0.25	-28	60 ⁶	80	3a	32w	95	2.2 ^o C/W
2N540	A PNP	G	Af, B-Amp, Pwr, Sw	0.1ma	.03ma			642		0.25	-28	60 ⁶	80	3a	32w	95	2.2 ^o C/W
2N540A	A PNP	G	Af, B-Amp, Pwr, Sw	0.1ma	.03ma			642		0.25	-28	60 ⁶	80	3a	32w	95	2.2 ^o C/W
2N574	B PNP	G	Af, B-Amp, Pwr, Sw	0.9ma	.03ma			14 ³		0.25	-28		60	15a	100w	95	0.7 ^o C/W
2N574A	B PNP	G	Af, B-Amp, Pwr, Sw	0.9ma	0.3ma			14 ³		0.25	-28		60	15a	100w	95	0.7 ^o C/W
2N575	B PNP	G	Af, B-Amp, Pwr, Sw	0.9ma	0.3ma			25 ³		0.25	-28		60	30a	100w	95	0.7 ^o C/W
2N575A	B PNP	G	Af, B-Amp, Pwr, Sw	0.9ma	0.3ma			25 ³		0.25	-28		80	30a	100w	95	0.7 ^o C/W
2N1157	B PNP	G	Af, B-Amp, Pwr, Sw	0.9ma	0.3ma			50 ³		0.25	-28		60	30a	100w	95	0.7 ^o C/W
2N1157A	B PNP	G	Af, B-Amp, Pwr, Sw	0.9ma	0.3ma			50 ³		0.25	-28		80	30a	100w	95	0.7 ^o C/W
2N1202	A PNP	G	Af, B-Amp, Pwr, Sw	0.1ma	.03ma			86 ³		0.25	-28	60 ⁶	80	3a	32w	95	2.2 ^o C/W



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"If it's a high-quality device and you need it—regardless of quantity—General Transistor will produce and deliver it as promised."

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QUALITY CONTROL—Intensive efforts were also applied to innovating techniques for quality control during production. OUR AIM: To supply only high-quality semiconductor devices.

LARGE PRODUCTION FACILITIES—Today GT is a major producer; GT production facilities are larger than those of many suppliers in the semiconductor field. Meeting high-quality specifications, in quantity, is never a problem.

LOGISTIC RELIABILITY—GT's earned reputation for high-quality devices in production quantities is a precious one. It's worth protecting. Therefore, "wild" claims are avoided. This leads to logistic reliability. When GT says: "We will deliver"—that is a fact on which other plans may be based.

GT never announced a major research breakthrough until the result was available in production quantities. When GT publishes specifications, tolerances, etc., it is done with the full knowledge that they can be substantiated to every decimal point in production quantities... not merely in sample lots.

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TRANSISTORS: See page 151; DIODES: See page 202

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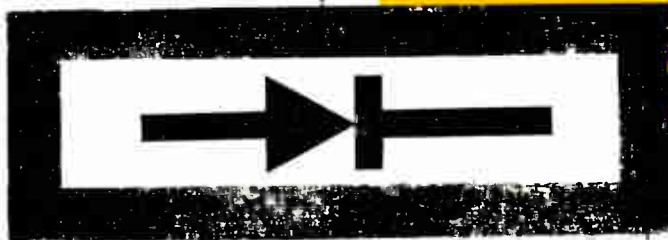


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TRANSISTORS

TYPE	CASE	CLASS	MAT	APP	TYPICAL OPERATION					MAXIMUM RATINGS						
					I _{CO} μa	I _{EO} μa	PG db	α _{or} β	T °C	f _α mc	V _{EB} V	V _{CE} V	V _{CB} V	I _C ma	P _C mw	T _J °C

MINNEAPOLIS - HONEYWELL REGULATOR CO., (Cont.)

Semiconductor Products, 2747 Fourth Ave., South, Minneapolis 8, Minn.

2N1203	A PNP	G	Af, B-Amp, Pwr, Sw	0.1ma	.03ma		372	0.25	-28	70 ⁶	120	3a	32w	95	2.2°C/W	
2N1261	A PNP	G	Af, B-Amp, Pwr, Sw	0.1ma	.03ma		30 ²	0.25	-28	45 ⁶	60	3a	32w	95	2.2°C/W	
2N1262	A PNP	G	Af, B-Amp, Pwr, Sw	0.1ma	.03ma		432	0.25	-28	45 ⁶	60	3a	32w	95	2.2°C/W	
2N1263	A PNP	G	Af, B-Amp, Pwr, Sw	0.1ma	.03ma		64 ²	0.25	-28	45 ⁶	60	3a3a	32w	95	2.2°C/W	
H3A	A PNPA	G	B-Amp, Pwr, Sw	.03ma			15					60	0.35a	5w	95	14°C/W
H4A	A PNPA	G	B-Amp, Pwr, Sw	.03ma			27					60	0.5a	5w	95	14°C/W
H45	A PNP	G	Af-B-Amp, Pwr, Sw	0.1ma	.03ma		20	0.25	-28		80	3a	32w	95	2.2°C/W	
H200 ¹	C PNP	G	Af, B-Amp, Pwr, Sw	0.3ma	.09ma		50 ⁴	0.75 ⁵		35 ⁶	80	10a	63w	95	1.1°C/W	
H201 ¹	C PNP	G	Af, B-Amp, Pwr, Sw	0.3ma	.09ma		40 ⁴	0.375 ⁵		50 ⁶	80	10a	63w	95	1.1°C/W	

1. Tetrode HFE 2. HFE (D. C. Beta) @ I_C = 2a 3. HFE (D. C. Beta) @ I_C = 10a 4. HFE (D. C. Beta) @ I_C = 5a 5. Gain Bandwidth Product
b/fc | b/fc (~f_αco) 6. Voc = 1 (Active Region, Emitter Forward Biased)

MOTOROLA INC., Semi conductor Products Div., 5005 East McDowell Rd., Phoenix, Ariz.

2N176	A PNPA	G	Af, B-Amp, Pwr	50		35	45	0.4		30	40	3a	10w	90	
2N350	A PNPA	G	Af, B-Amp, Pwr	50		31	45	0.4		30	40	3a	10w	90	
2N350A	A PNPA	G	Af, B-Amp, Pwr, Sw	50		32	45	0.4		40	50	3a	24w	100	1.2
2N351	A PNPA	G	Af, B-Amp, Pwr	50		36	65	0.4		30	40	3a	10w	90	
2N351A	A PNPA	G	Af, B-Amp, Pwr, Sw	50		34	65	0.4		40	50	4a	25w	100	1.2
2N375	B PNPA	G	Af, B-Amp, Pwr	200			55	0.4		60	80	3a	45w	95	1.2
2N376	A PNPA	G	Af, B-Amp, Pwr	50		35	85	0.4		30	40	3a	10w	90	
2N376A	A PNPA	G	Af, B-Amp, Pwr, Sw	50		36	85	0.4		30	50	5a	25w	100	1.2
2N425	E PNPA	G	Sw	2	1		30	4	20	20	30	400	150	85	
2N426	E PNPA	G	Sw	2	1		40	6	20	18	30	400	150	85	
2N427	E PNPA	G	Sw	2	1		55	11	20	15	30	400	150	85	
2N428	E PNPA	G	Sw	2	1		80	17	20	12	30	400	150	85	
2N464	E PNPA	G	Af	6	2	40	26	0.7	12	40	45	100	150	85	
2N465	E PNPA	G	Af	6	1	42	45	0.8	12	30	45	100	150	85	
2N466	E PNPA	G	Af	6	1	44	90	1	12	20	35	100	150	85	
2N467	E PNPA	G	Af	6	1	45	180	1.2	12	15	35	100	150	85	
2N618	B PNPA	G	Af, B-Amp, Pwr	200			90	0.4		60	80	3a	45w	95	1.2
2N627	C PNPA	G	Af, B-Amp, Pwr, Sw	60			60	0.3		30	40	10a	50w	100	1.2
2N628	C PNPA	G	Af, B-Amp, Pwr, Sw	65			60	0.3		45	60	10a	50w	100	1.2
2N629	C PNPA	G	Af, B-Amp, Pwr, Sw	80			60	0.3		60	80	10a	50w	100	1.2
2N630	C PNPA	G	Af, B-Amp, Pwr, Sw	90			60	0.3		75	100	10a	50w	100	1.2
2N650	E PNPA	G	Af	1	1	42	40	2	25	25	45	250	200	100	
2N651	E PNPA	G	Af	1	1	44	25	2.5	25	25	45	250	200	100	
2N652	E PNPA	G	Af	1	1	46	160	3	25	25	45	250	200	100	
2N653	E PNPA	G	Af	1	1	42	40	2	15	15	30	250	200	100	
2N654	E PNPA	G	Af	1	1	44	75	2.5	15	15	30	250	200	100	
2N655	E PNPA	G	Af	1	1	46	160	3	15	15	30	250	200	100	
2N669	A PNPA	G	Af, B-Amp, Pwr	50		40	90	0.4		30	40	3a	10w	90	
2N695	D PNP ^m	G	Sw	0.8			33		4	15	18	50	75	100	
2N700	D PNP ^m	G	if, rf	1		24*		600†	0.5	30	30	50	75	100	
2N701	D PNP ^m	G	if, rf	1		30**		200	1.5	12	30	50	75	85	
2N1162	B PNPA	G	Af, B-Amp, Pwr, Sw	80			65	0.25		35	50	25a	50w	100	1.2
2N1163	C PNPA	G	Af, B-Amp, Pwr, Sw	80			65	0.25		35	50	25a	50w	100	1.2
2N1164	B PNPA	G	Af, B-Amp, Pwr, Sw	80			65	0.25		60	80	25a	50w	100	1.2
2N1165	C PNPA	G	Af, B-Amp, Pwr, Sw	80			65	0.25		60	80	25a	5w	100	1.2
2N1191	E PNPA	G	Af	1	1	42	40	1.5	25	25	40	200	175	85	
2N1192	E PNPA	G	Af	2	1	44	75	2	25	25	40	200	175	85	
2N1193	E PNPA	G	Af	2	1	46	160	2.5	25	25	40	200	175	85	

* = @ 70 mcs ** = @ 30mcs † = f max

PACIFIC SEMICONDUCTORS, INC., 10451 W. Jefferson Blvd., Culver City, Calif.

XT515	NPNm	Si	VHF, Pwr, OSC	1.5	100		25	70	3	120	75	2.8w	150	
XT516	NPNm	Si	VHF, Pwr, OSC	1.5	100		25	70	3	120	75	2.8w	150	
XT517	NPNm	Si	VHF, Pwr, OSC	1.5	100		25	70	3	220	75	2.8w	150	
XT518	NPNm	Si	VHF, Pwr, Amp	1.5	100	10	1.5	25	70	4	120	75	2.8w	150
XT519	NPNm	Si	VHF, Pwr, Amp	1.5	100	10	1.5	25	70	4	120	75	2.8w	150
XT520	NPNm	Si	VHF, Pwr, Amp	1.5	100	10	1.5	25	70	4	120	75	28	150

PHILCO CORP., Lansdale Tube Div., Lansdale, Pa.

2N128	C SBT	G	if, rf	0.6	0.5		40	25	60 ¹	4.5	10	5	25	85	
2N207	B PNP	G	Af, Sw	4	1.5		100	25	2	12	12	20	50	65	0.8
2N223	D PNP	G	Af	7			110	25	0.6	18		150	250	75	0.12
2N224	D PNP	G	Af, Sw	10			90 ²	25	0.51		25	150	250	75	0.12
2N225	D PNP	G	Af, Sw				Pair of 2N224 with h _{FE} matched within 20%								
2N226	D PNP	G	Af, Sw	8			60 ²	25	0.4		30	150	250	75	0.12
2N227	C SB	G	Af, Sw				Pair of 2N226 with h _{FE} matched within 20%	25	0.4		30	150	250	75	0.12
2N231	C SBT	G	if, rf	3 ³	3 ³		66 ³	25	20 ^{1,4}	4.5	4.5	3	9 ⁵	55	

TUNG-SOL

GERMANIUM TRANSISTORS



MEDIUM
POWER OUTLINE
TO-5

INVERTED HEADER DESIGN
BRINGS YOU THESE BENEFITS . . .

- improved thermal properties for longer life
- superior mechanical characteristics for increased reliability

MEDIUM POWER, MEDIUM FREQUENCY

TYPE	MAXIMUM RATINGS (25° C)					TYPICAL VALUES (25° C)		
	Pc mw	V _{CE} volts	V _{CB} volts	I _C ma	T _J °C	Max. I _{CBO} µa	h _{FE}	f _{αb} mc
2N381	200	-25	-25	200	85	10	36	1.2
2N382	200	-25	-25	200	85	10	54	1.5
2N383	200	-25	-25	200	85	10	72	1.8
INDUSTRIAL TYPES								
2N460	200	—	-45	400	100	15	25	1.2
2N461*	200	—	-45	400	100	15	50	1.2

*Designed to meet MIL-T-19500/45

MEDIUM POWER, HIGH FREQUENCY

TYPE	MAXIMUM RATINGS (25° C)					TYPICAL VALUES (25° C)		
	Pc mw	V _{CE} volts	V _{CB} volts	I _C ma	T _J °C	Max. I _{CBO} µa	h _{FE}	f _{αb} mc
COMPUTER TYPES								
2N404*	120	-24	-25	100	85	5	30	12
2N425	120	-20	-30	400	85	5	30	4
2N426	120	-18	-30	400	85	5	40	6
2N427	120	-15	-30	400	85	5	55	11
2N428†	120	-12	-30	400	85	5	80	17
2N578	120	-14	-20	400	85	5	15	5
2N579	120	-14	-20	400	85	5	30	8
2N580	120	-14	-20	400	85	5	45	15
2N581	120	-14	-18	100	85	5	30	8
2N582	120	-14	-25	100	85	5	60	18
GENERAL PURPOSE TYPES								
2N413	120	-18	-30	200	85	5	30▲	2.5
2N414	120	-15	-30	200	85	5	60▲	5
2N416	120	-12	-30	200	85	5	80▲	10
2N417	120	-10	-30	200	85	5	140▲	20

*Designed to meet MIL-T-19500/20

†Designed to meet MIL-T-19500/44

▲h_{FE}

POWER, MEDIUM FREQUENCY

TYPE	MAXIMUM RATINGS (25° C)					TYPICAL VALUES (25° C)		
	Pc w	V _{CE} volts	V _{CB} volts	I _C A	T _J °C	Max. I _{CBO} ma	h _{FE}	f _{αb} mc
AUDIO TYPES								
2N242	15	-45	—	2	85	1.0	50	0.4
POWER SWITCH TYPES								
2N378	50	-20	-40	5	100	0.5	30	0.3
2N379	50	-40	-80	5	100	0.5	30	0.3
2N380	50	-30	-60	5	100	0.5	50	0.4
2N459	50	-60	-105	5	100	0.5	30	0.3

HIGH POWER, MEDIUM FREQUENCY

TYPE	MAXIMUM RATINGS (25° C)				TYPICAL VALUES (25° C)		
	V _{CE} volts	V _{CB} volts	I _C A	T _J °C	Max. I _{CBO} ma	h _{FE}	f _{αc} Kc
MILITARY TYPE							
TS 748	Designed to meet MIL-T-19500/13A dated 8 January 1958						
INDUSTRIAL TYPES							
2N173	-50	-60	15	95	8	52	10
2N174	-70	-80	15	95	8	37	10
2N174A	-70	-80	15	95	8	37	10
2N277	-40	-40	15	95	8	52	10
2N278	-45	-50	15	95	8	52	10
2N441	-40	-40	15	95	8	30	10
2N442	-45	-50	15	95	8	30	10
2N443	-50	-60	15	95	8	30	10



POWER
OUTLINE
TO-3

HIGH
POWER OUTLINE



Exclusive Tung-Sol Cold Weld Seal!

All Tung-Sol Power and High Power transistors are sealed by advanced cold weld process for three-way quality boost . . .

- True hermetic, copper-to-copper seal improves transistor thermal characteristics.
- Elimination of heat-damage, heat-caused moisture and "splash" increase overall reliability.
- Vacuum-tight, moisture-proof cold-weld seal lasts even through "breathing" over long life operation.

For detailed information on specific types or to fill a particular need, contact: Tung-Sol Electric Inc., Newark 4, New Jersey.



TUNG-SOL®

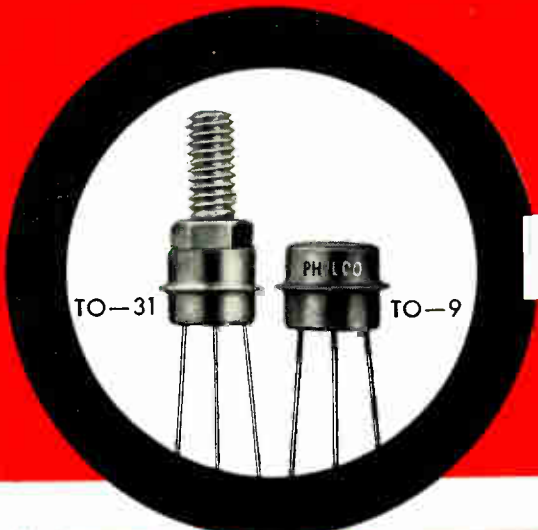
TRANSISTORS

TYPE	CASE	CLASS	MAT	APP	TYPICAL OPERATION					MAXIMUM RATINGS							
					I _{CO} μA	I _{EO} μA	PG db	α or β	T °C	f _α mc	V _{EB} V	V _{CE} V	V _{CB} V	I _C ma	P _C mw	T _J °C	K °C/mw
2N232	C	SBT	G	if, rf	6B	63		393	25	301.4		4.5	4.5	3	35	55	
2N240	C	SBT	G	Sw	0.7	0.5		30	25			6	6	15	30	85	
2N299	C	SBT	G	if, rf	0.6	0.5			25			4.5	5	5	20 ⁵	85	
2N300	C	SBT	G	if, rf	0.6	0.5		18	25	110		4.5	5	5	20 ⁵	85	
2N344	C	SBT		if, rf, Sw	0.7	0.7		22	25	50 ¹		5	5	5	20 ⁶	55	0.75
2N345	C	SBT	G	if, rf, Sw	0.7	0.7		35	25	50 ¹		5	5	5	20 ⁶	55	0.75
2N346	C	SBT	G	if, rf, Sw	0.7	0.7		20	25	75 ¹		5	5	5	20 ⁶	55	0.75
2N393	C	MAT	G	Gen	1.5	2.5		155	25	60 ¹		6	6	50	25 ⁵	85	
2N462	D	PNP	G	Sw	7	7		452.7	25	0.54			40	200	150	75	0.3
2N495	F	PNP	Si	if, rf	.001	.001		15	25	15 ¹		25	25	50	150	140	0.77
2N496	F	PNP	Si	Sw	.001	.001		102	25	11		10	10	50	150	140	0.77
2N499	F	MADT	G	if, rf	1		10	8.5	25	100		18	30	50	30 ⁵	85	0.8
2N501	F	MADT	G	Sw	1			35 ²	25			12	15	50	25 ⁵		
2N501A	F	MADT	G	Sw	1			35 ²	25			12	15	50	25 ⁵	100	2.2
2N502	A	MADT	G	if, rf	3		10	45	25	500		20	20		25 ⁵	85	1.6
2N502A	A	MADT	G	if, rf	3		10	45	25	500		30	30		25 ⁵	100	
2N503	A	MADT	G	if, rf	3		12	4.2	25	100		20	20	50	25 ⁵	85	1.6
2N504	F	MADT	G	if, rf	10 ³			16 ⁴	25	50 ⁴		25	35	50	30	85	
2N534	B	PNP	G	Af, if, rf	8			150	25			50	50	25	25 ⁹	65	0.7
2N535	B	PNP	G	Af, Sw	3	1.5		100	25	2		20	20	20	50	85	
2N536	B	PNP	G	Sw	4	3		150 ²	25	2		20	20	30	50	85	
2N588	F	MADT	G	if, rf	3				25	250 ¹		15	15	50	30 ⁵	85	
2N597	A	PNP	G	Sw	53	503		70 ²	25	4.5		40	45	400	250	100	
2N598	A	PNP	G	Sw	53	503		85 ²	25	7.5		20	30	400	250	100	
2N599	A	PNP	G	if, rf, Sw	53	503		105 ²	25	18		20	30	400	250	100	
2N600	G	PNP	G	Sw	53	503		85 ²	25	7.5		20	30	400	750	100	
2N601	G	PNP	G	Sw	53	503		105 ²	25	18		20	30	400	750	100	
2N670	H	PNP	G	Sw	20	15		100	25	0.7		40	40	2000	300	85	
2N671	E	PNP	G	Sw	20	15		100 ²	25	0.7		40	40	2000	1000	85	
2N672	H	PNP	G	Sw	253	503			25			25	25	2000	300	85	
2N673	E	PNP	G	Sw	253	503			25			25	25	2000	1000	85	
2N1122	C	MAT	G	Sw	53	103		35 ⁴	25	401.4		10	15	50	25 ⁵	85	1.6
2N1122A	C	MAT	G	Sw	53	103		35 ⁴	25	401.4		14	15	50	25 ⁵	85	1.6
2N1123	G	PNP	G	Sw	53	503		70 ²	25	4.5		40	45	400	750	100	
2N1124	H	PNG	G	Af, Sw	303	303		40 ⁴	25	0.44		35	40	150	300	85	0.2
2N1125	H	PNP	G	Sw	253	203		150 ⁴	25	14		40	40	150	300	85	0.2
2N1126	E	PNP	G	Af, Sw	303	303		40 ⁴	25	0.44		35	40	150	1000	85	0.06
2N1127	E	PNP	G	Sw	253	203		150 ³	25	14		40	40	150	1000	85	0.06
2N1128	H	PNP	G	Af	203			100	25	1		18	25	150	150	85	0.4
2N1129	H	PNP	G	Af	253	753		190	25	0.75		25	25	150	150	85	0.4
2N1130	H	PNP	G	Af	253			160	25	0.75		30	150	150	85	0.4	
SB100	C	SBT	G	Af, rf, Sw	0.5			20	25	45 ¹		4.5		50	10 ⁶	55	

1. f_{max} 2. D. C. 3. max 4. min 5. @45°C. 6. @40°C. 7. Bilateral

RADIO CORPORATION OF AMERICA, Semiconductor Div., Somerville, N. J.

2N104	A	PNPA	G	Af, B-Amp	-10	-10	41	44	25	0.7	-12	-30	-50	80	85	0.4
2N105	C	PNPA	G	Af	-7		42	55	25	0.75		-25	15	60	85	
2N109	A	PNPA	G	Af, Sw	-14		33	75	25		-12	-25	-70	150	85	
2N139	A	PNPA	G	if, rf, Sw	-6	-12	38	48	25	6.8	-0.5	-16	-15	80	85	
2N140	A	PNPA	G	if, rf, Sw	-6	-12	32	75	25	10	-0.5	-16	-15	80	85	
2N175	A	PNPA	G	Af	-12	-12	43	65	25	0.85	-10	-10	-2	50	85	
2N176	F	PNPA	G	Af, B-Amp	-3A	-2A	36	63	80			-40	-3A	10w	90	1°C/W
2N215	D	PNPA	G	Af	-10	-10	41	44	25	0.7	-12	-30	-50	80	85	
2N217	D	PNPA	G	Af, B-Amp, Sw	-14	-14	33	75	25		-12	-25	-70	150	85	
2N218	D	PNPA	G	if, rf, Sw	-6	-12	38	48	25	6.8	-0.5	16	-15	80	85	
2N219	D	PNPA	G	if, rf, Sw	-6	-12	32	75	25	10	-0.5	-16	-15	80	85	
2N220	D	PNPA	G	Af	-12	-12	43	65	25	0.85	-10	-10	-2	50	85	
2N247	E	PNPd	G	if, rf, Sw	-16	-50	37	60	25	30	-0.5	-35	-10	80	85	
2N269	D	PNPA	G	Sw	-5	-20			25	12	-12	-25	-100	120	85	0.35
2N270	E	PNPA	G	Af, B-Amp, Sw	-16	-12	32	70	25		-12	-25	-150	250	85	0.24
2N274	D	PNPd	G	if, rf, Sw	-30	-50	30	60	25	30	-0.5	-35	10	80	85	
2N301	F	PNPA	G	Af, B-Amp, Pwr	-5A	-100	30	70	80		-12	-40	-3A	11w	91	1°C/W
2N301A	F	PNPA	G	Af, B-Amp, Pwr	-5A	-100	30	70	80		-12	-60	-3A	11w	91	1°C/W
2N331	F	PNPA	G	Af	-16	-12	44	50	25		-12	-30	-200	200	85	0.3
2N351	F	PNPA	G	Af, B-Amp, Pwr	-3A	-2A	34	65	80			40	-3A	10w	90	1°C/W
2N356	B	NPNA	G	Sw	5	5		30	20	3	20	18	20	500	100	85
2N357	B	NPNA	G	Sw	5	5		30	25	6	20	15	20	500	100	85
2N358	B	NPNA	G	Sw	5	5		30	25	9	20	12	20	500	100	85
2N370	E	PNPd	G	if, rf	-20	-50	31	60	25	30	-1.5	-20	-10	80	85	
2N371	E	PNPd	G	if, rf	20	-50		60	25	30	-0.5	-20	-10	80	85	



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A complete family of Medium Frequency Transistors

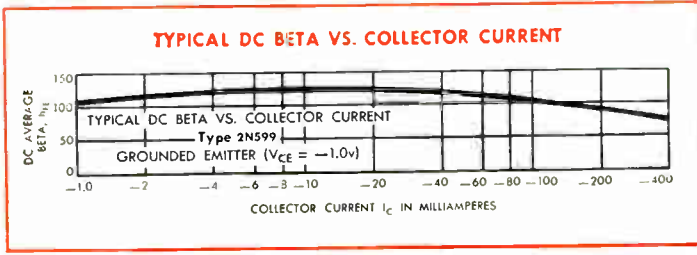
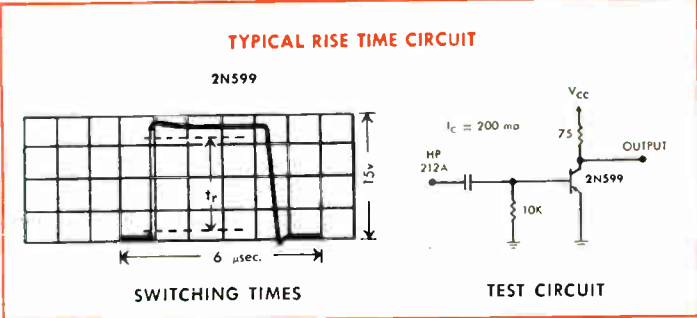
Type	Outline	Max. Readings			General Performance			"ON" Switch Performance	
		P _T mw	V _{CB} volts	I _C ma	Min. f _{αb} mc	Typical h _{FE} V _{CE} = -1v, I _C = -100 ma	Max. V _{CE}	Max. V _{BE}	
2N597	TO-9	250	45	400	3	70	0.2	0.34	
2N1123	TO-31	750*	45	400	3	70	0.2	0.34	
2N598	TO-9	250	30	400	5	85	0.2	0.34	
2N600	TO-31	750*	30	400	5	85	0.2	0.34	
2N599	TO-9	250	30	400	12	105	0.2	0.34	
2N601	TO-31	750*	30	400	12	105	0.2	0.34	

*Peak Dissipation at 25°C = 1 Watt

- High Dissipation: to 1 watt peak at 25°C
- High Current: Max. I_C = -400 ma
- High Temperature: 100° C Max.
- High Voltage: Max. V_{CB} to -45v
- High Frequencies: Min. f_{αb} to 12 mc

Philco's complete family of PNP germanium alloy junction transistors is available in both studded and unstudded cases (TO-31 and TO-9), permitting operation at power levels as high as 1 watt peak. They offer the designer complete flexibility, providing a choice within each form factor to meet circuit requirements for voltage, gain and frequency. These transistors feature a unique, patented, cold-welded *copper* housing and internal construction that result in lower junction temperatures at normal operating power levels. (K factor as low as 0.1° C/mw.) Their design insures improved life and reliability at temperatures as high as 100° C.

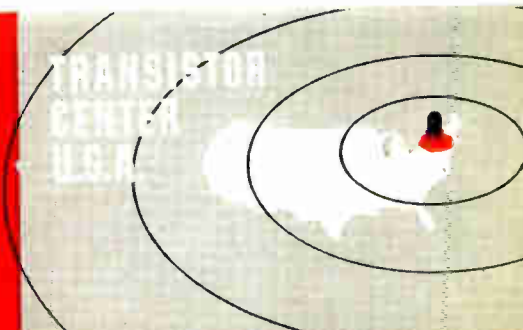
The high beta of these transistors at high current makes them particularly applicable to medium speed flip-flops, logic gates, drum writers and core-driver circuits. The 30v to 45v collector rating provides the high level logic swings required in many data processing equipments. The entire family is available in production quantities . . . and in quantities 1-99 from your local Philco Industrial Semiconductor Distributor.

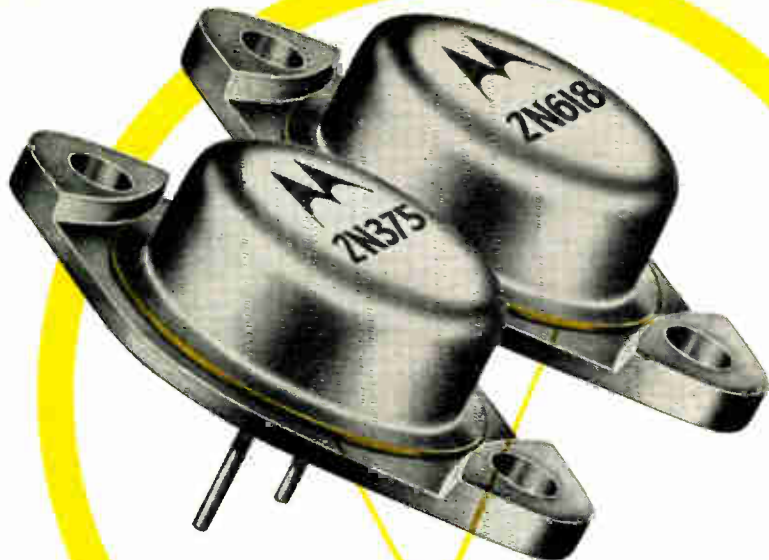


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LANSDALE TUBE COMPANY DIVISION
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Circle 75 on Inquiry Card





NEW WELDED SEAL to meet **MILITARY SPECIFICATIONS**

FOR MOTOROLA 3 AMP 80 VOLT POWER TRANSISTORS

3 AMP POWER TRANSISTORS

Type Number	MAXIMUM RATINGS				Typical Electrical Characteristics	
	BV_{CEO} volts	BV_{CES} volts	T_J °C	I_C amps	h_{FE} @ I_C amps	
2N375	80	60	95	3.0	22	3
2N618	80	60	95	3.0	35	3

The addition of a welded hermetic seal to these popular Motorola power transistors improves reliability under extreme environmental conditions. This new welded seal and the industry standard TO-3 package are designed to meet or exceed the mechanical and environmental requirements of MIL-T-19500A. Both units are now available from stock.

MOTOROLA'S COMPLETE RANGE OF INDUSTRIAL POWER TRANSISTORS enables you to select devices best suited for a specific application

10 AMP POWER TRANSISTORS

Type Number	MAXIMUM RATINGS				Typical Electrical Characteristics	
	BV_{CEO} volts	BV_{CES} volts	T_J °C	I_C amps	h_{FE} @ I_C amps	
2N627*	40	30	90	10.0	18	10
2N628*	60	45	90	10.0	18	10
2N629*	80	60	90	10.0	18	10
2N630*	100	75	90	10.0	18	10

Three separately designed series, produced under individual specifications, give you "power for every purpose." 3 amp devices offer a Beta range of $2\frac{1}{2}$ to 1. The 10 amp series are the world's fastest high-current switching devices. The 25 amp series offers low saturation resistance and a minimum Beta of 15 ($I_C = 25A$, $V_{CE} = 1V$). Stringent specs, enforced by exacting test requirements, maintain product integrity regardless of production volume.

25 AMP POWER TRANSISTORS

Type Number	MAXIMUM RATINGS				Typical Electrical Characteristics	
	BV_{CEO} volts	BV_{CES} volts	T_J °C	I_C amps	h_{FE} @ I_C amps	
2N1162	50	35	90	25.0	25	25
2N1164	80	60	90	25.0	25	25
2N1163*	50	35	90	25.0	25	25
2N1165*	80	60	90	25.0	25	25

NEW POWER TRANSISTOR INFORMATION KIT, containing complete specifications and helpful applications data, is now available. Write, wire or phone the nearest Motorola Semiconductor regional office.

*Supplied in TO-3 package with solder terminals.

NOTE: all ten of the transistors listed above now have a welded hermetic seal and are designed to meet or exceed the mechanical and environmental requirements of MIL-T-19500A.

Regional Offices:

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Whitney 5-7500

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4900 West Flournoy Street
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"DEPENDABLE QUALITY - IN QUANTITY"

**MOTOROLA
SEMICONDUCTORS**

MOTOROLA INC., 5005 E. McDOWELL, PHOENIX, ARIZONA

TRANSISTORS

TYPE	CASE	CLASS	MAT	APP	TYPICAL OPERATION						MAXIMUM RATINGS						
					I _{CO} μa	I _{EO} μa	PG db	α or β	T °C	f _a mc	V _{EB} v	V _{CE} v	V _{CB} v	I _C ma	P _C mw	T _J °C	K °C/mw

RADIO CORPORATION OF AMERICA, (Cont.) Semiconductor Div., Somerville, N. J.

2N372	E	PNPd	G	if, rf	-20	-50	31		60	25	30	-0.5	-20	-10	80	85		
2N374	E	PNPd	G	if, rf	-8	-12	40		60	25	30	-0.5	-25	-10	80	85	0.75	
2N375	E	PNPd	G	if, rf	-8	-12	40		60	25	30	0.5	-25	-10	80	85	0.75	
2N376	F	PNPA	G	Af, B-Amp, Pwr	-3A	-2A	35		78	80			-40	-3A	10w	90	1°C/W	
2N384	D	PNPd	G	if, rf, Sw	-16	-50	34		60	25	100	-0.5	-30	-10	120	85		
2N398	B	PNPA	G	Sw	-14	-50			60	25		-50	-105	-105	-100	100	85	
2N404	B	PNPA	G	Sw	-5	-20			25		12	-12	-24	-25	-100	120	85	
2N405	A	PNPA	G	Af	-14	-14	43		35	25		-2.5	-18	-20	-70	150	85	
2N406	D	PNPA	G	Af	-14	-14	43		35	25		-2.5	-18	-20	-70	150	85	
2N407	A	PNPA	G	Af, B-Amp	-14	-14	33		65	25		-2.5	-18	-20	-70	150	85	
2N408	D	PNPA	G	Af, B-Amp	-14	-14	33		65	25		-2.5	-18	-20	-70	150	85	
2N409	A	PNPA	G	if, rf	-10	-12	31		48	25	6.8	-0.5	-13	-15	80	85		
2N410	D	PNPA	G	if, rf	-10	-12	31		48	25	6.8	-0.5	-13	-15	80	85		
2N411	A	PNPA	G	if, rf	-10	-12	32		75	25	10	-0.5	-13	-15	80	85		
2N412	D	PNPA	G	if, rf	-10	-12	32		75	25	10	-0.5	-13	-15	80	85		
2N456	F	PNPA	G	Af, B-Amp, Pwr, Sw	-2A	-2A	26		52	25		-20	-40	-5A	50w	100	1.1°C/W	
2N457	F	PNPA	G	Af, B-Amp, Pwr, Sw	-2A	-2A	26		52	25		-20	-60	-5A	50w	100	1.1°C/W	
2N544	E	PNPd	G	if, rf	-8	-12	30		60	25	30	-1	-18	-10	80	85		
2N561	F	PNPA	G	if, rf	-3A	-200	26		52	25		-60	-50	-80	-10A	50w	100	1°C/W
2N578	B	PNPA	G	Sw	-5	-5			15	25	5	-12	-14	-20	-400	120	85	
2N579	B	PNPA	G	Sw	-5	-5			30	25	8	-12	-14	-20	-400	120	85	
2N580	B	PNPA	G	Sw	-5	-5			25		15	-12	-14	-20	-400	120	85	
2N581	B	PNPA	G	Sw	-6	-20			30	25	8	-10	-15	-18	-100	80	85	
2N582	B	PNPA	G	Sw	-5	-20			60	25	18	-12	-14	-25	-100	120	85	
2N583	D	PNPA	G	Sw	-6	-20			30	25	8	-10	-15	-18	-100	80	85	
2N584	D	PNPA	G	Sw	-5	-20			60	25	18	-12	-14	-25	100	120	85	
2N585	B	NPNA	G	Sw	8	5			40	25	5	20	24	25	200	120	85	
2N586	E	PNPA	G	Af, B-Amp, Pwr, Sw	-16	12			55	25		-12	-45	-250	250	85		
2N591	D	PNPA	G	Af	-7	-20	41		70	25			-32	-40	50	85		
2N640	E	PNPd	G	if, rf	-7	-8	40		60	25	42	-1	-34	-10	80	85		
2N641	E	PNPd	G	if, rf	-7	-8	40		60	25	42	-1	-34	-10	80	85		
2N642	E	PNPd	G	if, rf	-7	-8	40		60	25	42	-1	-34	-10	80	85		
2N643	B	PNPd	G	Sw	-10				45	25	30	-1	29	-30	-100	120	85	
2N644	B	PNPd	G	Sw	-10				45	25	50	-2	29	-30	-100	120	85	
2N645	B	PNPD	G	Sw	-10				45	25	75	-2	-29	-30	-100	120	85	
2N647	D	NPNA	G	Af, B-Amp	14	14	54		70	25		12	25	25	100	100	85	
2N649	D	NPNA	G	Af, B-Amp	14	14	54		65	25		2.5	18	20	100	100	85	
2N1010	D	NPNA	G	Af	10	6			35	25		10	10	10	2	20	85	
2N1014	F	PNPA	G	Af, B-Amp, Pwr, Sw	-3A	-200	26		52	52		-60	-65	-100	-10A	50w	100	
2N1067	G	NPNDm	Si	Af, B-Amp, Pwr, Sw	500	100			35	25	1.5	12	30	60	500	5w	175	30°C/W
2N1068	G	NPNDm	Si	Af, B-Amp, Pwr, Sw	500	100			38	25	1.5	12	30	60	1.5A	10w	175	14°C/W
2N1069	H	NPNDm	Si	Af, B-Amp, Pwr, Sw	1A	100			20	25	1.2	9	45	60	4A	50w	175	3°C/W
2N1070	H	NPNDm	Si	Af, B-Amp, Pwr, Sw	1A	100			20	25	1.2	9	45	60	4A	50w	175	3°C/W
2N1090	D	NPNA	G	Sw	8	5			50	25	7	20	18	25	400	120	85	
2N1091	D	NPNA	G	Sw	8	5			70	25	13	20	12	25	400	120	85	
2N1092	B	NPNDm	Si	Af, B-Amp, Pwr, Sw	500	100			35	25	1.5	12	30	60	500	1w	175	75°C/W

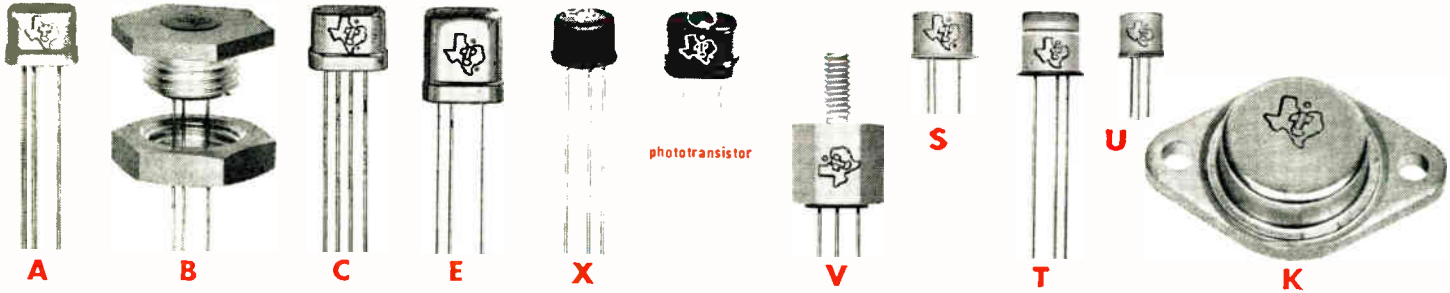
RAYTHEON MANUFACTURING CO., Semiconductor Div., 55 Chapel St., Newton 58, Mass.

2N63		PNP	G	Af	6		39		22	25	0.6		22	10	80	85	0.50	
2N64		PNP	G	Af	6		41		45	25	0.8		15	10	80	85	0.50	
2N65		PNP	G	Af	6		42		90	25	1.2		12	10	80	85	0.50	
2N130A	D	PNPA	G	Af	6		40		26	25	0.7	12	40	45	100	100	85	0.59
2N131A	D	PNPA	G	Af	6		42		45	25	0.8	12	30	45	100	100	85	0.59
2N132A	D	PNPA	G	Af	6		44		90	25	1.0	12	20	35	100	100	85	0.59
2N133A	D	PNPA	G	Af	6		38		50	25	0.8	12	20	35	100	100	85	0.59
2N138B	D	PNPA	G	Af										100	100	85	0.5	
2N327A	A	PNPA	Si	Af, Sw	0.005	0.005			15	25	0.2	20	40	50	100	380	160	0.35
2N328A	A	PNPA	Si	Af, Sw	0.005	0.005			30	25	0.3	20	35	50	100	380	160	0.35
2N329A	A	PNPA	Si	Af, Sw	0.005	0.005			60	25	0.5	20	30	50	100	380	160	0.35
2N359	A	PNPA	G	Af	10		40		150	25	1.5	6		20	400	150	85	0.35
2N360	A	PNPA	G	Af	10		37		100	25	1.2	6		20	400	150	85	0.35
2N361	A	PNPA	G	Af	10		34		75	25	1.0	6		30	400	150	85	0.35
2N362	A	PNPA	G	Af	10				100	25		6	20	20	100	150	85	0.35
2N363	A	PNPA	G	Af	10				50	25		6	40	40	100	150	85	0.35
2N404	A	PNPA	G	Sw	2	1.0			60	25	12	12	24	25	100	150	85	0.35
2N413	A	PNPA	G	if, rf	2	2			30	25	2.5	20	18	30	200	150	85	0.35
2N414	A	PNPA	G	if, rf	2	2	16		60	25	7	20	15	30	200	150	85	0.35
2N416	A	PNPA	G	if, rf	2	2	20		80	25	10	20	12	30	200	150	85	0.35
2N417	A	PNPA	G	if, rf	2	2	27		140	25	20	20	10	30	200	150	85	0.35
2N422	A	PNPA	G	Af,	6		38		90	25	0.8	12	20	35	100	150	85	0.35

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GERMANIUM and SILICON



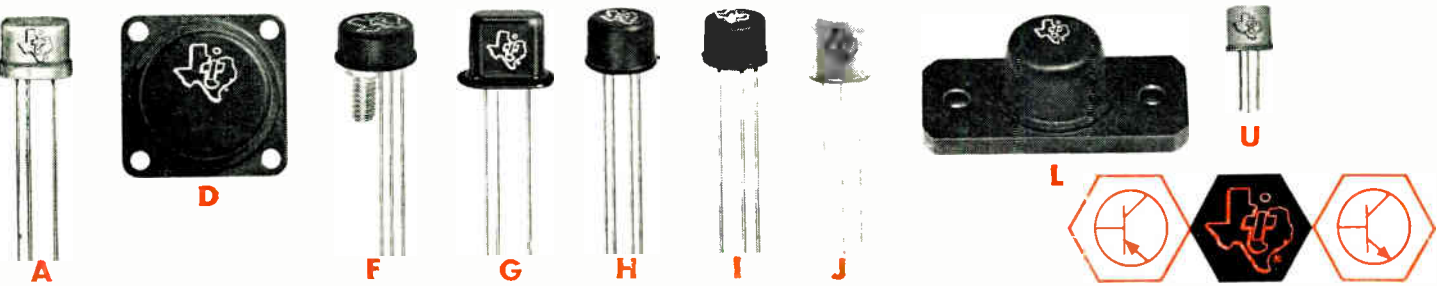
GERMANIUM TRANSISTORS

	Type	Case Type	Former Designation	Dissipation at 25°C mw	Collector Voltage-v max	Collector Current ma max	Beta		Collector Reverse Current I _{CO} μa max		Gain db and R _{CS} typ	Audio Gain db typ		RF Gain db min	Alpha Cutoff Frequency mc avg	
							min	max	μa	v		min	max			
computer	pnp	2N395	X	150	-30	-250	20	30	150	-6	-15				4.5	
		2N396	X	150	-30	-250	30	40	150	-6	-20				8.0	
		2N397	X	150	-30	-250	40	25	150	-6	-15				12.0	
		2N705	U		150	-15	-50	25	50	-50	-4.5 at 65°C				250	
		2N1093	X	320	150	-30	-250	50	200	-6	-20				8.0	
computer power	pnp	2N1046	K	X282	15W	-80	-3a	40	70 (Avg)	-1ma	-40				12	
VHF tetrode	pnp	3N25	C	501	25	-15	-2	65 (Avg)	-20	-12			10 at 100mc		200	
high frequency	pnp	2N248	A		30	-25	-5	20 (Avg)	-10	-12			10 at 18mc		50	
		2N1141	S		750	-35	-100	12db at 10ma, 100mc	-5	-6					750	
		2N1142	S		750	-30	-100	10db at 10ma, 100mc	-10	-15					600	
		2N1143	S		750	-25	-100	8db at 10ma, 100mc	-10	-12					480	
radio RF, converter, osc and IF	pnp	2N1107	A	RF	30	-16	-5		-10	-12	h _{FE} 34 at 455kc					
		2N1108	A	Conv	30	-16	-5		-10	-12	h _{FE} 33 at 455kc					
		2N1109	A	OSC	30	-16	-5		-10	-12	h _{FE} 20 at 455kc					
		2N1110	A	1st IF	30	-16	-5		-10	-12	h _{FE} 29 at 455kc					
		2N1111	A	2nd IF	30	-20	-5		-10	-12	h _{FE} 25 at 455kc					
		2N1111A	A	Reflex	30	-20	-5		-10	-12	h _{FE} 25 at 455kc	h _{FE} 29 at 1kc				
		2N1111B	A	Reflex	30	-27	-5		-10	-12	h _{FE} 25 at 455kc	h _{FE} 29 at 1kc				
audio output	pnp	2N185	A	352	150	-20	-150	35 (70 Avg)	-15	-20		39/26†				
		2N238	A	310	50	-20	-150	50 (Avg)	-20	-20		37	42			
		2N291	E	357	300	-25	-200	30 (45 Avg)	-25	-25		31/22†				
		2N680	A		150	-20	-150	(35 Avg)	-14	-12						
		2N250	K	356	25w	-30	-3a	30 at 0.5a	-1ma	-30		30				
		2N251	K	356A	25w	-60	-3a	30 at 0.5a	-2ma	-60		30				
general purpose	npn	2N364	A	200A	150	30	50	9	19	10	30				2.5	
		2N365	A	201A	150	30	50	19	49	10	30				3	
		2N366	A	202A	150	30	50	49	142	10	30				3.5	
		204A	A		150	60	50	9	49	10	30				2.5	
		2N368	A	301	150	-30	-50	19	49	-20	-30				1	
	pnp	2N369	A	302	150	-30	-50	49	142	-20	-30				1.3	
		2N1038	T		800	-40	-1a	20	60	-125	-20	0.2 ohm Rcs				
		2N1039	T		800	-60	-1a	20	60	-125	-30	0.2 ohm Rcs				
		2N1040	T		800	-80	-1a	20	60	-125	-40	0.2 ohm Rcs				
		2N1041	T		800	-100	-1a	20	60	-125	-50	0.2 ohm Rcs				
power	pnp	2N456	K		50w	-40	-5a	30 at 5a avg.	-2ma	-40	0.048 ohm Rcs					
		2N457	K		50w	-60	-5a	30 at 5a avg.	-2ma	-60	0.048 ohm Rcs					
		2N458	K		50w	-80	-5a	30 at 5a avg.	-2ma	-80	0.048 ohm Rcs					
		2N511	K‡		80w	40	10a	10 at 10a	20-2ma		0.025 ohm Rcs					
		2N511A	K‡		80w	60	10a	10 at 10a	30-2ma		0.025 ohm Rcs					
		2N511B	K‡		80w	80	10a	10 at 10a	40-2ma		0.025 ohm Rcs					
		2N512	K‡		80w	40	15a	10 at 15a	20-2ma		0.025 ohm Rcs					
		2N512A	K‡		80w	60	15a	10 at 15a	30-2ma		0.025 ohm Rcs					
		2N512B	K‡		80w	80	15a	10 at 15a	40-2ma		0.025 ohm Rcs					
		2N513	K‡		80w	40	20a	10 at 20a	20-2ma		0.025 ohm Rcs					
		2N513A	K‡		80w	60	20a	10 at 20a	30-2ma		0.025 ohm Rcs					
		2N513B	K‡		80w	80	20a	10 at 20a	40-2ma		0.025 ohm Rcs					
		2N514	K‡		80w	40	25a	10 at 25a	20-2ma		0.025 ohm Rcs					
		2N514A	K‡		80w	60	25a	10 at 25a	30-2ma		0.025 ohm Rcs					
		2N514B	K‡		80w	80	25a	10 at 25a	40-2ma		0.025 ohm Rcs					
		2N1021	K		50w	-100	-5a	23 at 5a avg.	-2ma	-100	0.08 ohm Rcs					
		2N1022	K		50w	-120	-5a	23 at 5a avg.	-2ma	-120	0.08 ohm Rcs					
		2N1042	B‡		20w	-40	-3a	20	60	-125	-20	0.16 ohm Rcs				
		2N1043	B‡		20w	-60	-3a	20	60	-125	-30	0.16 ohm Rcs				
		2N1044	B‡		20w	-80	-3a	20	60	-125	-40	0.16 ohm Rcs				
2N1045	B‡		20w	-100	-3a	20	60	-125	-50	0.16 ohm Rcs						

‡ Except for 0.090" Emitter lead † Min. audio power gain—Class A Class B § To specify case type T add suffix (-2) to type number ¶ To specify case type V add suffix (-1) to type number

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TRANSISTORS



SILICON TRANSISTORS

Type	Case Type	Dissipation at 25°C w	Small Signal Current Transfer Ratio h_{FE}		Collector Current $I_{c\ max}$	DC Current Transfer Ratio h_{FE}		Collector Breakdown Voltage-v $V_{CB0\ min}$	Saturation Resistance $R_{CS\ Ohms\ max}$	Alpha Cutoff Frequency $f_{\alpha\ mc\ typ}$
			min	max		min	max			
small signal										
2N1149/903	A	0.150	9	20	25	10 (typ)	45	200	4	
2N1150/904	A	0.150	18	40	25	20 (typ)	45	200	5	
2N1151/904A	A	0.150	18	90	25	25 (typ)	45	200	8 (min)	
2N1152/905	A	0.150	36	90	25	40 (typ)	45	200	6	
2N1153/910	A	0.150	76	333	25	80 (typ)	45	200	7	
2N117	G	0.150	9	20	25	10 (typ)	45	200	4	
USN2N117	G	0.150	9	20	25	10 (typ)	45	200	1 (min)	
2N118	G	0.150	18	40	25	20 (typ)	45	200	5	
USN2N118	G	0.150	18	40	25	20 (typ)	45	200	2 (min)	
2N118A	G	0.150	18	90	25	25 (typ)	45	200	8 (min)	
2N119	G	0.150	36	90	25	40 (typ)	45	200	6	
USN2N119	G	0.150	36	90	25	40 (typ)	45	200	2 (min)	
2N120	G	0.150	76	333	25	80 (typ)	45	200	7	
2N332	If	0.150	9	20	25	10 (typ)	45	200	4	
2N333	If	0.150	18	40	25	20 (typ)	45	200	5	
2N334	If	0.150	18	90	25	25 (typ)	45	200	8 (min)	
2N335	If	0.150	36	90	25	40 (typ)	45	200	6	
2N336	If	0.150	76	333	25	80 (typ)	45	200	7	
switching										
2N337	If	0.125	19		20	20	55	45	150	10 (min)
2N338	If	0.125	39		20	45	150	45	150	20 (min)
2N702	U	0.500	1 at 50mc		20	15	45	20	60	100
high frequency										
3N34	H	0.125	1 at 30mc		10 Power Gain: 22db typ at 30 mc		30	300		
3N35	H	0.125	1 at 70mc		10 Power Gain: 20db typ at 70 mc		30	300	150	
medium power										
2N1154/951	A	0.750	9		60	18 (typ)	50	300	8	
2N1155/952	A	0.750	9		50	18 (typ)	80	350	8	
2N1156/953	A	0.750	9		40	18 (typ)	120	400	8	
2N243	A	0.750	9	32	60	14 (typ)	60	350	7	
2N244	A	0.750	28	90	60	30 (typ)	60	350	8	
2N339	J	1	9	90	60	15 (typ)	55	300	6	
2N340	J	1	9	90	60	15 (typ)	85	350	6	
2N341	J	1	9	90	60	20 (typ)	125	400	6	
2N342	J	1	9	32	60	14 (typ)	60	350	6	
2N342A	J	1	9	32	60	14 (typ)	85	350	6	
2N343	J	1	28	90	60	30 (typ)	60	350	8	
2N497	If§	4		30 (typ)		12	36	60	25	9
2N498	If§	4		30 (typ)		12	36	100	25	9
2N656	If§	4		60 (typ)		30	90	60	25	8
2N657	If§	4		60 (typ)		30	90	100	25	8
intermediate power										
2N122	L	8.75			140	3	120	200	1	
2N1047	F	40		20 (typ)		12	36	80	15	8
2N1048	F	40		20 (typ)		12	36	120	15	8
2N1049	F	40		40 (typ)		30	90	80	15	7
2N1050	F	40		40 (typ)		30	90	120	15	7
power										
2N389	D	85 at 25°C 45 at 100°C		30 (typ)		12	60	60	5	7
2N424	D	85 at 25°C 45 at 100°C		30 (typ)		12	60	80	10	6

† All connections insulated from case § Collector in electrical contact with case

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TRANSISTORS

TYPE	CASE	CLASS	MAT	APP	TYPICAL OPERATION						MAXIMUM RATINGS						
					I _{CO} μa	I _{EO} μa	PG db	α _{or} β	T °C	f _a mc	V _{EB} V	V _{CE} V	V _{CB} V	I _c ma	P _c mw	T _J °C	K °C/mw

RAYTHEON MANUFACTURING CO., (Cont.) Semiconductor Div., 55 Chapel St., Newton 58, Mass.

2N425	A	PNPA	G	Sw	2	1.5			30	25	4	20	20	30	400	150	85	0.35
2N426	A	PNPA	G	Sw	2	1.5			40	25	6	20	18	30	400	150	85	0.35
2N427	A	PNPA	G	Sw	2	1.5			55	25	11	20	15	30	400	150	85	0.35
2N428	A	PNPA	G	Sw	2	1.5			80	25	17	20	12	30	400	150	85	0.35
2N464	A	PNPA	G	Af	6		40		26	25	0.7	12	40	45	100	150	85	0.35
2N465	A	PNPA	G	Af	6		42		45	25	0.8	12	30	45	100	150	85	0.35
2N466	A	PNPA	G	Af	6		44		90	25	1.0	12	20	35	100	150	85	0.35
2N467	A	PNPA	G	Af	6		45		180	25	1.2	12	15	35	100	150	85	0.35
2N481	A	PNPA	G	rf, rf	3	2			50	25	3		12		20	150	85	0.35
2N482	A	PNPA	G	if, rf	3	2			50	25	3.5		12		20	150	85	0.35
2N483	A	PNPA	G	if, rf	3	2			60	25	5.5		12		20	150	85	0.35
2N484	A	PNPA	G	if, rf	3	2			90	25	10		12		20	150	85	0.35
2N485	A	PNPA	G	if, rf	3	2			50	25	7.5		12		10	150	85	0.35
2N486	A	PNPA	G	if, rf	3	2			100	25	12		12		10	150	85	0.35
2N619	A	NPNA	G	Af, Sw	0.005	0.005			15	25	0.2	20		45	50	380	160	0.35
2N620	A	NPNA	Si	Af, Sw	0.005	0.005			30	25	0.3	20		50	50	380	160	0.35
2N621	A	NPNA	Si	Af, Sw	0.005	0.005			60	25	0.5	20		50	50	380	160	0.35
2N631	A	PNPA	G	Af, B-Amp	10		35		150	25	1.2	6	20	25	50	150	185	0.35
2N632	A	PNPA	G	Af, B-Amp	10		25		100	25	1.0	6	24	30	50	150	85	0.35
2N633	A	PNPA	G	Af, B-Amp	10		25		60	25	0.8	6	30	35	50	150	85	0.35
2N658	A	PNPA	G	Sw	2.5	2.5			50	25	5.0	12	16	25	1a	150	85	0.35
2N659	A	PNPA	G	Sw	2.5	2.5			70	25	10	12	14	25	1a	150	85	0.35
2N660	A	PNPA	G	Sw	2.5	2.5			90	25	15	12	11	25	1a	150	85	0.35
2N661	A	PNPA	G	Sw	2.5	2.5			120	25	20	12	9	25	1a	150	85	0.35
2N662	A	PNPA	G	Sw	2.5	2.5			60	25	8	12	11	25	1a	150	85	0.35
2N1017	A	PNPA	G	Sw	2	1.5			100	25	20	20	10	30	1a	150	85	0.35
2N1034	A	PNPA	Si	Sw	0.005	0.005			15	25	0.2	20	40	50	50	380	160	0.35
2N1034	A	PNPA	Si	Sw	0.005	0.005			30	25	0.3	20	35	50	50	380	160	0.35
2N1036	A	PNPA	Si	Sw	0.005	0.005			60	25	0.5	20	30	50	50	380	160	0.35
2N1087	A	PNPA	Si	Sw	0.005	0.005			25	25	0.3	20	35	50	50	380	160	0.35
2N1074	A	NPNA	Si	Sw	0.005	0.005			15	25	0.2	20	40	45	50	380	160	0.35
2N1075	A	NPNA	Si	Sw	0.005	0.005			28	25	0.3	20	35	50	50	380	160	0.35
2N1076	A	NPNA	Si	Sw	0.005	0.005			60	25	0.5	20	30	50	50	380	160	0.35
2N1077	A	NPNA	Si	Sw	0.005	0.005			25	25	0.3	20	30	50	50	380	160	0.35
CK13	B	PNPA	G		2	2	10		30	25	2.5	20	18	30	200	80	85	0.75
CK14	B	PNPA	G		2	2	16		60	25	7	20	15	30	200	80	85	0.75
CK16	B	PNPA	G		2	2	20		80	25	10	20	12	30	200	80	85	0.75
CK17	B	PNPA	G		2	2	27		140	25	18	20	10	30	200	80	85	0.75
CK22	B	PNPA	G	Af	2		44		90	25	12	12	20	35	100	80	85	0.75
CK25	B	PNPA	G	Sw	2	1.5			30	25	4	20	20	30	400	80	85	0.75
CK26	B	PNPA	G	Sw	2	1.5			40	25	6	20	18	30	400	80	85	0.75
CK27	B	PNPA	G	Sw	2	1.5			55	25	11	20	15	30	400	80	85	0.75
CK28	B	PNPA	G	Sw	2	1.5			80	25	17	20	12	30	400	80	85	0.75
CK64	B	PNPA	G	Af	2		40		22.5	25	0.8	12	29	45	100	80	85	0.75
CK65	B	PNPA	G	Af	2		42		45	25	1.0	12	24	45	100	80	85	0.75
CK66	B	PNPA	G	Af	2		44		90	25	1.2	12	20	35	100	80	85	0.75
CK67	B	PNPA	G	Af	2		45		180	25	1.5	12	15	35	100	80	85	0.75

RHEEM SEMICONDUCTOR CORP., 327 Moffett Blvd., Mountain View, Calif.

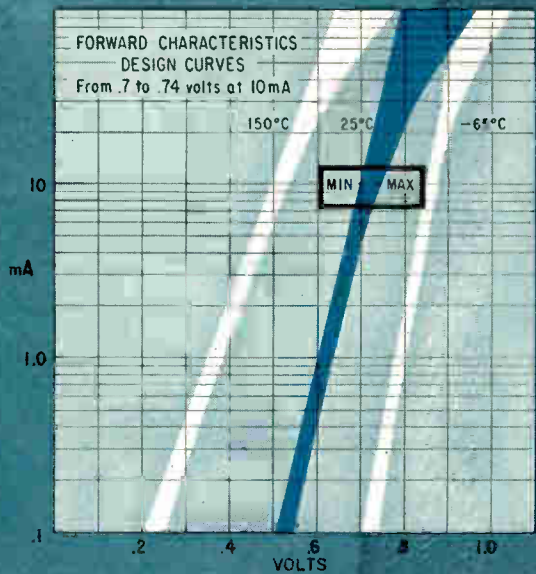
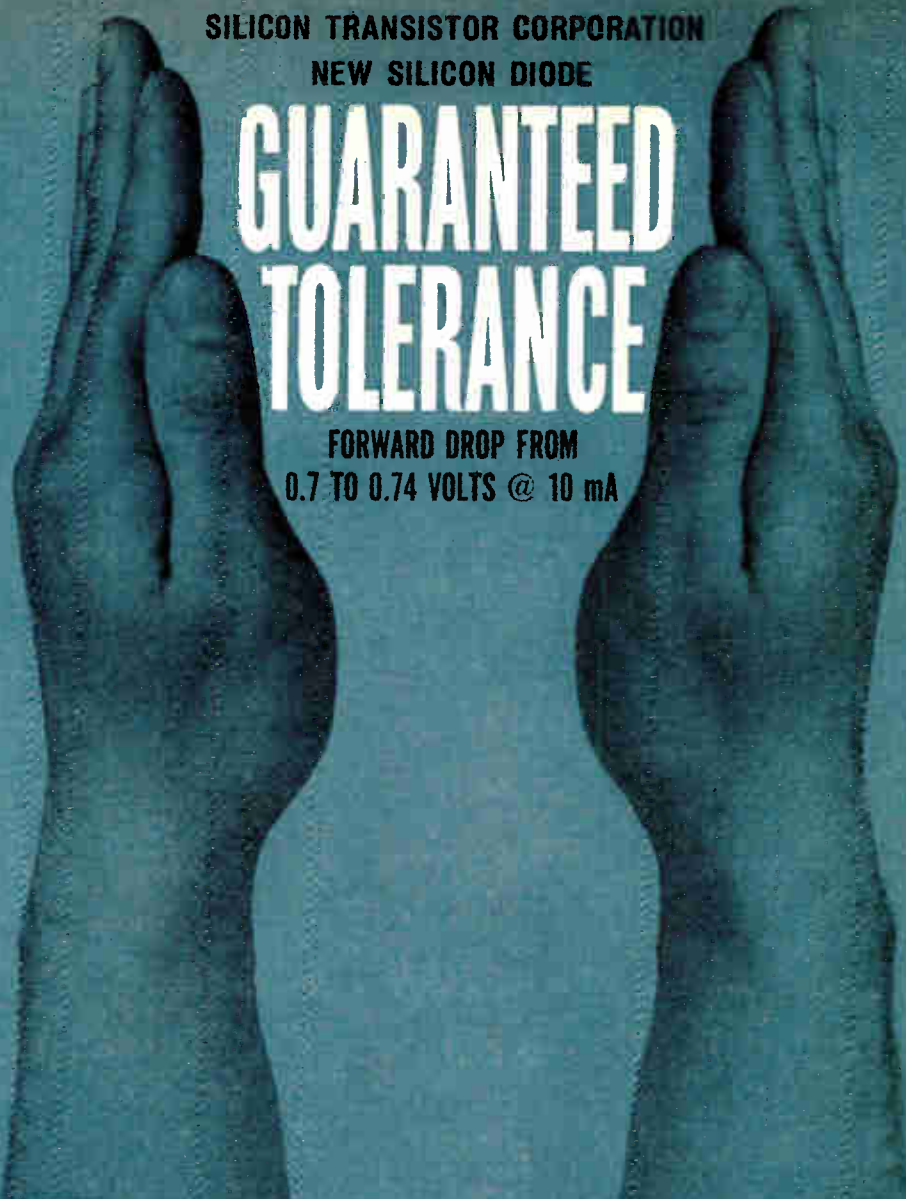
2N332	NPN	Si	Af, B-Amp, if, rf	<4		35		90-20	<1					25	150	175	
2N333	NPN	Si	Af, B-Amp, if, rf	<4		39		18-40	<2					25	150	175	
2N334	NPN	Si	Af, B-Amp, if, rf	<4		39		18-90	<8					25	150	175	
2N335	NPN	Si	Af, B-Amp, if, rf	<4		42		36-90	<2					25	150	175	
2N336	NPN	Si	Af, B-Amp, if, rf	<4		42		78-333						25	150	175	
2N337	NPN	Si	Af, B-Amp, if, rf	<4						20				20	125	150	
2N338	NPN	Si	Af, B-Amp, if, rf	<4						10				20	125	150	
2N471A	NPN	Si	if, rf	0.5								30	30		200	175	
2N474A	NPN	Si	if, rf	0.5								30	30		200	175	
2N479A	NPN	Si	if, rf	0.5								30	30		200	175	
2N497	NPN	Si	Sw	0.1								60	60		4w	200	
2N498	NPN	Si	Sw	<15	0.1							100	100		4w		
2N545	NPN	Si	Sw	<15	<100							60	60		5w		
2N546	NPN	Si	Sw	<15	<100							30	30		5w		
2N547	NPN	Si	Af, B-Amp, if, rf	<15	<100							60	60		5w		
2N548	NPN	Si	Af, B-Amp, if, rf	<15	<100							30	30		5w		
2N549	NPN	Si	Af, B-Amp, if, rf	<3	<100							60	60		5w		
2N550	NPN	Si	Af, B-Amp, if, rf	<3	<100							30	30		5w		
2N551	NPN	Si	Af, B-Amp, if, rf	<3	<100							60	60		5w		
2N552	NPN	Si	Af, B-Amp, if, rf	<3	<100							30	30		5w		
2N656	NPN	Si	Sw	<3	<100							60	60		4w		

SILICON TRANSISTOR CORPORATION

NEW SILICON DIODE

GUARANTEED TOLERANCE

FORWARD DROP FROM
0.7 TO 0.74 VOLTS @ 10 mA



Silicon Transistor Corp. now manufactures subminiature silicon glass diodes with a guaranteed forward drop of 0.7 to 0.74 volts @ 10 mA with a tolerance of 40 mV.

The recent STC development of Guaranteed Forward Tolerance enables design engineers to utilize techniques heretofore impractical and eliminates many problems now existing with matched pairs and quads.

TYPE	FORWARD VOLT DROP @ 10 mA VOLTS	MAX. REV. D.C. CURR. @ MAX. REV. WKG. VOLTS		MAX. WKG. VOLTS	MIN. REV. V. @ 100 μ A & 25°C.	MAX. AV. FORWARD CURRENT @ 25°C. mA
		μ A @ 25°C.	μ A @ 150°C.			
STC 101	.7 to .74	0.025	15	35	40	200
STC 102	.7 to .74	0.025	5	35	40	200
STC 103	.7 to .74	0.025	15	70	80	200
STC 104	.7 to .74	0.025	5	70	80	200
STC 105	.7 to .74	0.025	15	130	150	200
STC 106	.7 to .74	0.025	5	130	150	200
STC 107	.7 to .74	0.025	15	180	200	200
STC 108	.7 to .74	0.025	5	180	200	200



STC manufactures a complete line of silicon diodes. Write for technical bulletins.

SILICON TRANSISTOR CORPORATION

CARLE PLACE, LONG ISLAND, NEW YORK PIONEER 2-4100

TRANSISTORS

TYPE	CASE	CLASS	MAT	APP	TYPICAL OPERATION					MAXIMUM RATINGS								
					I _{CO} μa	I _{EO} μa	PG db	α or β	T °C	f _α ma	V _{EB} V	V _{CE} V	V _{CB} V	I _C ma	P _C mw	T _J °C	K °C/mw	
RHEEM SEMICONDUCTOR CORP. (Cont.) 327 Moffett Blvd., Mountain View, Calif.																		
2N657		NPN	Si	Sw								100	100			4w		
2N1005		NPN	Si	Sw, if, rf									15			125		
2N1006		NPN	Si	Sw, if, rf									15			125		
SILICON TRANSISTOR CORP. , 150 Glen Cove Road, Carle Place, L. I., N. Y.																		
2N1069	A	NPND	Si	Af, Pwr, Sw	25	1			25	1.2		9	45	60	4a	50w	175	1
2N1070	A	NPND	Si	Af, Pwr, Sw	25	1			25	1.2		9	45	60	4a	50w	175	1
SPERRY SEMICONDUCTOR DIV. , Sperry Rand Corp., Great Neck, L. I., N. Y.																		
2N1024	A	PNPA	Si	Af, rf, if	.025	.025		9	25	1		15	15	15	100	150	150	.83
2N1025	A	PNPA	Si	Af, rf, if	.025	.025		9-18	25	1		35	35	35	100	150	150	.83
2N1026	A	PNPA	Si	Af, rf, if	.025	.025		18-36	25	2		35	35	35	100	150	150	.83
2N1026A	A	PNPA	Si	Af, rf, if	.025	.025		36	25	2		35	35	35	100	150	150	.83
2N1027	A	PNPA	Si	Af, rf, if, Sw	.025	.025		18	25	4		15	15	15	100	150	150	.83
2N1028	A	PNPA	Si	Af, rf, if, Sw	.025	.025		9	25	4	f _α =1.8mc	10	10	10	100	150	150	.83
SPRAGUE ELECTRIC CO. , North Adams, Mass.																		
2N128	C	SBT	G	if, rf	0.6	0.5		40	25	60 ¹		4.5	10	5	25	85		
2N129		PNP	G					0.955	25			-4.5	-10	-5	30			
2N240	C	SBT	G	if, rf	0.7	0.5		30	25			6	6	15	30	85		
2N344	C	SBT	G	if, rf, Sw	0.7	0.7		22	25	50 ¹		5	5	5	20 ⁴	55	0.75	
2N345	C	SBT	G	if, rf, Sw	0.7	0.7		35	25	50 ¹		5	5	5	20 ⁴	55	0.75	
2N346	C	SBT	G	if, rf, Sw	0.7	0.7		20	25	75 ¹		5	5	5	20 ⁴	55	0.75	
2N393	C	MAT	G	Gen	1.5	2.5		155	25	60 ¹		6	6	50	25 ⁵	85		
2N501	F	MADT	G	Sw	1			35	25			12	15	50	25 ⁵			
2N501A	F	MADT	G	Sw	1			35	25			12	15	50	25 ⁵	100	2.2	
2N1122	C	MAT	G	Sw	5 ³	10 ³		35 ⁴	25	40 ^{1,4}		10	15	50	25 ⁵	85	1.6	
2N1122A	C	MAT	G	Sw	5 ³	10 ³		35 ⁴	25	40 ^{1,4}		14	15	50	25 ⁵	85	1.6	
SB-100	C	SBT	G	Pwr, Sw	0.5			20	25	45 ¹		4.5		5	10 ⁴	55		
1. fmax 2. D. C. 3. max 4. min 5. @ 45°C 6. @ 40°C.																		
SYLVANIA ELECTRIC PRODUCTS INC. , Semiconductor Div., 100 Sylvan Rd., Woburn, Mass.																		
2N34	A	PNP	G	Af	75	35			25	0.4			-40	50	50	75		
2N35	A	NPN	G	Af	50	37		75	25			25	40	100	50	75		
2N68	B	PNP	G	Af, Pwr	5ma	23			25	0.4		-15	-30	1.5A	1.5w	75		
2N94	A	NPN	G	rf, if		26		35	25	3		20			50	75		
2N94A	A	NPN	G	rf, if	25	27			25	6		20	20	50	50	75		
2N95	B	NPN	G	Af, Pwr	5ma	23			25	0.4		15	30	1.5A	1.5w	75		
2N101	C	PNP	G	Af, Pwr	5ma	23			25	0.4		-15	-30		1w	75		
2N102	C	NPN	G	Af, Pwr	5ma	23			25	0.4		-15	-30	800	1w	75		
2N109		PNP	G	Af	5				25	0.4			-25	70	50	85		
2N123		PNP	G	Sw					25	5		-15	-30	125	100	85		
2N139		PNP	G	rf, if	6	30		45	25	6			-16	15	35	70		
2N140		PNP	G	Cntr	5	30			25	5			-16	15	35	85		
2N141	B	PNP	G	Af, Pwr	5	23			25	0.4		-30	-60	800	1.5w	75		
2N142	B	NPN	G	Af, Pwr	5	23			25	0.4		-30	-60	800	1.5w	75		
2N143	C	PNP	G	Af, Pwr	5	23			25	0.4		-30	-60	800	1w	75		
2N144	C	NPN	G	Af, Pwr	5	23			25	0.4		-30	-60	800	1w	75		
2N155	F	PNP	G	Af, Pwr	0.5ma			60	25			-25	-30	3A	8.5	85		
2N168A		NPN	G	mixer		25			25	5		15	15	20	65	85		
2N169A		NPN	G	if		25			25	2		25	25	20	65	75		
2N176	F	PNP	G	Af					25			-30		3A	10w	90		
2N193	A	NPN	G	OSC	25			7.5	25	3		18		50	50	75		
2N194	A	NPN	G	mixer	25	15		8	25	3		18		50	50	75		
2N194A		NPN	G	mixer		23			25			18		50	50	75		
2N211	A	NPN	G	OSC	25			10	25	3		10		50	50	75		
2N212	A	NPN	G	cvtr	25	30		20	25	6		12		50	50	75		
2N213	A	NPN	G	Af	50	40		300	25			25	40	100	50	75		
2N213A		NPN	G	Af					25	10kc		0.5		100	150	85		
2N214	A	NPN	G	Af, matched pair	25	28			25	10kc		25	40	100	180	85		
2N216	A	NPN	G	if	25	26		7.5	25	3		18		10	50	75		
2N217		PNP	G	Af	5	33			25				-25	70	50	85		
2N228	A	NPN	G	Af	50	26		60	25	0.6		25	40		50	75		
2N229	A	NPN	G	Af, if	40			15	25	3			6	40	50	75		
2N233	A	NPN	G	if	50			4.5	25			10	10	50	50	75		
2N233A	A	NPN	G	if	25	24		5	25	3		18		50	50	75		
2N235A	F	PNP	G	Af, Pwr	0.5ma	35		60	25				-40	3a	25	90		
2N235B		PNP	G	Af, Pwr		36			25			35		3a	35w	95		
2N236B		PNP	G	Af, Pwr		36			25			40		3a	35w	95		
2N241A		PNP	G	Af	16	35			25	1.3		-25	-25	200	180	85		

MERCK HAS ALL FOUR FORMS OF Silicon

IN PRODUCTION QUANTITIES

MERCK DOPED SINGLE CRYSTAL SILICON—offers doped float zone single crystals of high quality at low costs. Yields of usable material are reported to be especially high when device diffusion technics are used with these crystals. Float zone single crystals doped either "p" or "n" type with resistivities from 3 to 300 ohm cm. any range plus or minus 25% and a minimum lifetime of 100 microseconds are available in diameters of 18 to 20 mm., and random lengths of 2 to 10 inches.

NOTE: Doped single crystals in other diameters, resistivities, or lifetimes not listed above can be furnished as specials.

MERCK HIGH RESISTIVITY "P" TYPE SINGLE CRYSTAL SILICON—offers float zone single crystals of a quality unobtainable by other methods. Available with minimum resistivity of 1000 ohm cm. "p" type and a minimum lifetime of 200 microseconds, diameter 18 to 20 mm., random lengths 2 to 10 inches.

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For additional information on specific applications and processes, write Merck & Co., Inc., Electronic Chemicals Division, Department E1-2, Rahway, New Jersey.

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Type	Max. Dissipation at 25° Ambient	Max. Junction Temp (°C)	Max. I_c (ma)	Current Gain h_{FE}	Max. Rise Time, t_r (Microseconds)
2N356	100 mw	85	500	30	2.0
2N357	100 mw	85	500	30	1.2
2N358	100 mw	85	500	30	0.8
2N377*	150 mw	100	200	40	2.5
2N385*	150 mw	85	200	70	—
2N388*	150 mw	100	200	110	1.0

*Base internally connected to the case

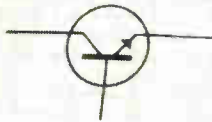
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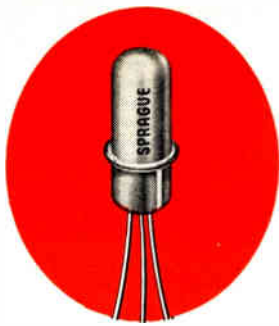
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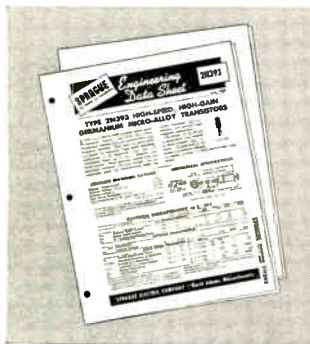


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Types 2N393 and 2N1122 Micro-Alloy Transistors combine high gain with excellent high frequency response to meet demands of high-speed computer switching applications in the megacycle range. Low saturation resistance, low hole storage, and exceptionally good life characteristics make these micro-alloy transistors top performers in general high frequency applications and computer circuits.



Made by electrochemical manufacturing techniques, Sprague Micro-Alloy Transistors are uniformly reliable, as well as reasonably priced for transistors with such excellent operating parameters.

All Sprague transistors—micro-alloy, micro-alloy diffused base, and surface barrier types—are now produced in Sprague's completely new spotless semiconductor facility.

For engineering data sheets on the types in which you are interested, write Technical Literature Section, Sprague Electric Company, 233 Marshall Street, North Adams, Massachusetts.

● *Sprague micro-alloy, micro-alloy diffused base, and surface barrier transistors are fully licensed under Philco patents. All Sprague and Philco transistors having the same type numbers are manufactured to the same specifications and are fully interchangeable. You have two sources of supply when you use micro-alloy and surface barrier transistors!*

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FOR COMPUTER
SWITCHING



2N344/SB101
FOR MEDIUM GAIN
AMPLIFIERS



2N345/SB102
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2N246/SB103
FOR HIGH FREQUENCY
OSCILLATORS



2N501
MADT FOR ULTRA-HIGH
SPEED SWITCHING

SPRAGUE®

THE MARK OF RELIABILITY

TRANSISTORS

TYPE	CASE	CLASS	MAT	APP	TYPICAL OPERATION						MAXIMUM RATINGS							
					I _{CO} μa	I _{EO} μa	PG db	aor β	T °C	f _a mc	V _{EB} v	V _{CE} v	V _{CB} v	I _c ma	P _c mw	T _J °C	K °C/mw	
SYLVANIA ELECTRIC PRODUCTS, INC. (Cont.)					Semiconductor Div., 100 Sylvan Rd., Woburn, Mass.													
2N217	F	PNP	G	Af, Pwr	1.0		35		60	25			-30	-30	3a	25w	90	
2N247	G	PNP	G	if, rf	25		27		60	25		-0.5		-35	10	35	85	
2N250	F	PNP	G	af, Pwr	2.5ma		33		60	25			-30	-30	2a	12w	80	
2N255		PNP	G	Af, Pwr	1.5ma		21		40	25				-15	3a	6.25w	85	
2N256		PNP	G	Af, Pwr			25		25	25	0.1		-30		3a	6.25w	85	
2N257	F	PNP	G	Af, Pwr	1ma		33		60	25				-40	2a	25w	85	
2N268		PNP	G	Af, Pwr	2ma		30		25	25	.006			-80		-80	85	
2N270		PNP	G	Af, Pwr	75		30		25	25	.006			-25	75	150	75	
2N285A		PNP	G	Af, Pwr					25	25	.004		-35		3a	32w	95	
2N292		NPN	G	if			25		25	25	5		15	15	20	65	85	
2N296	F	PNP	G	Af, Pwr	1ma				30	25	.004		-60		2a	25w	85	
2N301	F	PNP	G	Af, Pwr	0.5ma		35		25	25				-40	1a	12w	85	
2N301A	F	PNP	G	Af, Pwr	0.5ma				25	25				-60	1a	12w	85	
2N306	A	NPN	G	Af,			37		75	25	0.6			20		50	75	
2N307	F	PNP	G	Af, Pwr	7.5ma				25	25	.003		-35	-35	1a	10w	75	
2N312		NPN	G	Sw	7				50	25	1.5		15	15	200	100	85	
2N307A		PNP	G	Af, Pwr	3.5ma				30	25	.0035		-35	-35	2a	17w	75	
2N321		PNP	G	Af	16		35		73	25	1.3		-30		200	200	85	
2N326	F	NPN	G	Af	250				35	25	0.15		35		35	2a	7w	85
2N350	F	PNP	G	Af	1.5ma				30	25	.005			-40	3a	10w	90	
2N351	F	PNP	G	Af	1.5ma				45	25	.005			-40	3a	10w	90	
2N356	E	NPN	G	Sw	20				30	25	3		18	20	500	100	85	
2N357	E	NPN	G	Sw	20				30	25	6		15	20	500	100	85	
2N358	E	NPN	G	Sw	20				30	25	9		12	20	500	100	85	
2N370	G	PNP	G	Af	25		13.5		25	25		-1.5		-20		80	85	
2N371	G	PNP	G	OSC	25		14.5		90	25		-0.5		-20	10	80	85	
2N372	G	PNP	G	mixer	27		14.5		90	25		-0.5		-20	10	80	85	
2N373		PNP	G	if	3		38		90	25		-0.5		-12	10	80	85	
2N374		PNP	G	Cnvtr	3		40		105	25		-0.5		-12	10	80	85	
2N377	D	NPN	G	Sw	6				40	25			20	25	200	150	100	
2N381		PNP	G	Af, Pwr	10		30		25	25	10		-30		200	200	85	
2N282		PNP	G	Af, Pwr	10		34		25	25	10		-30		200	200	85	
2N383		PNP	G	Af, Pwr	10		38		25	25	10		-30		200	200	85	
2N384		PNP	G	VHF, Amp			38		25	25		-0.5		-30	10	120	85	
2N385	D	NPN	G	Sw	17				70	25	4		25	25	200	150	100	
2N388	D	NPN	G	Sw	10				110	25	8		20	25	200	150	100	
2N404		PNP	G	Sw	10				25	25	4		-24	-25	100	120	85	
2N405		PNP	G	Af					25	25			-13	-18	35	150	85	
2N406		PNP	G	Af	14				25	25			-12	70	150	85		
2N407		PNP	G	Af	14				25	25			-20	70	150	85		
2N408		PNP	G	Af	14				25	25			-20	70	150	85		
2N409		PNP	G	mixer			20		25	25			-20		15	80	85	
2N410		PNP	G	mixer			20		25	25			-20		15	80	85	
2N411		PNP	G	Cnvtr	5		32		25	25				-13	15	80	85	
2N412		PNP	G	Cnvtr	5		32		25	25				-13	15	80	85	
2N419		PNP	G	Pwr					25	25			-45		3a	32w	95	
2N420		PNP	G	Pwr					25	25			-40		5a	34w	100	
2N425		PNP	G	Sw	10				15	25	6		-20	-30	400	150	85	
2N426		PNP	G	Sw	10				18	25	11		-18	-30	400	150	85	
2N427		PNP	G	Sw	10				20	25	17		-15	-30	400	150	85	
2N428		PNP	G	Sw	10				30	25	20		-12	-30	400	150	85	
2N439		NPN	G	Sw Sw					25	25			20	30	100	100	85	
2N515	A	NPN	G	if	25				7.5	25	3		18		10	50	75	
2N516	A	NPN	G	if	25				7.5	25	3		18		-10	50	75	
2N517	A	NPN	G	if	25				7.5	25	3		18		10	50	75	
2N544		PNP	G	if, rf	25				100	25	1.5		-1.0		10	80	85	
2N554		PNP	G	Af, Pwr					25	25	.008				3a	10w	100	
2N556	E	NPN	G	Sw	10				50	25	.002		20	25	200	100	85	
2N557	E	NPN	G	Sw	10				30	25	.002		20	20	200	100	85	
2N558	E	NPN	G	Sw	10				75	25	.002		10	15	200	100	75	
2N585		NPN	G	Sw					25	25			20	25	200	120	85	
2N587		NPN	G	Sw	25				30	25	.002		20	40	200	150	85	
2N591		PNP	G	Af			40		25	25	10kc		-25	-40	100	150	75	
2N624		PNP	G	12.5 mc, Amp	15		20		25	25	12.5		-20	-30		100	100	
2N677		PNP	G	Pwr, Sw					25	25			-30	-50	15a	50	100	
2N677A		PNP	G	Pwr, Sw					25	25			-40	-60	15a	50	100	
2N677B		PNP	G	Pwr, Sw					25	25			-70	-90	15a	50	100	
2N677C		PNP	G	Pwr, Sw					25	25			-90	-100	15a	50	100	
2N679		NPN	G	Sw					25	25			20	25	200	150	85	
2N1058		NPN	G	Cnvtr			24	25	25	25	4		18		75	50	75	

TRANSISTORS

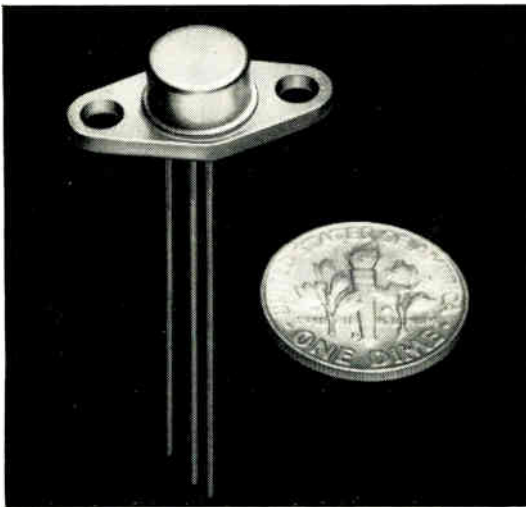
TYPE	CASE	CLASS	MAT	APP	TYPICAL OPERATION					MAXIMUM RATINGS								
					I _{CO} μa	I _{EO} μa	PG db	α or β	T °C	f _α ma	V _{EB} V	V _{CE} V	V _{CB} V	I _C mA	P _C mW	T _J °C	K °C/mW	
SYLVANIA ELECTRIC PRODUCTS INC., (Cont.) Semiconductor Div., 100 Sylvan Rd., Woburn, Mass.																		
2N1059	NPN	G	Af				28		25	10kc		15	40	100	180	75		
2N1101	NPN	G	Af						25	10kd		15	20	100	180	75		
2H1102	NPN	G	Af						25	10kc		25	40	100	180	75		
2N1114	NPN	G	Sw						25	7		15	25	200	150	100		
TEXAS INSTRUMENTS INCORPORATED , Semiconductor - Components Div., P.O. Box 312, Dallas Texas																		
2N85	A PNP	G	Af, B-Amp		-8		40.5		80	0.2		20	20	150	150 ¹	60		
2N238	A PNP	G	Af		-8		37-42		55	0.2		20	20	100	50 ¹	60		
2N243	B NPN	Si	Pwr		1				9-32					60	750	150	0.6mw/°C	
2N244	B NPN	G	Pwr		1				28-90					60	750	150	0.6mw/°C	
2N248	A PNP	G	if-rf		-10 ²				104-11	50		25	25	5	30	85		
2N250	K PNP	G	Pwr		-0.3ma							30	30	3a	25w ¹	85	1.1°C/W	
2N251	K PNP	G	Pwr		-0.5ma		31-40					60	60	3a	25w ¹	85	1.1°C/W	
2N252	A PNP	G	if, rf		-5		34		30	30		16	16	-5	30 ¹	55		
2N253	A NPN	G	if, rf		0.2		28-32		10	2.5		12	12	5	65 ¹	75	0.7	
2N254	A NPN	G	if, rf		0.2		32-36		15	3		20	20	5	65 ¹	75	0.7	
2N291	E PNP	G	Af, B-Amp		-10		33		90	0.2		25	25	200	300 ¹	50	0.125	
2N308	A PNP	G	if, rf		-5		39-42		30	30		20	20	-5	30 ¹	55		
2N309	A PNP	G	if, rf		-5		41-44		30	30		20	20	-5	30 ¹	55		
2N310	A PNP	G	Af, if, rf		-5		37		30	30		30	30	-5	30 ¹	55		
2N332	I NPN	Si	Gen		21-2		35		9-20 ³	14		45	25	150 ¹	175	0.12mw/°C		
2N333	I NPN	Si	Gen		21-2		39		18-40 ³	23		45	25	150 ¹	175	0.12mw/°C		
2N334	I NPN	Si	Gen		21-2		39		18-90 ³	84		45	25	150 ¹	175	0.12mw/°C		
2N335	I NPN	Si	Gen		21-2		42		36-90 ³	24		45	25	150 ¹	175	0.12mw/°C		
2N336	I NPN	Si	Gen		21-2		52.5		76-333 ³			45	25	150 ¹	175	0.12mw/°C		
2N337	I NPN	Si	Sw		11-2					20		40	20	125 ¹	150	1mw/°C		
2N338	I NPN	Si	Sw		11-2					10		40	20	125 ¹	150	1mw/°C		
2N339	J NPN	Si	Pwr		11-2			93-4				55	60	1w ¹	150	0.8mw/°C		
2N340	J NPN	Si	Pwr		11-2			93-4				85	50	1w ¹	150	0.8mw/°C		
2N341	J NPN	Si	Pwc		11-2			93-4				125	40	1w ¹	150	0.8mw/°C		
2N342	J NPN	Si	Pwr		11-2			9-32 ³				60	60	1w ¹	150	0.8mw/°C		
2N343	J NPN	Si	Pwr		11-2			28-90 ³				60	60	1w ¹	150	0.8mw/°C		
2N364	A NPN	G	Gen		10 ²			9-19 ³		3		30	30	150	85			
2N365	A NPN	G	Gen		10 ²			19-49 ³				30	30	150	85			
2N366	A NPN	G	Gen		10 ²			49-142 ³		3.5		30	50	150	85			
2N368	A PNP	G	Gen		20 ²			19-49 ³		1		30	50	100	75			
2N369	A PNP	G	Gen		20			49-142 ³		1.3		30	50	100	75			
2N389	D NPN	Si	Pwr		10ma		20	6-60		0.3		60	20	85w	200			
2N395	X PNP	G	Sw		150			20		4.5		-15	30	-250	150	100	0.5	
2N396	X PNP	G	Sw		150			30		8		-30	-250	150				
2N397	X PNP	G	Sw		150			40		12		-30	-250	150				
2N424	D NPN	Si	Pwr		10ma		20	6-60		0.3		80	2a	85w	200			
2N456	K PNP	G	Pwr		-2ma ²			130 ⁵		8kc		40	40	5a	50w	95	1.1°C/W	
2N457	K PNP	G	Pwr		-2ma ²			130 ⁵		8kc		60	60	5a	50w	95	1.1°C/W	
2N458	K PNP	G	Pwr		-2ma ²			130 ⁵		8kc		80	80	5a	50w	95	1.1°C/W	
2N497	I PNP	Si	B-Amp		15	100		12-36		0.1		60	60	4w	200			
2N498	I PNP	Si	B-Amp		15	100		12-36		0.2		100	100	4w	200			
2N511	K PNP	G	Pwr		-0.2ma	-0.2ma		10	0.7*	7kc		-40	-40	10a	80w	.95	0.88	
2N511A	K PNP	G	Pwr		-0.2ma	-0.2ma		10	0.7*	7kc		-60	-60	10a	80w	.95	0.88	
2N511B	K PNP	G	Pwr		0.2ma	-0.2ma		10	0.7*	7kc		-80	-80	10a	80w	.95	0.88	
2N512	K PNP	G	Pwr		0.2ma	-0.25ma		10	0.7*	7kc		-40	-40	15a	80w	.95	0.88	
2N512A	K PNP	G	Pwr		0.2ma	-0.25ma		10	0.7*	7kc		-60	-60	15a	80w	.95	0.88	
2N512B	K PNP	G	Pwr		0.2ma	-0.25ma		10	0.7*	7kc		-80	-80	15a	80w	.95	0.88	
2N513	K PNP	G	Pwr		-0.2ma	-0.2ma		10ki	0.88*	7kc		-40	-40	20a	80w	.95	0.7	
2N513A	K PNP	G	Pwr		-0.2ma	-0.2ma		10ki	0.88*	7kc		-60	-60	20a	80w	.95	0.7	
2N514	K PNP	G	Pwr		-0.2ma	-0.2ma		10ki	0.88*	7kc		-40	-40	25a	80w	.95	0.7	
2N514A	K PNP	G	Pwr		-0.2ma	-0.2ma		10ki	0.88*	7kc		-60	-60	25a	80w	.95	0.7	
2N514B	K PNP	G	Pwr		-0.2ma	-0.2ma		10ki	0.88*	7kc		-80	-80	25a	80w	.95	0.7	
2N680	A PNP	G	Af		-8			35		0.2		-20	-20	-100	50	60		
2N702	NPN	Si	Sw		0.05			15-45 α	175	100		15v	20v	50	100°C	300	175	0.25
2N705	U PNP	G	Sw									-15	-15	-50	150	100	0.5	
2N1021	K PNP	G	Pwr		-0.2ma	-0.15ma		70	1.1	45kc		-100	-100	5a	50w	95	-1.4	
2N1022	K PNP	G	Pwr		-0.2ma	-0.15ma		70	1.1	45kc		-40	-40	-4a	800	95	3.5	
2N1038	T PNP	G	Gen		-50	-50		35	2.5*	8.5kc		-60	-60	-1a	800	95	3.5	
2N1039	T PNP	G	Gen		-50	-50		35	2.5*	8.5kc		-80	-80	-1a	800	95	3.5	
2N1040	T PNP	G	Gen		-50	-50		35	2.5*	8.5kc		-100	-100	-1a	800	95	3.5	
2N1041	T PNP	G	Gen		-50	-50		35	2.5*	8.5kc		-40	-40	3a	20	95	3.5	
2N1042	K PNP	G	Pwr		-125	50		40	2.5*	650kc		-60	-60	3a	20	95	3.5	
2N1043	K PNP	G	Pwr		-125	50		40	2.5*	650kc		-80	-80	-3a	20	95	3.5	
2N1044	B PNP	G	Pwr		-125	50		40	2.5*	650kc								

NEW!

SMALL!

DELCO POWER TRANSISTOR

Designed for use where space and weight are restricting factors



MAXIMUM RATINGS	2N1172
Collector Diode Voltage	40 volts
Emitter Diode Voltage	20 volts
Collector Current	1.5 Amperes
Junction Temperature	95°C
TYPICAL CHARACTERISTICS (25°C)	
Typ. Collector Diode Current I_{co} $V_{cb}=40$ volts	50 μ
Current Gain ($V_{ec} = -2$ volts, $I_c = 100$ Ma)	70
Current Gain ($V_{ec} = -2$ volts, $I_c = 1/2$ A)	30
Saturation Resistance	0.3 ohms
Cutoff Frequency (Common Emitter)	17 kc
Thermal Resistance	12° C/Watt

The 2N1172 is a medium power transistor offering dependable operation in a new range of applications where space and weight have been a problem.

It's a mighty mite with more punch in a smaller package. The 2N1172, excellent for output use or as a driver for a very high power transistor, has already proved especially effective in DC amplifiers, voltage regulators, and as a driver for a high power stage in servo or other amplifiers.

This PNP germanium transistor is housed in a modified version of the JEDEC 30 package with a diamond shaped base for improved thermal conduction. It dissipates up to 2 watts at a mounting base temperature of 70 degrees centigrade. Available now in volume production—write today for complete engineering data.

DELCO RADIO

Division of General Motors

Kokomo, Indiana

BRANCH OFFICES

Newark, New Jersey
1180 Raymond Boulevard
Tel: Mitchell 2-6165

Santa Monica, California
726 Santa Monica Boulevard
Tel: Exbrook 3-1465

TRANSISTORS

TYPE	CASE	CLASS	MAT	APP	TYPICAL OPERATION					MAXIMUM RATINGS						
					I _{CO} μa	I _{EO} μa	PG db	α _{0F} β	T °C	f _α mc	V _{EB} V	V _{CE} V	V _{CB} V	I _C ma	P _C mw	T _J °C	K °C/mw

TEXAS INSTRUMENTS INCORPORATED (Cont.)

Semiconductor - Components Div., P.O. Box 312, Dallas, Texas

2N1045	B PNP	G Pwr			-125	50		40	2.5*	650kc	-100	-100	-3a	20	95	3.5	
2N1046	K PNP	G Gen			-1*	0.2ma		70		0.2	-80	-80	-3a	15w	65		
2N1093	X PNP	G Sw			-50			25		250		-15	-30	150	85	2.5	
2N1107	A PNP	G if, rf			-5			34		40		-16	-5	30	85		
2N1108	A PNP	G if, rf			-5			33		35		-16	-5	30	85		
2N1109	A PNP	G if, rf			-5			20		30		-16	-5	30	85		
2N1110	A PNP	G if, rf			-5			29		35		-16	-5	30	85		
2N1111	A PNP	G if, rf			-5			25		35		-16	-5	30	85		
2N1111A	A PNP	G Af, if, rf			-5			25		35		-16	-5	30	85		
2N1111B	A PNP	G Af, if, rf			-5			25		35		-16	-5	30	85		
2N1141	S PNP	G Gen			1.0	100ma		16		150	3	-35	-100	750	100	0.1	
2N1142	S PNP	G Gen			1.0	100ma		10		600	3	-30	-100	750	100	0.1	
2N1143	S PNP	G Gen			1.0	100ma		6		480	3	-25	-100	750	100	0.1	
3N25	C PNP	G if, rf			-20		104-12		65 ⁵	200		15	2	25	85		
3N32	H NPN	Si if, rf			0.2 ¹⁻²		284-6						10	125 ¹	150	1mw/°C	
3N33	H NPN	Si if, rf			0.2 ¹⁻²		184-7						10	125 ¹	150	1mw/°C	
3N34	H NPN	Si if, rf			0.2 ¹⁻²		164-8						10	125 ¹	150	1mw/°C	
3N35	H NPN	Si if, rf			0.2 ¹⁻²		204-9						10	125 ¹	150	1mw/°C	
204A	A NPN	G Gen			10 ²				9-49 ³	2.5							
800	F NPN	G Photo-transistor									30		5	65	75	0.12mw/°C	
903	A NPN	G Gen			10 ¹⁻²		30.5		9-20 ³	14			25	150 ¹	175	0.12mw/°C	
904	A NPN	Si Si			10 ^{2/3}		34		18-40 ³	2			25	150 ¹	175	0.12mw/°C	
904A	A NPN	Si Gen			10 ¹⁻²		35		18-90 ³	8			25	150 ¹	175	0.12mw/°C	
905	A NPN	Si Gen			10 ¹⁻²		36.5		36-90 ³	2			25	150 ¹	175	0.12mw/°C	
910	A NPN	Si Gen			10 ¹⁻²		42.5		76-333 ³				25	150 ¹	175	0.12mw/°C	
951	A NPN	Si Pwr			5 ¹⁻²				93-4				60	750 ¹	150	0.6mw/°C	
952	B NPN	Si Pwr			6 ¹⁻²				93-4				50	750 ¹	150	0.6mw/°C	
953	B NPN	Si Pwr			8 ¹⁻²				93-4				40	750 ¹	150	0.6mw/°C	
970	L NPN	Si Pwr			10 ¹⁻²		28 ⁴		34-5				120	140	8.75w ¹	150	70mw/°C

1. @ 25°C.

2. Maximum

3. h_{FE}.

4. Minimum.

5. h_{FE}.

6. @ 4.3 mc.

7. @ 12.5 mc.

8. @ 30 mc.

9. @ 70mc.

10. Phototransistor

11. @ 18mc.

12. @ 100 mc.

* /w

TRANSITRON ELECTRONIC CORP., Wakefield, Mass.

2N117	A NPN	Si Af			10				9-19	1	1	30		150	150		
USN2N117	A NPN	Si Af			10				9-19	1	1	30		150	150		
2N118	A NPN	Si Af			10				19-39	2	1	30		150	150		
USN2N118	A NPN	Si Af			10				19-39	2	1	30		150	150		
JAN2N118	A NPN	Si Af			10				19-39	2	1	30		150	150		
2N119	A NPN	Si Af			10				38min	2	1	30		150	150		
USN2N119	A NPN	Si Af			10				38min	2	1	30		150	150		
2N332	B NPN	Si Af				36			9-20	7	1	45	45	25	150	175	1
2N333	B NPN	Si Af				39			18-41	9	1	45	45	25	150	175	1
2N334	B NPN	Si Af, if, rf				40			18-90	11	1	45	45	25	150	175	1
2N335	B NPN	Si Af				40			37-90	10	1	45	45	25	150	175	1
2N336	B NPN	Si Af, if, rf			0.2				78min	13	1	45	45	25	150	175	
2N337	B NPN	Si Af, Sw			1	100			20-55	10	1	45	45	20	125	150	1mw/°C
2N338	B NPN	Si Af, Sw			1	100			45-150	20	1	45	45	20	125	150	1mw/°C
2N339	C NPN	Si Pwr			1	100	30		9-90	5	1	55	55	60	1w	150	8mw/°C
2N340	C NPN	Si Pwr			1	100	30		9-90	5	1	85	85	50	1w	150	8mw/°C
2N341	C NPN	Si Pwr			1	100	30		9-90	5	1	85	125	40	1w	150	8mw/°C
2N342	C NPN	Si Pwr			1	100	30		9-32	5	1	60	60	60	1w	150	8mw/°C
2N342A	C NPN	Si Pwr			1	100	30		9-32	5	1	85	85	50	1w	150	8mw/°C
2N343	C NPN	Si Pwr			1	100	30		28-90	5	1	60	60	60	1w	150	8mw/°C
2N389	D NPN	Si Pwr			10ma	10ma			12-60	2	10	60	60	2a	85w	200	2w/°C
2N404	B NPN	G Sw			2	2			50	8	25	25	200	150	85	0.4	
2N424	D NPN	Si Pwr			10ma	10ma			8-60	2	10	80	80	2a	85w	200	2w/°C
2N425	B PNP	G Sw			2	2			30	4	20	30	20	400	150	85	0.4
2N426	B PNP	G Sw			2	2			40	6	18	30	18	400	150	85	0.4
2N427	B PNP	G Sw			2	2			55	11	15	30	15	400	150	85	0.4
2N428	B PNP	G Sw			2	2			80	15	12	30	12	400	150	85	0.4
2N470	B NPN	Si Af					37		10-25	8	2	15	15	200	175	0.75	
2N471	B NPN	Si Af					37		10-25	8	2	30	30	200	175	0.75	
2N471A	B NPN	Si Af			0.5	0.5			10-25	4	2	30	30	200	175		
2N472	B NPN	Si Af					37		10-25	8	2	45	45	200	175	0.75	
2N473	B NPN	Si Af, if, rf					39		20-50	11	2	15	15	200	175	0.75	
2N474	B NPN	Si Af, if, rf					39		20-50	10	2	30	30	200	175	0.75	
2N474A	B NPN	Si Af, if, rf			0.5	0.5			20-50	8	2	30	30	200	175		
2N475	B NPN	Si Af, if, rf					39		20-50	10	2	45	45	200	175	0.75	
2N476	B NPN	Si Af, if, rf					40		30-60	17	2	15	15	200	175	0.75	
2N477	B NPN	Si Af, if, rf					40		30-60	17	2	30	30	200	175	0.75	

TRANSISTORS

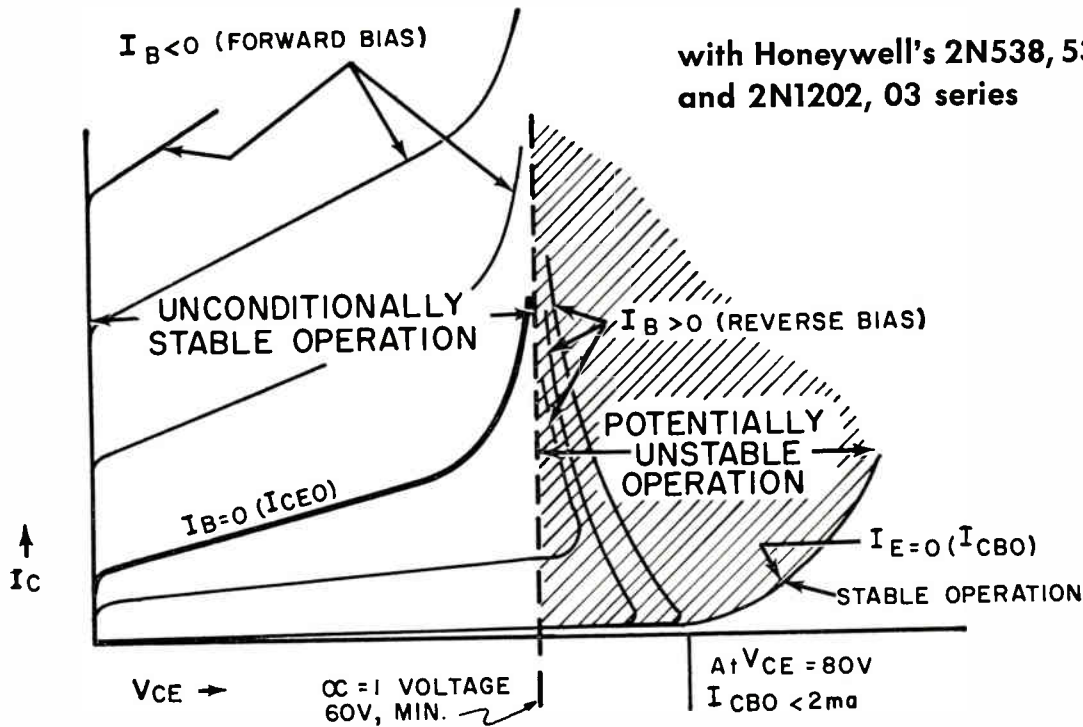
TYPE	CASE	CLASS	MAT	APP	TYPICAL OPERATION						MAXIMUM RATINGS							
					I _{CO} μa	I _{EO} μa	PG db	α or β	T °C	f _α ma	V _{EB} v	V _{CE} v	V _{CB} v	I _C ma	P _C mw	T _J °C	K °C/mw	
TRANSITRON ELECTRONIC CORP., Wakefield, Mass.																		
2N478	B	NPN	Si	Af, if, rf			40	40-100	100	11	2	15	15		200	175	0.75	
2N479	B	NPN	Si	Af, if, rf			40	40-100	100	11	2	30	30		200	175	0.75	
2N480	B	NPN	Si	Af, if, rf			40	40-100	100	11	2	45	45		200	175	0.75	
2N497	B	NPN	Si	Pwr	0.2	0.1		12-36	100	4	8	60	60		200			
2N498	B	NPN	Si	Pwr	10	100		12-36		4	8	100	100	200	4	200	20mw/°C	
2N541	B	NPN	Si	if, rf	0.02	0.01	41	80-200	100	15	2	15	15		200	200		
2N542	B	NPN	Si	Af, if, rf	0.02	0.01	41	80-200		15	2	30	30		200	200		
2N543	B	NPN	Si	Af, if, rf	0.02	0.01	41	80-200		15	2	45	45		200	200		
2N545	B	NPN	Si	Pwr, Sw	6	1		25	100	4	10	60	60	500	5w	200		
2N546	B	NPN	Si	Pwr, Sw	5	1		25	100	4	10	30	30	500	5w	200		
2N547	C	NPN	Si	Af, Pwr, Sw	6	1		20-80	100	4	10	60	60	500	5w	200		
2N548	C	NPN	Si	Af, Pwr, Sw	5	1		20-80	100	4	10	30	30	500	5w	200		
2N549	C	NPN	Si	Af, Pwr, Sw	1.5	1		20-80	100	4	10	60	60	200	5w	200		
2N550	C	NPN	Si	Af, Pwr, Sw	1.5	1		20-80	100	4	10	30	30	200	5w	200		
2N551	C	NPN	Si	Af, Pwr, Sw	6	1		20-80	100	3	10	60	60	50	5w	200		
2N552	C	NPN	Si	Af, Pwr, Sw	6	1		20-80	100	3	10	30	30	50	5w	200		
2N656	B	NPN	Si	Pwr	10	100		30-90		4	8	60	60	200	4w	200	20mw/°C	
2N657	B	NPN	Si	Pwr	10	100		30-90		4	8	100	100	200	4w	200	20mw/°C	
2N1116	B	NPN	Si	Pwr, Sw	15	100		40-		6	10	60	60	300	5w	200		
2N1117	B	NPN	Si	Pwr, Sw	15	100		40-		6	10	60	60	400	5w	200		
2N1139	B	NPN	Si	if, rf, Sw	5	50		20-		100	3	15	15	50	0.5w	200		
2N1140	B	NPN	Si	Sw	15	50		20-		35	5	40	40	100	1w	200		
2N1205	B	NPN	Si	if, rf	0.5	100		20-		30	1	20	20	10	150	150	1mw/°C	
2N1206	B	NPN	Si	Pwr	15	50		20-50		10	3	60	60	100	1.2	200		
2N1207	B	NPN	Si	Pwr	15	50		30-90		10	3	60	60	100	1.2	200		
2N1208	E	NPN	Si	Pwr	10ma	10ma		15-60		6	10	60	60	5a	85w	200	2w/°C	
2N1209	E	NPN	Si	Pwr	10ma	10ma		20-80		6	5	45	45	5a	85w	200	2w/°C	
2N1212	E	NPN	Si	Pwr	10ma	10ma		12-60		2	10	60	60	2a	85w	200	2w/°C	
2N1247	B	NPN	Si	Af	0.005	0.03		15-		10	2	6	6	2	30	200	0.25mw/°C	
2N1248	B	NPN	Si	Af	0.01	0.03		20-		10	2	6	6	2	30	150	0.25mw/°C	
2N1249	B	NPN	Si	Af	0.01	0.03		15-		10	2	6	6	2	30	150	0.25mw/°C	
2N1250	D	NPN	Si	Pwr	10ma	10ma		15-60		6	10	60	60	5a	85w	200	2w/°C	
ST9	B	NPN	Si	Af	1	2		30-200		10	2	15	15	10	150	150	1mw/°C	
ST15	B	NPN	Si	Af	0.5	0.5		10-100		10	2	15	15	10	200	200	1mw/°C	
ST29	B	NPN	Si	Af	1	2		30-200		10	2	30	30	10	150	150	1mw/°C	
ST25	B	NPN	Si	Af	0.5	0.5		10-100		10	2	30	30	10	200	200	1mw/°C	
ST45	B	NPN	Si	Af	0.5	0.5		10-100		10	2	45	45	10	200	200	1mw/°C	
ST400	D	NPN	Si	Pwr	10ma	10ma		15-60		6	10	60	60	5a	85w	200	2w/°C	
ST401	D	NPN	Si	Pwr	10ma	10ma		20-80		6	5	45	45	5a	85w	200	2w/°C	
ST402	D	NPN	Si	Pwr	10ma	10ma		15-80		4	5	60	60	3a	50w	200	2w/°C	
ST403	D	NPN	Si	Pwr	10ma	10ma		15-80		4	5	45	45	3a	50w	200	2w/°C	
ST903	F	NPN	Si	if, rf	0.1		30.5	9-20		7	1	30	30		150	175		
ST904	F	NPN	Si	if, rf	0.1		34	18-40		9	1	30	30		150	175		
ST904A	F	NPN	Si	if, rf	0.1		35	18-90		11	1	30	30		150	175		
ST905	F	NPN	Si	if, rf	0.1		36.5	36-90		10	1	30	30		150	175		
ST910	F	NPN	Si	if, rf	0.1		42.5	76-333		11	1	30	30		150	175		
ST1026	B	NPN	Si	Af	0.005	0.03		15-		10	2	6	6	2	20	150	0.25mw/°C	
ST1050	B	NPN	Si	Af	0.01	0.03		20-		10	2	6	6	2	30	150	0.25mw/°C	
ST1051	B	NPN	Si	Af	0.01	0.03		15-		10	2	6	6	2	30	150	0.25mw/°C	

TUNG-SOL ELECTRIC INC., Semiconductor Div., Newark 4, N. J.

2N173	C	PNP	G	Af, Pwr, Sw					52	10 ¹	50	60	15a		95	0.8°C/W
2N174	C	PNP	G	Af, Pwr, Sw					37	10 ¹	70	80	15a		95	0.8°C/W
2N174A	C	PNP	G	Af, Pwr, Sw					37	10 ¹	70	80	15a		95	0.8°C/W
2N242	C	PNP	G	Af, Pwr	150		34		50	0.4	45		2a	15w	85	3°C/W
2N277	C	PNP	G	Af, Pwr, Sw					52	10 ¹	40	40	15a		95	0.8°C/W
2N278	C	PNP	G	Af, Pwr, Sw					52	10 ¹	45	50	15a		95	0.8°C/W
2N378	B	PNP	G	Pwr, Sw	150		24		30	0.3	20	40	5a	50w	100	1.2°C/W
2N379	B	PNP	G	Pwr, Sw	150		28.5		30	0.3	40	80	5a	50w	100	1.2°C/W
2N380	B	PNP	G	Pwr, Sw	150	30	50		50	0.4	30	60	5a	50w	100	1.2°C/W
2N381	A	PNP	G	Af, B-Amp	6	5	31		36	1.2	25	25	200	200	85	0.3
2N382	A	PNP	G	Af, B-Amp	6	5	33		54	1.5	25	25	200	200	85	0.3
2N383	A	PNP	G	Af, B-Amp	6	5	35		72	1.8	25	25	200	200	85	0.3
2N404	A	PNP	G	Sw	2	2			30	12	24	25	100	120	85	0.4
2N413	A	PNP	G	if, rf	2	2	10		30	2.5	18	30	200	120	85	0.4
2N414	A	PNP	G	if, rf	2	2	16		60	5	15	30	200	120	85	0.4
2N416	A	PNP	G	if, rf	2	2	20		80	10	12	30	200	120	85	0.4
2N417	A	PNP	G	if, rf	2	2	27		140	20	10	30	200	120	85	0.4
2N425	A	PNP	G	Sw	2	2			30	4	20	30	400	120	85	0.4
2N426	A	PNP	G	Sw	2	2			40	6	18	30	400	120	85	0.4

New Honeywell formula for power transistor reliability

with Honeywell's 2N538, 539, 540
and 2N1202, 03 series



NOW THESE Honeywell Power Transistors guarantee minimum $\alpha=1$ voltage to insure stable operation under all bias conditions up to 60 volts. This rating permits operation of both class A and class B transformer-coupled output power amplifiers from a 28VDC source. Proper back bias extends safe operating voltage up to the collector diode design limit of 80 volts.

Contributing to the superior reliability of Honeywell Power Transistors are built-in stability through improved design and processing methods plus significant dynamic testing.

Honeywell's 2N538, 539 and 540, and 2N1202 (characterized at $\frac{1}{2}$ amp) and 2N1203 (120 volt collector diode) Power Transistor Series are rugged, hermetically sealed germanium PNP transistors suited to servo amplifier, power conversion, voltage regulation and switching applications.

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- UNION, NEW JERSEY.....(MURdock 8-9000)
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PARkview 8-7311)
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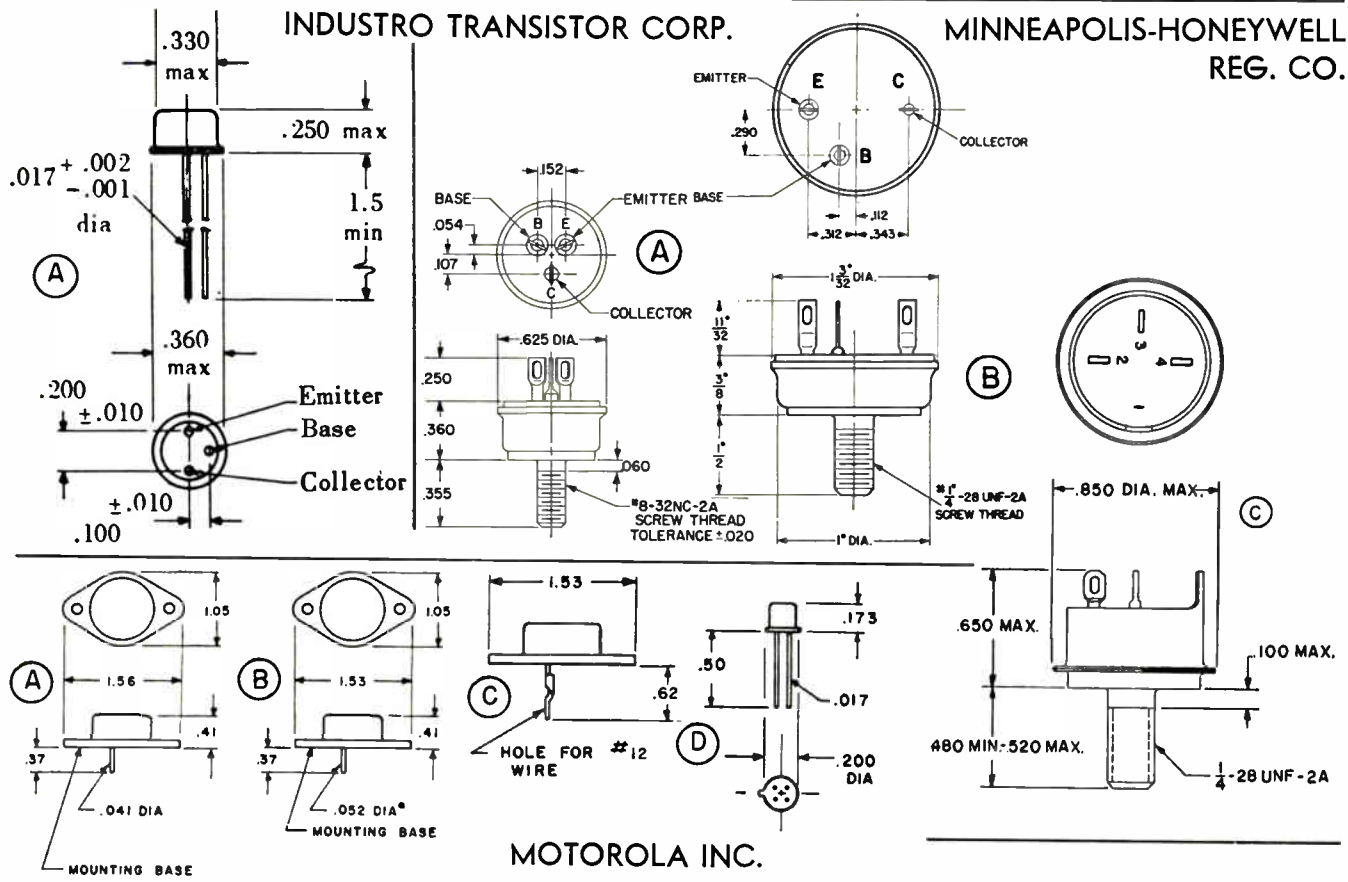
Or write Minneapolis-Honeywell, Dept. EI-6-82,
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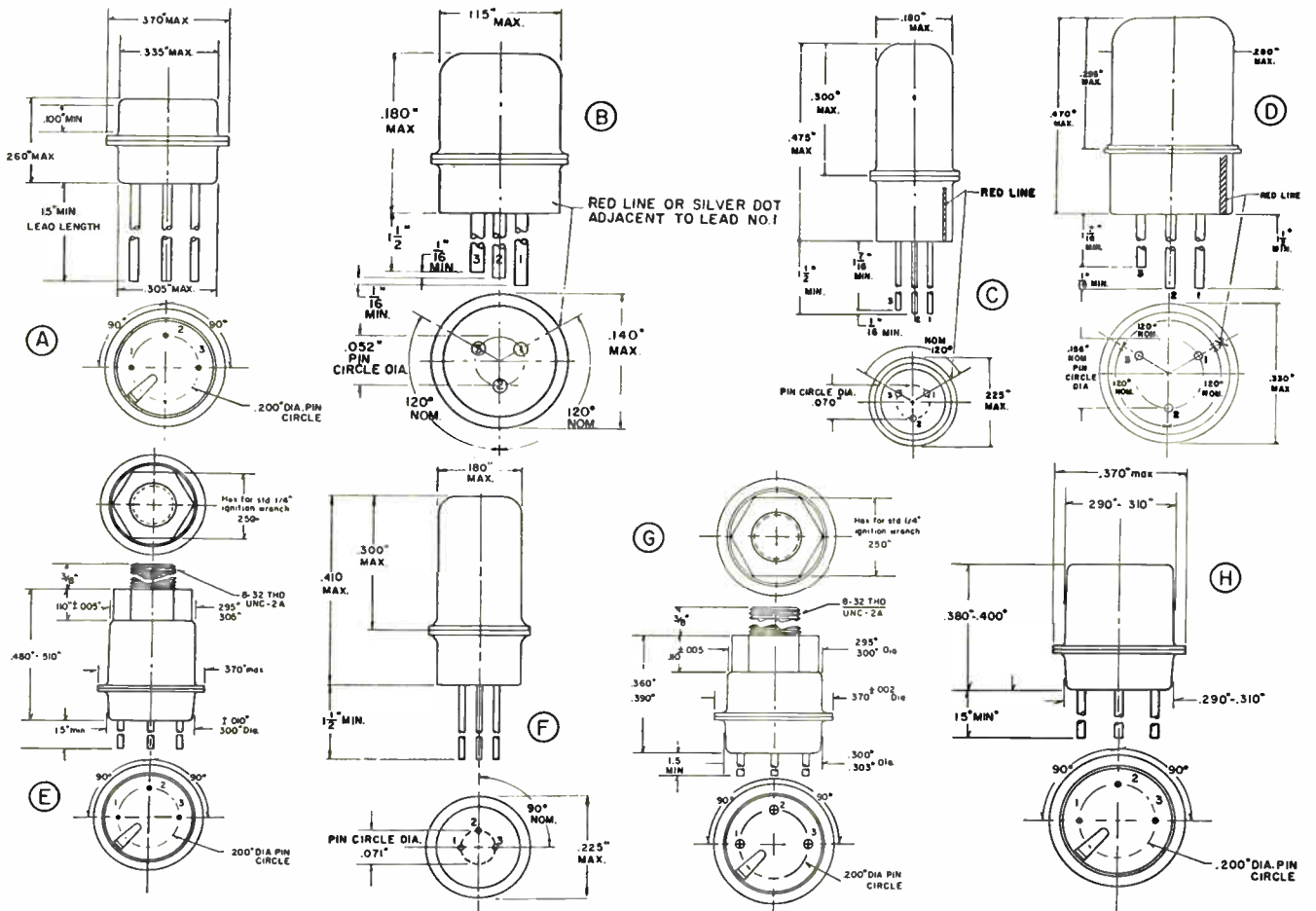
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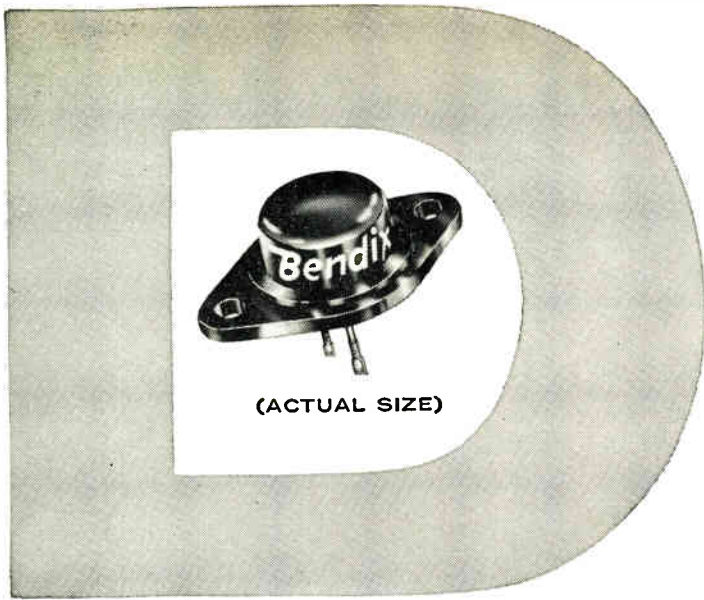
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REG. CO.



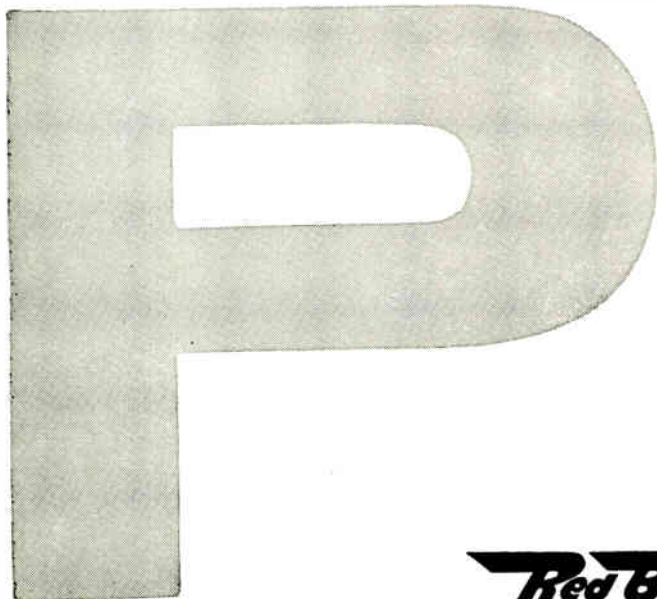
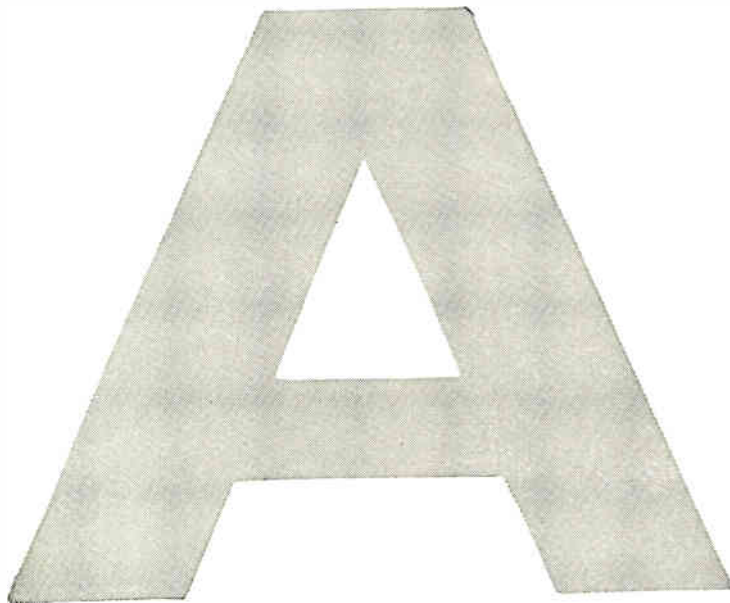
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Uses

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	Ratings		Typical Performance			
	Vdc	Pc (25°C)	B (Ic=5 Adc)	Vs (Ic=5 Adc)	f α	rbb'
2N1073	40	35 W	40	0.5 Vdc	1.5 mc	2 ohms
2N1073A	80	35 W	40	0.5 Vdc	1.5 mc	2 ohms
2N1073B	120	35 W	40	0.5 Vdc	1.5 mc	2 ohms

West Coast Sales: 117 E. Providencia Ave., Burbank, Calif.

Midwest Sales: 4104 N. Harlem Ave., Chicago 34, Ill.

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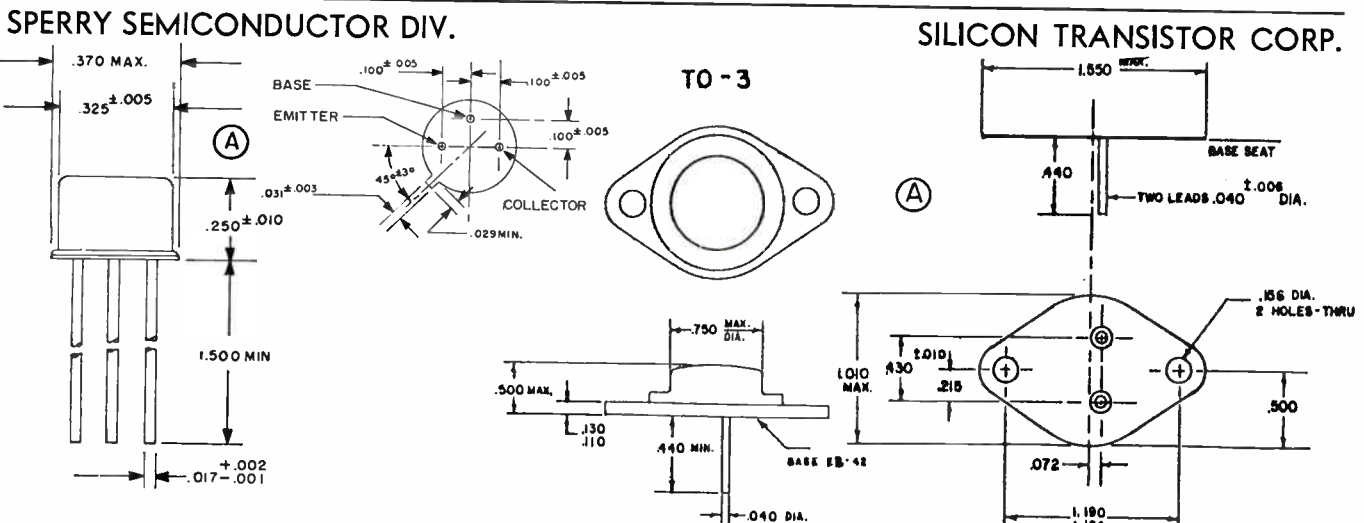
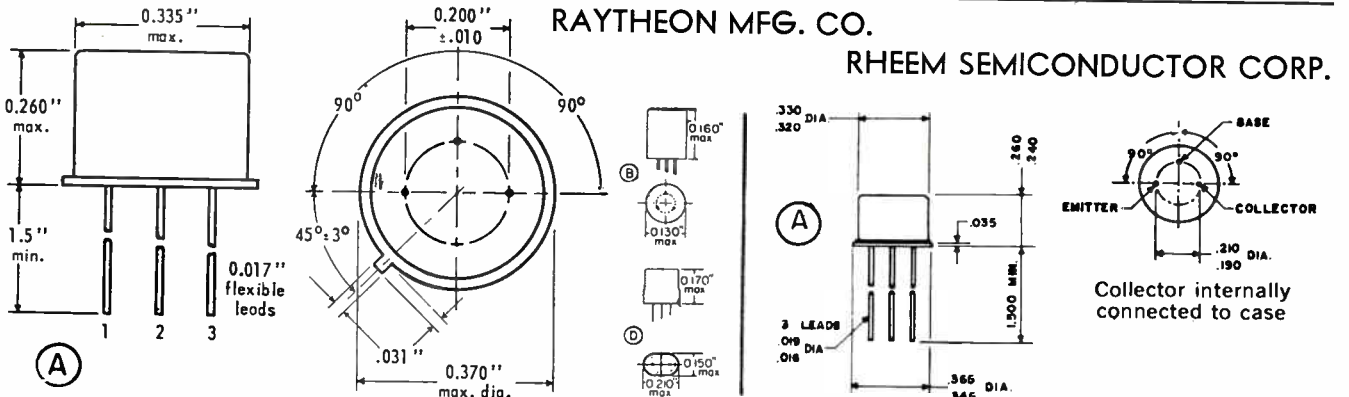
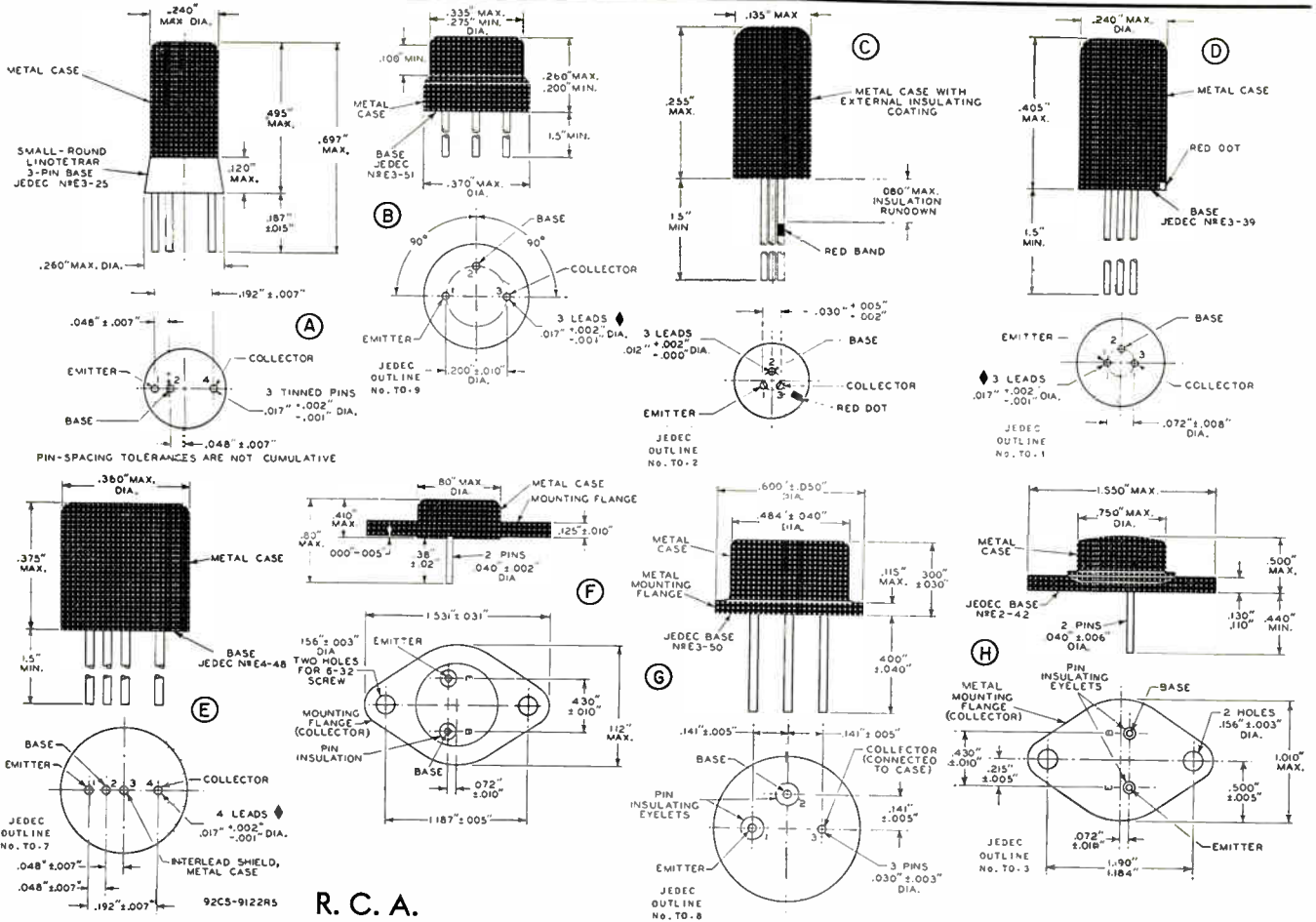
Canadian Affiliate: Computing Devices of Canada, Ltd.,

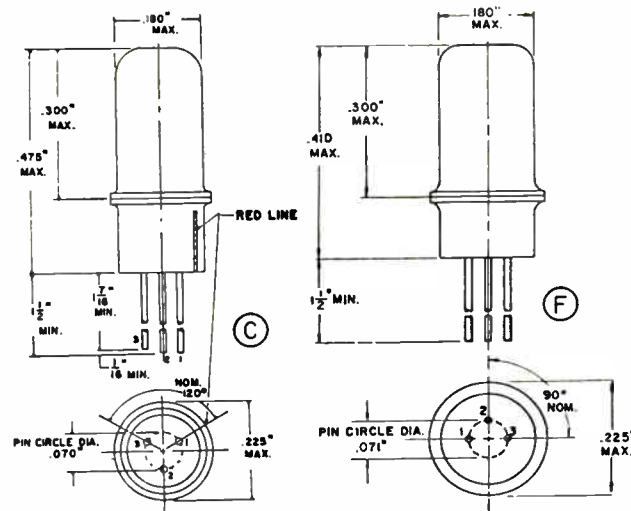
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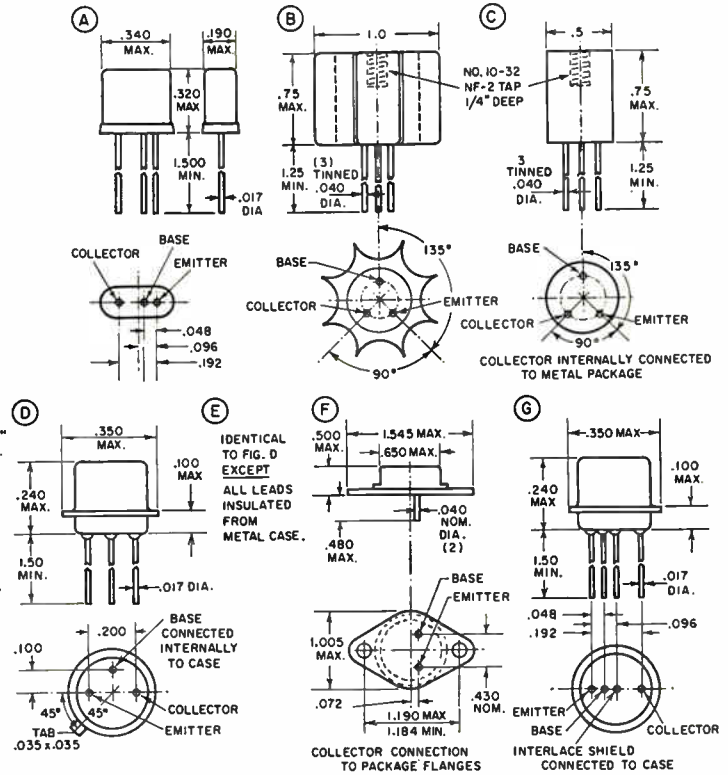
TRANSISTORS



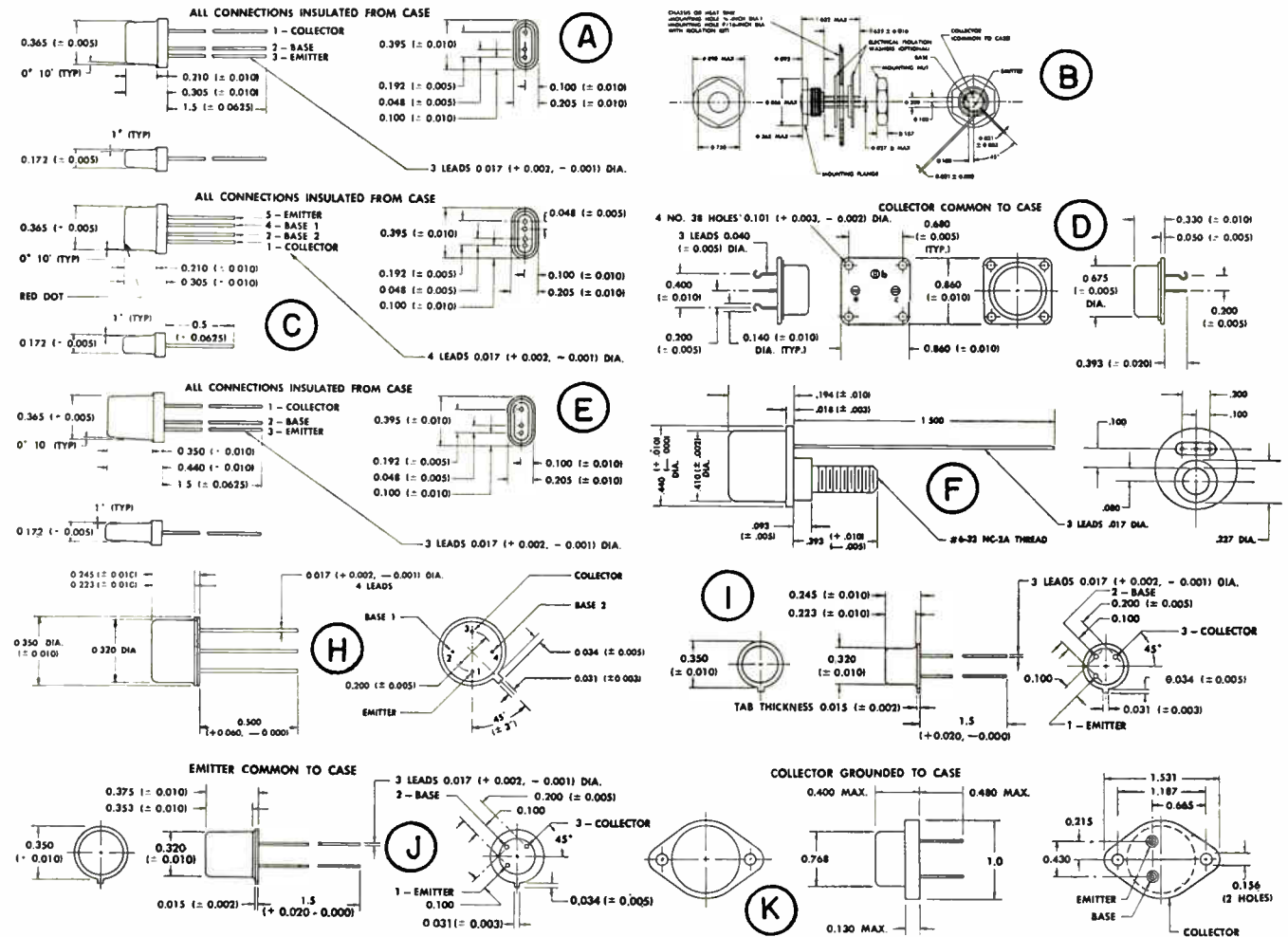


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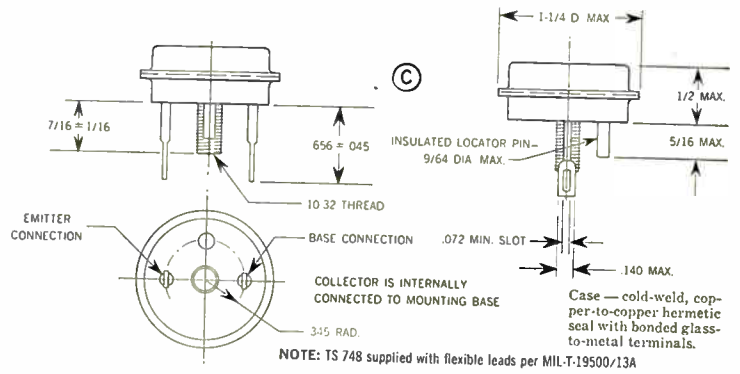
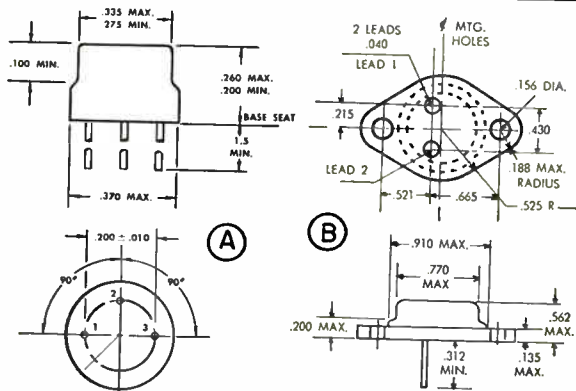
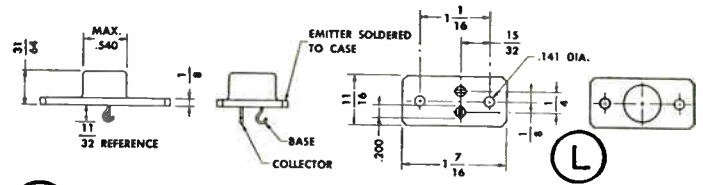
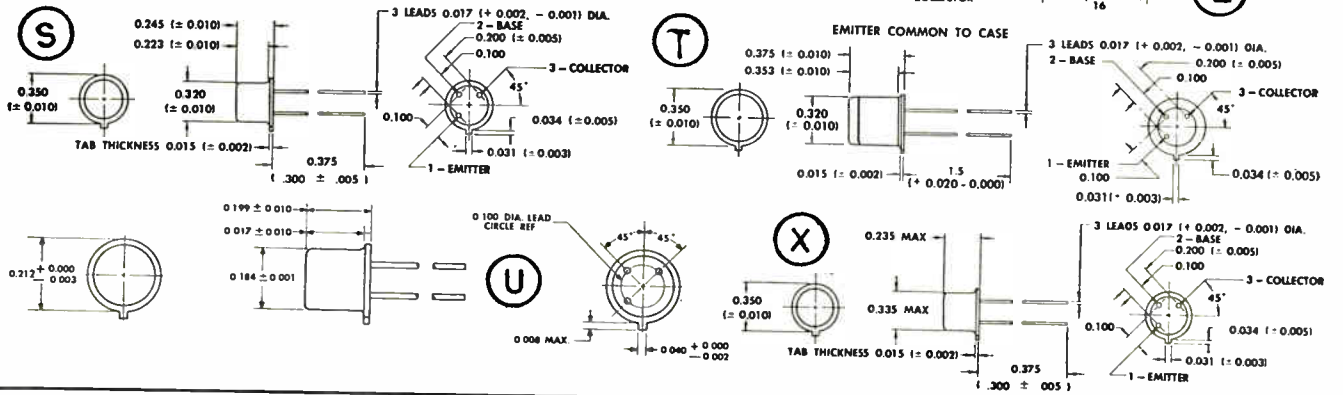


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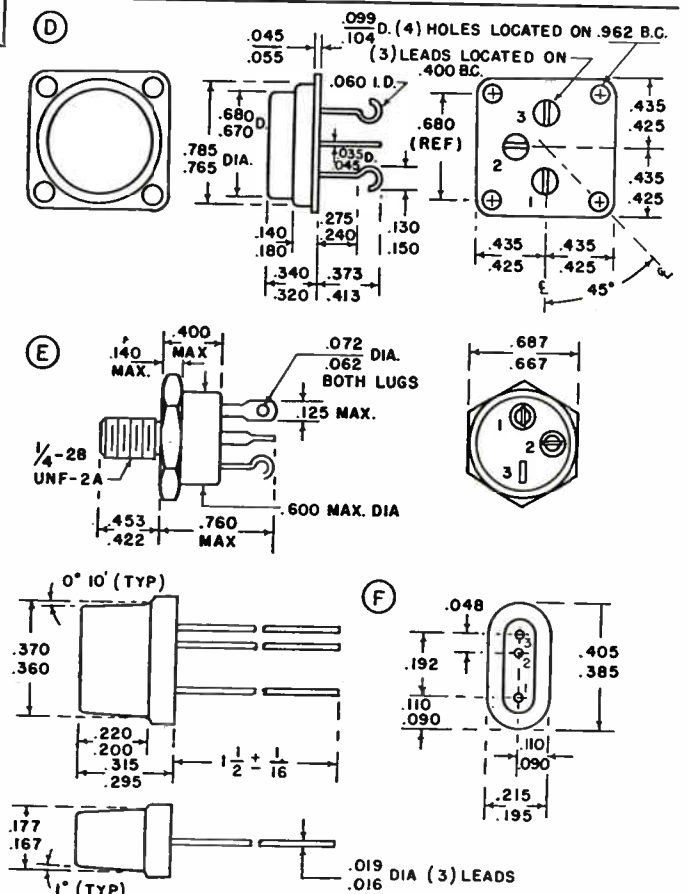
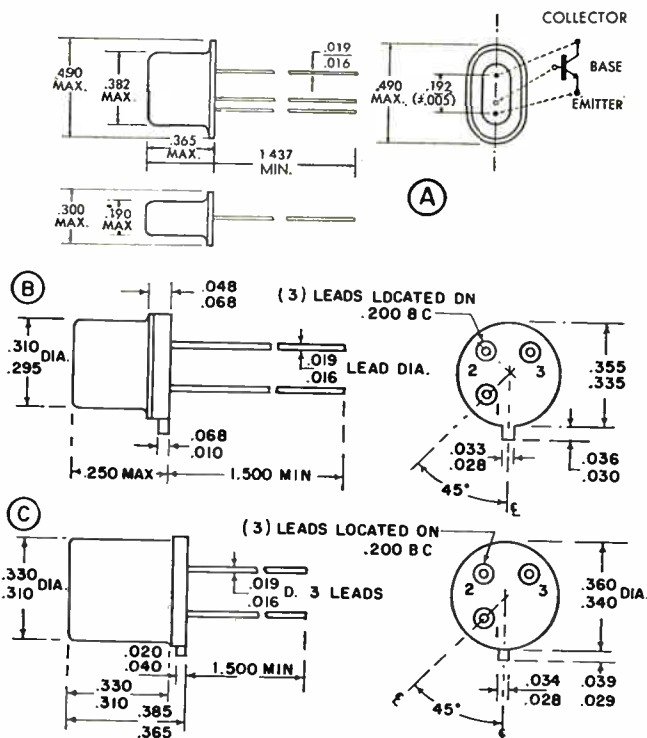
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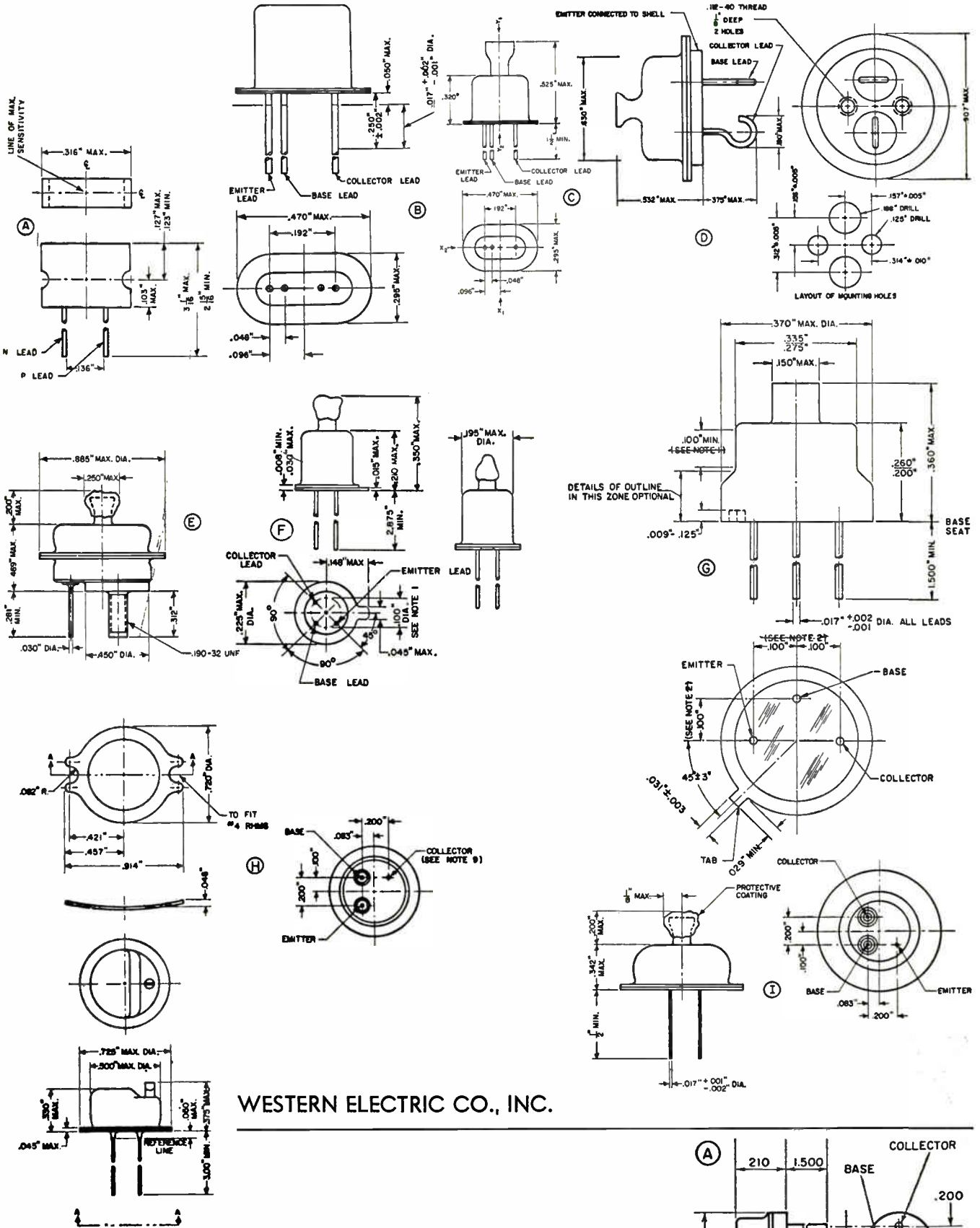
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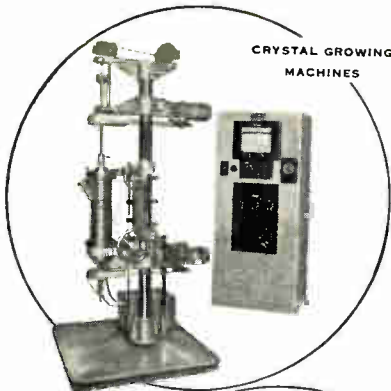


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TRANSITRON ELECTRONIC CORP.

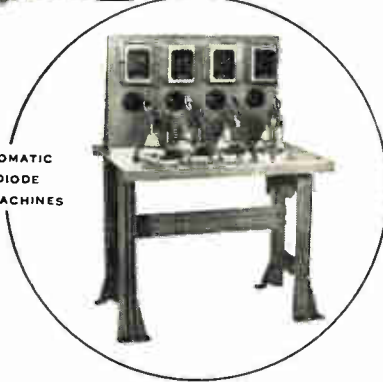




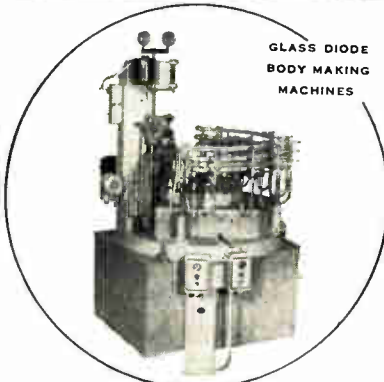


CRYSTAL GROWING MACHINES

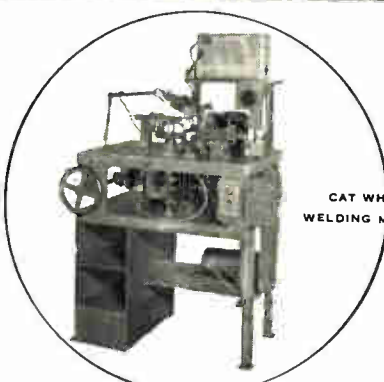
We have created over one thousand DIFFERENT KINDS of electronic production machines!



SEMI-AUTOMATIC GLASS DIODE SEALING MACHINES

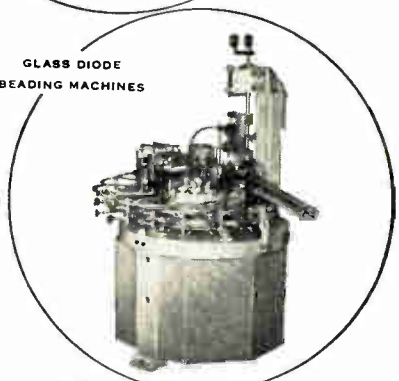


GLASS DIODE BODY MAKING MACHINES

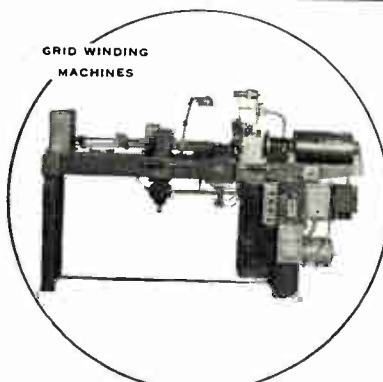


CAT WHISKER WELDING MACHINES

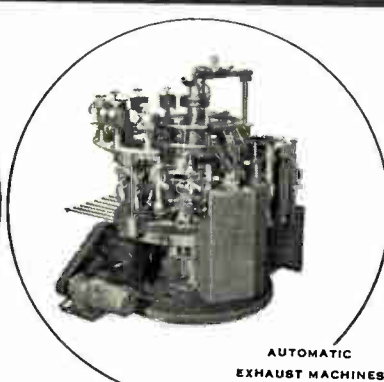
Whether for semiconductor or electronic tube production, each has exceeded customers' specifications. And each was tested under actual operating conditions before shipment.



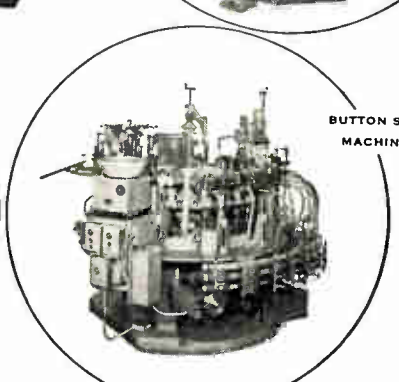
GLASS DIODE BEADING MACHINES



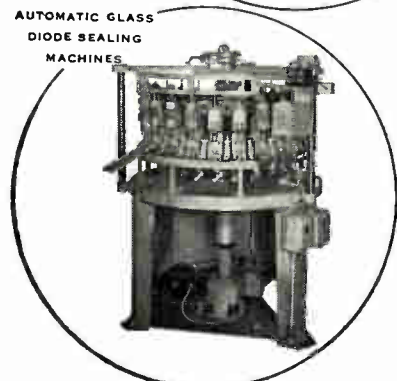
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ELECTRONIC INDUSTRIES



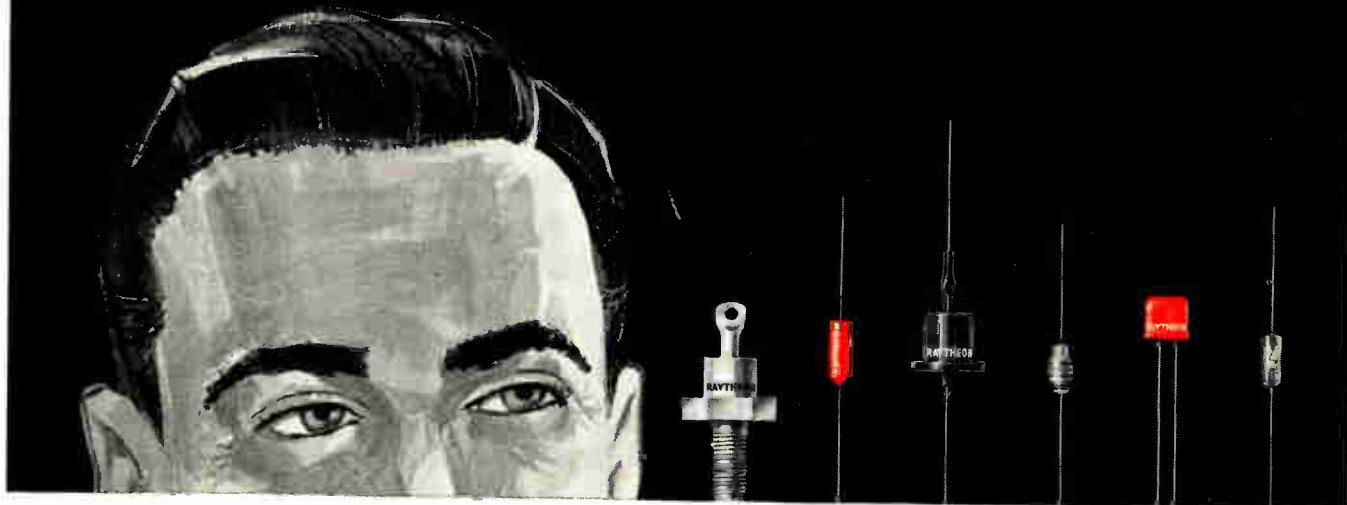
SEMI-CONDUCTOR **DIODE** SPECIFICATIONS

1959-60 Listings
for
5,000 Germanium and Silicon Types
from
40 U. S. Manufacturers

RAYTHEON

reliable silicon **RECTIFIERS**
silicon and germanium **DIODES**

rate first choice for your circuits



Raytheon diffused junction Silicon Rectifiers for missile and other critical applications were the first to be put into mass production. They are outstanding for high forward conductance, exceptional reverse recovery. Many meet requirements of MIL-E-ID.

Raytheon Bonded Silicon Diodes feature low reverse current, high forward conductance and excellent stability in high temperature applications. All are subject to environmental quality control. Twenty-seven types cover every need.

Raytheon Germanium Diodes meet the highest standards of quality, uniformity and performance. Both gold bonded and point contact constructions are available in a wide range of characteristics.



Raytheon Circuit-Paks are compact, encapsulated sub-assemblies of Diodes, Rectifiers, Transistors and other components for uses such as Phase Comparators, Bridges, Choppers, Flip-Flops, etc. They save space, speed assembly and assure Raytheon reliability.



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See the Raytheon listing in this Section for information on our complete line.

SEMICONDUCTOR DIODES

GENERAL PURPOSE DIODES

DIODE TYPE NO.	CASE & MAT	REVERSE				FORWARD			
		E _{PEAK} V	I _{MAX} (μa)	@ V	@ °C	I _{SRG} (ma)	I _{MIN} (ma)	@ V	I _{MAX} AV RECT. (ma)

AMPEREX ELECTRONIC CORP., 230 Duffy Avenue, Hicksville, L.I., N.Y.

IN34	A G	75	30	10	25	500	5	1.0	50
IN34A	A G	75	30	10	25	500	5	1.0	50
IN38	A G	120	500	25	25	500	4	1.0	50
IN38A	B G	120	6	3	25	500	4	1.0	50
IN54	A G	75	7	10	10	500	5	1.0	50
IN54A	B G	75	7	10	25	500	5	1.0	50
IN58	A G	120	600	100	100	500	4	1.0	50
IN58A	B G	120	600	100	25	500	5	1.0	50
IN60	A G	30	67	10	25	500	3	1.0	50
IN63	B G	125	500	50	25	400	4	1.0	50
IN67A	C G	100	50	50	25	500	4	1.0	30
IN68A	C G	130	625	100	25	500	3	1.0	30
IN87	H G	22.5	30	1.5	75	400	0.1	.25	50
IN87A	C G	22.5	30	1.5	75	400	0.1	.25	50
IN88	A G	110	100	50	25	400	2.5	1.0	50
IN89	C G	100	100	50	25	400	3.5	1.0	30
IN90	C G	75	800	50	25	500	5	1.0	40
IN95	C G	75	500	50	25	250	10	1.0	30
IN99	C G	100	50	50	25	300	10	1.0	30
IN116	C G	75	100	50	25	250	5	1.0	30
IN117	C G	75	100	50	25	250	10	1.0	30
IN126	C G	75	50	10	25	350	5	1.0	30
IN128	C G	50	10	10	25	300	3	1.0	30
IN198	C G	100	250	50	75	300	4	1.0	30
IN476	G G	115	11	10	25	500	3	1.0	50
IN477	B G	115	11	10	25	500	3	1.0	50
IN478	G G	115	4.5	1.5	25	500	30	1.0	50
IN479	B G	115	4.5	1.5	25	500	30	1.0	50
IN541	A G	30	18	10	25	100	1.5	1.0	10
IN542	A G	45	150	30	30	200	1.5	1.0	(Matched w/IN541)
IN616	A G	40	18	1.5	25	200	8	1.0	30
IN617	C G	115	275	100	100	500	3	1.0	50
IN618	C G	115	250	100	100	500	5	1.0	50
C60	B G	30	5.0	5.0	25	500	5.1	1.0	50
C67	B G	100	5.0	5.0	25	250	4	1.0	30
C68	B G	130	625	100	25	350	3	1.0	30
C89	B G	100	8.0	5.0	25	250	3.5	1.0	30
C95	B G	75	500	50	25	300	10	1.0	30
C99	B G	100	50	50	25	300	10	1.0	30
C116	B G	75	100	50	25	300	5	1.0	30
C117	B G	75	100	50	25	300	10	1.0	30
G48	A G	85	50	10	25	400	4	1.0	50
G63	A G	125	50	50	25	400	4	1.0	50
G67	A G	100	5	5	25	250	4	1.0	30
G68	A G	130	625	100	25	350	3	1.0	30
G89	A G	100	100	50	25	250	3.5	1.0	30
OA210	H Si	408	25	60		5a	10	0.64	0.5a
OA211	H Si	800	10	170		4a	10	0.64	0.4a

BRADLEY LABS, 168 Columbia Avenue, New Haven, Conn.

Manufactures a line of diodes rated over 1 amp. These diodes will be included in EI's forthcoming "Survey of Power Rectifiers."

CBS-HYTRON, Division of CBS, Inc., Semiconductor Operations, Lowell, Mass.

IN34A	A G	75	30	10	25	500	5	1.0	50
IN35	A G	75	30	10	25	500	7.5	1.0	50
IN39A	B G	225	200	10	25	200	5	1.0	50
IN40	C G	75	75	10	25		12.75	1.5	40
IN42	C G	120	800	10	25		12.75	1.5	50
IN48	A G	85	833	50	25	400	4	1.0	50
IN51	A G	50	1660	50	25	300	2.5	1.0	25
IN52	A G	85	150	50	25	400	4	1.0	50
IN54A	B G	75	7	10	25	500	5	1.0	50
IN55A	B G	170	300	100	25	500	4	1.0	50
IN55B	A G	190	500	150	25	500	5	1.0	30
IN56A	A G	50	300	30	25	1a	15	1.0	60
IN58A	A G	120	600	100	25	500	5	1.0	50
IN60	A G	30	67	10	25	500	3	1.0	30
IN63	A G	125	500	50	25	400	4	1.0	50
IN65	A G	85	200	50	25	400	2.5	1.0	50
IN67A	A G	100	5	5	25	500	4	1.0	35
IN69A	B G	75	30	10	25	400	5.25	1.0	40
IN70A	B G	125	25	10	25	350	3	1.0	30
IN71	C G	50	300	30	25	1a	15	1.0	60
IN73	C G	75	50	10	70	100	15	1.0	22.5
IN74	A G	75	50	10	70	100	15	1.0	22.5
IN75	A G	125	50	50	25	400	2.5	1.0	50
IN81A	B G	50	10	10	25	350	3	1.0	30
IN90	A G	75	800	50	25	500	5	1.0	40
IN107	G	15	200	10	25	400	150	1.0	80
IN108	G	60	200	50	25	300	50	1.0	50
IN116	A G	75	100	50	25	250	5	1.0	30
IN126A	A G	75	50	10	25	350	5	1.0	30
IN127A	A G	125	25	10	25	300	3	1.0	30
IN128	-A G	50	10	10	25	300	3	1.0	30
IN198	A G	100	10	10	75	300	4	1.0	30
IN497	A G	25	20	10	25	400	100	1.0	80
IN498	A G	50	25	40	25	400	100	1.0	80
IN499	A G	65	30	50	25	400	100	1.0	80
IN500	A G	75	40	60	25	400	100	1.0	80
IN501	A G	100	40	80	25	400	100	1.0	80
IN502	A G	125	40	100	25	400	100	1.0	80
IN636	A G	60	10	10	25	400	2.5	1.0	30
LD-31	A G		20	20			50	1.0	
LD-38	A G		150	25	70		0.5	0.6	
LD-70	A G		150	15	25	400	100	1.0	30
LD-71	A G		40	15	25	300	2	0.4	30

DIODE TYPE NO.	CASE & MAT	REVERSE				FORWARD			
		E _{PEAK} V	I _{MAX} (μa)	@ V	@ °C	I _{SRG} (ma)	I _{MIN} (ma)	@ V	I _{MAX} AV RECT. (ma)

CLEVITE TRANSISTOR PRODUCTS, 241-257 Crescent St., Waltham 54, Mass.

IN34A	A G	75	500	50		500	5	1.0	50
IN38	A G	125	625	100		500	3	1.0	
IN38A	A G	125	500	100		500	5	1.0	
IN52	A G	85	150	50		400	5	1.0	50
IN54	A G	75	10	10		500	5	1.0	50
IN54A	A G	75	100	50		500	5	1.0	50
IN55	A G	170	800	150		500	5	1.0	50
IN55A	A G	170	500	150		500	5	1.0	50
IN55B	A G	190	500	150		500	5	1.0	30
IN56	A G	40	300	30		600	15	1.0	
IN56A	A G	50	300	30		1a	15	1.0	60
IN58A	A G	125	600	100		500	5	1.0	50
IN63	A G	125	50	50		400	5	1.0	50
IN65	A G	85	200	50		400	5	1.0	50
IN66	A G	70	800	50		500	5	1.0	50
IN67A	A G	100	50	50		300	5	1.0	30
IN68A	A G	130	625	100		300	5	1.0	30
IN75	A G	125	50	50		400	5	1.0	50
IN89	A G	100	100	50		300	5	1.0	30
IN90	A G	75	500	50		300	5	1.0	30
IN95	A G	75	500	50		300	10	1.0	30
IN96	A G	75	500	50		250	20	1.0	30
IN96A	A G	75	500	50		400	40	1.0	30
IN97	A G	100	100	50		300	10	1.0	30
IN98	A G	100	100	50		250	20	1.0	30
IN98A	A G	100	100	50		400	40	1.0	
IN99	A G	100	50	50		300	10	1.0	30
IN100	A G	100	50	50		300	20	1.0	30
IN100A	A G	100	50	50		400	40	1.0	
IN107	A G	15	200	10		400	150	1.0	100
IN108	A G	65	200	10		500	50	1.0	
IN111	A G	75	125	50		500	5	1.0	50
IN112	A G	75	250	50		500	5	1.0	50
IN113	A G	75	125	50		500	5	1.0	50
IN114	A G	75	250	50		500	5	1.0	50
IN115	A G	75	500	50		500	5	1.0	50
IN116	A G	75	100	50		300	5	1.0	30
IN117	A G	75	100	50		300	10	1.0	30
IN118	A G	75	100	50		250	20	1.0	30
IN118A	A G	75	100	50		400	40	1.0	
IN126	A G	75	800	50		300	5	1.0	30
IN127	A G	125	300	50		300	3	1.0	30
IN128	A G	100	250	50		300	3	1.0	30
IN139	A G	50	1.5 ma	50		500	20	1.0	70
IN140	A G	85	300	50		750	40	1.0	85
IN141	A G	85	50	50		500	20	1.0	70
IN142	A G	125	100	100		400	5	1.0	60
IN143	A G	120	100	100		750	40	1.0	85
IN144	A G	40	200	20		750	100	1.0	150
IN192	A G	75				300	5	1.0	30
IN198	A G	100	250	50		300	5	1.0	30
IN270	A G	75	100	50		500	200	1.0	
IN273	A G	35	20	20		450	100	1.0	80
IN277	A G	125	250	50		400	100	1.0	
IN278	A G	60	125	50		175	20	1.0	
IN279	A G	35	200	20		450	100	1.0	
IN281	A G	75	500	50		400	100	1.0	
IN283	A G	25	25	10		500			

SEMICONDUCTOR DIODES

GENERAL PURPOSE DIODES - (Continued)

DIODE TYPE NO.	CASE & MAT	REVERSE				FORWARD			
		E _{PEAK} V	I _{MAX} (μa)	@ V	@ °C	I _{SRG} (ma)	I _{MIN} (ma)	@ V	I _{MAX} AV RECT. (ma)

CLEVEITE TRANSISTOR PRODUCTS - (Continued)

IN500	A G	80	10	60		500	120	0.8	80
IN501	A G	100	20	80		500	100	0.8	
IN502	A G	120	20	100		500	100	0.8	
IN634	A G	115	115	100		300	50	1.0	100
IN635	A G	165	175	150		200	50	1.0	
CTP301	A G	75	20	50		400	400	1.0	
CTP307	A G	50	20	30		500	300	1.0	
CTP309	A G	25	20	6		500	300	1.0	
CTP311	A G	130	80	80		500	4	1.0	
CTP313	A G	125	20	100		450	100	1.0	
CTP320	A G	100	50	50		300	5	1.0	
CPT447	A Si-G	25	10	10		200	40	1.0	
CTP460	A Si-G	20	10	10		400	100	1.0	120
CTP553	A G	50	200	20		450	100	1.0	
CTP591	A G	10	4	3		400	1.4	3.0	
CTP592	A G	10	4	3		400	1.4	3.0	
CTP2313	B Si	150	20	125		300	5	1.5	
CTP2315	B Si	40	20	30		300	5	1.5	
CTP2317	B Si	120	50	175		300	5	1.5	

FANSTEEL METALLURGICAL CORP., 2200 Sheridan Road, N. Chicago, Illinois Manufactures a line of diodes rated over 1 amp. These diodes will be included in EI's forthcoming "Survey of Power Rectifiers."

GAHAGAN, INC., Esmond 17, Rhode Island

IN34	A G	60	850	50	25	500	5	1.0	
IN34A	A G	60	500	50	25	500	8.5	1.0	
IN35	A G	60	(Matched with IN34)			500	8.5	1.0	
IN38	A G	120	625	100	25	500	5	1.0	
IN38A	A G	120	500	100	25	500	5	1.0	
IN39	A G	225	200	100	25	500	3	1.0	
IN39A	A G	225	100	100	25	500	3	1.0	
IN48	A G	80	800	50	25	400	5	1.0	
IN51	A G	60	1300	50	25	300	2.5	1.0	
IN52	A G	85	150	50	25	400	5	1.0	
IN54	A G	45	10	10	25	500	5	1.0	
IN54A	A G	70	100	50	25	500	5	1.0	
IN55	A G	175	800	150	25	500	3	1.0	
IN55A	A G	175	500	150	25	500	4	1.0	
IN55B	A G	175	500	150	25	500	5	1.0	
IN56A	A G	50	300	30	25	600	15	1.0	
IN58	A G	120	800	100	25	500	5	1.0	
IN58A	A G	120	600	100	25	500	5	1.0	
IN59	A G	275	800	200	25	500	3	1.0	
IN61	A G	150	300	100	25	500	5	1.0	
IN63	A G	125	50	50	25	400	5	1.0	
IN67	A G	100	50	50	25	500	4	1.0	
IN67A	A G	100	50	50	25	500	5	1.0	
IN68A	A G	125	625	100	25	500	5	1.0	
IN69	A G	80	50	10	25	500	5	1.0	
IN88	A G	100	100	50	25	500	5	1.0	
IN89	A G	100	100	50	25	500	5	1.0	
IN95	A G	75	800	50	25	500	10	1.0	
IN96	A G	75	500	50	25	500	20	1.0	
IN97	A G	100	100	50	25	500	10	1.0	
IN98	A G	100	100	50	25	500	20	1.0	
IN99	A G	100	50	50	25	500	10	1.0	
IN100	A G	100	50	50	25	500	20	1.0	
IN117	A G	75	100	50	25	500	10	1.0	
IN118	A G	75	100	50	25	500	20	1.0	
IN126	A G	75	850	50	25	500	5	1.0	
IN127	A G	120	300	50	25	500	5	1.0	
IN128	A G	55	10	10	25	400	3	1.0	
IN140	A G	90	300	50	25	500	40	1.0	
IN141	A G	90	50	50	25	500	20	1.0	
IN142	A G	120	100	100	25	400	5	1.0	
IN143	A G	120	100	100	25	500	40	1.0	
IN198	A G	65	250	50	25	400	5	1.0	
IN270	A G	65	100	50	25	500	200	1.0	
IN273	A G	45	20	20	25	500	100	1.0	
IN277	A G	125	500	100	25	400	5	1.0	
IN278	A G	65	125	50	75	500	20	1.0	
IN279	A G	45	200	20	25	500	100	1.0	
IN283	A G	25	20	10	25	500			100
IN289	A G	85	50	50	25	500			70
IN292	A G	75	25	50	25	400			70
IN298	A G	90	250	40	25	400	30	2	
IN447	A G	45	60	30	25	500	25	1.0	
IN448	A G	120	100	100	25	500	25	1.0	
IN449	A G	45	30	30	25	500	50	1.0	
IN450	A G	125	100	100	25	500	50	1.0	
IN451	A G	175	150	150	25	500	50	1.0	
IN452	A G	45	30	30	25	500	100	1.0	
IN453	A G	120	100	100	25	500	100	1.0	
IN454	A G	70	50	50	25	500	200	1.0	
IN455	A G	45	30	30	25	500	300	1.0	
G45D	A G	10	25	2	25	300	5	1.0	
G49	A G	50	200	24	60	500	15	1.0	
G87	A G	50	2	6	55	500	10	1.0	
G87B	A G	50	32	32	25	500	10	1.0	
G98	A G	60	500	100	25	500	100	1.0	
G106	A G	200	600	200	25	500	100	1.0	
G400	A G	100	25	50	25	400			100
G500	A G	60	50	50	25	500			125

DIODE TYPE NO.	CASE & MAT	REVERSE				FORWARD			
		E _{PEAK} V	I _{MAX} (μa)	@ V	@ °C	I _{SRG} (ma)	I _{MIN} (ma)	@ V	I _{MAX} AV RECT. (ma)

GENERAL ELECTRIC CO., Semiconductor Dept., Syracuse, N. Y.

IN34A	A G	75	.03 ma	10	25	500	5	1.0	50
IN38A	A G	120	.005 ma	3	25	500	4	1.0	50
IN48	A G	85	0.83 ma	50	25	400	4	1.0	50
IN51	A G	50	1.67 ma	50	25	300	2.5	1.0	25
IN52	A G	85	0.15 ma	50	25	400	4	1.0	50
IN54A	A G	75	0.1 ma	50	25	500	5	1.0	50
IN58A	A G	120	.007 ma	10	25	500	4	1.0	50
IN63	A G	125	0.6 ma	100	25	400	2.5	1.0	50
IN65	A G	85	0.2 ma	50	25	400	2.5	1.0	50
IN69	A G	75	0.85 ma	50	25	400	5	1.0	40
IN70	A G	125	0.3 ma	50	25	350	3	1.0	30
IN75	A G	125	.05 ma	50	25	400	2.5	1.0	50
IN81	A G	50	.01 ma	10	25	350	3	1.0	30
IN355	A G	100	.05 ma	50	25	400	4	1.0	50

GENERAL TRANSISTOR CORP., 91-27 138th Place, Jamaica 35, N. Y.

GTD970	A G	100	25	50		550	400	1.0	120
GTD971	A G	100	25	50		500	200	1.0	100
GTD972	A G	100	25	50		450	100	1.0	80
GTD973	A G	80	50	50		500	200	1.0	25
GTD974	A G	80	50	50		450	100	1.0	80
GTD975	A G	75	100	50		500	200	1.0	100
GTD976	A G	75	100	50		450	100	1.0	80
GTD977	A G	70	250	50		500	200	1.0	100
GTD978	A G	70	250	50		450	100	1.0	80
GTD979	A G	70	500	50		450	100	1.0	80
GTD980	A G	30	500	10		400	50	1.0	60
GTD990	A G	70				450	100	1.0	80

HOFFMAN ELECTRONICS CORP., Semiconductor Div., 930 Pitner Ave., Evanston, Illinois

IN137A	A Si	40	0.30	20	25		3	+1	30
IN138A	A Si	20	0.10	10	25		5	+1	50
IN200	A Si	6.8	0.5	6.8	25		50	+1	130
IN201	A Si	9	0.5	8.2	25		35	+1	115
IN202	A Si	11	0.5	10	25		30	+1	105
IN203	A Si	13.5	0.5	12	25		23	+1	95
IN204	A Si	17	0.5	15	25		17	+1	85
IN205	A Si	20	0.1	18	25		12	+1	75
IN206	A Si	25	0.1	22	25		9	+1	67
IN207	A Si	30	0.1	27	25		7	+1	60
IN208	A Si	37	0.1	33	25		5.5	+1	50
IN209	A Si	43	0.1	39	25		4.5	+1	45
IN210	A Si	52	0.1	47	25		3.5	+1	42
IN211	A Si	62	1	56	25		2.7	+1	36
IN212	A Si	75	1	68	25		2	+1	30
IN213	A Si	90	1	82	25		1.5	+1	25
IN214	A Si	110	1	100	25		1.2	+1	20
IN215	A Si	135	1	120	25		0.9	+1	17
IN216	A Si	170	5	150	25		0.7	+1	25
IN217	A Si	200	5	180	25		6.5	4	14
IN218	A Si	250	5	220	25		6	4	13
IN219	A Si	300	5	270	25		3	4	12
IN220	A Si	370	5	330	25		2.2	4	11
IN221	A Si	430	5	390	25		2	4	10
IN222	A Si	520	5	470	25		1.5	4	9
IN253	D Si	100	10	75	25	4000	1A	1.5	1000
IN254	D Si	200	10	150	25	1500	500	1.5	400
IN255	D Si	400	10	350	25	1500	500	1.5	400
IN256	D Si	600	20	500	25	1000	500	2	200
IN431	A Si	75	0.1	15	25	200	0.015	0.5	17
IN456	F Si	30	0.025	25	25	700	40	1	135
IN457	F Si	70	0.025	60	25	600	20	1	110
IN458	F Si	150	0.025	125	25	500	7	1	80
IN459	F Si	200	0.025	175	25	400	3	1	60
IN461	F Si	30	0.5	25	25</				

GENERAL PURPOSE DIODES - (Continued)

DIODE TYPE NO.	CASE & MAT	REVERSE				FORWARD			
		E _{PEAK} V	I _{MAX} (μa)	⊖ V	⊖ °C	I _{SURGE} (ma)	I _{MIN} (ma)	⊕ V	I _{MAX} Av RECT. (ma)

HUGHES AIRCRAFT CO. - (Continued)

HD6649	C Si	200	1.0	175		6	1.5		
HD6651	C Si	100	1.0	75		15	1.5		
HD6652	C Si	200	1.0	175		15	1.5		
HD6653	C Si	50	1.0	35		15	1.5		
HD6751	B Si	175	0.1	150		100			
HD6752	B Si	225	0.1	200		100			
HD6753	B Si	275	0.1	250		100			
HD6754	B Si	325	0.1	300		100			
HD6755	B Si	375	0.1	350		100			
HR10211	C Si		5	175	1.5a	150	0.5		
HR10212	C Si		5	225	1.5a	150	0.5		
HR10213	C Si		5	275	1.5a	150	0.5		
HR10214	C Si		5	325	1.5a	150	0.5		
HR10215	C Si		5	375	1.5a	150	0.5		
HR10251	C Si		5	175	2a	200	0.5		
HR10252	C Si		5	225	2a	200	0.5		
HR10253	C Si		5	275	2a	200	0.5		
HR10254	C Si		5	325	2a	200	0.5		
HR10255	C Si		5	375	2a	200	0.5		
HR10311	C Si	500			600	200	0.5		
HR10312	C Si	600			600	200	0.5		
HR10313	C Si	700			600	200	0.5		
HR10314	C Si	800			600	200	0.5		
HR10315	C Si	900			600	200	0.5		
HR10316	C Si	1000			600	200	0.5		

INTERNATIONAL RECTIFIER CORP., 1521 E. Grand Ave., El Segundo, Calif.

IN1625	E Se	18.75	26	100		0.1	1	0.25	
IN1625A	E Se	18.75	26	100		0.2	1	0.5	
IN1626	E Se	18.75	52	100		0.1	2	0.25	
IN1626A	E Se	18.75	52	100		0.2	2	0.5	
IN1627	E Se	33.75	26	100		1.5	1	3.75	
IN1628	E Se	33.75	52	100		1.5	2	3.75	
IN1629	E Se	33.75	76	100		1.5	3	3.75	
IN1630	E Se	33.75	104	100		1.5	4	3.75	
IN1631	E Se	33.75	130	100		1.5	5	3.75	
IN1632	E Se	38.75	156	100		1.5	6	3.75	
IN1633	E Se	33.75	182	100		1.5	7	3.75	
IN1634	E Se	43.75	208	100		1.5	8	3.75	
IN1635	E Se	135	26	100		5	1	12.5	
IN1636	E Se	135	52	100		5	2	12.5	
IN1637	E Se	135	78	100		5	3	12.5	
IN1638	E Se	135	104	100		5	4	12.5	
IN1639	E Se	135	130	100		5	5	12.5	
IN1640	E Se	300	26	100		11	1	28	
IN1641	E Se	300	52	100		11	2	28	
IN1642	E Se	300	78	100		11	3	28	

INTERNATIONAL RESISTANCE CO., 401 N. Broad St., Philadelphia 8, Pa.

9GA1	A Se	46	10	20	35				
9GA125	B Se	5750	10	2500	35				
19PA1	C Se	46	75	20	35				
19PA125	D Se	5750	75	2500	35				
19PA100	Se								
25PA1	E Se	46	175	20	35				
25PA200	F Se	9200	175	4000	35				
28PA1	G Se	46	225	20	35				
28PA200	H Se	9200	225	4000	35				
44PA1	I Se	46	550	20	35				
44PA200	J Se	9200	550	4000	35				
9LR		47	10	20	85	5a		0.5	
Minifier 130		46	4	20		2.5	1.5	0.25	
Minifier 270		92	16	40		10	3	1.0	

ITT, Components Div., Clifton, N.J.

1215	A Se	56	6	40				0.37	
1863	A Se	56	20	40				1.5	
1864	A Se	56	100	40				4.5	
1865	A Se	56	250	40				7.5	

KEMTRON ELECTRON PRODUCTS, INC., Newburyport, Mass.

IN34	E G	75	30	10	25		5	1.0	50
IN34A	F G	75	30	10	25		5	1.0	50
IN35	G G	75	10	10	25		7.5	1.0	
IN36	E G	40	100	25	25		4	1.0	
IN38	E G	120	6	3	25		4	1.0	100
IN38A	F G	120	6	3	25		4	1.0	100
IN39	E G	225	100	100	25		3	1.0	200
IN39A	F G	225	200	100	25		5	1.0	200
IN39B	E G	225	100	100	25		4	1.0	200
IN40	H G	75				12.8	1.5		
IN41	H G	75				12.8	1.5		
IN42	H G	120				12.8	1.5		
IN43	E G	75	20	5	25		5	1.0	50
IN44	E G		1000	5	25		3	1.0	
IN45	E G		410	50	25		3	1.0	
IN46	E G		1500	50	25		3	1.0	
IN47	E G		500	100	25		4	1.0	
IN48	E G	86	833	50	25		4	1.0	
IN51	E G	50	1667	50	25		2.5	1.0	
IN52	E G	85	150	150	25		4.9	1.0	
IN54	E G	75	7	10	25		5	1.0	50
IN54A	F G	75	7	10	25		5	1.0	50
IN55	E G	170	500	150	25		4	1.0	
IN55A	F G	170	500	150	25		4	1.0	
IN56	E G	50	300	10	25		15	1.0	
IN56A	F G	50	300	10	25		15	1.0	

DIODE TYPE NO.	CASE & MAT	REVERSE				FORWARD			
		E _{PEAK} V	I _{MAX} (μa)	⊖ V	⊖ °C	I _{SURGE} (ma)	I _{MIN} (ma)	⊕ V	I _{MAX} Av RECT. (ma)

KEMTRON ELECTRON PRODUCTS - (Continued)

IN57	E G	90	500	75	25		4	1.0	
IN57A	F G	90	500	75	25		4	1.0	
IN58	E G	120	600	100	25		4	1.0	
IN58A	F G	120	600	100	25		4	1.0	
IN60	E G	30	40	20	25		5.1	1.0	
IN61	E G	140	300	100	25		5	1.0	125
IN63	E G	125	50	50	25		4	1.0	
IN65	E G	85	200	50	25		2.5	1.0	
IN66	E G	70	50	10	25		5	1.0	50
IN67	E G	100	5	5	25		4	1.0	50
IN67A	E G	100	50	50	25		4	1.0	5
IN68	E G	120	625	100	25		3	1.0	
IN68A	F G	130	625	100	25		3	1.0	
IN69	E G	75	800	50	25		5	1.0	
IN69A	F G	75	30	18	25		5	1.0	50
IN70	E G	125	10	50	25		3	1.0	50
IN70A	F G	125	25	10	25		3	1.0	50
IN71	H G	100					4	1.0	
IN73	H G	75					15	1.3	
IN74	H G	75					15	1.3	
IN75	E G	125	50	50	25		2.5	1.0	
IN81	E G	50	10	10	25		3.5	1.0	
IN81A	F G	50	10	10	25		3	1.0	
IN86	E G	50	10	10	25		4	1.0	50
IN87	E G	30	30	1.5	25		0.1	0.25	
IN87A	F G	30	30	1.5	25		0.1	0.25	
IN88	E G	110	100	50	25		2.5	1.0	
IN89	E G	100	8	5	25		3.5	1.0	50
IN90	E G	75	500	50	25		5	1.0	
IN95	E G	75	500	50	25		10	1.0	30
IN96	E G	75	500	50	25		20	1.0	30
IN97	E G	100	8	5	25		10	1.0	30
IN97A	F G	100	8	5	25		20	1.0	
IN98	E G	100	5	5	25		20	1.0	30
IN98A	F G	100	8	5	25		40	1.0	
IN99	E G	100	5	5	25		10	1.0	30
IN99A	F G	100	5	5	25		20	1.0	
IN100	E G	100	5	5	25		20	1.0	30
IN100A	F G	100	5	5	25		40	1.0	
IN107	E G	15	200	10	25		150	1.0	100
IN108	E G		200	50	25		50	1.0	
IN111	F G	70	25	10	25		5	1.0	50
IN112	F G	70	50	10	25		5	1.0	50
IN113	F G	70	25	10	25		2.5	1.0	50
IN114	F G	70	50	10	25		2.5	1.0	50
IN115	F G	70	100	10	25		2.5	1.0	50
IN116	F G	75	100	50	25		5	1.0	30
IN116A	F G	75	100	50	25		10	1.0	30
IN117	F G	75	100	50	25		20	1.0	
IN117A	F G	75	100	50	25		20	1.0	
IN118	F G	75	100	50	25		40	1.0	
IN118A	F G	75	100	50	25		5	1.0	
IN126	E G	75	50	10	25		5	1.0	
IN126A	F G		50	10	25		5	1.0	
IN127	E G	125	25	10	25		3	1.0	
IN127A	F G		25	10	25		3	1.0	
IN128	E G	50	10	10	25		3	1.0	
IN128A	F G		10	10	25		3	1.0	
IN132	F G		0.3	0.6	25				
IN133	F G		50	50	25		3	0.5	
IN198	F G	100	300 ma	60	25		4	1.0	
IN265	F G		300 ma	30	25		4	1.0	
IN266	F G		50 ma	10	25		5	1.0	
IN267	F G		25	10	25		5	1.0	
IN268	F G		10	10	25		6	1.0	
IN294	F G	70	10	5	25		5	1.0	
IN297	F G	100	250	40	25		3.5	1.0	
IN298	F G	85</							

SEMICONDUCTOR DIODES

GENERAL PURPOSE

DIODE TYPE NO.	CASE & MAT	REVERSE				FORWARD			
		E _{PEAK} V	I _{MAX} (μa)	@ V	@ °C	I _{SURGE} (ma)	I _{MIN} (ma)	@ V	I _{MAX} Av RECT. (ma)

NUCLEONIC PRODUCTS CO., INC., 1601 Grande Vista Ave., Los Angeles 23, Calif.

IN34	A G	75	30	10	25	500	5	1.0	50
IN34A	A G	75	30	10	25	500	5	1.0	50
IN38	A G	120	6	3	25	500	4	1.0	50
IN38A	A G	120	6	3	25	500	4	1.0	50
IN39	A G	220	800	200	25	500	4	1.0	50
IN39A	A G	225	200	100	25	200	5	1.0	50
IN43	A G	75	20	5.0	25	500	5	1.0	40
IN44	A G	125	.01	10	25	3	1.0	40	
IN45	A G	75	410	50	25	3	1.0	35	
IN46	A G	60	1500	50	25	3	1.0	40	
IN47	A G	150	500	50	25	4	1.0	30	
IN48	A G	85	833	50	25	400	4	1.0	50
IN51	A G	50	1660	50	25	300	2.5	1.0	25
IN52	A G	85	150	50	25	400	4	1.0	50
IN54	A G	75	100	50	25	5	1.0	50	
IN54A	A G	75	7	10	25	500	5	1.0	50
IN55	A G	170	500	150	25	2.5	1.0	50	
IN55A	A G	170	300	100	25	500	4	1.0	50
IN57	A G	90	500	75	25	500	4	1.0	50
IN58	A G	120	600	100	25	500	4	1.0	50
IN58A	A G	120	600	100	25	500	5	1.0	50
IN59	A G	275	800	250	25	500	3	1.0	50
IN60	A G	30	67	10	25	500	3	1.0	50
IN61	A G	140	700	125	25	500	5	1.0	40
IN63	A G	125	500	50	25	400	4	1.0	50
IN64	A G	20	25	1.3	25	400	2.5	1.0	50
IN65	A G	85	200	50	25	500	5	1.0	50
IN66	A G	70	50	10	25	500	4	1.0	35
IN67	A G	100	5	5	25	500	4	1.0	30
IN67A	A G	100	5	5	25	500	4	1.0	30
IN68	A G	120	625	100	25	500	3	1.0	35
IN68A	A G	130	625	100	25	500	3	1.0	30
IN69	A G	75	30	10	25	400	5	1.0	40
IN70	A G	125	25	10	25	350	3	1.0	30
IN75	A G	125	50	50	25	400	2.5	1.0	50
IN81	A G	50	10	10	25	350	3.5	1.0	50
IN86	A G	70	833	50	25	4	1.0	50	
IN88	A G	110	100	50	25	400	2.5	1.0	50
IN89	A G	100	100	50	25	3.5	1.0	30	
IN90	A G	75	30	10	25	500	5	1.0	40
IN111	A G	75	125	50	25	5	1.0	50	
IN112	A G	75	250	50	25	5	1.0	50	
IN113	A G	75	125	50	25	2.5	1.0	50	
IN114	A G	75	250	50	25	2.5	1.0	50	
IN115	A G	75	500	50	25	2.5	1.0	50	
IN116	A G	75	100	50	25	250	5	1.0	30
IN126	A G	75	850	50	25	350	5	1.0	30
IN127	A G	125	300	50	25	300	3	1.0	30
IN128	A G	50	10	10	25	300	3	1.0	30
IN142	A G	125	5	1.0	25	400	5	1.0	60

PACIFIC SEMICONDUCTORS, INC., 10451 W. Jefferson Blvd., Culver City, Calif.

IN456	A Si	.025	25	25	25	40	1.0	90	
IN456A	A Si	.025	25	25	25	100	1.0	200	
IN457	A Si	.025	60	25	25	20	1.0	75	
IN457A	A Si	.025	60	25	25	100	1.0	200	
IN458	A Si	.025	125	25	25	7	1.0	55	
IN458A	A Si	.025	125	25	25	100	1.0	200	
IN459	A Si	.025	175	25	25	3	1.0	40	
IN459A	A Si	.025	175	25	25	100	1.0	200	
IN461	A Si	0.5	25	25	25	15	1.0	60	
IN461A	A Si	0.5	25	25	25	100	1.0	200	
IN462	A Si	0.5	60	25	25	5	1.0	50	
IN462A	A Si	0.5	60	25	25	100	1.0	200	
IN463	A Si	0.5	175	25	25	1.0	1.0	30	
IN463A	A Si	0.5	175	25	25	100	1.0	200	
IN464	A Si	0.5	125	25	25	3	1.0	40	
IN464A	A Si	0.5	125	25	25	100	1.0	200	
IN482	A Si	0.25	30	25	25	100	1.1	125	
IN482A	A Si	0.25	30	25	25	100	1.0	200	
IN482B	A Si	0.25	30	25	25	100	1.0	200	
IN483	A Si	0.25	60	25	25	100	1.1	125	
IN483A	A Si	0.25	60	25	25	100	1.0	200	
IN483B	A Si	0.25	60	25	25	100	1.0	200	
IN484	A Si	0.25	125	25	25	100	1.1	125	
IN484A	A Si	0.25	125	25	25	100	1.0	200	
IN484B	A Si	0.25	125	25	25	100	1.0	200	
IN485	A Si	0.25	175	25	25	100	1.1	125	
IN485A	A Si	0.25	175	25	25	100	1.0	200	
IN485B	A Si	0.25	175	25	25	100	1.0	200	
IN486	A Si	0.25	225	25	25	100	1.1	125	
IN486A	A Si	0.50	225	25	25	100	1.0	200	
IN486B	A Si	0.50	225	25	25	100	1.0	200	
IN487	A Si	0.25	300	25	25	100	1.1	125	
IN487A	A Si	0.1	300	25	25	100	1.0	200	
IN488	A Si	0.25	380	25	25	100	1.1	125	
IN488A	A Si	0.1	380	25	25	100	1.0	200	
PS603	A Si	0.25	30	25	25	200	1.0	100	
PS604	A Si	0.25	30	25	25	200	1.0	100	
PS605	A Si	0.25	30	25	25	200	1.0	100	
PS609	A Si	0.25	60	25	25	200	1.0	100	
PS610	A Si	0.25	60	25	25	200	1.0	100	
PS611	A Si	0.25	60	25	25	200	1.0	100	
PS615	A Si	0.25	125	25	25	200	1.0	100	
PS616	A Si	0.25	125	25	25	200	1.0	100	
PS617	A Si	0.25	125	25	25	200	1.0	100	

DIODES - (Continued)

DIODE TYPE NO.	CASE & MAT	REVERSE				FORWARD			
		E _{PEAK} V	I _{MAX} (μa)	@ V	@ °C	I _{SURGE} (ma)	I _{MIN} (ma)	@ V	I _{MAX} Av RECT. (ma)

PACIFIC SEMICONDUCTORS, INC. - (Continued)

PS621	A Si	0.25	175	25	25	200	1.0	100	
PS622	A Si	.025	175	25	25	200	1.0	100	
PS623	A Si	.025	175	25	25	200	1.0	100	
PS627	A Si	0.25	225	25	25	200	1.0	100	
PS628	A Si	.050	225	25	25	200	1.0	100	
PS629	A Si	.050	225	25	25	200	1.0	100	
PS632	A Si	0.25	300	25	25	200	1.0	100	
PS633	A Si	0.1	300	25	25	200	1.0	100	
PS636	A Si	0.25	380	25	25	200	1.0	100	
PS637	A Si	0.1	300	25	25	200	1.0	100	

RADIO CORPORATION OF AMERICA, Semiconductor Div., Somerville, N. J.

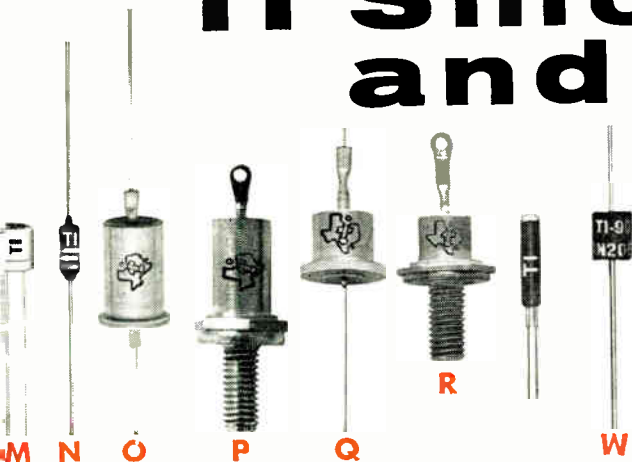
IN34A	A G	60	30	10	25	500	5	1.0	
IN38A	A G	100	5	3	25	500	4	1.0	
IN54A	A G	50	7	10	25	500	5	1.0	
IN58A	A G	100	600	100	25	500	4	1.0	
IN1763	B Si	400	100	400	25	35			0.5
IN1764	B Si	500	100	500	25	35			0.5

RADIO RECEPTOR CO., INC., General Instrument Corp., 240 Wythe Ave., Brooklyn 11, N. Y.

IN34	A G	75	30	10	25	500	5	1.0	
IN34A	A G	75	30	10	25	500	5	1.0	
IN38	A G	120	6	3	25	500	4	1.0	
IN38A	A G	120	6	3	25	500	4	1.0	
IN43	G	75	20	5	25	500	5	1.0	40
IN48	A G	85	833	50	25	400	4	1.0	
IN51	A G	50	1660	50	25	300	2.5	1.0	
IN52	A G	85	150	50	25	400	4	1.0	
IN54	A G	75	7	10	25	500	5	1.0	
IN54A	A G	75	7	10	25	500	5	1.0	
IN55	A G	170	500	50	25	4	1.0		
IN55A	A G	170	300	100	25	500	4	1.0	
IN55B	A G	190	500	150	25	500	5	1.0	
IN56	A G	50	300	30	25	15	1.0		
IN56A	A G	50	300	30	25	15	1.0		
IN58	A G	120	600	100	25	500	4	1.0	
IN58A	A G	120	600	100	25	500	5	1.0	
IN60	G	30	40	20	25	5	1.0		50
IN63	A G	125	5	5	25	4	1.0		
IN67A	A G	100	5	5	25	5	1.0		
IN68A	A G	130	625	100	25	3	1.0		
IN69	A G	75	30	10	25	5	1.0		
IN70	A G	125	30	10	25	3	1.0		
IN80	A G	50				3.5	1.0		
IN89	A G		8	5		3.5	1.0		
IN90	A G		500	50		5	1.0		
IN95	A G		500	50		10	1.0		
IN96	A G		500	50		20	1.0		
IN97A	A G		8	5		20	1.0		
IN98A	A G		8	5		40	1.0		
IN99A	A G		5	5		20	1.0		
IN100A	A G		5	5		40	1.0		
IN116A	A G		100	50		10	1.0		
IN117A	A G		100	50		20	1.0		
IN118A	A G		100	50		40	1.0		
IN126	A G		50	10		5	1.0		25
IN127	A G		25	10		3	1.0		25
IN128	A G		10	10		3	1.0		
IN140	G	85	400	50		40	1.0		85
IN198	A G		75	10	75	5	1.0		
IN27									

For reliable performance...

TI Silicon Diodes and Rectifiers



POWER REGULATORS AND DOUBLE ANODE CLIPPERS

Available with either anode or cathode to stud

Type	Case Type	Zener Voltage (@ 25°C)	I _Z ma	Power Diss (@ 50°C) w	Reverse Current I _R 25°C μa	max Z ₂ @ 25°C @ I _Z ohms	Typ Temp Coef %/°C
1N1816	R	13	500	10	25	2	0.07
1N1817	R	15	500	10	15	2	0.07
1N1818	R	16	500	10	10	3	0.07
1N1819	R	18	500	10	10	3	0.07
1N1820	R	20	250	10	—	3	0.08
1N1821	R	22	250	10	—	3	0.08
1N1822	R	24	250	10	—	3	0.08
1N1823	R	27	250	10	—	3	0.08
1N1824	R	30	250	10	—	4	0.08
1N1825	R	33	150	10	—	4	0.08
1N1826	R	36	150	10	—	5	0.09
1N1827	R	39	150	10	—	5	0.09
1N1828	R	43	150	10	—	6	0.09
1N1829	R	47	150	10	—	7	0.09
1N1830	R	51	150	10	—	8	0.10
1N1831	R	56	150	10	—	9	0.10
1N1832	R	62	50	10	—	12	0.10
1N1833	R	68	50	10	—	14	0.10
1N1834	R	75	50	10	—	20	0.11
1N1835	R	82	50	10	—	22	0.11
1N1836	R	91	50	10	—	35	0.12

Suffix A (±5% Tolerance) Suffix C (Double Anode Clipper)

VOLTAGE REGULATOR DIODES

Type	Case Type	Zener Voltage (@ 25°C)	Max Total Power mw	Z ₂ max ohms
1N746†	N	3.3	400	28
1N747†	N	3.6	400	24
1N748†	N	3.9	400	23
1N749†	N	4.3	400	22
1N750†	N	4.7	400	19
1N751†	N	5.1	400	17
1N752†	N	5.6	400	11
1N753†	N	6.2	400	7
1N754†	N	6.8	400	5
1N755†	N	7.5	400	6
1N756†	N	8.2	400	8
1N757†	N	9.1	400	10
1N758†	N	10	400	17
1N759†	N	12	400	30
650C	M	3.7-4.5	150	40
651C	M	4.3-5.4	150	40
652C	M	5.2-6.4	150	40
653C9	M	6.2-8.0	150	40
654C9	M	8.5-9.5	150	40
655C9	M	9.5-10.5	150	40

†Suffix A (±5% Tolerance)

SILICON RECTIFIERS

Type	Case Type	Mounting	PIV v	I _o ma	Recurrent Peak Current -65°C to +150°C ma	E _b @ 25°C V @ I _o	I _l @ PIV @ 25°C μa
1N588	Q	Axial	1500	1000	25	10	150
1N589	Q	Axial	1500	1000	50	25	80 @ 50ma
1N130	P	Cathode Stud	1500	1000	300	150	1 a
1N131	P	Anode Stud	1500	1000	300	150	1 a
1N538	Q	Axial	200	200	750	250	2.5 a @ 25°C
1N539	Q	Axial	300	300	750	250	2.5 a @ 25°C
1N540	Q	Axial	400	400	750	250	2.5 a @ 25°C
1N1095	Q	Axial	500	500	750	250	2.5 a @ 25°C
1N1096	Q	Axial	600	600	750	250	2.5 a @ 25°C
1N1124	R	Cathode Stud	200	200	3 a	1 a	10 a @ 50°C
1N1125	R	Cathode Stud	300	300	3 a	1 a	10 a @ 50°C
1N1126	R	Cathode Stud	400	400	3 a	1 a	10 a @ 50°C
1N1127	R	Cathode Stud	500	500	3 a	1 a	10 a @ 50°C
1N1128	R	Cathode Stud	600	600	3 a	1 a	10 a @ 50°C
1N1124R	R	Anode Stud	200	200	3 a	1 a	10 a @ 50°C
1N1125R	R	Anode Stud	300	300	3 a	1 a	10 a @ 50°C
1N1126R	R	Anode Stud	400	400	3 a	1 a	10 a @ 50°C
1N1127R	R	Anode Stud	500	500	3 a	1 a	10 a @ 50°C
1N1128R	R	Anode Stud	600	600	3 a	1 a	10 a @ 50°C

GENERAL PURPOSE SILICON DIODES

Max at Elevated Temps (150°C)

Type	Case Type	PIV	V _Z	Min DC Fwd I (@ 25°C) ma at 1v	Max I _L (@ 25°C) μa	P (@ 25°C) mw	Ambient Temp °C	I _L [†]	P
1N645	N	225	275	400	0.2	600	100	15	40
AF1N645	N	225	275	430	0.2	600	100	15	40
1N646	N	300	360	430	0.2	600	100	15	40
1N647	N	400	480	430	0.2	600	100	20	40
AF1N647	N	400	480	400	0.2	600	100	20	40
1N648	N	500	600	400	0.2	600	100	20	40
AF1N648	N	500	600	400	0.2	600	100	20	40
1N649	N	600	720	400	0.2	600	100	25	40
AF1N649	N	600	720	400	0.2	600	100	25	40
600C	M	27	30	3	1 @ -10v	150	100	20 @ -10v	40
601C	M	45	50	10	0.025 @ -10v	150	150	40 @ -10v	40
604C	M	4.7	5.5	60	0.1	150	150	40	40
606C	M	6.8	7.5	35	0.1	150	150	40	40
608C	M	10	11	25	0.1	150	150	40	40
610C	M	15	17	20	0.1	150	150	40	40
612C	M	22	25	20	0.1	150	150	40	40
614C	M	33	37	20	0.1	150	150	40	40
616C	M	47	52	10	0.2	150	150	40	40
618C	M	68	75	10	0.2	150	150	40	40
620C	M	100	110	10	0.2	150	150	40	40
622C	M	150	170	7	0.2	150	100	20	40
624C	N	220	250	3	0.2	150	100	20	40

† At PIV except for types 600C and 601C

HIGH CONDUCTANCE SILICON DIODES

Type	Case Type	Min Saturation Volts @ 100 μa PIV v	Av Rect Fwd I @ 25°C ma	Recurrent Peak Fwd I @ 25°C ma	P @ 25°C mw
1N482	N	30	40	125	400
1N482A	N	38	40	200	650
1N483	N	60	80	125	400
1N483A	N	60	80	200	650
1N484	N	125	150	125	400
1N484A	N	125	150	200	650
1N485	N	175	200	125	400
1N485A	N	175	200	200	650
1N486	N	225	250	125	400
1N486A	N	225	250	200	650
1N487	N	300	330	125	400
1N487A	N	300	330	200	650
1N488	N	380	420	125	400
1N488A	N	380	420	200	650

SILICON COMPUTER DIODES

Type	Case Type	PIV	V _Z	Max T _R @ 25°C μsec	Max I _L @ 25°C μa	I _o @ 25°C ma	Min I _b @ 1v ma	Typ Cap f = 1mc VR = -12v μf	Max I _L @ PIV @ 100°C μa
1N659	N	50	60	0.3	5	100	6	2.7	25
1N660	N	100	120	0.3	5	100	6	2.7	50
1N661	N	200	240	0.3	10	100	6	2.7	100

PHOTO DIODE

Type	Bias Voltage v max	Dark Current @ 25°C ±50v max μa	Dark Current @ 100°C ±50v max μa	*Typ Light Current @ 25°C @ ±10v μa	*Typ Sensitivity @ 10v μh/mw/cm²
1N2175	50	0.5	100	200	22.3

* Light current measured in terms of radiation. Radiation = 3 mw/cm² in a frequency bandwidth of .7 to 1 micron.

SILICON RECTIFIERS — ECONOMY PACKAGE

Type	Case Type	PIV	I _o ma	Recurrent Peak current @ 25°C a	Dynamic Forward Voltage Drop @ 100°C v @ I _o	Dynamic Reverse Current @ 100°C ma @ V
1N2069	W	200	750	500	6	0.6 @ 500
1N2070	W	400	750	500	6	0.6 @ 500
1N2071	W	600	750	500	6	0.6 @ 500

TEXAS INSTRUMENTS INCORPORATED
 SEMICONDUCTOR COMPONENTS DIVISION
 POST OFFICE BOX 312
 13500 N. CENTRAL EXPRESSWAY
 DALLAS, TEXAS

Write on your company letterhead describing your application for specific details on TI products. Circle 91 on Inquiry Card

SEMICONDUCTOR DIODES

GENERAL PURPOSE DIODES - (Continued)

DIODE TYPE NO.	CASE & MAT	REVERSE				FORWARD			
		E_{PEAK} (V)	I_{MAX} (μ a)	V	θ ($^{\circ}$ C)	I_{SURGE} (ma)	I_{MIN} (ma)	V	$I_{MAX AV}$ RECT. (ma)

RADIO RECEPTOR CO., INC. - (Continued)

DR272	G		20	10			400	1.0	100
DR283	G		30	10	25		50	1.0	
DR291	G		100	25	25		50	1.0	
DR292	G		10	10			50	1.0	
DR301	A G	125	100	50			400	1.0	
DR302	A G	100	100	50			400	1.0	
DR303	A G	75	50	20			400	1.0	
DR304	G		500	150	25		200	1.0	100
DR305	G	125	100	50	25		200	1.0	
DR306	G	100	100	50	25		200	1.0	
DR307	A G	75	50	20	25		200	1.0	
DR308	A G	100	50	50	25		200	1.0	
DR309	A G	100	50	50	25		400	1.0	
DR310	A G	120	50	100	25		100	1.0	
DR311	A G	120	100	100	25		100	1.0	
DR312	A G	100	20	100	25		100	1.0	
DR313	A G	80	20	50	25		100	1.0	
DR314	A G	80	50	50	25		100	1.0	
DR315	A G	150	50	100	25		50	1.0	
DR316	A G	125	100	100	25		50	1.0	
DR317	A G	100	50	50	25		50	1.0	
DR318	A G	75	2	10	25		50	1.0	
DR319	A G	75	5	10	25		50	1.0	
DR321	A G		125	50	25		200	1.0	
DR322	A G		200	50	25		100	1.0	
DR324	A G		500	50	25		100	1.0	
DR325	A G		250	50	25		100	1.0	
DR326	A G	75	250	50	25		100	1.0	
DR327	A G	125	100	50	25		300	1.0	
DR328	A G	100	100	50	25		300	1.0	
DR329	A G	75	50	20	25		300	1.0	
DR330	A G	100	50	50	25		300	1.0	
DR336	G		8	5	25		40	1.0	
DR337	G		5	5	25		40	1.0	
DR338	G		100	50	25		40	1.0	
DR366	G		100	50	25		50	1.0	
DR351	G		300	30	50		200	1.0	100
DR352	G		300	30	50		10	0.35	100
DR365	G		60	6	25		10	4	
DR379	G		100	50	25		200	1.0	100
DR389	G		50	50	25		200	1.0	
DR401	A G				25		20	0.5	
DR402	A G				25		20	0.5	
DR403	A G				25		20	0.5	
DR404	A G				25		20	0.5	
DR449	G		500	10	25		20	1.0	
DR463	G		100	10	25		300	1.0	
DR695	Si		50	300	100		100	1.0	100
DR698	Si		1.0	300	25		50	1.0	100
DR699	Si		1.0	200	25		50	1.0	100
DR668	B Si	80	.025	60			200	1.0	
DR669	B Si	150	.025	125			200	1.0	
DR670	B Si	200	.025	175			200	1.0	
DR671	B Si	250	.05	225			200	1.0	
DR826	Si	150	180	100			100	1.5	
DR848	Si	0	.025	20			100	1.5	
DR863	Si		500	30	90		20	1.0	

RAYTHEON MANUFACTURING CO., Semiconductor Div., 55 Chapel St., Newton 58, Mass.

IN60	E G	50	200	10			300		35
IN63A	E G	125	50	50			400	4	50
IN66	E G	70	800	50			500	5	50
IN66A	F G	70	800	50			300	5	30
IN67	E G	100	50	50			500	4	35
IN67A	F G	100	50	50			300	4	30
IN68	E G	120	625	100			500	3	35
IN68A	F G	125	625	100			300	3	30
IN89	F G	100	8	5			250	3.5	30
IN90	F G	75	800	5			500	5	30
IN95	F G	75	800	50			300	10	30
IN97	F G	100	8	5			250	10	30
IN99	F G	100	5	5			300	10	30
IN116	F G	75	100	50			250	5	30
IN117	F G	75	100	50			250	10	30
IN126	F G	75	850	50			350	5	30
IN127	F G	125	300	50			300	3	30
IN128	F G	150	10	10			300	3	30
IN198	F G	100	50	50			300	4	30
IN294	E G	70	800	50			500	5	50
IN294A	F G	70	800	50			300	5	30
IN297	E G	100	100	50			500	3.5	35
IN297A	F G	100	100	50			300	3.5	30
IN298	E G	85	250	40			500	30	2
IN298A	F G	85	250	40			300	30	2
IN300	D Si	15	0.001	10			12	15	1
IN300A	D Si	15	0.001	10			550	30	80
IN300B	D Si	15	0.001	10			600	50	100
IN301	D Si	70	0.05	50			350	5	45
IN301A	D Si	70	0.05	50			500	18	65
IN301B	D Si	70	0.05	50			550	50	75
IN302	D Si	225	0.2	200			250	1	30
IN302A	D Si	225	0.2	200			350	5	40
IN302B	D Si	225	0.2	200			400	20	55
IN303	D Si	125	0.1	100			300	3	40
IN303A	D Si	125	0.1	100			400	12	95
IN303B	D Si	125	0.1	100			500	50	65

RAYTHEON MANUFACTURING CO. - (Continued)

DIODE TYPE NO.	CASE & MAT	REVERSE				FORWARD			
		E_{PEAK} (V)	I_{MAX} (μ a)	V	θ ($^{\circ}$ C)	I_{SURGE} (ma)	I_{MIN} (ma)	V	$I_{MAX AV}$ RECT. (ma)

RAYTHEON MANUFACTURING CO. - (Continued)

IN305	D G	60	20	50			500	100	0.8	125
IN306	D G	15	2	10			500	100	0.8	150
IN307	D G	125	20	100			500	100	1	50
IN432	D Si	40	0.005	10			450	10	1	55
IN432A	D Si	40	0.005	10			550	20	1	70
IN432B	D Si	40	0.005	10			550	50	1	85
IN433	D Si	145	0.1	125			300	3		40
IN433A	D Si	145	0.1	125			400	10		50
IN433B	D Si	145	0.1	125			450	50		60
IN434	D Si	180	0.1	150			300	2		35
IN434A	D Si	180	0.1	150			400	7		45
IN434B	D Si	180	0.1	150			450	20		60
IN460	D Si	90	0.1	75			350	5		45
IN460A	D Si	90	0.1	75			450	15		60
IN460B	D Si	90	0.1	75			500	50		70
IN645	A Si	225	0.2	225			3a			400
IN646	A Si	300	0.2	225			3a			400
IN647	A Si	400	0.2	225			3a			400
IN648	A Si	500	0.2	225			3a			400
IN1095	B Si	500	300	500			15a	250	0.5	750
IN1096	B Si	600	300	600			10a	300	0.3	750
CK709		60	1.5	10			500	2.5	1.5	50
CK711		80	30	50			500			35
CK717		60	10	10			500	2.5	1.5	50
CK719		80	30	50			500			35
CK863	D	300	0.3	275			175	1	1	20
CK863A	D	300	0.3	275			250	3		30
CK863B	D	300	0.3	275			300	20		50

RHEEM SEMICONDUCTOR CORP., 327 Moffett Blvd., Mountain View, Calif.

IN456	A Si	30	0.025	25	25			40	1.0	90
IN456A	A Si		0.025	25	25			100	1.0	200
IN457	A Si		0.025	60	25			20	1.0	75
IN457A	A Si		0.025	60	25			100	1.0	200
IN458	A Si		0.025	0.25	25			7	1.0	55
IN458A	A Si		0.025	125	25			100	1.0	200
IN459	A Si		0.025	175	25			3.0	1.0	40
IN459A	A Si		0.025	175	25			100	1.0	200
IN460	C Si	90	0.01	10	25			5.0	1.0	45
IN460A	C Si	90	0.01	10	25			15	1.0	60
IN461	A G	30	0.5	25	25			15	1.0	90
IN461A	A G		0.5	25	25			100	1.0	200
IN462	A G	70	0.5	60	25			5	1.0	50
IN462A	A G		0.5	60	25			100	1.0	200
IN463	A G	200	0.5	175	25			1.0	1.0	30
IN463A	A G		0.5	125	25			100	1.0	200
IN464	A G	150	0.5	125	25			3	1.0	40
IN464A	A G		0.5	175	25			100	1.0	200
IN482	B Si		0.25	30	25			100	1.1	125
IN482A	B Si		0.025	30	25			100	1.0	125
IN482B	B Si		0.025	30	25			100	1.0	
IN483	B Si		0.025	60	25			100	1.1	125
IN483A	B Si		0.025	60	25			100	1.0	125
IN483B	B Si		0.025	60	25			100	1.0	125
IN484	B Si		0.25	125	25			100	1.1	125
IN484A	B Si		0.025	125	25			100	1.0	125
IN484B	B Si		0.025	125	25			100	1.0	
IN485	B Si		0.25	175	25			100	1.1	125
IN485A	B Si		0.025	175	25			100	1.0	125
IN485B	B Si		0.025	175	25			100	1.0	125
IN486	B Si		0.25	225	25			100	1.1	125
IN486A	B Si</									

CLEVITE

SILICON JUNCTION DIODES



ACTUAL SIZE

*250 MW Package . . .
Fast Switching and General Purpose Types
Featuring . . .*

- **MECHANICAL RELIABILITY** — Rugged, hermetically sealed, subminiature packages. Designed to meet both military and commercial requirements.
- **ELECTRICAL SUPERIORITY** — Excellent high temperature operation . . . thermally stable . . . high forward conductance . . . efficient rectification.
- **PRODUCT UNIFORMITY** — Tight manufacturing controls.

For details, write for Bulletin B217A-1 B217A-2

TECHNICAL DATA

Type	Max. DC Inver. Oper. Voltage	Forward Current @ Specified Voltage	Max. Inverse Current		
			@ 25°C	@ 150°C	Test Volts
1N457	60 V	20 ma @ 1.0 V	0.025 μ a	5.0 μ a	60 V
1N458	125 V	7 ma @ 1.0 V	0.025 μ a	5.0 μ a	125 V
1N459	175 V	3 ma @ 1.0 V	0.025 μ a	5.0 μ a	175 V
1N662	90 V	10 ma @ 1.0 V	20 μ a	100 μ a (@ 100° C)	50 V
1N663	90 V	100 ma @ 1.0 V	5.0 μ a	50 μ a (@ 100° C)	75 V
1N778	100 V	10 ma @ 1.0 V	0.5 μ a	30 μ a (@ 125° C)	100 V
1N779	175 V	10 ma @ 1.0 V	0.5 μ a	30 μ a (@ 125° C)	175 V

OTHER CLEVITE DIVISIONS:

Cleveland Graphite Bronze • Brush Instruments
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CLEVITE TRANSISTOR PRODUCTS

241 CRESCENT ST., WALTHAM 54, MASS.
Twinbrook 4-9330

Circle 92 on Inquiry Card



Silicon Junction Diodes Germanium Diodes Power Transistors Solder Lug Power Transistor

SEMICONDUCTOR DIODES

GENERAL PURPOSE DIODES - (Continued)

DIODE TYPE NO.	CASE & MAT	REVERSE				FORWARD			
		E _{PEAK} V	I _{MAX} (μa)	@ V	@ °C	I _{SURGE} (ma)	I _{MIN} (ma)	@ V	I _{MAX} AV RECT. (ma)

SEMI-ELEMENTS INC. - (Continued)

IN57	A	90	500	75		500	4	1.0	
IN58	AG	120	600	100		500	4	1.0	
IN58A	AG	120	600	100		500	5	1.0	
IN60	AG	30	67	10		500	3	1.0	
IN61	AG	40	300	100		500	5	1.0	
IN63	AG	125	500	50		400	4	1.0	
IN64	AG	20	200	10					
IN66	AG	70	800	50		500	5	1.0	
IN67	AG	100	50	50		500	4	1.0	
IN67A	AG	100	5	5		500	4	1.0	
IN68	AG	120	625	100		500	3	1.0	
IN68A	AG	130	625	100		500	3	1.0	
IN69	AG	75	30	10		400	5	1.0	
IN69A	AG	75	30	10		400	5-25	1.0	
IN70	AG	125	25	10		350	3	1.0	
IN70A	AG	125	25	10		350	3	1.0	
IN73	AG	75	50	10		100	15	1.0	
IN74	AG	75	50	10		100	15	1.0	
IN75	AG	125	50	50		100	2.5	1.0	
IN81	AG	50	10	10		350	3.5	1.0	
IN81A	AG	50	10	10		350	3	1.0	
IN86	AG	70	50	10		4	4	1.0	
IN88	AG	110	100	50		400	25	1.0	
IN90	AG	75	800	50		500	55	1.0	
IN95	AG	75	500	50		250	10	1.0	
IN97	AG	100	8	5		250	10	1.0	
IN99	AG	100	5	5		300	10	1.0	
IN111	AG	75					5	1.0	
IN112	AG	75					5	1.0	
IN113	AG	75					2.5	1.0	
IN114	AG	75					2.5	1.0	
IN115	A	75					2.5	1.0	
IN116	AG	75	100	50		250	5	1.0	
IN116A	AG	75	100	50		10	10	1.0	
IN117	AG	75	100	50		250	10	1.0	
IN126	GG	75	50	10		350	5	1.0	
IN126A	GG	75	50	10		350	5	1.0	
IN127	AG	125	25	10		300	3	1.0	
IN128	AG	50	10	10		300	3	1.0	
IN142	AG	125	25	10		400	5	1.0	
IN192	AG	70	250	50		400	5	1.0	
IN198	AG	100	10	10		300	4	1.0	
IN198A	AG	100	50	50		300	4	1.0	
IN268	AG	40	850	30		300	2.5	1.0	
IN294	AG	70	800	50		500	5	1.0	
IN295	A	50	200	10		300			
IN297	AG	100	100	50		500	3.5	1.0	
IN314	AG	75	50	10		100	15	1.0	
IN355	AG		5	5		400	4	1.0	
IN476	AG	115	275	100		500	3	1.0	
IN477	AG	115	275	100		500	3	1.0	
IN478	AG	115	150	30		500	5	1.0	
IN479	AG	115	150	30		500	5	1.0	
IN541	AG	45	150	30		200	1.5	1.0	
IN616	AG	40	150	30		200	8	1.0	
IN617	AG	115	275	100		500	3	1.0	
IN618	AG	115	250	100		500	5	1.0	
IN636	AG	60	10	10		400	2.5	1.0	

SILICON TRANSISTOR CORP., Carle Place, Long Island, N. Y.

IN456	Si	.025	25	25		40	1.0	90	
IN457	Si	.025	60	25		20	1.0	75	
IN458	Si	.025	125	25		7	1.0	55	
IN459	Si	.025	175	25		3	1.0	40	
IN461	Si	.5	25	25		15	1.0	60	
IN462	Si	.5	60	25		5	1.0	50	
IN663	Si	.5	175	25		1	1.0	30	
IN464	Si	.5	125	25		3	1.0	40	
IN482	Si	.25	36	25		100	1.1	100	
IN482A	Si	.025	36	25		100	1.0	200	
IN482B	Si	.025	36	25		100	1.0	200	
IN483	Si	.25	70	25		100	1.1	100	
IN483A	Si	.025	70	25		100	1.0	200	
IN483B	Si	.025	70	25		100	1.0	200	
IN484	Si	.25	130	25		100	1.1	100	
IN484A	Si	.025	130	25		100	1.0	200	
IN484B	Si	.025	130	25		100	1.0	200	
IN485	Si	.25	180	25		100	1.1	100	
IN485A	Si	.025	180	25		100	1.0	200	
IN485B	Si	.025	180	25		100	1.0	200	
IN486	Si	.25	225	25		100	1.1	100	
IN486A	Si	.05	225	25		100	1.0	200	
IN487	Si	.25	300	25		100	1.1	100	
IN487A	Si	.1	300	25		100	1.0	200	

SPERRY SEMICONDUCTOR DIV., Sperry Rand Corp., Great Neck, L. I., N. Y.

IN457	A Si	70	.025	60	25	1.0a	20	1.0	100
IN458	A Si	150	.025	125	25	1.0a	7	1.0	100
IN459	A Si	200	.025	175	25	1.0a	3	1.0	100
IN482	A Si	40	.25	30	25	1.0a	100	1.1	100
IN482A	A Si	40	.025	30	25	2.0a	100	1.1	200
IN482B	A Si	40	.025	60	25	2.0a	100	1.0	200
IN483	A Si	80	.25	60	25	1.0a	100	1.1	100
IN483A	A Si	80	.025	60	25	2.0a	100	1.0	200
IN483B	A Si	80	.025	60	25	2.0a	100	1.0	200

DIODE TYPE NO.	CASE & MAT	REVERSE				FORWARD			
		E _{PEAK} V	I _{MAX} (μa)	@ V	@ °C	I _{SURGE} (ma)	I _{MIN} (ma)	@ V	I _{MAX} AV RECT. (ma)

SPERRY SEMICONDUCTOR DIV. - (Continued)

IN484	A Si	150	.25	125	25	2.0a	100	1.1	100
IN484A	A Si	150	.25	125	25	2.0a	100	1.1	200
IN484B	A Si	150	.025	125	25	2.0a	100	1.0	200
IN485	A Si	200	.25	175	25	1.0a	100	1.1	100
IN485A	A Si	200	.025	175	25	2.0a	100	1.0	200
IN485B	A Si	200	.025	175	25	2.0a	100	1.0	200
IN486	A Si	250	.25	225	25	1.0a	100	1.1	100
IN486A	A Si	250	.05	225	25	1.0a	100	1.1	200
IN487	A Si	330	.25	300	25	1.0a	100	1.1	100
IN487A	A Si	330	.1	300	25	2.0a	100	1.0	200

SYLVANIA ELECTRIC PRODUCTS, INC., Semiconductor Div., 100 Sylvan Rd., Woburn, Mass.

IN34A	AG	30	10	25			1.0	1.0	50
IN35	CG	10	10	25			7	1.0	22.5
IN38B	AG	6	3	25			4	1.0	50
IN39B	AG	100	100	25			4	1.0	50
IN40	EG	40	10	25			12.7	1.5	22.5
IN41		40	10	25			12.7	1.5	22.5
IN42		750	100	25			12.7	1.5	22.5
IN48		800	50	25			4	1.0	50
IN52A	G	100	50	25			5	1.0	50
IN54A	AG	7	10	25			5	1.0	50
IN55A	AG	500	150	25			4	1.0	50
IN56A	AG	300	30	25			15	1.0	60
IN58A	AG	600	100	25			4	1.0	50
IN63	AG	50	50	25			4	1.0	50
IN65	AG	200	50	25			2.5	1.0	50
IN67A	BG	5	5	25			4	1.0	30
IN68A		625	100	25			3		40
IN69A	AG	30	10	25			5	1.0	40
IN70A	AG	25	10	25			3	1.0	30
IN71	EG	300	30	25			15	1.0	60
IN81	AG	10	10	25			3	1.0	30
IN81A	AG	10	10	25			3	1.0	30
IN90	BG	750	50	25			5	1.0	30
IN91		2.7	100	25			1.0		150
IN92		1.9	200	25			1.0		100
IN93		1.2	300	25			1.0		75
IN98	BG	8	5	25			20	1.0	30
IN100	BG	5	5	25			20	1.0	30
IN117		100	50	25			10	1.0	30
IN118	BG	100	50	25			20	1.0	60
IN126A	BG	50	10	25			5	1.0	30
IN127	BG	25	10	25			3	1.0	30
IN127A	BG	25	10	25			3	1.0	30
IN128	BG	10	10	25			3	1.0	30
IN140	AG	300	50	25			40	1.0	85
IN191	BG			25			5	1.0	30
IN192				25			25	1.0	25
IN193	A Si	20	10	25			1	2.0	30
IN194	A Si	10	40	25			1.5	2.0	30
IN195	A Si	10	40	25			2	2.0	30
IN196	A Si	10	40	25			1	2.0	30
IN198	BG	10	10	25			4	1.0	30
IN198A	BG	10	10	25			4	1.0	30
IN253		10	75	25			1.0		1000
IN254		10	150	25			1.0		400
IN255		10	350	25			1.0		400
IN256				25			1.0		200
IN270		75	10	25			200	1.0	60
IN276	B	20	10	25			40	1.0	40
IN279	B	200	20	25			100	1.0	80
IN281		30	10	25			100	1.0	75
IN283	BG	80	10	25			200	1.0	100
IN294		10	10	25			10	1.0	50
IN297		10	50	25			3.5	1.0	35
IN298		250	40	25			30	2.0	50
IN435	EG	300	30	25			1.0		60</

Radio Receptor

*silicon
diodes*

IN ANY COMBINATION OF CHARACTERISTICS

*high speed • high conductance • high temperature
high voltage • high back resistance*

General Instrument semiconductor engineering has made possible these Radio Receptor diodes with a range of characteristics never before available to the industry.

The types listed here are just a small sampling of the complete line which can be supplied in volume quantities for prompt delivery. Write today for full information.

Including the industry's most versatile diode with uniform excellence in all parameters

1N658

GENERAL PURPOSE TYPES		FAST RECOVERY TYPES	HIGH CONDUCTANCE TYPES	
1N456	1N461	1N625	1N482	1N484A
1N457*	1N462	1N626	1N482A	1N484B
1N458*	1N463	1N627	1N482B	1N485
1N459*	1N464	1N628	1N483	1N485A
		1N629	1N483A	1N485B
			1N483B	1N486
			1N484	1N486A

* JAN Types

PLUS a large group of special DR numbers developed by General Instrument Corporation with characteristics that far exceed any of the standard types listed above!



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SEMICONDUCTOR DIODES

GENERAL PURPOSE DIODES - (Continued)

DIODE TYPE NO.	CASE & MAT	REVERSE				FORWARD			
		E _{PEAK} V	I _{MAX} (μa)	@ V	@ °C	I _{SURGE} (ma)	I _{MIN} (ma)	@ V	I _{MAX AV} RECT. (ma)

TEXAS INSTRUMENTS INCORPORATED, Semiconductor-Components Div., P. O. Box 312, Dallas, Tex.

IN482	N Si	30							125
IN482A	N Si	30							200
IN483	N Si	60							125
IN483A	N Si	60							200
IN484	N Si	125							125
IN484A	N Si	125							200
IN485	N Si	175							125
IN485A	N Si	175							200
IN486	N Si	225							125
IN486A	N Si	225							200
IN487	N Si	300							125
IN487A	N Si	300							200
IN488	N Si	380							125
IN488A	N Si	380							200
IN645	M Si	225	0.2				400	1	
IN646	M Si	300	0.2				400	1	
IN647	M Si	400	0.2				400	1	
IN648	M Si	500	0.2				400	1	
IN649	M Si	600	0.2				400	1	
600C	M Si	27	1.0	10	25		3	1	
601C	M Si	45	0.025	10	25		10	1	
604C	M Si	4.7	0.1		25		60	1	
606C	M Si	6.8	0.1		25		35	1	
608C	M Si	10	0.1		25		25	1	
610C	M Si	15	0.1		25		20	1	
612C	M Si	22	0.1		25		20	1	

THERMOSEN, INC., 375 Fairfield Avenue, Stamford, Connecticut
Manufactures a line of diodes rated over 1 amp. These diodes will be included in EI's forthcoming "Survey of Power Rectifiers."

TRANSITRON ELECTRONICS CORP., 168-182 Albion St., Wakefield, Mass.

IN34	H G	75	800	50			5	1.0	25
IN34A	H G	75	500	50			5	1.0	50
IN35	H G	75	10	10			7.5	1.0	22.5
IN38	H G	125	625	100			3	1.0	50
IN38A	H G	125	500	100			5	1.0	50
IN38B	H G	120	6	3			4	1.0	
IN40		75	40	10			12.75	1.5	
IN42		120	6	3			12.75	1.5	
IN48	H G	85	800	50			5	1.0	60
IN51	H G	50	1.5 ma	50			2.5	1.0	25
IN52	H G	85	150	50			5	1.0	50
IN54	H G	75	10	10			5	1.0	50
IN54A	H G	75	100	50			5	1.0	50
IN56	H G	50	300	30			15	1.0	60
IN56A	H G	50	200	30			15	1.0	60
IN58	H G	125	800	100			5	1.0	60
IN58A	H G	125	600	100			5	1.0	50
IN63	H G	125	50	50			5	1.0	60
IN65	H G	85	200	50			5	1.0	50
IN67A	A G	100	50	50			5	1.0	50
IN68	A G	130	625	100			3	1.0	35
IN68A	A	130	625	100			5	1.0	50
IN69	H G	85	800	50			5	1.0	40
IN69A	H G	75	30	10			5	1.0	5-25
IN70	H G	125	300	50			5	1.0	40
IN70A	H G	125	25	10			3	1.0	
IN71	G	50	300	30			15	1.0	
IN73	G	75	50	10			15	1.7	
IN74	G	75	50	10			15	1.8	
IN75	H G	125	50	50			5	1.0	50
IN81	H G	50	10	10			5	1.0	40
IN81A	H G	50	10	10			3	1.0	
IN89	G	100	100	50			5	1.0	50
IN90	G	75	500	50			5	1.0	50
IN95	G	75	500	50			10	1.0	50
IN96	G	75	500	50			20	1.0	60
IN96A	G	75	500	50			40	1.0	70
IN97	G	100	100	50			10	1.0	50
IN98	G	100	100	50			20	1.0	60
IN99	A G	100	50	50			10	1.0	50
IN100	A G	100	50	50			20	1.0	60
IN100A	A G	100	50	50			40	1.0	70
IN107	H G	15	200	10			150	1.0	80
IN108	H G	75	200	50			50	1.0	75
IN111	H G	75	125	50			5	1.0	50
IN112	H G	75	250	50			5	1.0	50
IN113	H G	75	125	50			5	1.0	50
IN114	H G	75	250	50			5	1.0	50
IN115	H G	75	500	50			5	1.0	50
IN116	A G	75	100	50			5	1.0	50
IN117	A G	75	100	50			10	1.0	50
IN118	A G	75	100	50			20	1.0	60
IN118A	A G	75	100	50			40	1.0	70
IN126	A G	75	850	50			5	1.0	50
IN126A	A G	75	850	50			5	1.0	30
IN127	A G	125	300	50			3	1.0	50
IN127A	A G	125	300	50			3	1.0	30
IN128	A G	50	10	10			3	1.0	30
IN137A	I Si	36	.03	20			3	1.0	30
IN137B	I Si	36	.03	20			20	1.0	50
IN138A	I Si	18	.01	10			5	1.0	50
IN138B	I Si	18	.01	10			40	1.0	60
IN139	H G	50	1.5 ma	50			20	1.0	70
IN140	H G	85	300	50			40	1.0	85

DIODE TYPE NO.	CASE & MAT	REVERSE				FORWARD			
		E _{PEAK} V	I _{MAX} (μa)	@ V	@ °C	I _{SURGE} (ma)	I _{MIN} (ma)	@ V	I _{MAX AV} RECT. (ma)

TRANSITRON ELECTRONICS CORP. - (Continued)

IN141	H G	85	50	50				20	1.0	70
IN142	H G	125	100	100				5	1.0	60
IN143	H G	125	100	100				40	1.0	85
IN144	H G	40	200	20				100	1.0	150
IN145	G	40	100	10				40	1.0	
IN198	A G	100	10	10				4	1.0	
IN248		50	5 ma	50				25a	1.5	10
IN248A		50	5 ma	50				50a	1.5	20
IN249		100	5 ma	100				25a	1.5	10
IN250		200	5 ma	100				25a	1.5	20
IN250A		200	5 ma	100				50a	1.5	10
IN253		95	100	95				1.0a	1.5	20
IN254		200	100	190				50a	1.5	100
IN255		380	150	380				500	1.5	400
IN256		570	250	510				500	2	200
IN270	A G	100	100	50				200	1.0	60
IN277	A G	125	250	50				100	1.0	50
IN278	A G		125	50				20	1.0	35
IN279	A G	35	200	20				100	1.0	80
IN281	A G	75	500	50				100	1.0	75
IN283	A G	25	20	10				200	1.0	100
IN308		8	500	8				300	1.0	250
IN309		30	100	20				100	1.0	200
IN310		110	100	100				15	1.0	30
IN312		55	0.2	50				30	1.0	50
IN313		100	.01	20				20	1.0	40
IN316		50	1.0	50				200	2	250
IN317		100	1.0	100				200	2	250
IN318		200	1.0	200				200	2	250
IN319		350	1.0	350				200	2	250
IN320		500	1.0	500				200	2	250
IN323		50	1.0	50				400	3	250
IN324		100	1.0	100				400	3	250
IN325		200	1.0	200				400	3	250
IN326		350	1.0	500				400	3	250
IN327		500	200	400				400	3	250
IN332		400	200	400				800	2	400
IN333		400	200	400				400	2	200
IN334		300	200	300				800	2	400
IN335		300	200	300				400	2	200
IN336		200	100	200				800	2	400
IN337		200	100	200				400	2	200
IN338		100	200	100				2a	2	1.0a
IN339		100	100	100				800	2	400
IN340		100	100	100				400	2	200
IN341		400	500	400				800	2	400
IN342		400	500	400				400	2	200
IN343		300	500	300				800	2	400
IN344		300	500	300				400	2	200
IN345		200	500	300				800	2	400
IN346		200	500	300				400	2	200
IN347		100	500	100				2a	2	1.0a
IN348		100	500	100				800	2	400
IN349		100	500	100				400	2	200
IN350	I Si	80	.03	60				20	1.0	40
IN351	I Si	120	.03	100				20	1.0	40
IN352	I Si	170	.05	150				20	1.0	40
IN353	I Si	225	0.1	200				20	1.0	40
IN354	I Si	360	0.1	300				20	1.0	40
IN359		50	1.0	50				200	2	300
IN360		100	1.0	100				200	2	300
IN361		200	1.0	200				200	2	300
IN362		350	1.0	350				200	2	300
IN363		500	1.0	500				200	2	300
IN411B		50	15 ma	50				150a	1.5	50
IN412B		100	15 ma	100				150a	1.5	100
IN413B		200	15 ma	200				150a	1.5	200
IN440		100	0.3	100				300	1.5	250
IN440B		100	0.3	100				750	1.5	250
IN441		200	0.75	500						

GENERAL PURPOSE DIODES - (Continued)

DIODE TYPE NO.	CASE & MAT	REVERSE				FORWARD			
		E _{PEAK} V	I _{MAX} (μa)	@ V	@ °C	I _{SURGE} (ma)	I _{MIN} (ma)	@ V	I _{MAX} Av RECT. (ma)

TRANSITRON ELECTRONICS CORP. - (Continued)

IN485	A Si	200	30	175		100	1.1	400	
IN485A	A Si	200	15	175		100	1.0	650	
IN485B	A Si	200	5	175		100	1.0	650	
IN486	A Si	250	50	225		100	1.1	400	
IN486A	A Si	250	25	225		100	1.0	650	
IN486B	A Si	250	10	225		100	1.0	650	
IN487	A Si	330	50	300		100	1.1	400	
IN487A	A Si	330	25	300		100	1.0	650	
IN488	A Si	420	50	380		100	1.1	400	
IN488A	A Si	420	25	380		100	1.0	650	
IN530		100	3	100		100	1.0	300	
IN531		200	7.5	200		250	1.0	300	
IN532		300	10	300		250	1.0	300	
IN533		400	15	400		250	1.0	300	
IN534		500	17.5	500		250	1.0	300	
IN535		600	20	600		250	1.0	300	
IN536		50	10	50		500	1.2	250	
IN537		100	10	100		500	1.1	250	
IN538		200	10	200		500	1.1	250	
IN539		300	10	200		500	1.1	250	
IN540		400	10	400		500	1.1	250	
IN547		600	10	600		500	1.2	250	
IN550		100	0.5	100		350	1.0	500	
IN551		200	1.0	200		350	1.0	500	
IN552		300	1.5	300		350	1.0	500	
IN553		400	2.5	400		350	1.0	500	
IN554		500	3.3	500		350	1.0	500	
IN555		600	5	600		350	1.0	500	
IN560		800	300	800		500	1.2	250	
IN561		1000	300	1000		500	1.2	250	
IN562		800	15	800		300	1.0	400	
IN563		1000	20	1000		300	1.0	400	
IN588		1500	100	1500		10	10	10	
IN589		1500	100	1500		50	8	25	
IN599	F	50	25	50		200	1.5	400	
IN599A	F	50	1.0	50		400	1.5	400	
IN600	F	100	25	100		200	1.5	400	
IN600A	F	100	1.0	100		400	1.5	400	
IN601	F	150	25	150		200	1.5	400	
IN601A	F	150	1.0	150		400	1.5	400	
IN602	F	200	25	200		200	1.5	400	
IN602A	F	200	1.0	200		400	1.5	400	
IN603	F	300	25	300		200	1.5	400	
IN603A	F	300	1.0	300		400	1.5	400	
IN604	F	400	25	400		200	1.5	400	
IN604A	F	400	1.5	400		400	1.5	400	
IN605	F	500	25	500		200	1.5	400	
IN605A	F	500	2	500		400	1.5	400	
IN606	F	600	25	600		200	1.5	400	
IN606A	F	600	2.6	600		400	1.5	400	
IN607	F	50	25	50		200	1.5	800	
IN607A	F	50	1.0	50		400	1.5	800	
IN608		100	75	100		200	1.5	800	
IN608A		100	100	100		400	1.5	800	
IN609		150	25	150		200	1.5	800	
IN609A		150	1.0	150		400	1.5	800	
IN610		200	25	200		200	1.5	800	
IN610A		200	1.0	200		400	1.5	800	
IN611		300	25	300		200	1.5	800	
IN611A		300	1.0	300		400	1.5	800	
IN612		400	25	400		200	1.5	800	
IN612A		400	1.0	400		400	1.5	800	
IN613		500	25	500		200	1.5	800	
IN613A		500	1.0	500		400	1.5	800	
IN614		600	25	600		200	1.5	800	
IN614A		600	1.0	600		400	1.5	800	
IN645		225	0.2	225		400	1.0	150	
IN646		300	0.2	300		400	1.0	150	
IN647		400	0.2	400		400	1.0	150	
IN648		500	0.2	500		400	1.0	150	
IN649		600	0.2	600		400	1.0	150	
IN676	A	100	1.0	180		200	1.0	75	
IN677	A	100	1.0	100		400	1.0	150	
IN678	A	200	1.0	200		200	1.0	75	
IN679	A	200	1.0	200		400	1.0	150	
IN681	A	300	1.0	300		200	1.0	75	
IN682	A	300	1.0	300		400	1.0	150	
IN683	A	400	1.0	400		200	1.0	75	
IN684	A	400	1.0	400		400	1.0	150	
IN685	A	500	1.0	500		200	1.0	150	
IN686	A	500	1.0	500		400	1.0	150	
IN687	A	600	1.0	600		200	1.0	75	
IN689	A	600	1.0	600		400	1.0	150	
IN695		20	2	10		100	1.0	100	
IN1095		500	500	500		500	1.0	250	
IN1096		600	500	600		500	1.2	250	
IN1100		100	200	100		500	1.2	250	
IN1101		200	200	200		500	1.2	250	
IN1102		300	200	300		500	1.2	250	
IN1103		400	200	400		500	1.2	250	
IN1104		500	200	500		500	1.2	250	
IN1105		600	200	600		500	1.2	250	
IN1115		100	300	100		2a	2	1.5a	
IN1116		200	300	200		2a	2	1.5a	
IN1117		300	300	300		2a	2	1.5a	
IN1118		400	300	400		2a	2	1.5a	
IN1119		500	300	500		2a	2	1.5a	
IN1120		600	300	600		2a	2	1.5a	
IN1133		1500	25	1500		75	15	75	
IN1134		1500	25	1500		100	7.5	100	
IN1135		1800	25	1800		65	18	65	
IN1136		1880	25	1800		85	9	85	
IN1137		2400	25	2400		50	24	50	
IN1138		2400	25	2400		60	12	60	
IN1139		3600	25	3600		65	27	65	
IN1140		3600	25	3600		65	18	65	

DIODE TYPE NO.	CASE & MAT	REVERSE				FORWARD			
		E _{PEAK} V	I _{MAX} (μa)	@ V	@ °C	I _{SURGE} (ma)	I _{MIN} (ma)	@ V	I _{MAX} Av RECT. (ma)

IN1141		4800	25	4800		50	36	50	
IN1142		4800	25	4800		60	24	60	
IN1143		6000	25	6000		50	45	50	
IN1143A		6000	25	6000		65	30	65	
IN1144		7200	25	7200		50	54	50	
IN1145	Si	7200	25	7200		60	36	60	
IN1146	Si	8000	25	8000		45	60	45	
IN1147	Si	12000	25	12000		45	60	45	
IN1148	Si	14000	25	14000		50	52	50	
IN1149	Si	16000	25	16000		45	60	45	
IN1251		70	100	70		500		500	
IN1252		125	100	125		500		500	
IN1253		250	100	250		500		500	
IN1254		375	100	375		500		500	
IN1255		500	100	500		500		500	
IN1255A		500	100	500		320		320	
IN1256		625	100	625		300		300	
IN1257		750	100	750		280		280	
IN1258		850	100	850		265		265	
IN1259		950	100	950		250		250	
IN1260		1050	100	1050		240		240	
IN1261		1150	100	1150		60a	1.2	30a	
IN1434	Si	50	5 ma	50		60a	1.2	30a	
IN1435	Si	100	5 ma	100		60a	1.2	30a	
IN1436	Si	200	5 ma	200		60a	1.2	30a	
IN1437	Si	400	5 ma	400		60a	1.2	3a	
IN1438	Si	600	5 ma	600		200	1.6	250	
IN1487	Si	100	500	100		200	1.6	205	
IN1488	Si	200	500	200		200	1.6	250	
IN1489	Si	300	500	300		200	1.6	250	
IN1490	Si	400	500	400		200	1.6	250	
IN1491	Si	500	500	500		200	1.6	250	
IN1492	Si	600	500	600		200	1.6	250	
IN1569		100	500	100		500	1.2	1.0a	
IN1570		200	500	200		500	1.2	1.0a	
IN1571		300	500	300		500	1.2	1.0a	
IN1572		400	500	400		6a	1.5	3a	
IN1581		50	500	50		6a	1.5	3a	
IN1582		100	500	100		6a	1.5	3a	
IN1583		200	500	200		6a	1.5	3a	
IN1584		300	500	300		6a	1.5	3a	
IN1585		400	500	400		6a	1.5	3a	
IN1586		500	500	500		6a	1.5	3a	
IN1587		600	500	600		10a	1.5	5a	
IN1612		50	1 ma	50		10a	1.5	5a	
IN1613		100	1 ma	100		10a	1.5	5a	
IN1614		200	1 ma	200		10a	1.5	5a	
IN1615		400	1 ma	400		18a	1.5	5a	
IN1616		600	1 ma	600		200	1.6	250	
IN1692		100	500	100		200	1.6	250	
IN1693		200	500	200		200	1.6	250	
IN1694		300	500	300		200	1.6	250	
IN1695		4							

SEMICONDUCTOR DIODES

GENERAL PURPOSE DIODES - (Continued)

DIODE TYPE NO.	CASE & MAT	REVERSE				FORWARD			
		E _{PEAK} V	I _{MAX} (μa)	e V	e °C	I _{SURGE} (ma)	I _{MIN} (ma)	e V	I _{MAX} AV RECT. (ma)

TRANSITRON ELECTRONICS CORP. - (Continued)

T24G	40	300	30			20	1.0	45	
T25G	25	20	10			200	1.0	100	
T26G	25	10	10			40	1.0	70	
T27G	20	100	10			40	1.0	40	
TH152B	150	15 ma	150			150a	1.0	50a	
TH252B	250	15 ma	250			150a	1.5	50a	
TH302B	300	15 ma	300			150a	1.5	50a	
TH352B	350	15 ma	350			150a	1.5	50a	
TH402B	400	15 ma	400			150a	1.5	50a	
TJ5	50	10	50			500	1.5	200	
TJ5A	50	500	50			500	1.5	200	
TJ10	100	10	100			500	1.5	200	
TJ10A	100	1	100			500	1.5	200	
TJ15	150	10	150			500	1.5	200	
TJ15A	150	1	150			500	1.5	200	
TJ20	200	10	200			500	1.5	200	
TJ20A	200	1	200			500	1.5	200	
TJ25	250	10	200			500	1.5	200	
TJ25A	250	1	250			500	1.5	200	
TJ30	300	10	300			500	1.5	200	
TJ30A	300	1	300			500	1.5	200	
TJ35	350	10	350			500	1.5	200	
TJ35A	350	1	350			500	1.5	200	
TJ40	400	10	400			500	1.5	200	
TJ40A	400	1	400			500	1.5	200	
TJ50	500	10	500			500	1.5	200	
TJ50A	500	1	500			500	1.5	200	
TJ60	600	10	600			500	1.5	200	
TJ60A	600	1	600			500	1.5	200	
TK21	200	300	200			750	1.0	1a	
TK41	400	300	400			750	1.0	1a	
TK61	600	300	600			750	1.0	1a	
TL1	50	300	50			400	2	200	
TL2	50	100	50			800	1.6	350	
TL11	100	300	100			400	2	100	
TL12	100	100	100			800	1.6	350	
TL21	200	300	200			400	2	200	
TL22	200	100	200			800	1.6	350	
TL31	300	300	300			400	2	200	
TL32	300	100	300			800	1.6	350	
TL41	400	300	400			400	2	200	
TL42	400	100	400			800	1.6	350	
TL51	500	300	500			400	2	200	
TL61	600	300	600			400	2	200	
TM1	50	300	50			2a	2	1000	
TM2	50	300	50			800	2	400	
TM3	50	300	50			200	2	200	
TM4	50	500	50			2a	2	1000	
TM5	50	500	50			800	2	400	
TM7	50	500	50			6a	1.5	3a	
TM8	50	500	50			6a	1.1	6a	
TM11	100	300	100			2a	2	1000	
TM12	100	300	100			800	2	400	
TM13	100	300	100			200	2	200	
TM17	100	500	100			6a	1.5	3a	
TM18	100	500	100			6a	1.1	6a	
TM21	200	300	200			2a	2	1000	
TM22	200	300	200			800	2	400	
TM23	200	300	200			200	2	200	
TM24	200	500	200			2a	2	1000	
TM27	200	500	200			6a	1.5	3a	
TM28	200	500	200			6a	1.1	6a	
TM31	300	300	300			2a	2	1000	
TM32	300	300	300			800	2	400	
TM33	300	300	300			200	2	200	
TM34	300	500	300			2a	2	1000	
TM37	300	500	300			6a	1.5	3a	
TM38	300	500	300			6a	1.1	6a	
TM41	400	300	400			2a	2	1000	
TM42	400	300	400			800	2	400	
TM43	400	300	400			200	2	200	
TM44	400	500	400			2a	2	1000	
TM47	400	500	400			6a	1.5	3a	
TM48	400	500	400			6a	1.1	6a	
TM51	500	300	500			2a	2	1000	
TM52	500	300	500			800	2	400	
TM53	500	300	500			200	2	200	
TM54	500	500	500			2a	2	1000	
TM55	500	500	500			800	2	400	
TM56	500	500	500			400	2	200	
TM57	500	500	500			6a	1.5	3a	
TM58	500	500	500			6a	1.1	6a	
TM61	600	300	600			2a	2	1000	
TM62	600	300	600			800	2	400	
TM63	600	300	600			200	2	200	
TM64	600	500	600			2a	2	1000	
TM65	600	500	600			800	2	400	
TM66	600	500	600			400	2	200	
TM67	600	500	600			6a	1	3a	
TM68	600	500	600			6a	1.1	6a	
TM74	700	500	700			2a	2	1000	
TM75	700	500	700			1a	2	400	
TM76	700	500	700			500	2	200	
TM84	800	500	800			2a	2	1000	
TM85	800	500	800			800	2	400	
TM86	800	500	800			400	2	200	

DIODE TYPE NO.	CASE & MAT	REVERSE				FORWARD			
		E _{PEAK} V	I _{MAX} (μa)	e V	e °C	I _{SURGE} (ma)	I _{MIN} (ma)	e V	I _{MAX} AV RECT. (ma)

TRANSITRON ELECTRONICS CORP. - (Continued)

TM104	1000	500	1000			2a	2	1000	
TM105	1000	500	1000			800	2	400	
TM106	1000	500	1000			400	2	200	
TM124	1200	500	1200			2a	2	1000	
TM125	1200	500	1200			800	2	400	
TM126	1200	500	1200			400	2	200	
TM155	1500	500	1500			800	2	400	
TM156	1500	500	1500			400	2	200	
TP100	100	500	100			500	1.5	500	
TP101	100	500	100			500	1.5	500	
TP200	200	500	200			500	1.5	500	
TP201	200	500	200			500	1.5	500	
TP300	300	500	300			500	1.5	500	
TP301	300	500	300			500	1.5	500	
TP400	400	500	400			500	1.5	500	
TP401	400	500	400			500	1.5	500	
TR30	30	10 ma	30			25a	2	20a	
TR50	50	10 ma	50			25a	2	20a	
TR53	50	10 ma	50			100a	1.5	35a	
TR100	100	10 ma	100			25a	2	20a	
TR103	100	10 ma	100			100a	1.5	35a	
TR150	150	10 ma	150			25a	2	20a	
TR151	150	5 ma	150			25a	1.5	10a	
TR152	150	5 ma	150			50a	1.5	20a	
TR153	150	10 ma	150			100a	1.5	35a	
TR200	200	10 ma	200			25a	2	20a	
TR203	200	10 ma	200			100a	1.5	35a	
TR251	250	5 ma	250			25a	1.5	10a	
TR252	250	5 ma	250			50a	1.5	20a	
TR253	205	10 ma	250			100a	1.5	35a	
TR301	300	5 ma	300			25a	1.5	10a	
TR302	300	5 ma	300			50a	1.5	20a	
TR303	300	10 ma	300			100a	1.5	35a	
TR351	350	5 ma	350			25a	1.5	10a	
TR352	350	5 ma	350			50a	1.5	20a	
TR353	350	10 ma	350			100a	1.5	35a	
TR401	400	5 ma	400			25a	1.5	10a	
TR402	400	5 ma	400			50a	1.5	20a	
TR403	400	10 ma	400			100a	1.5	35a	
TR501	500	5 ma	500			25a	1.5	10a	
TR502	500	5 ma	500			50a	1.5	20a	
TR601	600	5 ma	600			25a	1.5	10a	
TR602	600	5 ma	600			50a	1.5	20a	
2W3	400	3	350			100	2.0	50	
2W3A	360	1	350			150	2.0	75	
2W4	500	.3	450			100	2.0	50	
2W4A	450	1	450			150	2.0	75	
2W5	600	.3	525			100	3.0	50	
2W5A	540	1	525			150	3.0	75	
2W6	750	.3	675			100	3.0	50	
2W6A	675	1	675			150	3.0	75	
2W7	800	.3	700			100	4.0	50	
2W7A	720	1	700			150	4.0	75	
2W9	1000	3	900			100	4.0	50	
2W9A	900	1	900			150	4.0	75	
2W12	1320	3	1200			100	4.0	50	
2W12A	1200	2	1200			150	4.0	75	
2W15	1680	3	1500			100	4.0	50	
2W15A	1500	1	1500			150	4.0	75	
2W20A	2000	65	2000			150	4.0	75	

U.S. SEMICONDUCTOR PRODUCTS, INC., 3540 W. Osborn Rd., Phoenix, Ariz.

IN1839	C Si	6.8	0.5	6.8	25			50	1.0	85
IN1840	C Si	10	0.5	10	25			35	1.0	77
IN1841	C Si	15	0.5	15	25			23	1.0	63
IN1842	C Si	22	0.1	22	25			12	1.0	50
IN1843	C Si	33	0.1							

RECTIFIER DIODES (LOW CURRENT)

DIODE TYPE NO.	CASE & MAT	REVERSE				MAXIMUM RATINGS		
		E _{PEAK} V	I _{MAX} (ma)	@ V	@ °C	I _{SURGE} (amps)	DC OUTPUT CURRENT (amps)	T °C

DIODE TYPE NO.	CASE & MAT	REVERSE				MAXIMUM RATINGS		
		E _{PEAK} V	I _{MAX} (ma)	@ V	@ °C	I _{SURGE} (amps)	DC OUTPUT CURRENT (amps)	T °C

AUDIO DEVICES, INC., Rectifier Div., 620 East Dyer Road, Santa Ana, Calif.

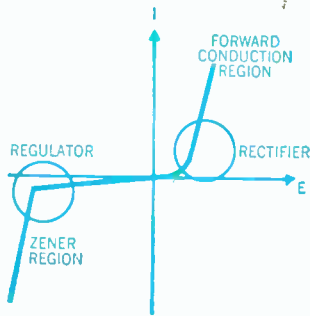
IN1445	A Si	360	4	360		0.2	25
IN1446	A Si	100	2	100		0.75	100
IN1447	A Si	200	2	100		0.75	100
IN1448	A Si	300	2	300		0.75	100
IN1449	A Si	400	2	400		0.75	100
IN1551	B Si	100	1.0	100		0.75	100
IN1552	B Si	200	1.0	200		0.75	100
IN1553	B Si	300	1.0	300		0.75	100
IN1554	B Si	400	1.0	400		0.75	100
IN1555	B Si	500	1.0	500		0.75	100
IN1556	C Si	100	1.0	100		0.5	100
IN1557	C Si	200	1.0	200		0.5	100
IN1558	C Si	300	1.0	300		0.5	100
IN1559	C Si	400	1.0	400		0.5	100
IN1560	C Si	500	1.0	500		0.5	100

AUTOMATIC MANUFACTURING CO., General Instrument Corp., 65 Gouverneur St., Newark 4, N. J.

IN253	B Si	100	100	100	135		135
IN254	B Si	200	100	200	135		135
IN255	B Si	400	150	400	135		135
IN256	B Si	600	250	600	135		135
IN316A	Si	50	.05	50	100	10	0.25
IN317A	Si	100	.05	200	100	10	0.25
IN318A	Si	200	.05	200	100	10	0.25
IN319A	Si	350	.05	350	100	10	0.25
IN320A	Si	500	.05	500	100	10	0.25
IN323A	Si	50	.05	50	100		0.4
IN324A	Si	100	.05	100	100		0.4
IN325A	Si	200	.05	200	100	10	0.4
IN326A	Si	350	.05	350	100	10	0.4
IN327A	Si	500	.05	500	100	10	0.4
IN332	B Si	400	0.2	400	150		0.4
IN333	B Si	400	0.2	400	150		0.2
IN334	B Si	300	0.2	300	150		0.4
IN335	B Si	300	0.2	300	150		0.2
IN336	B Si	200	0.1	200	150		0.4
IN337	B Si	200	0.1	200	150		0.2
IN338	B Si	100	0.2	100	150		1.0
IN339	B Si	100	0.1	100	150		0.4
IN340	B Si	100	0.1	100	150		0.2
IN341	B Si	400	0.5	400	150		0.4
IN342	B Si	400	0.5	400	150		0.2
IN343	B Si	300	0.5	300	150		0.4
IN344	B Si	300	0.5	300	150		0.2
IN345	B Si	200	0.5	200	150		0.4
IN346	B Si	200	0.5	200	150		1.0
IN347	B Si	100	0.5	100	150		0.4
IN348	B Si	100	0.5	100	150		0.2
IN349	B Si	100	0.5	100	150		0.1
IN359	Si	50	0.25	100	100		0.15
IN360A	Si	100	.05	100	100		0.15
IN361A	Si	200	.05	200	100		0.15
IN362A	Si	350	.05	350	100		0.15
IN363A	Si	500	0.25	500	100		0.1
IN440	A Si	100	0.3 μa	100	25		0.3
IN441	A Si	200	0.75 μa	200	25		0.3
IN442	A Si	300	1.0 μa	300	25		0.3
IN443	A Si	400	1.5 μa	400	25		0.3
IN444	A Si	500	1.75 μa	500	25		0.3
IN445	A Si	600	2 μa	600	25		0.3
IN440B	A Si	100	0.3 μa	100	55		0.75
IN441B	A Si	200	0.75 μa	200	55		0.75
IN442B	A Si	300	1.0 μa	300	55		0.75
IN443B	A Si	400	1.5 μa	400	55		0.75
IN444B	A Si	500	1.75 μa	500	55		0.75
IN445B	A Si	600	2 μa	600	55		0.75
IN530	A Si	100	3 μa	100	25		0.3
IN531	A Si	200	7.5 μa	200	25		0.3
IN532	A Si	300	10 μa	300	25		0.3
IN533	A Si	400	15 μa	400	25		0.3
IN534	A Si	500	17.5 μa	500	25		0.3
IN535	A Si	600	20 μa	600	25		0.3
IN536	A Si	50	0.4	50	150		0.75
IN537	A Si	100	0.4	100	150		0.75
IN538	A Si	200	0.3	200	150		0.75
IN539	A Si	300	0.3	300	150		0.75
IN540	A Si	400	0.3	400	150		0.75
IN547	A Si	600	0.35	600	150		0.25
IN550	B Si	100	0.5 μa	100	25		0.5
IN551	B Si	200	1.0 μa	200	25		0.5
IN552	B Si	300	1.5 μa	300	25		0.5
IN553	B Si	400	2.5 μa	400	25		0.5
IN554	B Si	500	3.5 μa	500	25		0.5
IN555	B Si	600	5 μa	600	25		0.5
IN560	A Si	800	15 μa	800	25		0.25
IN561	A Si	1000	20 μa	1000	25		0.25
IN562	B Si	800	15 μa	800	25		0.4
IN563	B Si	1000	20 μa	1000	25		0.4
IN599	A Si	50	25 μa	50	25		0.3
IN599A	A Si	50	1.0 μa	50	25		0.3
IN600	A Si	100	25 μa	100	25		0.3
IN600A	A Si	100	1.0 μa	100	25		0.3
IN601	A Si	150	25 μa	150	25		0.3
IN601A	A Si	150	1.0 μa	150	25		0.3
IN602	A Si	200	25 μa	200	25		0.3
IN602A	A Si	200	1.0 μa	200	25		0.3

AUTOMATIC MANUFACTURING CO. — (Continued)

IN603	A Si	300	25 μa	300	25		0.3	100
IN603A	A Si	300	1.0 μa	300	25		0.3	100
IN604	A Si	400	25 μa	400	25		0.3	100
IN604A	A Si	400	1.5 μa	400	25		0.3	100
IN605	A Si	500	25 μa	500	25		0.3	100
IN605A	A Si	500	2 μa	500	25		0.3	100
IN606	A Si	600	25 μa	600	25		0.3	100
IN606A	A Si	600	2.5 μa	600	25		0.3	100
IN607	B Si	50	25 μa	50	25		0.8	100
IN607A	B Si	50	1.0 μa	50	25		0.8	100
IN608	B Si	100	25 μa	100	25		0.8	100
IN608A	B Si	100	1.0 μa	100	25		0.8	100
IN609	B Si	150	25 μa	150	25		0.8	100
IN609A	B Si	150	1.0 μa	150	25		0.8	100
IN610	B Si	200	25 μa	200	25		0.8	100
IN610A	B Si	200	1.0 μa	200	25		0.8	100
IN611	B Si	300	25 μa	300	25		0.8	100
IN611A	B Si	300	1.0 μa	300	25		0.8	100
IN612	B Si	400	25 μa	400	25		0.8	100
IN612A	B Si	400	1.5 μa	400	25		0.8	100
IN613	B Si	500	25 μa	500	25		0.8	100
IN613A	B Si	500	2 μa	500	25		0.8	100
IN614	B Si	600	25 μa	600	25		0.8	100
IN614A	B Si	600	2.5 μa	600	25		0.8	100
IN645	F Si	225	15 μa	225	100		0.4 @ 25°	
IN646	F Si	300	15 μa	300	100		0.4 @ 25°	
IN647	F Si	400	20 μa	400	100		0.4 @ 25°	
IN648	F Si	500	20 μa	500	100		0.4 @ 25°	
IN649	F Si	600	25 μa	600	100		0.4 @ 25°	
IN1095	A Si	500	0.3	500	150		0.25	135
IN1096	A Si	600	0.3	600	150		0.25	135
IN1100	A Si	100	0.3	100	150		0.25	150
IN1101	A Si	200	0.2	200	150		0.25	150
IN1102	A Si	300	0.2	300	150		0.25	150
IN1103	A Si	400	0.2	400	150		0.25	150
IN1104	A Si	500	0.2	500	150		0.25	150
IN1105	A Si	600	0.2	600	150		0.25	150
IN1115		100	0.3	100	150		0.6	150
IN1116		200	0.3	200	150		0.6	150
IN1117		300	0.3	300	150		0.6	150
IN1118		400	0.3	400	150		0.6	150
IN1119		500	0.3	500	150		0.6	135
IN1120		600	0.3	600	150		0.6	135
IN1487	A Si	100	0.4	100	125		0.75 @ 25°	
IN1488	A Si	200	0.3	200	125		0.75 @ 25°	
IN1489	A Si	300	0.3	300	125		0.75 @ 25°	
IN1490	A Si	400	0.3	400	125		0.75 @ 25°	
IN1491	A Si	500	0.3	500	125		0.25	110
IN1492	A Si	600	0.3	600	125		0.25	95
IN1692	A Si	100	0.5	100	100		0.6	50
IN1693	A Si	200	0.5	200	100		0.6	50
IN1694	A Si	300	0.5	300	100		0.6	50
IN1695	A Si	400	0.5	400	100		0.6	50
AM1	B Si	50	0.3	50	100	20	1.0	100
AM2	B Si	50	0.3	50	100	10	0.4	100
AM3	B Si	50	0.3	50	100	8	0.2	100
AM4	B Si	50	0.5	50	150	20	1.0	150
AM5	B Si	50		50			0.4	150
AM11	B Si	100	0.3	100	100	20	1.0	100
AM12	B Si	100	0.3	100	100	10	0.4	100
AM13	B Si	100	0.3	100	100	8	0.2	100
AM21	B Si	200	0.3	200	100	20	1.0	100
AM22	B Si	200	0.3	200	100	10	0.4	100
AM23	B Si	200	0.3	200	100	8	0.2	100
AM24	B Si	200	0.5	200	150	20	1.0	150
AM31	B Si	300	0.3	300	100	20	1.0	100
AM32	B Si	300	0.3	300	100	10	0.4	100
AM33	B Si	300	0.3	300	100	8	0.2	100
AM34	B Si	300	0.5	300	150	20	1.0	150
AM41	B Si	400	0.3	400	100	20	1.0	100
AM42	B Si	400	0.3	400	100	10	0.4	100
AM43	B Si	400	0.3	400	100	8	0.2	100
AM44	B Si	400	0.5	400	150	20	1.0	150
AM51	B Si	500	0.3	500	150	20	1.0	100
AM52	B Si	500	0.3	500	100	10	0.4	100
AM53	B Si	500						



typical I-E characteristic curve for Hoffman Silicon Diodes

YOUR SOURCE FOR GREATER SELECTIVITY IN SILICON SEMICONDUCTOR DEVICES

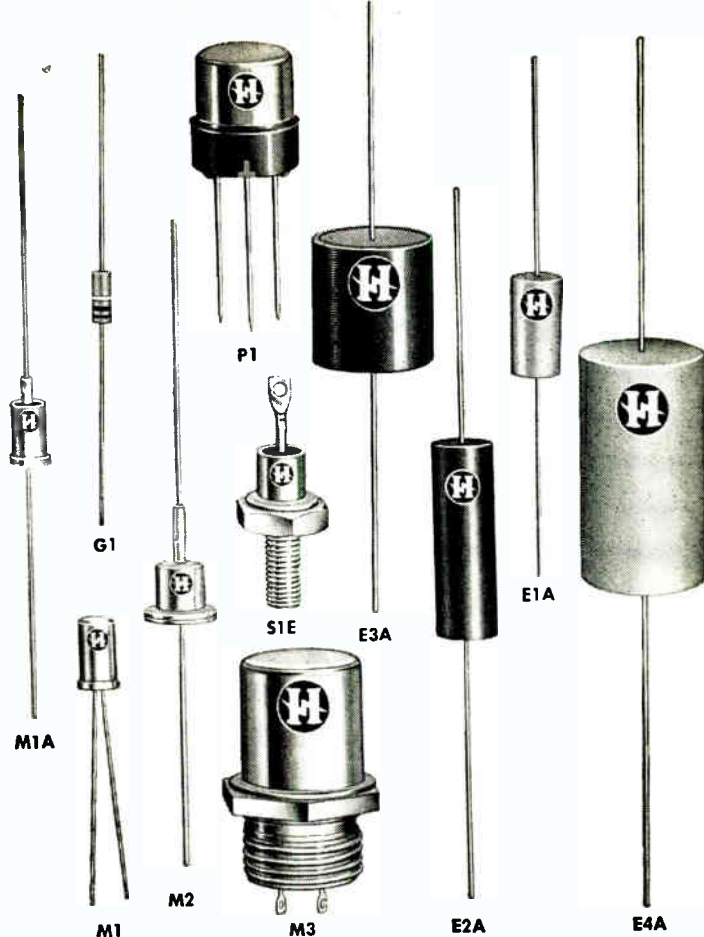




<p>6 ZENER LOW VOLTAGE DIODES</p> <ul style="list-style-type: none"> • 200mW • Zener Voltage Range: 2.0V — 8.0V 	<p>9 ZENER "DOUBLE ANODE" MEDIUM VOLTAGE DIODES</p> <ul style="list-style-type: none"> • 150mW • Zener Voltage Range: 7.5V — 45V 	<p>38 ZENER VOLTAGE REGULATORS</p> <p>10 WATT</p> <ul style="list-style-type: none"> • Zener Voltage Range: 5.6V to 200V $\pm 10\%$ • Dynamic Impedance: 1 ohm to 140 ohms (over the entire line)
<p>6 ZENER MICRO-MINIATURE GLASS LOW VOLTAGE DIODES</p> <ul style="list-style-type: none"> • 250mW • Zener Voltage Range: 2.0V — 8.0V 	<p>6 ZENER REFERENCE DIODES & ELEMENTS</p> <ul style="list-style-type: none"> • Operating Zener Voltage: 1N429: 6.2V $\pm 5\%$ 1N430, 1N430A, 1N430B, 1N1530, 1N1530A: 8.4V $\pm 5\%$ • Dynamic Impedance: 1N429: 20 ohms Others: 15 Ohms 	<p>38 ZENER VOLTAGE REGULATORS</p> <p>1 WATT</p> <ul style="list-style-type: none"> • Zener Voltage Range: 5.6V to 200V $\pm 10\%$ • Dynamic Impedance: 1.2 ohms to 1100 ohms (over the entire line)
<p>5 ZENER "DOUBLE ANODE" LOW VOLTAGE DIODES</p> <ul style="list-style-type: none"> • 250mW • Zener Voltage Range: 3.0V — 8.0V 	<p>4 ZENER REFERENCE MICRO-MINIATURE DIODES</p> <ul style="list-style-type: none"> • Operating Zener Voltage: 5.9V to 6.5V • Dyn. Imp.: 15 ohms 	<p>38 ZENER VOLTAGE REGULATORS</p> <p>1/4 WATT</p> <ul style="list-style-type: none"> • Zener Voltage Range: 5.6V to 200V $\pm 10\%$ • Dynamic Impedance: 3.5 ohms to 1400 ohms
<p>15 ZENER "SINGLE ANODE" MEDIUM VOLTAGE DIODES</p> <ul style="list-style-type: none"> • 150mW • Zener Voltage Range: 7.5V — 145V 	<p>15 ZENER REFERENCE STRINGS</p> <ul style="list-style-type: none"> • Operating Zener Voltage: 6.2V thru 49.6V $\pm 5\%$ • Dynamic Impedance: 20 ohms to 180 ohms (over the entire line) 	<p>38 ZENER VOLTAGE REGULATORS</p> <p>1/4 WATT</p> <ul style="list-style-type: none"> • Zener Voltage Range: 5.6V to 200V $\pm 10\%$ • Dynamic Impedance: 3.5 ohms to 1400 ohms

Design Parameter Data Available On All Above Items Upon Request.

IF YOU NEED A JOB IN ELECTRONICS DONE QUICKER AND BETTER, CONTACT

Hoffman



<p>26 GENERAL PURPOSE SILICON DIODES</p> <ul style="list-style-type: none"> • 150mW • PIV Range: 6.8V thru 470V 	<p>CASE TYPE</p> <p>M1</p>	<p>11 SILICON DIFFUSED JUNCTION MEDIUM POWER RECTIFIERS</p> <ul style="list-style-type: none"> • PIV Range: 50V to 1000V 	<p>9 SILICON SOLAR CELLS</p> <ul style="list-style-type: none"> • Typical Power Output Range: .072mW to 34.0mW (at 10,000 ft. candles— sunlight) • Spectral Response: Range: 4000/11,500 angstroms; Peak: 8500 angstroms 
<p>6 HB GENERAL PURPOSE SILICON DIODES</p> <ul style="list-style-type: none"> • 150mW • PIV Range: 6.8V thru 270V 	<p>M1</p>	<p>7 SILICON DIFFUSED JUNCTION MEDIUM POWER RECTIFIERS</p> <ul style="list-style-type: none"> • PIV Range: 50V to 500V 	<p>8 PHOTO-VOLTAIC READOUT CELLS</p> <ul style="list-style-type: none"> • Number of readout positions: from 4 to 10 • Spectral Response: Range: 4000/11,500 angstroms; Peak: 8500 angstroms 
<p>8 GLASS GENERAL PURPOSE DIODES</p> <ul style="list-style-type: none"> • 200mW • PIV Range: 25V to 175V 	<p>G1</p>	<p>8 SILICON DIFFUSED JUNCTION MEDIUM POWER RECTIFIERS</p> <ul style="list-style-type: none"> • PIV Range: 95V to 570V 	<p>M2</p>
<p>5 GLASS FAST RECOVERY SILICON DIODES</p> <ul style="list-style-type: none"> • 200mW • PIV Range: 25V to 175V 	<p>G1</p>	<p>S1E</p>	<p>M3</p>



C O R P O R A T I O N

SEMICONDUCTOR DIVISION

930 PITNER AVENUE

• EVANSTON, ILLINOIS

SEMICONDUCTOR DIODES

RECTIFIER DIODES - (Continued)

DIODE TYPE NO.	CASE & MAT	REVERSE				MAXIMUM RATINGS			DIODE TYPE NO.	CASE & MAT	REVERSE				MAXIMUM RATINGS		
		E _{PEAK} V	I _{MAX} (ma)	@ V	@ °C	I _{5URGE} (amps)	DC OUTPUT CURRENT (amps)	T °C			E _{PEAK} V	I _{MAX} (ma)	@ V	@ °C	I _{5URGE} (amps)	DC OUTPUT CURRENT (amps)	T °C
AUTOMATIC MANUFACTURING CO. - (Continued)																	
PT515	A Si		0.5	150	100	15	0.5	100	IN602	B Si	200	.025	200	2	0.3	175	
PT520	A Si		0.5	200	100	15	0.5	100	IN602A	B Si	200	1.0 μa	200	2	0.3	175	
PT525	A Si		0.5	250	100	15	0.5	100	IN603	B Si	300	.025	300	2	0.3	175	
PT530	A Si		0.5	300	100	15	0.5	100	IN603A	B Si	300	1.0 μa	300	2	0.3	175	
PT540	A Si		0.5	400	100	15	0.5	100	IN604	B Si	400	.025	400	2	0.3	175	
PT550	A Si		0.5	500	100	15	0.5	100	IN604A	B Si	400	1.0 μa	400	2	0.3	175	
BENDIX AVIATION CORP., Semiconductor Products, Red Bank Div., Long Branch, N. J.																	
IN536	C Si	50	10	50		15	0.75	175	IN605	B Si	500	.025	500	2	0.3	175	
IN537	C Si	100	10	100		15	0.75	175	IN605A	B Si	500	1.0 μa	500	2	0.3	175	
IN538	C Si	200	10	200		15	0.75	175	IN606	B Si	600	.025	600	2	0.3	175	
IN539	C Si	300	10	300		15	0.75	175	IN606A	B Si	600	1.0 μa	600	2	1.0	175	
IN540	C Si	400	10	400		15	0.75	175	IN607	A Si	50	.025	50	2	1.0	175	
IN547	C Si	600	10	600		15	0.75	175	IN607A	A Si	50	1.0 μa	50	2	1.0	175	
IN1434	A Si	50	2.5 ma	50		250			IN608	A Si	100	.025	100	2	1.0	175	
IN1435	A Si	100	2.5 ma	100		250			IN608A	A Si	100	1.0 μa	100	2	1.0	175	
IN1436	A Si	200	2.5 ma	200		250			IN609	A Si	150	.025	150	2	1.0	175	
IN1437	A Si	400	2.5 ma	400		250			IN609A	A Si	150	1.0 μa	150	2	1.0	175	
IN1438	A Si	600	2.5 ma	600		250			IN610	A Si	200	.025	200	2	1.0	175	
IN1612	B Si	50	500	50		25			IN610A	A Si	200	1.0 μa	200	2	1.0	175	
IN1613	B Si	100	500	100		25			IN611	A Si	300	.025	300	2	1.0	175	
IN1614	B Si	200	500	200		25			IN611A	A Si	300	1.0 μa	300	2	1.0	175	
IN1615	B Si	400	500	400		25			IN612	A Si	400	.025	400	2	1.0	175	
IN1616	B Si	600	500	600		25			IN612A	A Si	400	1.5 μa	400	2	1.0	175	
BOGUE ELECTRIC MFG CO., 52 Iowa Avenue, Paterson, N. J.																	
IN253	A Si	100	0.1	100		4	1.0	150	IN613	A Si	500	.025	500	2	1.0	175	
IN254	A Si	200	0.1	150		1.5	0.4	150	IN613A	A Si	500	2.0 μa	500	2	1.0	175	
IN255	A Si	400	0.1	350		1.5	0.4	150	IN614	A Si	600	.025	600	2	1.0	175	
IN256	A Si	600	0.2	500		1.0	0.2	150	IN614A	A Si	600	2.5 μa	600	2	1.0	175	
IN316A	B Si	50	.05	50		10	0.25	175	IN1034	E Si	50	0.2	50	30	1.0	175	
IN317A	B Si	100	.05	100		10	0.25	175	IN1035	E Si	100	0.2	100	30	1.0	175	
IN318A	B Si	200	.05	200		10	0.25	175	IN1036	E Si	150	0.2	150	30	1.0	175	
IN319A	B Si	350	.05	350		10	0.25	175	IN1037	E Si	200	0.2	200	30	1.0	175	
IN320A	B Si	500	.05	500		10	0.25	175	IN1038	E Si	300	0.2	300	30	1.0	175	
IN321A	B Si	850	0.15	850		10	0.25	175	IN1040	E Si	50	0.2	50	30	1.0	175	
IN322A	B Si	1000	0.15	1000		10	0.25	175	IN1041	E Si	100	0.2	100	30	1.0	175	
IN332	A Si	400	0.2	400		10	0.4	175	IN1042	E Si	150	0.2	150	30	1.0	175	
IN333	A Si	400	0.2	400		5	0.2	175	IN1043	E Si	200	0.2	200	30	1.0	175	
IN334	A Si	300	0.2	300		10	0.4	175	IN1044	E Si	300	0.2	300	30	1.0	175	
IN335	A Si	300	0.2	300		5	0.2	175	IN1095	B Si	500	0.3	500	15	0.3	175	
IN336	A Si	200	0.1	200		10	0.4	175	IN1096	B Si	600	0.3	600	15	0.3	175	
IN337	A Si	200	0.1	200		5	0.2	175	IN1100	B Si	100	0.2	100	15	0.3	175	
IN338	A Si	100	0.2	100		20	1.0	175	IN1101	B Si	200	0.2	200	15	0.3	175	
IN339	A Si	100	0.1	100		10	0.4	175	IN1102	B Si	300	0.2	300	15	0.3	175	
IN340	A Si	100	0.1	100		5	0.2	175	IN1103	B Si	400	0.2	400	15	0.3	175	
IN341	A Si	400	0.5	400		10	0.4	175	IN1104	B Si	500	0.2	500	15	0.3	175	
IN342	A Si	400	0.5	400		5	9.2	175	IN1105	B Si	600	0.2	600	15	0.6	175	
IN343	A Si	300	0.5	300		10	0.4	175	IN1115	A Si	100	0.4	100	15	0.6	175	
IN344	A Si	300	0.5	300		5	0.2	175	IN1116	A Si	200	0.3	200	15	0.6	175	
IN345	A Si	200	0.5	200		10	0.4	175	IN1117	A Si	300	0.3	300	15	0.6	175	
IN346	A Si	200	0.5	200		5	0.2	175	IN1118	A Si	400	0.3	400	15	0.6	175	
IN347	A Si	100	0.5	100		20	1.0	175	IN1124	A Si	200	.010	200	10	1.0	175	
IN348	A Si	100	0.5	100		10	0.4	175	IN1125	A Si	300	.010	300	10	1.0	175	
IN349	A Si	100	0.5	100		5	0.2	175	IN1126	A Si	400	.010	400	10	1.0	175	
IN359A	B Si	50	.050	50		10	0.15	175	IN1551	A Si	100	1.0	100	10	0.75	175	
IN360A	B Si	100	.050	100		10	0.15	175	IN1552	A Si	200	1.0	200	10	0.75	175	
IN361A	B Si	200	.050	200		10	0.15	175	IN1553	A Si	300	1.0	300	10	0.75	175	
IN362A	B Si	360	.050	350		10	0.15	175	IN1554	A Si	400	1.0	400	10	0.75	175	
IN363A	B Si	580	.050	500		10	0.15	175	IN1555	A Si	500	1.0	500	10	0.75	175	
IN364A	B Si	850	0.25	850		10	0.15	175	S91	B Si	100	0.1	100	10	0.25	175	
IN365A	B Si	1000	0.25	1000		10	0.15	175	S91D	B Si	100	0.8	100	15	0.25	175	
IN440	B Si	100	0.3 μa	100		15	0.3	175	S92	B Si	200	0.1	100	10	0.25	175	
IN440B	B Si	100	0.3 μa	100		15	0.3	175	S92D	B Si	200	0.8	100	15	0.25	175	
IN441	B Si	200	0.75 μa	200		15	0.3	175	S93	B Si	300	1.0	100	10	0.25	175	
IN441B	B Si	200	0.75 μa	200		15	0.3	175	S93D	B Si	300	0.8	100	15	0.25	175	
IN442	B Si	300	1.0 μa	300		15	0.3	175	1SJ60A	B Si	600	0.25	600	10	0.1	175	
IN442B	B Si	300	1.0 μa	300		15	0.3	175	4SJ60A	B Si	600	.050	600	10	0.2	175	
IN443	B Si	400	1.5 μa	400		15	0.3	175	2SS5C	A Si	50	0.3	50	5	0.4	175	
IN443B	B Si	400	1.5 μa	400		15	0.3	175	2SS5P	A Si	50	0.5	50	5	0.2	175	
IN444	B Si	500	1.75 μa	500		15	0.3	175	2SS10C	A Si	100	0.3	100	5	0.2	175	
IN444B	B Si	500	1.75 μa	500		15	0.3	175	2SS20C	A Si	200	0.3	200	5	0.2	175	
IN445	B Si	600	2 μa	600		15	0.3	175	2SS30C	A Si	300	0.3	300	5	0.2	175	
IN445B	B Si	600	2 μa	600		15	0.3	175	2SS40C	A Si	400	0.1	400	5	0.2	175	
IN536	B Si	50	0.4	50		15	0.3	175	2SS50C	A Si	400	0.3	400	5	0.2	175	
IN537	B Si	100	0.4	100		15	0.3	175	2SS60C	A Si	500	0.3	500	5	0.2	175	
IN538	B Si	200	0.3	200		15	0.3	175	2SS60P	A Si	500	0.5	500	5	0.2	175	
IN539	B Si	300	0.3	300		15	0.3	175	2SS60C	A Si	600	0.3	600	5	0.2	175	
IN540	B Si	400	0.3	400		15	0.3	175	2SS60P	A Si	600	0.5	600	5	0.2	175	
IN547	B Si	600	0.35	600		15	0.3	175	2SS80P	A Si	800	0.5	800	5	0.2	175	
IN550	A Si	100	0.5 μa	100		4	0.4	175	2SS100P	A Si	1000	0.5	1000	5	0.2	175	
IN551	A Si	200	1.0 μa	200		4	0.4	175	4SS5C	A Si	50	0.3	50	1			

RECTIFIER DIODES - (Continued)

DIODE TYPE NO.	CASE & MAT	REVERSE				MAXIMUM RATINGS		
		E _{PEAK} V	I _{MAX} (ma)	@ V	@ °C	I _{SURGE} (amps)	DC OUTPUT CURRENT (amps)	T °C
BOGUE ELECTRIC MFG CO. - (Continued)								
10SS5P	A Si	50	0.5	50		20.	1.0	175
10SS10C	A Si	100	0.3	100		20	1.0	175
10SS20C	A Si	200	0.3	200		20	1.0	175
10SS20P	A Si	200	0.4	200		20	1.0	175
10SS30C	A Si	300	0.3	300		20	1.0	175
10SS30P	A Si	300	0.5	300		20	1.0	175
10SS40P	A Si	400	0.5	400		20	1.0	175
LDS5	D Si	50	1.5	50		300	1.0	175
LDS10	D Si	100	1.5	100		300	1.0	175
LDS20	D Si	200	1.5	200		300	1.0	175
LDS30	D Si	300	1.5	300		300	1.0	175
LDS40	D Si	400	1.5	400		300	1.0	175

GENERAL ELECTRIC CO., Semiconductor Dept., Syracuse, N. Y.

IN73	B G	75 min.	.05	10	25	100 ma	.022	
IN74	B G	75 min.	.05	10	25	100 ma	.022	
IN314	C G	75 min.	.05	10	25	100 ma	.022	
IN91	D G	100	2.7	1.0	55	25	0.15	105
IN92	D G	200	1.9	1.0	55	25	0.1	105
IN93	D G	300	1.2	1.0	55	25	.075	105
IN94	G	380				25	0.5	85
IN151	E G	100	2.4	1.0	55	25	0.5	85
IN152	E G	200	1.9	1.0	55	25	0.5	85
IN153	E G	300	1.2	1.0	55	25	0.5	85
IN158	F G	380	0.8	1.0	55	25	0.5	85
IN253	E Si	95	0.1			4	1.0	150
IN254	E Si	190	0.1			1.5	0.4	150
IN255	E Si	380	0.15			1.5	0.4	150
IN256	E Si	570	0.25			0.2	0.2	150
IN332	E Si	400				6	0.4	170
IN333	E Si	400				5	0.2	170
IN334	E Si	300				6	0.4	170
IN335	E Si	300				5	0.2	170
IN336	E Si	200				6	0.4	170
IN337	E Si	200				5	0.2	170
IN339	E Si	100				6	0.4	170
IN340	E Si	100				5	0.2	170
IN341	E Si	400				5	0.4	170
IN342	E Si	400				5	0.2	170
IN343	E Si	300				5	0.4	170
IN344	E Si	300				5	0.2	170
IN345	E Si	200				5	0.4	170
IN346	E Si	200				5	0.2	170
IN348	E Si	100				5	0.4	170
IN349	E Si	100				5	0.2	170
IN368	F G	200				15	0.1	85
IN315	F G	100				15	0.1	95
IN440	F Si	100	0.3 μa	100	25	15	0.3	175
IN441	F Si	200	0.75 μa	200	25	15	0.3	175
IN442	F Si	300	1.0 μa	300	25	15	0.3	175
IN443	F Si	400	1.5 μa	400	25	15	0.3	175
IN444	F Si	500	1.75 μa	500	25	15	0.3	175
IN445	F Si	600	2 μa	600	25	15	0.3	175
IN440B	F Si	100	0.3 μa	100	25	15	0.75	175
IN441B	F Si	200	0.75 μa	200	25	15	0.75	175
IN442B	F Si	300	1.0 μa	300	25	15	0.75	175
IN443B	F Si	400	1.5 μa	400	25	15	0.75	175
IN444B	F Si	500	1.75 μa	500	25	15	0.65	175
IN445B	F Si	600	2 μa	600	25	15	0.65	175
IN536	F Si	50				15	0.75	175
IN537	F Si	100				15	0.75	175
IN538	F Si	200				15	0.75	175
IN5-9	F Si	300				15	0.75	175
IN540	F Si	400				15	0.75	175
IN547	F Si	600				15	0.75	175
IN550	E Si	100	0.5 μa		25	4	0.5	150
IN551	E Si	200	1.0 μa		25	4	0.5	150
IN552	E Si	300	1.5 μa		25	4	0.5	150
IN553	E Si	400	2.5 μa		25	4	0.5	150
IN554	E Si	500	3.5 μa		25	4	0.5	150
IN555	E Si	600	5 μa		25	4	0.5	150
IN560	D Si	800	0.3		150	15	0.6	150
IN561	D Si	1000	0.3		150	15	0.6	150
IN562	C Si	800	0.3		150	15	0.4	150
IN563	C Si	1000	0.3		150	15	0.4	150
IN599	F Si	50	.025		25	10	0.6	150
IN600	F Si	100	.025		25	10	0.6	150
IN601	F Si	150	.025		25	10	0.6	150
IN602	F Si	200	.025		25	10	0.6	150
IN603	F Si	300	.025		25	10	0.6	150
IN604	F Si	400	.025		25	10	0.6	150
IN605	F Si	500	.025		25	10	0.6	150
IN606	F Si	600	.025		25	10	0.6	150
IN599A	F Si	50	.001		25	10	0.6	150
IN600A	F Si	100	.001		25	10	0.6	150
IN601A	F Si	150	.001		25	10	0.6	150
IN602A	F Si	200	.001		25	10	0.6	150
IN603A	F Si	300	.001		25	10	0.6	150
IN604A	F Si	400	.0015		25	10	0.6	150
IN605A	F Si	500	.002		25	10	0.6	150
IN606A	F Si	600	.0025		25	10	0.6	150
IN607	E Si	50	.001		25	2	1.0	150
IN607A	E Si	50	.001		25	2	1.0	150
IN608	E Si	100	.001		25	2	1.0	150
IN608A	E Si	100	.001		25	2	1.0	150
IN609	E Si	150	.001		25	2	1.0	150

DIODE TYPE NO.	CASE & MAT	REVERSE				MAXIMUM RATINGS		
		E _{PEAK} V	I _{MAX} (ma)	@ V	@ °C	I _{SURGE} (amps)	DC OUTPUT CURRENT (amps)	T °C
GENERAL ELECTRIC CO. - (Continued)								
IN609A	E Si	150	.001		25	2	1.0	150
IN610	E Si	200	.001		25	2	1.0	150
IN610A	E Si	200	.001		25	2	1.0	150
IN611	E Si	300	.001		25	2	1.0	150
IN611A	E Si	300	.001		25	2	1.0	150
IN612	E Si	400	.0015		25	2	1.0	150
IN612A	E Si	400	.0015		25	2	1.0	150
IN613	E Si	500	.002		25	2	1.0	150
IN613A	E Si	500	.002		25	2	1.0	150
IN614	E Si	600	.0025		25	2	1.0	150
IN614A	E Si	600	.0025		25	2	1.0	150
IN1095	F Si	500	0.3		150	15	0.75	165
IN1096	F Si	600	0.3		150	15	0.75	165
IN1100	F Si	100	0.3		150	15	0.75	165
IN1101	F Si	200	0.3		150	15	0.75	165
IN1102	F Si	300	0.3		150	15	0.75	165
IN1103	F Si	400	0.3		150	15	0.75	165
IN1487	F Si	100	0.4		125	15	0.75	140
IN1488	F Si	200	0.3		125	15	0.75	140
IN1489	F Si	300	0.3		125	15	0.75	140
IN1490	F Si	400	0.3		125	15	0.75	140
IN1491	F Si	500	0.3		125	25	0.75	140
IN1492	F Si	600	0.3		125	15	0.75	140
IN1692	F Si	100	0.5		100	20	0.6	115
IN1693	F Si	200	0.5		100	20	0.6	115
IN1694	F Si	300	0.5		100	20	0.6	115
IN1695	F Si	400	0.5		100	20	0.6	115
IN2154	H Si	50	5		145	300	25	200
IN2155	H Si	100	4.5		145	300	25	200
IN2156	H Si	200	4		145	300	25	200
IN2157	H Si	300	3.5		145	300	25	200
IN2158	H Si	400	3		145	300	25	200
IN2159	H Si	500	2.5		145	300	25	200
IN2160	H Si	600	2		145	300	25	200
C35	Si	400	4		(Controlled rectifier)			16

HOFFMAN ELECTRONICS, Semiconductor Div., 930 Pinler Avenue, Evanston, Illinois

IN1115	D Si	100	0.4	100	150	15	0.6
IN1116	D Si	200	0.3	200	150	15	0.6
IN1117	D Si	300	0.3	300	150	15	0.6
IN1118	D Si	400	0.3	400	150	15	0.6
IN1251	B Si	70	500		25	5	0.25
IN1252	B Si	125	500		25	5	0.25
IN1253	B Si	250	500		25	5	0.25
IN1254	B Si	375	500		25	5	0.2
IN1255	B Si	500	500		25	5	0.15
IN1255A	B Si	500	500		25	5	0.15
IN1256	B Si	625	320		25	5	0.13
IN1257	B Si	750	300		25	5	0.115
IN1258	B Si	850	280		25	5	0.1
IN1259	B Si	950	265		25	5	0.08
IN1260	B Si	1050	250		25	5	0.65
IN1261	B Si	1150	240		25	5	0.05

SEMICONDUCTOR DIODES

RECTIFIER DIODES - (Continued)

DIODE TYPE NO.	CASE & MAT	REVERSE				MAXIMUM RATINGS			DIODE TYPE NO.	CASE & MAT	REVERSE				MAXIMUM RATINGS		
		E _{PEAK} V	I _{MAX} (ma)	⊖ V	⊖ °C	I _{SRURGE} (amps)	DC OUTPUT CURRENT (amps)	T °C			E _{PEAK} V	I _{MAX} (ma)	⊖ V	⊖ °C	I _{SRURGE} (amps)	DC OUTPUT CURRENT (amps)	T °C

INTERNATIONAL RECTIFIER CORP. - (Continued)

IN596	D Si	.025	600	25	1	0.125	150
IN597	D Si	.025	800	25	1	0.125	150
IN598	D Si	.025	1000	25	1	0.125	150
IN599	A Si	.025	50	25	10	0.3	170
IN599A	A Si	.025	50	25	10	0.3	170
IN600	A Si	.025	100	25	10	0.3	170
IN600A	A Si	.001	100	25	10	0.3	170
IN601	A Si	.025	150	25	10	0.3	170
IN601A	A Si	.001	150	25	10	0.3	170
IN602	A Si	.025	200	25	10	0.3	170
IN602A	A Si	.001	200	25	10	0.3	170
IN603	A Si	.025	300	25	10	0.3	170
IN603A	A Si	.001	300	25	10	0.3	170
IN604	A Si	.025	400	25	10	0.3	170
IN604A	A Si	.0015	400	25	10	0.3	170
IN605	A Si	.025	500	25	10	0.3	170
IN605A	A Si	.002	500	25	10	0.3	170
IN606	A Si	.025	600	25	10	0.3	170
IN606A	A Si	.0025	600	25	10	0.3	170
IN607	A Si	.025	50	25	10	0.8	170
IN607A	A Si	.001	50	25	10	0.8	170
IN608	A Si	.025	100	25	10	0.8	170
IN608A	A Si	.001	100	25	10	0.8	170
IN609	A Si	.025	150	25	10	0.8	170
IN609A	A Si	.001	150	25	10	0.8	170
IN610	A Si	.025	200	25	10	0.8	170
IN610A	A Si	.001	200	25	10	0.8	170
IN611	A Si	.025	300	25	10	0.8	170
IN611A	A Si	.001	300	25	10	0.8	170
IN612	A Si	.025	400	25	10	0.8	170
IN612A	A Si	.0015	400	25	10	0.8	170
IN613	A Si	.025	500	25	10	0.8	170
IN613A	A Si	.002	500	25	10	0.8	170
IN614	A Si	.025	600	25	10	0.8	170
IN614A	A Si	.0025	600	25	10	0.8	170
IN1100	F Si	0.3	100	150	15	0.25	175
IN1101	F Si	0.3	200	150	15	0.25	175
IN1102	F Si	0.3	300	150	15	0.25	175
IN1103	F Si	0.3	400	150	15	0.25	175
IN1130	H Si	.05	1500	25	5	300	150
IN1131	H Si	.05	1500	25	5	300	150
IN1133	I Si	.025	1500	25	6	.075	170
IN1134	I Si	.025	1500	25	6	0.1	170
IN1135	I Si	.025	1800	25	6	.065	170
IN1136	I Si	.025	1800	25	6	.085	170
IN1137	I Si	.025	2400	25	6	.050	170
IN1138	I Si	.025	2400	25	6	.060	170
IN1139	I Si	.025	3600	25	6	.065	170
IN1140	I Si	.025	3600	25	6	.065	170
IN1141	I Si	.025	4800	25	6	.06	170
IN1142	I Si	.025	4800	25	6	.05	170
IN1143	I Si	.025	6000	25	6	.05	170
IN1143A	I Si	.025	6000	25	6	.065	170
IN1144	I Si	.025	700	25	6	.05	170
IN1145	I Si	.025	7200	25	6	.06	170
IN1146	I Si	.025	8000	25	6	.045	170
IN1147	I Si	.025	12000	25	6	.05	170
IN1148	I Si	.025	14000	25	6	.05	170
IN1149	I Si	.025	16000	25	6	.045	170
IN1406	J Si	0.1	600	75	6	0.1	170
IN1407	J Si	0.1	800	75	6	0.1	170
IN1408	J Si	0.1	1000	75	6	0.1	170
IN1409	K Si	0.1	1200	75	6	0.1	170
IN1410	K Si	0.1	1500	75	6	0.1	170
IN1411	K Si	0.1	1800	75	6	0.1	170
IN1412	K Si	0.1	200	75	6	0.1	170
IN1413	K Si	0.1	2400	75	6	0.1	170

ITT, Components Division, Clifton, N. J.

OUTLINE DIMENSIONS (Inches)		
A	B	C

123H30	B Se	1260	1-25/32	.005	50
123H41	B Se	1722	2-9/32	.005	50
123H52	B Se	2184	2-25/32	.005	50
123H64	B Se	2688	3-9/32	.005	50
123H75	B Se	3150	3-25/32	.005	50
123H86	B Se	3612	4-9/32	.005	50
123H98	B Se	4116	4-25/32	.005	50
123H110	B Se	4620	5-9/32	.005	50
123H126	B Se	5292	6-1/32	.005	50
123H149	B Se	6258	7-1/32	.005	50
123H175	B Se	7350	8-1/32	.005	50
123H200	B Se	8400	9-1/32	.005	50
147H30	B Se	1260	1-25/32	.008	50
147H41	B Se	1722	2-9/32	.008	50
147H52	B Se	2184	2-25/32	.008	50
147H64	B Se	2688	3-9/32	.008	50
147H75	B Se	3150	3-25/32	.008	50
147H86	B Se	3612	4-9/32	.008	50
147H98	B Se	4116	4-25/32	.008	50
147H110	B Se	4620	5-9/32	.008	50
147H126	B Se	5292	6-1/32	.008	50
147H149	B Se	6258	7-1/32	.008	50
147H175	B Se	7350	8-1/32	.008	50
147H200	B Se	8400	9-1/32	.008	50

ITT - (Continued)

OUTLINE DIMENSIONS (Inches)		
A	B	C

156H30	B Se	1260	1-25/32	.020	50		
156H41	B Se	1722	2-9/32	.020	50		
156H52	B Se	2184	2-25/32	.020	50		
156H64	B Se	2688	3-9/32	.020	50		
156H75	B Se	3150	3-25/32	.020	50		
156H86	B Se	3612	4-9/32	.020	50		
156H98	B Se	4116	4-25/32	.020	50		
156H110	B Se	4620	5-9/32	.020	50		
156H126	B Se	5292	6-1/32	.020	50		
156H149	B Se	6258	7-1/32	.020	50		
156H175	B Se	7350	8-1/32	.020	50		
156H200	B Se	8400	9-1/32	.020	50		
123H30	C Se	1260	1-25/32	.005	50		
123H41	C Se	1722	2-9/32	.005	50		
123H52	C Se	2184	2-25/32	.005	50		
123H64	C Se	2688	3-9/32	.005	50		
123H75	C Se	3150	3-25/32	.005	50		
123H86	C Se	3612	4-9/32	.005	50		
123H98	C Se	4116	4-25/32	.005	50		
123H110	C Se	4680	5-9/32	.005	50		
123H126	C Se	5292	6-1/32	.005	50		
123H149	C Se	6258	7-1/32	.005	50		
123H175	C Se	7350	8-1/32	.005	50		
123H200	C Se	8400	9-1/32	.005	50		
147H30	C Se	1260	1-25/32	.008	50		
147H41	C Se	1722	2-9/32	.008	50		
147H52	C Se	2184	2-25/32	.008	50		
147H64	C Se	2688	3-9/32	.008	50		
147H75	C Se	3150	3-25/32	.008	50		
147H86	C Se	3612	4-9/32	.008	50		
147H98	C Se	4116	4-25/32	.008	50		
147H110	C Se	4620	5-9/32	.008	50		
147H126	C Se	5292	6-1/32	.008	50		
147H149	C Se	6258	7-1/32	.008	50		
147H175	C Se	7350	8-1/32	.008	50		
147H200	C Se	8400	9-1/32	.008	50		
156H30	C Se	1260	1-25/32	.020	50		
156H41	C Se	1722	2-9/32	.020	50		
156H52	C Se	2184	2-25/32	.020	50		
156H64	C Se	2688	3-9/32	.020	50		
156H75	C Se	3150	3-25/32	.020	50		
156H86	C Se	3612	4-9/32	.020	50		
156H98	C Se	4116	4-25/32	.020	50		
156H110	C Se	4620	5-9/32	.020	50		
156H126	C Se	5292	6-1/32	.020	50		
156H149	C Se	6258	7-1/32	.020	50		
156H175	C Se	7350	8-1/32	.020	50		
156H200	C Se	8400	9-1/32	.020	50		
5A3P	D Se	126	3/8	5/8	1-3/8	.008	50
5A10P	D Se	420	3/8	15/16	1-3/8	.008	50
5A15P	D Se	390	3/8	1-1/8	1-3/8	.008	50
5A20P	D Se	840	3/8	1-3/8	1-3/8	.008	50
5A25P	D Se	1050	3/8	1-9/16	1-3/8	.008	50
5A30P	D Se	1260	3/8	1-3/4	2-7/8	.008	50
5A35P	D Se	1480	3/8	1-15/16	2-7/8	.008	50
5A40P	D Se	1680	3/8	2-1/8	2-7/8	.008	50
5A45P	D Se	1900	3/8	2-5/16	2-7/8	.008	50
5A60P	D Se	2520	3/8	3-1/8	2-7/8	.008	50
5A80P	D Se	3360	3/8	3-7/8	2-7/8	.008	50
5A90P	D Se	3780	3/8	4-5/8	2-7/8	.008	50
15A3P	D Se	126	1/2	5/8	1-3/8	.020	50
15A10P	D Se	420	1/2	15/16	1-3/8	.020	50
15A15P	D Se	630	1/2	1-1/8	1-3/8	.020	50
15A20P	D Se	840	1/2	1-3/8	1-3/8	.020	50
15A25P	D Se	1050	1/2	1-9/16	1-3/8	.020	50
15A30P	D Se	1260	1/2	1-3/4	2-7/8	.020	50
15A35P	D Se	1480	1/2	1-15/16	2-7/8	.020	50
15A40P	D Se	1680	1/2	2-1/8	2-7/8	.020	50
15A45P	D Se	1900	1/2	2-5/16	2-7/8	.020	50
15A60P	D Se	2520	1/2	3-1/8	2-7/8	.020	50
15A80P	D Se	3360	1/2	3-7/8	2-7/8	.020	50
15A90P	D Se	3780	1/2	4-5/8	2-7/8	.020	50
5A3H	Se	126	1/2	29/32	1-1/4	.005	50
5A10H	Se	420	1/2	1-7/32	1-1/4	.005	50
5A15H	Se	630	1/2	1-13/32	1-1/4	.005	50
5A20H	Se	840	1/2	1-21/32	1-1/4	.005	50
5A25H	Se	1050	1/2	1-27/32	1-1/4	.005	50
5A30H	Se	1260	1/2	2-1/32	2-3/4	.005	50
5A35H	Se	1480	1/2	2-7/32	2-3/4	.005	50
5A40H	Se	1680	1/2	2-13/32	2-3/4	.005	50
5A45H	Se	1900	1/2	2-19/32	2-3/4	.005	50
5A60H	Se	2520	1/2	3-13/32	2-3/4	.005	50
8AH3	Se	126	1/2	29/32	1-1/4	.008	50
8AH10	Se	420	1/2	1-7/32	1-1/4	.008	50
8AH15	Se	630	1/2	1-13/32	1-1/4	.008	50
8A20H	Se	840	1/2	1-21/32	1-1/4	.008	50
8A25H	Se	1050	1/2	1-27/32	1-1/4	.008	

RECTIFIER DIODES - (Continued)

DIODE TYPE NO.	CASE & MAT	REVERSE				MAXIMUM RATINGS		
		I_{EPEAK} V	I_{MAX} (ma)	@ V	@ °C	I_{SURGE} (amps)	DC OUTPUT CURRENT (amps)	T °C

ITT - (Continued)

OUTLINE DIMENSIONS (Inches)		
A	B	C

15A10H	Se	420	9/16	1-7/32	1-1/4	.020	50
15A15H	Se	630	9/16	1-13/32	1-1/4	.020	50
15A20H	Se	840	9/16	1-21/32	1-1/4	.020	50
15A25H	Se	1050	9/16	1-27/32	1-1/4	.020	50
15A30H	Se	1260	9/16	2-1/32	2-3/4	.020	50
15A35H	Se	1480	9/16	2-7/32	2-3/4	.020	50
15A40H	Se	1680	9/16	2-13/32	2-3/4	.020	50
15A45H	Se	1900	9/16	2-19/32	2-3/4	.020	50
15A60H	Se	2520	9/16	3-13/32	2-3/4	.020	50
123H1P1	Se	42	13/32	19/32		.005	50
123H5P1	Se	210	13/32	19/32		.005	50
123H20P1	Se	840	13/32	1-1/4		.005	50
147H1P1	Se	42				.008	50
147H5P1	Se	210				.008	50
147H20P1	Se	840				.008	50
147D1H1	Se	42	11/16	1-11/64		.008	50
147D5H1	Se	84	11/16	1-11/64		.008	50
147D10H1	Se	420	11/16	1-47/64		.008	50
147B1H1	Se		11/16	1-11/64		.016	
147B2H1	Se		11/16	1-47/64		.016	
147B3H1	Se		11/16	1-47/64		.016	
147B4H1	Se		11/16	1-47/64		.016	
147B5H1	Se		11/16	1-47/64		.016	

KEMTRON ELECTRON PRODUCTS, INC., Newburyport, Mass.

IN530	Si	100	3	100	25	3	0.3	150
IN531	Si	200	7.5	200	25	3	0.3	150
IN532	Si	300	.01	300	25	3	0.3	150
IN533	Si	400	.015	400	25	3	0.3	150
IN534	Si	500	.018	500	25	3	0.3	150
IN535	Si	600	.02	600	25	3	0.3	150
IN536	Si	50	0.4	50	150	15	0.75	175
IN537	Si	100	0.4	100	25	15	0.75	165
IN538	Si	200	0.3	200	150	15	0.75	175
IN539	Si	300	0.3	300	150	15	0.75	175
IN540	Si	400	0.3	400	150	15	0.75	175
IN547	Si	600	0.35	600	150	15	0.25	175
IN551	Si	200	1.0	200	25	4	0.5	150
IN552	Si	300	1.5	300	25	4	0.5	150
IN553	Si	400	2.5	400	25	4	0.5	150
IN554	Si	500	3.5	500	25	4	0.5	150
IN555	Si	600	5	600	25	4	0.5	150
IN600	Si	100	.025	100	25	15	0.3	150
IN1095	Si	500	0.3	500	150	15	0.75	150
IN1096	Si	600	0.3	600	150	15	0.75	150

P. R. MALLORY & CO.,

Semiconductor Division, Du Quoin, Illinois

IN2090	A Si	50	0.25	85	15	0.75	100
IN2091	A Si	100	0.25	85	15	0.75	100
IN2092	A Si	200	0.25	85	15	0.75	100
IN2093	A Si	300	0.25	85	15	0.75	100
IN2094	A Si	400	0.25	85	15	0.75	100
IN2095	A Si	500	0.25	85	15	0.75	100
IN2096	A Si	600	0.25	85	15	0.75	100
IN2115	A Si	365	0.25	85	10	0.3	100
E50	B Si	50	0.5	100	15	0.75	100
E100	B Si	100	0.5	100	15	0.75	100
E200	B Si	200	0.5	100	15	0.75	100
E300	B Si	300	0.5	100	15	0.75	100
E400	B Si	400	0.5	100	15	0.75	100
E500	B Si	500	0.5	100	15	0.75	100
E600	B Si	600	0.5	100	15	0.75	100

MOTOROLA, INC., Semiconductor Div., 5005 E. McDowell Road, Phoenix, Arizona

IN253	D Si	95	100	95	4	1.0	175
IN254	D Si	190	100	90	1.5	0.4	175
IN255	D Si	380	150	380	1.5	0.4	175
IN256	D Si	570	250	570	1.0	0.2	175
IN1563	B Si	100	500	100	70	1.0	175
IN1564	B Si	200	500	200	70	1.0	175
IN1565	B Si	300	500	300	70	1.0	175
IN1566	B Si	400	500	400	70	1.0	175
IN536	A Si	50	300	50	30	0.75	175
IN537	A Si	100	300	100	30	0.75	175
IN538	A Si	200	300	200	30	0.75	175
IN539	A Si	300	300	300	30	0.75	175
IN540	A Si	400	300	400	30	0.75	175
IN547	A Si	500	300	500	30	0.75	175
IN1095	A Si	600	300	600	30	0.75	175
IN1096	A Si	600	300	600	30	0.75	175

NORTH AMERICAN ELECTRONICS, INC., 212 Broad Street, Lynn, Mass.

IN253	A Si	100	0.1	135		1.0	
IN254	A Si	200	0.1	135		0.4	
IN255	A Si	400	0.15	135		0.4	
IN256	A Si	600	0.25	135		0.2	
IN332	A Si	400	0.2	150		0.4	
IN333	A Si	400	0.2	150		0.2	
IN334	A Si	300	0.2	150		0.4	
IN335	A Si	300	0.2	150		0.2	
IN336	A Si	200	0.1	150		0.4	
IN337	A Si	200	0.1	150		0.2	
IN338	A Si	100	0.2	150		1.0	

DIODE TYPE NO.	CASE & MAT	REVERSE				MAXIMUM RATINGS		
		I_{EPEAK} V	I_{MAX} (ma)	@ V	@ °C	I_{SURGE} (amps)	DC OUTPUT CURRENT (amps)	T °C

NORTH AMERICAN ELECTRONICS, INC. - (Continued)

IN339	A Si	100	0.1			150	0.4
IN340	A Si	100	0.1			150	0.2
IN341	A Si	400	0.5			150	0.4
IN342	A Si	400	0.5			150	0.2
IN343	A Si	300	0.5			150	0.4
IN344	A Si	300	0.5			150	0.2
IN345	A Si	200	0.5			150	0.4
IN346	A Si	200	0.5			150	0.2
IN347	A Si	100	0.5			150	1.0
IN348	A Si	100	0.5			150	0.4
IN349	A Si	100	0.5			150	0.2
IN440B	B Si	100	0.3			150	15
IN441B	B Si	200	0.75 μ a			25	15
IN442B	B Si	300	1.0 μ a			25	15
IN443B	B Si	400	1.5 μ a			25	15
IN444B	B Si	500	1.75 μ a			25	15
IN536	B Si	50	0.3			150	15
IN537	B Si	100	0.3			150	15
IN538	B Si	200	0.3			150	15
IN539	B Si	300	0.3			150	15
IN540	B Si	400	0.3			150	15
IN547	B Si	600	0.3			150	15
IN550	A Si	100	0.5 μ a			150	15
IN551	A Si	200	1.0 μ a			25	0.5
IN552	A Si	300	1.5 μ a			25	0.5
IN553	A Si	400	2.5 μ a			25	0.4
IN554	A Si	500	3.5 μ a			25	0.4
IN555	A Si	600	5 μ a			25	0.4
IN560	B Si	800	0.3			100	0.5
IN561	B Si	1000	0.3			100	0.5
IN588	B Si	1500	100 μ a	1500		25	.025
IN589	B Si	1500	100 μ a	1500		25	.050
IN599	B Si	25 μ a				25	10
IN599A	B Si	1.0 μ a				25	10
IN600	B Si	25 μ a				25	10
IN600A	B Si	1.0 μ a				25	10
IN601	B Si	25 μ a				25	10
IN601A	B Si	1.0 μ a				25	10
IN602	B Si	25 μ a				25	10
IN602A	B Si	1.0 μ a				25	10
IN603	B Si	25 μ a				25	10
IN603A	B Si	1.0 μ a				25	10
IN604	B Si	25 μ a				25	10
IN604A	B Si	1.5 μ a				25	10
IN605	B Si	25 μ a				25	10
IN605A	B Si	2.0 μ a				25	10
IN606	B Si	25 μ a				25	10
IN606A	B Si	2.5 μ a				25	10
IN1095	B Si	10 μ a				25	15
IN607	A Si	50	25 μ a			25	0.8
IN607A	A Si	50	1.0 μ a			25	0.8
IN608	A Si	100	25 μ a			25	0.8
IN608A	A Si	100	1.0 μ a			25	0.8
IN610	A Si	200	25 μ a			25	0.8
IN610A	A Si	200	1.0 μ a			25	0.8
IN611	A Si	300	0.25 μ a			25	0.4
IN611A	A Si	300	1.0 μ a			25	0.4
IN612	A Si	400	0.25 μ a			25	0.8
IN612A	A Si	400	1.5 μ a			25	0.8
IN613	A Si	500	25 μ a			25	0.8
IN613A	A Si	500	2.0 μ a			25	0.4
IN614	A Si	600	25 μ a			25	0.4
IN614A	A Si	600	2.5 μ a			25	0.4
IN1115	A Si	100	0.3			125	0.6
IN1116	A Si	200	0.3			150	0.6
IN1117	A Si	300	0.3			150	0.6
IN1118	A Si	400	0.3			150	0.6
IN1130	A Si	1500	0.05			25	0.3
IN1131	A Si	1500	0.05			25	0.3
IN1133	C Si	1500	.025			25	0.75
IN1134	C Si	1500	.025			25	0.1
IN1135	C Si	1800	.025			25	.065
IN1136	C Si	1800	.025			25	.085
IN1137	C Si	2400	.025			25	.050
IN1138	C Si	2400	.025			25	.060
IN1139	C Si	3600	.025			25	.065
IN1140	C Si	3600	.025			25	.065
IN1141	C Si	4800	.025			25	.060
IN1142	C Si	4800	.025			25	.050
IN1143	C Si	6000	.025			25	.050
IN1143A	C Si	6000	.025			25	.060
IN1144	C Si	7200	.025			25	.050
IN1145	C Si	7200	.025			25	.060
IN1146	C Si	8000	.025			25	.045
IN1147	C Si	12K	.025			25	.045
IN1148	C Si						

SEMICONDUCTOR DIODES

RECTIFIER DIODES (Continued)

DIODE TYPE NO.	CASE & MAT	REVERSE				MAXIMUM RATINGS		
		E _{PEAK} V	I _{MAX} (ma)	@ V	@ °C	I _{SURGE} (amps)	DC OUTPUT CURRENT (amps)	T °C

NORTH AMERICAN ELECTRONICS, INC. - (Continued)

NA22	A Si	200	0.3		100		0.4
NA23	A Si	200	0.3		100		0.2
NA24	A Si	200	0.3		150		1.0
NA25	A Si	200	.05		150		0.4
NA31	A Si	300	0.3		100		1.0
NA32	A Si	300	0.3		100		0.4
NA33	A Si	300	0.3		100		0.2
NA34	A Si	300	0.5		150		1.0
NA35	A Si	300	0.1		150		0.4
NA36	A Si	300	0.1		150		0.2
NA41	A Si	400	0.3		100		1.0
NA42	A Si	400	0.3		100		0.4
NA43	A Si	400	0.3		100		0.2
NA44	A Si	400	0.5		150		1.0
NA45	A Si	400	0.1		150		0.4
NA46	A Si	400	0.1		150		0.2
NA51	A Si	500	0.3		100		1.0
NA52	A Si	500	0.3		100		0.4
NA53	A Si	500	0.3		100		0.2
NA54	A Si	500	0.5		150		1.0
NA55	A Si	500	0.5		150		0.4
NA56	A Si	500	0.5		150		0.2
NA61	A Si	600	0.3		100		1.0
NA62	A Si	600	0.3		100		0.4
NA63	A Si	600	0.3		100		0.2
NA64	A Si	600	0.5		150		1.0
NA65	A Si	600	0.5		150		0.4
NA66	A Si	600	0.5		150		0.2
NA74	A Si	700	0.5		125		1.0
NA75	A Si	700	0.5		125		0.4
NA76	A Si	700	0.5		125		0.2
NA84	A Si	800	0.5		125		1.0
NA85	A Si	800	0.5		125		0.4
NA86	A Si	800	0.5		125		0.2
NA104	A Si	1000	0.5		125		1.0
NA105	A Si	1000	0.5		125		0.4
NA106	A Si	1000	0.5		125		0.2
NA124	A Si	1200	0.5		125		1.0
NA125	A Si	1200	0.5		125		0.4
NA126	A Si	1200	0.5		125		0.2
NA150	A Si	1500			25		0.3
NA150R	A Si	1500			25		0.3
NA151	A Si	1800			25		0.3
NA152	A Si	2000			25		0.3

PACIFIC SEMICONDUCTORS, INC., 10451 W. Jefferson Blvd., Culver City, Calif.

IN645	C Si	225	2 μa	225	25		0.4	150
IN646	C Si	300	2 μa	300	25		0.4	150
IN647	C Si	400	2 μa	400	25		0.4	150
IN648	C Si	500	2 μa	500	25		0.4	150
IN649	C Si	600	2 μa	600	25		0.4	150
IN1134	D Si	1500	.025	1500	25		0.1	150
IN1135	D Si	1800	.025	1800	25		.065	150
IN1136	D Si	1800	.025	1800	25		.085	150
IN1137	D Si	2400	.025	2400	25		.050	150
IN1138	D Si	2400	.025	2400	25		.060	150
IN1139	D Si	3600	.025	3600	25		.065	150
IN1140	D Si	3600	.025	3600	25		.065	150
IN1141	D Si	4800	.025	4800	25		.060	150
IN1142	D Si	4800	.025	4800	25		.050	150
IN1143	D Si	6000	.025	6000	25		.050	150
IN1143A	D Si	6000	.025	6000	25		.065	150
IN1144	D Si	7200	.025	7200	25		.050	150
IN1145	D Si	7200	.025	7200	25		.060	150
IN1146	D Si	8000	.025	8000	25		.045	150
IN1147	D Si	12000	.025	12000	25		.045	150
IN1148	D Si	14000	.025	14000	25		.050	150
IN1149	D Si	16000	.025	16000	25		.045	150
IN1730	E Si	1000	10 μa	1000	25		0.2	150
IN1731	E Si	1500	10 μa	1500	25		0.2	150
IN1732	F Si	2000	10 μa	2000	25		0.2	150
IN1733	F Si	3000	10 μa	3000	25		0.15	150
IN1734	G Si	5000	10 μa	5000	25		0.1	150
PS005	A Si	50	0.1		100		0.25	200
PS010	A Si	100	0.1		100		0.25	200
PS015	A Si	150	0.1		100		0.25	200
PS020	A Si	200	0.1		100		0.25	200
PS025	A Si	250	0.1		100		0.25	200
PS030	A Si	300	0.1		100		0.25	200
PS035	A Si	350	0.1		100		0.25	200
PS040	A Si	400	0.1		100		0.25	200
PS050	A Si	500	0.1		100		0.25	200
PS060	A Si	600	0.1		100		0.25	200
PS105	H Si	50	0.5		150		0.2	200
PS110	H Si	100	0.5		150		0.2	200
PS115	H Si	150	0.5		150		0.2	200
PS120	H Si	200	0.5		150		0.2	200
PS125	H Si	250	0.5		150		0.2	200
PS130	H Si	300	0.5		150		0.2	200
PS135	H Si	350	0.5		150		0.2	200
PS140	H Si	400	0.5		150		0.2	200
PS105	H Si	50	0.5		150		0.5	200
PS110	H Si	100	0.5		150		0.5	200
PS115	H Si	150	0.5		150		0.5	200
PS120	H Si	250	0.5		150		0.5	150

DIODE TYPE NO.	CASE & MAT	REVERSE				MAXIMUM RATINGS		
		E _{PEAK} V	I _{MAX} (ma)	@ V	@ °C	I _{SURGE} (amps)	DC OUTPUT CURRENT (amps)	T °C

PACIFIC SEMICONDUCTORS, INC. - (Continued)

PS125	H Si	250	0.5		150		0.5	200
PS130	H Si	300	0.5		150		0.5	200
PS135	H Si	350	0.5		150		0.5	200
PS140	H Si	400	0.5		150		0.5	200
PS150	H Si	500	0.5		150		0.5	200
PS160	H Si	600	0.5		150		0.5	200
PS405	A Si	50	0.5		150		0.4	200
PS410	A Si	100	0.5		150		0.4	200
PS415	A Si	150	0.5		150		0.4	200
PS420	A Si	200	0.5		150		0.4	200
PS425	A Si	250	0.5		150		0.4	200
PS430	A Si	300	0.5		150		0.4	200
PS435	A Si	350	0.5		150		0.4	200
PS440	A Si	400	0.5		150		0.4	200
PS450	A Si	500	0.5		150		0.4	200
PS460	A Si	600	0.5		150		0.4	200

RAYTHEON MFG. CO., Semiconductor Div., 55 Chapel St., Newton 58, Mass.

IN536	B Si	50	400	50		5a	0.75	175
IN537	B Si	100	400	100		15a	0.75	175
IN538	B Si	200	300	200		15a	0.75	175
IN539	B Si	300	300	300		15a	0.75	175
IN540	B Si	400	300	400		15a	0.75	175
CK844	B Si	500	2	500		10a	0.75	175
CK845	B Si	600	2	600		10a	0.75	175
CK846	C Si	100	2	100		20a	3	175
CK847	C Si	200	2	200		20a	3.5	175
CK848	C Si	300	2	300		20a	3.5	175
CK849	C	400	2	400		20a	3.5	175
CK850	C	500	2	500		20a	3.5	175
CK851	C	600	2	600		20a	3.5	175

RHEEM SEMICONDUCTOR CORP., 327 Moffett Blvd., Mountain View, Calif.

IN676	Si	115	1.0	100		3	0.2	175
IN677	Si	115	1.0	100		5	0.4	175
IN678	Si	230	1.0	200		3	0.2	175
IN679	Si	230	1.0	200		5	0.4	175
IN681	Si	340	1.0	300		3	0.2	175
IN682	Si	340	1.0	300		5	0.4	175
IN683	Si	455	1.0	400		3	0.2	175
IN684	Si	455	1.0	400		5	0.4	175
IN685	Si	565	1.0	500		3	0.2	175
IN686	Si	565	1.0	500		5	0.4	175
IN687	Si	680	1.0	600		3	0.2	175
IN689	Si	680	1.0	600		5	0.4	175
IN789		30	1.0	20				
IN691		30	5.0	20				
IN792		30	5.0	20				
IN793		60	1.0	50				
IN795		60	5.0	50				
IN801		150	1.0	125				
IN802		150	5.0	125				
IN804		200	10.0	175				

SARKES TARZIAN, INC., Rectifier Div., 415 N. College Ave., Bloomington, Ind.

IN1028	A Si	50				30	0.5	
IN1029	A Si	100				30	0.5	
IN1030	A Si	150				30	0.5	
IN1031	A Si	200				30	0.5	
IN1032	A Si	300				30	0.5	
IN1033	A Si	400				30	0.5	
IN1034	B Si	50				30	1.0	
IN1035	B Si	100				30	1.0	
IN1036	B Si	150				30	1.0	
IN1037	B Si	200				30	1.0	
IN1038	B Si	300				30	1.0	
IN1039	B Si	400				30	1.0	
IN1040	C Si	50				30	1.0	
IN1041	C Si	100				30	1.0	
IN1042	C Si	150				30	1.0	
IN1043	C Si	200				30	1.0	
IN1044	C Si	300				30	1.0	
IN1045	C Si	400				30	1.0	
IN1046	XX Si	50				30	1.0	
IN1047	XX Si	100				30	1.0	
IN1048	XX Si	150				30	1.0	
IN1049	XX Si	200				30	1.0	
IN1050	XX Si	300				30	1.0	
IN1051	XX Si	400				30	1.0	
IN1081	G Si	100				30	0.5	
IN1082	G Si	200				30	0.5	
IN1083	G Si	300				30	0.5	
IN1084	G Si	400				30	0.5	
IN1108	I Si	800				27	0.45	
IN1109	J Si	1200				25.5	0.425	
IN1110	K Si	1600				24	0.4	

SEMICONDUCTOR DIODES

RECTIFIER DIODES - (Continued)

DIODE TYPE NO.	CASE & MAT	REVERSE				MAXIMUM RATINGS			DIODE TYPE NO.	CASE & MAT	REVERSE				MAXIMUM RATINGS				
		E _{PEAK} V	I _{MAX} (ma)	e V	e °C	I _{SURGE} (amps)	DC OUTPUT CURRENT (amps)	T °C			E _{PEAK} V	I _{MAX} (ma)	e V	e °C	I _{SURGE} (amps)	DC OUTPUT CURRENT (amps)	T °C		
SARKES TARZIAN, INC. - (Continued)									UNITED STATES DYNAMICS CORP. - (Continued)										
IN1262	X Si	4500					0.25	100	IN1126	B Si	400	10 μa	400	25	1.0				
IN1439	P Si	300				30	0.75		IN1126R	B Si	400	10 μa	400	25	1.0				
IN1440	P Si	200				30	0.75		IN1127	B Si	500	10 μa	500	25	1.0				
IN1441	P Si	300				30	0.75		IN1127R	B Si	500	10 μa	500	25	1.0				
IN1442	P Si	400				30	0.75		IN1128	B Si	600	10 μa	600	25	1.0				
IN2088	P Si	500				30	0.75		IN1128R	B Si	600	10 μa	600	25	1.0				
IN2089	P Si	600				30	0.75		U. S. SEMICONDUCTOR PRODUCTS, INC., 3536 West Osborn Rd., Phoenix, Ariz.										
TEXAS INSTRUMENTS INCORPORATED, Semiconductor-Components Div., P.O. Box 312, Dallas, Tex.									IN2103	D Si	50	0.3	50	10	0.75	165			
IN538	Q Si	200	0.01	200	25		0.75		IN2104	D Si	100	0.3	100	25	10	0.75	165		
IN539	Q Si	300	0.01	300	25		0.75		IN2105	D Si	200	0.3	200	25	10	0.75	165		
IN540	Q Si	400	0.01	400	25		0.75		IN2106	D Si	300	0.3	300	25	10	0.75	165		
IN588	O Si	1500	0.05	1500	25		0.025		IN2107	D Si	400	0.3	400	25	10	0.75	165		
IN589	O Si	1500	0.05	1500	25		0.05		IN2108	D Si	500	0.3	500	25	10	0.75	165		
IN1095	Q Si	500	0.01	500	25		0.75		IN2109	E Si	50	0.3	50	25	10	2	165		
IN1096	Q Si	600	0.01	600	25		0.75		IN2110	E Si	100	0.3	100	25	10	2	165		
IN2069	W Si	200		200	25		0.75		IN2111	E Si	200	0.3	200	25	10	2	165		
IN2070	W Si	400		200	25		0.75		IN2112	E Si	300	0.3	300	25	10	2	165		
IN2071	W Si	600		200	25		0.75		IN2113	E Si	400	0.3	400	25	10	2	165		
UNITED STATES DYNAMICS CORP., 1250 Columbus Ave., Boston 20, Mass.									IN2114	E Si	500	0.3	500	25	10	2	165		
IN253	B Si	100	0.1	95		4	1.0	150	S1134	D Si	1000	0.1		25		0.7			
IN254	B Si	200	0.1	190		1.5	0.4	150	S1134A	D Si	1000	0.1		25		0.7			
IN255	B Si	400	0.15	380		1.5	0.4	150	S1136	E Si	1000	0.1		25		0.7			
IN256	B Si	600	0.25	570		1.0	0.2	150	S1136A	E Si	1000	0.1		25		0.7			
IN332	B Si	400	0.2	400		10	0.8		S1137	E Si	1500	0.1		25		0.7			
IN333	B Si	400	0.2	400		5	0.4		S1137A	E Si	1500	0.1		25		0.7			
IN334	B Si	300	0.2	400		10	0.8		S1135	D Si	1500	0.1		25		0.7			
IN335	B Si	300	0.2	400		5	0.4		S1135A	D Si	1500	0.1		25		0.7			
IN336	B Si	200	0.2	200		10	0.8		IN253	Si	95	0.1		20	1.0	150			
IN337	B Si	200	0.1	200		5	0.4		IN254	Si	190	0.1		10	0.4	150			
IN338	B Si	100	0.2	100		20	2.0		IN255	Si	380	0.15		10	0.4	150			
IN339	B Si	100					0.8		IN256	Si	570	0.25		5	0.2	150			
IN340	B Si	100	0.1	100		5	0.4		WESTERN ELECTRIC CO., 195 Broadway., New York 7, New York										
IN341	B Si	400	0.5	400		10	0.8		IN664	C Si	8.2			3		150			
IN342	B Si	400	0.5	400		5	0.4		IN665	C Si	12			3		150			
IN343	B Si	300	0.5	300		10	0.8		IN666	C Si	15			3		150			
IN344	B Si	300	0.5	300		5	0.4		IN667	C Si	18			3		150			
IN345	B Si	200	0.5	200		10	0.8		IN668	B Si	22			3		150			
IN346	B Si	200	0.5	200		5	0.4		IN669	C Si	27			3		150			
IN347	B Si	100	0.5	100		20	2.0		IN670	C Si	68			3		150			
IN348	B Si	100	0.5	100		10	0.8		IN671	C Si	100			3		150			
IN349	B Si	100	0.5	100		5	0.4		IN672	C Si	150			3		150			
IN550	B Si	100	0.5 μa	100		4	0.5		IN673	B Si	350			3		150			
IN551	B Si	200	0.1 μa	200		4	0.5		IN674	C Si	4.7			3		150			
IN552	B Si	300	0.15 μa	300		4	0.5		IN675	C Si	6.2			3		150			
IN553	B Si	400	0.25 μa	400		4	0.5		IN701	Si	10								
IN554	B Si	500	0.35 μa	500		4	0.5		IN1414	Si	350								
IN555	B Si	600	0.5 μa	600		4	0.5		IN1415	Si	350								
IN562	B Si	800	1.5 μa	800		3	0.4		IN1416	A Si	8.2		100			150			
IN563	B Si	1000	2.0 μa	1000		3	0.4		IN1417	A Si	12		100			150			
IN607	B Si	50	0.25	50			0.2		IN1418	A Si	15		100			150			
IN607A	B Si	50	0.01	50	25		0.2		IN1419	A Si	18		100			150			
IN608	B Si	100	0.25	100	25		0.2		IN1420	A Si	22		100			150			
IN608A	B Si	100	0.01	100	25		0.2		IN1421	A Si	27		100			150			
IN609	B Si	150	0.25	150	25		0.2		IN1422	A Si	68		100			150			
IN609A	B Si	150	0.01	150	25		0.2		IN1423	A Si	100		100			150			
IN610	B Si	200	0.25	200	25		0.2	150	IN1424	A Si	150		100			150			
IN610A	B Si	200	0.01	200	25		0.2		IN1425	D Si	8.2		10			150			
IN611	B Si	300	0.25	300	25		0.2		IN1426	D Si	12		10			150			
IN611A	B Si	300	0.01	300	25		0.2	150	IN1427	D Si	15		10			150			
IN612	B Si	400	0.25	400	25		0.2		IN1428	D Si	18		10			150			
IN612A	B Si	400	0.25	400	25		0.2		IN1429	D Si	22		10			150			
IN613	B Si	500	0.25	500	25		0.2		IN1430	D Si	27		10			150			
IN613A	B Si	500	0.01	500	25		0.2		IN1431	D Si	68		10			150			
IN614	B Si	600	0.25	600	25		0.2		IN1432	D Si	100		10			150			
IN614A	B Si	600	0.01	600	25		0.2		IN1433	D Si	150		10			150			
IN1115	B Si	100	0.4	100	150		0.6		IN1482	Si	4.7								
IN1116	B Si	200	0.3	200	150		0.6		IN1483	Si	6.2								
IN1117	B Si	300	0.3	300	150		0.6		IN1484	Si	4.7								
IN1118	B Si	400	0.3	400	150	15	0.6		IN1485	Si	6.2								
IN1119	B Si	500	0.3	500	150	15	0.6		IN1743	Si	10								
IN1120	B Si	600	0.3	150	150	15	0.6		IN1744	Si	10								
IN1124	B Si	200	10 μa	200	25		1.0		WESTINGHOUSE ELECTRIC CORP., Semiconductor Div., Youngwood, Pa.										
IN1124R	B Si	200	10 μa	200	25		1.0		IN1169	I Si	500 μa	500 μa	400	25	20	0.5	150		
IN1125	B Si	300	10 μa	300	25		1.0		IN1169A	Si	100 μa	100 μa	400	25	20	0.5	150		
IN1125R	B Si	300	10 μa	300	25		1.0												

WATCH FOR . . .

ELECTRONIC INDUSTRIES' forthcoming "SURVEY OF POWER RECTIFIERS"

To complete the survey of semiconductor diodes EI is now preparing a review of all units rated at above 1 ampere—the diodes that can be described roughly as "power rectifier" types. This feature will appear in an early forthcoming issue.

A PARTIAL LISTING OF INTERNATIONAL

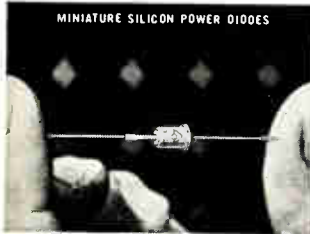
...THE MOST EXTENSIVE

ELECTRONIC TYPES FOR INDUSTRIAL AND MILITARY APPLICATION.

SILICON AND SELENIUM LOW CURRENT TYPES TO 1 AMP.

***SPECIAL MILITARY TYPES**
Special configurations and high reliability rectifiers for military applications may be obtained under our "Prescribed Reliability" Program. Address your inquiry to: Military Products Dept.

SILICON AND SELENIUM HIGH VOLTAGE TYPES



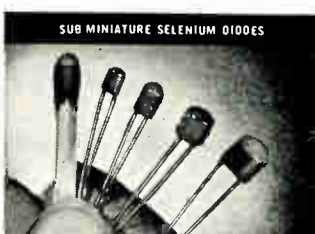
MINIATURE SILICON POWER DIODES
Ratings: 100 to 600 PIV, up to 500 ma. Specifically designed for missile and airborne equipment applications where miniaturization and reliability are prime factors. Hermetically sealed, all-welded, pigtail lead construction. Manufactured to meet the most rigid military requirements. Request Bulletin SR-203



PIGTAIL TYPE SILICON POWER DIODES
Ratings: 50 to 600 volts PIV • 250 to 750 ma. An extensive line of silicon power diodes for military and industrial applications featuring all-welded, hermetically sealed construction. All designed and manufactured to meet the most rigid military requirements. For complete technical data, write for Bulletin SR-202.



STUD MOUNTED SILICON POWER DIODES
Ratings: 50 to 600 volts PIV • 400 ma. to 1 amp. Industrial and military types including the 1N253, 1N254 and 1N255. Stud mounted, hermetically sealed, all-welded construction. Operating temperature range: -55°C to +150°C. Designed and manufactured to meet most rigid military specifications. Bulletin SR-133C



SUB MINIATURE SELENIUM DIODES
Ratings: 20 to 160 volts • 100µa to 11 ma. Ideal components for bias supplies, sensitive relays, computers etc. High resistance, (10 megohms and higher at -10 volts). Excellent linear forward characteristics. Extremely small, low in cost. Encapsulated to resist adverse environmental extremes. Bulletin SR-163.



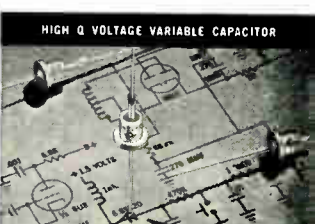
SELENIUM RECTIFIER STACKS
Ratings: From 100 ma. to 50 Amps. Low forward voltage drop and low leakage characteristics make this series ideal for a wide variety of power applications. For details request Bulletin C-349, (26 volt cells); Bulletin SR-160, (45 to 52 volts per cell) and Bulletin SR-152, on high current density cells.



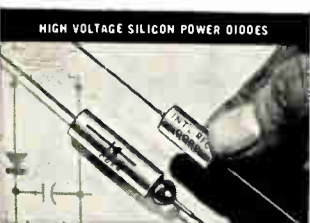
SELENIUM TV AND RADIO RECTIFIERS
Ratings: 25 to 156 volts AC, 50 to 1,200 ma. DC The widest range in the industry! Designed for Radio, Television, TV booster, UHF converter and experimental applications. Input ratings from 25 to 156 volts AC and up. DC output current 50 to 1,200 MA. Write for application information. Bulletin ER-178-A



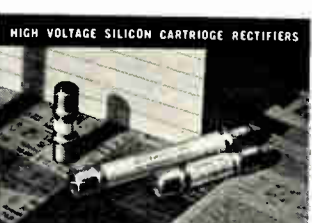
SILICON TV RECTIFIERS
Ratings: 400 PIV, up to 750 ma. SD-500. A hermetically sealed, all-welded silicon junction rectifier offering maximum reliability in the high temperatures encountered in TV applications. Pigtail leads eliminate the need for brackets, blocks, etc., simplify installation. For complete data: Bulletin SR-201



HIGH Q VOLTAGE VARIABLE CAPACITOR
Ratings: Q of 1000, 200 PIV DC Semicap's small size, light weight, high reliability and low power requirements make it ideal for automatic frequency control, frequency modulation oscillators and filter networks. All-welded hermetically sealed, shock-proof housing. Request Bulletin SR-205.



HIGH VOLTAGE SILICON POWER DIODES
Rating: 600 to 2400 volts PIV • 100 to 125 ma. Three types available. Hermetically sealed, pigtail construction. Style J rated at 600 to 1000 volts PIV at 125 ma. Bulletin SR-138E Styles K and L with PIV ratings from 600 to 2400 volts at 100 ma. dc output current are described in technical detail—Bulletin SR-157.



HIGH VOLTAGE SILICON CARTRIDGE RECTIFIERS
Ratings: 1000 to 20,000 volts PIV @ 45 to 440 ma. Especially suited for miniaturized military equipment where optimum reliability is a prime factor. Standard types for normal convection cooling and high current types for forced air or oil cooling. Hermetically sealed, metallized ceramic housing. Request Bulletin SR-225.



SELENIUM HIGH VOLTAGE CARTRIDGE RECTIFIERS
Ratings: 20 to 20,000 volts • 0.2 to 195 ma. Designed for long life and reliability in half-wave, voltage doubler, bridge, center-tap circuits, and 3-phase circuit types. Phenolic cartridges and hermetically sealed types available. Operating temperature range: -65°C to +100°C. For details: specify Bulletin H-2.



SPECIAL HIGH VOLTAGE TYPES
Rating: 12,500 volts PIV at 5 Amps. Illustrated above is a typical rectifier of advanced design produced by International Rectifier Corporation for military application. Data on ruggedized silicon substitutes for many standard vacuum tubes may be obtained from our Military Products Department.

International

EXECUTIVE OFFICES: EL SEGUNDO, CALIF.

The World's Largest Supplier of Industrial Metallic Rectifiers • Selenium • Germanium • Silicon

RECTIFIERS FOR ALL DC REQUIREMENTS...FROM MICROWATTS TO MEGAWATTS!

RECTIFIER CORPORATION PRODUCTS

LINE OF QUALITY RECTIFIERS ON EARTH!

All designed and manufactured to meet the most rigid military requirements!

POWER TYPES FOR INDUSTRIAL AND MILITARY APPLICATIONS

SILICON AND SELENIUM MEDIUM CURRENT TYPES

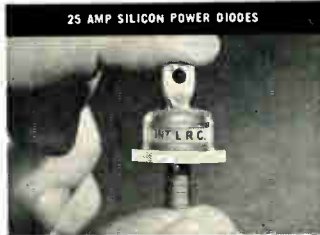
TO 150 AMPS.



SILICON RECTIFIER STACKS
Utilizing junctions rated to 1.25 amps DC output. These stacks consist of hermetically sealed junction diodes mounted on copper cooling fins, stacked to include the interconnections required for specific circuits. Junction ratings: 1.25 amps. DC output: 70 to 350 AC input volts rms. Request Bulletin SR-137A



6 AND 12 AMP. SILICON POWER DIODES
Rating: 50 to 500 volts PIV • 6 & 12 Amps
Conservatively rated to provide a substantial safety factor in industrial applications. Hermetically sealed, all-welded case construction provides reliability over a long life. Types available in a wide voltage range. For details Contact Factory.



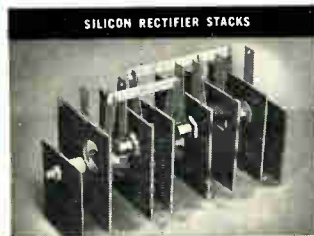
25 AMP SILICON POWER DIODES
Rating: 50 to 500 volts PIV • 25 to 45 Amps.
Advanced ceramic techniques assuring excellent thermal characteristics and mechanical stability are used in the production of these highly reliable, hermetically sealed rectifiers for military or industrial applications. For complete technical data, request Bulletin SR-304



450 AMP. SILICON POWER DIODES
Rating: 50 to 800 volts PIV • 45 to 150 Amps.
An extensive series of standard and reverse polarity types. Optional mounting bases including machine thread and pipe thread types. Machine thread base types: Bulletin SR-300, Pipe thread base types: Bulletin SR-301, Complete stack assemblies: Bulletin SR-302

SILICON, SELENIUM AND GERMANIUM HIGH CURRENT TYPES

TO 670 AMPS. PER JUNCTION



SILICON RECTIFIER STACKS
Ratings: 45 to 150 Amperes per Junction
Consisting of hermetically sealed junction diodes mounted on aluminum or copper cooling fins, stacked to include the interconnections required for specific circuits. Junction ratings: 45 to 150 amps average DC. Write for application data.



250 AMP. SILICON POWER DIODES
Ratings: 50 to 500 volts PIV • 75 to 250 Amps.
Standard and reverse polarity types offered in a series of machine thread and pipe thread mounting styles. Complete assemblies in all circuit configurations also available. Rugged construction and hermetic sealing assure long life and reliability. Ask for Bulletin SR-305



SELENIUM HEAVY POWER RECTIFIERS
Ratings: 6 to 30,000 volts • 50 to 2,300 Amps.
Specifically designed for industrial DC power needs. Patented construction features assure long life. Descriptive bulletins available are: Bulletin C-349, (26 volt cells); Bulletin SR-160, (45 to 52 volts per cell) and Bulletin SR-152, on high current density cells.

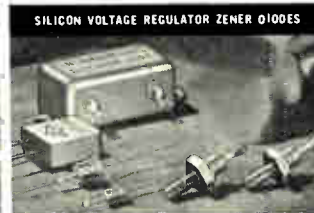


GERMANIUM POWER RECTIFIER JUNCTIONS
Ratings: 500 amperes • 26 to 66 volts rms
High capacity junctions especially designed for high-current, low-voltage electrochemical installations. Air cooled, these hermetically sealed junctions provide efficiency to 98.5%. Cast aluminum airflow housing effects maximum heat transfer. Request Bulletin GPR-25A.

SPECIAL SEMI-CONDUCTOR DEVICES



SELENIUM CONTACT PROTECTORS
Complete series of AC and DC types.
Designed to eliminate arcing and erosion across the contacts of relays, switches, etc. A complete series in each of three basic types: diode type, cartridge type and hermetically sealed types for industrial application. For complete data: Bulletin SR-150-A



SILICON VOLTAGE REGULATOR ZENER DIODES
Ratings: From 600 milliwatts to 10 watts
A complete series in 6 types. Miniature single junction types, multiple junction types and double anode units. 750 milliwatt and 1 watt types: Bulletin SR-251, 3.5 and 10 watt types: Bulletin SR-252, Multiple junction 5 watt types: SR-253, Double anode types: SR-254



SILICON ZENER VOLTAGE REFERENCE ELEMENTS
Temperature compensated for stability to $\pm 0.01\% ^\circ\text{C}$
Extremely precise units for power supplies and voltage sources. Temperature compensated for excellent stability over a temperature range of from -55°C to $+150^\circ\text{C}$. Manufactured to meet the most rigid military requirements. Types 1N430, 1N430A. Request Bulletin SR-255.

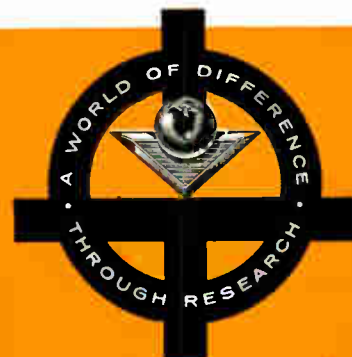


PHOTOELECTRIC CELLS AND SUN BATTERIES
(Wide range of silicon and selenium types.)
Self-generating cells available in standard and custom sizes, mounted or unmounted. For details on wide selection of selenium types, request Bulletin PC-649A. Silicon solar cells with efficiencies as high as 10%. Designed to rugged military specifications. Bulletin SR-275A.

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NEW ENGLAND AREA OFFICE: 17 Dunster St., Cambridge, Mass., UNiversity 4-6520
PENNSYLVANIA AREA OFFICE: Suburban Square Building, Ardmore, Penn., Midway 9-1428
MICHIGAN AREA OFFICE: 1799 Coolidge Highway, Berkley, Mich., LIncoln 8-1144
CANADA: International Rectifier of Canada, Ltd., 1581 Bank St., Ottawa, Ontario, REgent 3-6880



REPRESENTATIVES THROUGHOUT THE WORLD

Circle 95 on Inquiry Card

SEMICONDUCTOR DIODES

SWITCHING DIODES

DIODE TYPE NO.	CASE & MAT	REVERSE			FORWARD			RECOVERY		
		E _{PEAK}	I _{MAX} (μA)	@ V	I _{MIN} (ma)	@ V	TIME T _{μs}	TEST CONDITIONS		
								I _{FWD} (ma)	V _{REV} (V)	Z _{REC} (K Ohms)
AMPEREX ELECTRIC CORP., 230 Duffy Avenue, Hicksville, L.I., N. Y.										
IN119	B G	75	25	10	5	1.0	0.5	30	35	50
IN120	B G	75	50	10	5	1.0	0.5	30	35	50
IN480	G G	90	35 ma		5	1.0	0.5	30	35	50
IN490	A G	90	35 ma		5	1.0	0.5	30	35	50
IN698	E G	25	50 ma					30	30	
OA5	D G	100	11	100	200	1.0	0.5	5	5	20
OA7	D G	25	3.5	1.5	200	1.0	0.5 ¹	5	5	20
OA9	F G	25	100 ma					5	5	

¹JAN or other Test Circuit

CBS-HYTRON, Division of CBS, Inc., Semiconductor Operations, Lowell, Mass.

IN191	A G	90	25	10	5	1.0	0.5	30	35	50
LD105	A G	105			100	1.0	0.3	5	40	50
LD106	A G	53			100	0.7	0.6	150	0.83	
LD107	A G	65			100	1.0	1.0	30	35	20
IN699	A G	105	250	75	100	1.0	0.3 ¹	5	40	50
IN770	G	40	10	15	0.5		0.35 ¹	5	10	50

¹Mod. IBM-Y

CLEVITE TRANSISTOR PRODUCTS, 241-257 Crescent Street, Waltham 54, Mass.

IN120	A G	75	125	50	5	1.0	0.5	30	35	50
IN119	A G	75	125	50	5	1.0	0.5	30	35	50
IN191	A G	75	25	10	5	1.0	0.5	30	35	50
IN276	A G	100	100	50	40	1.0	0.3	5	40	80
IN625	B Si	23	30	20	4	1.5	1.0 ²			400
IN626	B Si	40	30	35	4	1.5	1.0 ²			400
IN627	B Si	84	30	75	4	1.5	1.0 ²			400
IN629	B Si	200	100	75	4	1.5	1.0			400
IN778	B Si	112	30	100	10	1.0	0.3 ¹	5	40	400
IN779	B Si	112	30	100	10	1.0	0.3 ¹	5	40	400
CTP318	G	75			1.0		0.3	5	40	50
CTP427	A Si-G	100	75	50	10	5	1.0	10	20	100
CTP2310	B Si	145	20	125	5	1.5	1.0 ¹	5	40	400
CTP2312	B Si	78	20	60	5	1.5	0.3 ¹	5	40	400
CTP2314	B Si	200	50	175	5	1.5	0.3 ¹	5	40	400
CTP2316	B Si	78	20	60	5	1.5	0.3 ¹	5	40	400
CTP2325	Si		30	1.5	0.5			20	40	80
CTP2359	Si		100	1.5	0.5			20	40	80
CTP2375	Si		30	1.5	0.5			20	40	80
CTP2317	B Si	200	50	175	5	1.5	1.0 ¹			400

¹JAN or other Test Circuit

²Mod. IBM-Y

GAHAGAN, INC., Esmond 17, Rhode Island

IN276	G	100	100	50		0.5		5	40	80
G2	G	70	125	50		0.2		30 μA	35	200
G17	G	70	120	60		0.2		5 μA	40	400
G18	G	70	120	60		0.2		5	40	400
G107	G	90	50	50		0.2		5	40	400
G108	G	75	100	50		0.1		5	40	200
G124	G	15	3	5		0.2		1.0	5	150
G127	G	70	100	50		0.1		5	40	200
G128	G	35	40	20		.02		4	10	20

HOFFMAN ELECTRONICS CORP., Semiconductor Div., 930 Pinter Avenue, Evanston, Illinois

IN625	F Si	30	1	10	4	1.5	0.15 ¹			400
IN626	F Si	50	20	35	4	1.5	1 ¹			400
IN627	F Si	100	20	75	4	1.5	1 ¹			400
IN628	F Si	150	20	125	4	1.5	1 ¹			400
IN629	F Si	200	20	175	4	1.5	1 ¹			400

¹Mod. IBM-Y

PACIFIC SEMICONDUCTORS, INC., 10451 W. Jefferson Boulevard, Culver City, California

IN625	A Si	1.0	20	4	1.5	1.0 ²		30	35	400
IN626	A Si	1.0	35	4	1.5	1.0 ²		30	35	400
IN627	A Si	1.0	30	4	1.5	1.0 ²		30	35	400
IN628	A Si	1.0	125	4	1.5	1.0 ²		30	35	400
IN629	A Si	1.0	175	4	1.5	1.0 ²		30	35	400
IN643	A Si	1.0	100	10	1.0	0.3		5	40	200
IN659	A Si	5	50	6	1.0	0.3 ¹		30	35	400
IN660	A Si	5	100	6	1.0	0.3 ¹		30	35	400
IN661	A Si	10	200	6	1.0	0.3 ¹		30	35	400
IN662	A Si	1.0	10	10	1.0	0.5 ¹		5	40	100
IN663	A Si	5	75	100	1.0	0.5 ¹		5	40	200
IN789	A Si	1.0	20	10	1.0	0.5				200
IN791	A Si	5	20	50	1.0	0.5				200
IN792	A Si	5	20	100	1.0	0.5				100
IN793	A Si	1.0	50	10	1.0	0.5				200
IN795	A Si	5	50	50	1.0	0.5				200
IN801	A Si	1.0	125	10	1.0	0.5				200
IN802	A Si	5	125	50	1.0	0.5				200
IN804	A Si	10	175	50	1.0	0.5				200
PS720	A Si	5	20	3	1.0	0.5 ¹		5	10	100
PS721	A Si	5	45	5	1.0	0.3 ¹		5	45	100
PS722	A Si	5	75	5	1.0	0.3 ¹		5	40	100
PS723	A Si	20	175	3	1.0	0.3 ¹		5	40	100
PS724	A Si	20	125	4	1.0	0.3 ¹		5	40	100
XD-1	B Si	1.0	5	1.0	1.0 ¹			5	40	100

¹JAN or other Test Circuit

²Mod. IBM-Y

DIODE TYPE NO.	CASE & MAT	REVERSE			FORWARD			RECOVERY		
		E _{PEAK}	I _{MAX} (μA)	@ V	I _{MIN} (ma)	@ V	TIME T _{μs}	TEST CONDITIONS		
								I _{FWD} (ma)	V _{REV} (V)	Z _{REC} (K Ohms)
PACIFIC SEMICONDUCTORS, INC. - (Continued)										
XD-021	B Si				20	1.0	0.3 ¹	5	40	100
XD-031	B Si				5	1.0	0.3 ¹	5	40	100
XD-034	B Si				20	1.0	0.3 ¹	5	40	100
XD-041	B Si				.025	10	1.0	0.3 ¹	5	40
XD-042	B Si				0.5	10	1.0	0.3 ¹	5	40

¹JAN or other Test Circuit

RADIO RECEPTOR CO., INC., General Instrument Corp., 240 Wythe Avenue, Brooklyn 11, N. Y.

IN191	G				5	1.0	0.5			50
IN192	G				5	1.0	0.5			50
IN276	G				40	1.0	0.3	5	40	80
IN625	Si	1.0	20	4	1.5	1.0	30	35	400	
IN626	Si	1.0	35	4	1.5	1.0	30	35	400	
IN627	Si	1.0	75	4	1.5	1.0	30	35	400	
IN628	Si	1.0	125	4	1.5	1.0	30	35	400	
IN629	Si	1.0	175	4	1.5	1.0	30	35	400	
IN643	Si	200			10	1.0	0.3	5	40	200
IN658	Si	120			100	1.0	0.3	5	40	80
IN662	Si	100			10	1.0	0.5	5	40	100
IN663	Si	100			100	1.0	0.5	5	40	200
DR211	G		100	50	200	1.0	0.3 ²	5	40	50
DR295	Si		4	2	1.0	0.2	1.0 ¹	30	35	20
DR362	Si		50	20	100	1.0	0.3 ¹	40	10	20
DR407	Si		12	6	5	1.0	0.5 ²	5	10	50
DR408	G		100	50	200	1.0	0.3 ¹	5	40	80
DR418	G		10	4	40	0.5	0.5 ¹	20	10	10
DR419	Si		20	3	10	0.5	1.0 ¹	30	5	25
DR422	G		300	500	50	1.0	0.3 ¹	5	40	50
DR437	G		20	4	40	0.5	0.5 ¹	30	10	10
DR459	G		200	10	10	0.5	0.2 ¹	5	6	20
DR481	Si		100	20	100	1.0	1.0 ¹	5	20	50
DR482	G		15	40	100	1.0	0.4 ¹	25	35	43
DR498	G		10	10	10	0.355	0.3 ¹	5	20	40
DR500	Si		12	25	20	1.0	0.5 ¹	5	40	500
DR521	Si		.05	1100	100	1.0	0.3 ¹	5	40	80
DR562	Si		0.10	50	10	0.75	0.4 ¹	10	20	25
DR661	Si		.05	80	300	1.0	0.3 ¹	5	40	80
DR664	Si		0.2	10	20	1.5	0.3 ¹	5	40	80
DR667	Si		0.25	200	100	1.0	0.3 ¹	5	40	80
DR672	Si		0.5	35	100	1.0	1.0 ²	30	35	400
DR673	Si	75	0.							

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SEMICONDUCTOR DIODES

MIXER DIODES

DIODE TYPE NO.	CASE & MAT	FREQ. (mc)	I-F IMPED. RANGE (Ohms)	MAX CONV LOSS (db)	MAX NOISE RATIO (Times)	MAX VSWR	OVERALL NOISE FIGURE (N _{if} 1.5 db)	MFR	DIODE TYPE NO.	CASE & MAT	FREQ. (mc)	I-F IMPED. RANGE (Ohms)	MAX CONV LOSS (db)	MAX NOISE RATIO (Times)	MAX VSWR	OVERALL NOISE FIGURE (N _{if} 1.5 db)	MFR		
IN21B	A Si	3060	200-800	6.5	2	1.7	10.3	BOM	IN26R	B Si	(reverse polarity, IN26)	23,984	300-600	8.5	2.5		13.4	KEM	
	A							MAS										MAS	
IN21C	A Si	3060	200-800	5.5	1.5	1.7	8.3	BOM	IN53	C Si		34,860	400-800	8.5	2.5	1.15			BOM
	A							KEM		D								KEM	
IN21D	A Si	3060	325-475	5	1.3	1.5	7.3	MAS	IN530	A G		34,860	400-800	6.5	2	1.6	10.4	MAS	
	A							BOM	IN72	A G	900		9.6			14		SE1	
IN21E	A Si	3060	350-450				7	KEM	IN78	D Si		16,000	325-625	7.5	2.5			SYL	
	A							BOM										BOM	
IN21WE	B Si	3060	350-450	5.5	1.5	1.3	7	MAS	IN78C				6	1.3				PHL	
	A							BOM	IN82	A G	UHF							PHL	
IN23B	A Si	9375	300-600	6.5	2.7	1.6	11.4	MAS	IN82A	A G	UHF							SE1	
	A							BOM										SYL	
IN23C	A Si	9375	325-475	6	2	1.5	10	MAS	IN149	A Si		9375	325-475	5.5	1.5			BOM	
	A							BOM	IN150	A Si		6750	250-500	6	2	1.5	9.8	KEM	
IN23D	A Si	9375	350-450	5	1.7	1.3	8.5	MAS	IN160	A Si		6750	200-500	6.5	2.7		11.4	KEM	
	A							KEM		A								MAS	
IN23E	A Si	9375	335-465				7.5	BOM	IN263	B	12,000		6					PHL	
	A							KEM	IN285	A G	UHF							GE	
IN23WE	B Si	9375	335-465	6	1.4	1.3	7.5	MAS	MA412		RG-98/U waveguide mtd. for mixer & det. (Add "M" and "MR" for matched pairs & rev. polarity)	26-75 kmc						MAS	
	E							BOM	MA421A		3060				1.3	6.5	MAS		
IN25	A Si	1000	100-400	8	2.5			KEM	MA421B		3060				1.3	6	MAS		
IN25A	A Si	1000	100-300	7	2			KEM										MAS	
IN26	B Si	23,984	300-600	8.5	2.5			KEM	MA428		RG-98/U waveguide mtd. for mixer & det.	50-75 kmc						MAS	
IN26B	C			7.5	2			PHL											

MANUFACTURER ABBREVIATIONS

BOM - BOMAC GE - General Electric MAS - Microwave Associates SE1 - Semi-Elements
 CBS - CBS-Hytron KEM - Kemtron PHL - Philco SYL - Sylvania

DETECTOR, SPECIAL PURPOSE DIODES

DIODE TYPE NO.	CASE & MAT	APPLICATION	FREQ. (mc)	IMPED. RANGE	E _{INV.} V	I _{INV.} (ma)	REMARKS	MFR	DIODE TYPE NO.	CASE & MAT	APPLICATION	FREQ. (mc)	IMPED. RANGE	E _{INV.} V	I _{INV.} (ma)	REMARKS	MFR																																																																																																																																							
IN31	B Si	video det.	9375	6000-23,000			(Add "R" for reverse polarity)	KEM	IN2175	B G	photo							TI																																																																																																																																						
IN32	A Si	video det.	3295	4000-22,000				KEM	TP-50	B G	photo							NPC																																																																																																																																						
IN60A	F G	video det.			25	0.8 @ 50 v		MAS	TP-55	B G	photo																																																																																																																																													
IN64	A G	video det.			20	0.2 @ 10 v		SYL	IN109	E G	harmonic gen.							KEM																																																																																																																																						
IN105	E G	video det.			30		Rev. res. = 150 k from 0-10 v	KEM	IN76		video rect.							KEM																																																																																																																																						
IN295	F G	video det.			40	0.2 @ 10 v		GAH	IN1838									PHL																																																																																																																																						
								RRC	OD4-37	A G	Det.							CBS																																																																																																																																						
IN358	C	video det.	1-12.4 k	4500-18,000				SYL	K1615	X Se	Dual diode							ITT																																																																																																																																						
IN869	C	video det.	3-12.4 k	4500-18,000				MAS	K1616	X Se	Dual diode							ITT																																																																																																																																						
IN369	C	video det.	1-12.4 k	4500-18,000				MAS	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="3">SOLAR CELLS</th> <th colspan="4">INCIDENT ENERGY 100 MW/CMZ (1 SUN)</th> </tr> <tr> <th>DIODE TYPE NO.</th> <th>CASE & MAT</th> <th>APPLICATION</th> <th>AVERAGE CONVER. EFFICIENCY</th> <th>OUTPUT POWER (mw)</th> <th>APPROXIMATE VOLTAGE</th> <th>APPROXIMATE CURRENT</th> <th>MFR</th> </tr> </thead> <tbody> <tr><td>S1020</td><td>Z Si</td><td>Solar Cell</td><td>4</td><td>7.0</td><td>0.35-0.4</td><td>17.5</td><td>IRR</td></tr> <tr><td>S1020A</td><td>Z Si</td><td>Solar Cell</td><td>6</td><td>10.5</td><td>0.4</td><td>26.0</td><td>IRR</td></tr> <tr><td>S1020B</td><td>Z Si</td><td>Solar Cell</td><td>8</td><td>14.0</td><td>0.4</td><td>35.0</td><td>IRR</td></tr> <tr><td>S0520</td><td>Z Si</td><td>Solar Cell</td><td>4</td><td>3.0</td><td>0.35-0.4</td><td>7.5</td><td>IRR</td></tr> <tr><td>S0520A</td><td>Z Si</td><td>Solar Cell</td><td>6</td><td>4.5</td><td>0.4</td><td>11.2</td><td>IRR</td></tr> <tr><td>S0520B</td><td>Z Si</td><td>Solar Cell</td><td>8</td><td>6.0</td><td>0.4</td><td>15.0</td><td>IRR</td></tr> <tr><td>S0510</td><td>Z Si</td><td>Solar-Cell</td><td>4</td><td>1.5</td><td>0.35-0.4</td><td>3.8</td><td>IRR</td></tr> <tr><td>S0510A</td><td>Z Si</td><td>Solar Cell</td><td>6</td><td>2.25</td><td>0.4</td><td>5.6</td><td>IRR</td></tr> <tr><td>S0510B</td><td>Z Si</td><td>Solar Cell</td><td>8</td><td>3.0</td><td>0.4</td><td>7.5</td><td>IRR</td></tr> <tr><td>S01020A</td><td>ZZ Si</td><td>Solar Cell</td><td>4-6</td><td>7-10.5</td><td>0.32</td><td>27</td><td>IRR</td></tr> <tr><td>S01020B</td><td>ZZ Si</td><td>Solar Cell</td><td>6-8</td><td>10.5-14</td><td>0.35</td><td>35</td><td>IRR</td></tr> <tr><td>S021020Z</td><td>ZZ Si</td><td>Solar Cell</td><td>4-6</td><td>14-21</td><td>0.64</td><td>27</td><td>IRR</td></tr> <tr><td>SD21020B</td><td>ZZ Si</td><td>Solar Cell</td><td>6-8</td><td>21-28</td><td>0.70</td><td>35</td><td>IRR</td></tr> <tr><td>SM51020A</td><td>ZZ Si</td><td>Solar Cell</td><td>4-6</td><td>35-52.5</td><td>1.60</td><td>27</td><td>IRR</td></tr> <tr><td>SM51020B</td><td>ZZ Si</td><td>Solar Cell</td><td>6-8</td><td>52.5-70</td><td>1.75</td><td>35</td><td>IRR</td></tr> </tbody> </table>									SOLAR CELLS			INCIDENT ENERGY 100 MW/CMZ (1 SUN)				DIODE TYPE NO.	CASE & MAT	APPLICATION	AVERAGE CONVER. EFFICIENCY	OUTPUT POWER (mw)	APPROXIMATE VOLTAGE	APPROXIMATE CURRENT	MFR	S1020	Z Si	Solar Cell	4	7.0	0.35-0.4	17.5	IRR	S1020A	Z Si	Solar Cell	6	10.5	0.4	26.0	IRR	S1020B	Z Si	Solar Cell	8	14.0	0.4	35.0	IRR	S0520	Z Si	Solar Cell	4	3.0	0.35-0.4	7.5	IRR	S0520A	Z Si	Solar Cell	6	4.5	0.4	11.2	IRR	S0520B	Z Si	Solar Cell	8	6.0	0.4	15.0	IRR	S0510	Z Si	Solar-Cell	4	1.5	0.35-0.4	3.8	IRR	S0510A	Z Si	Solar Cell	6	2.25	0.4	5.6	IRR	S0510B	Z Si	Solar Cell	8	3.0	0.4	7.5	IRR	S01020A	ZZ Si	Solar Cell	4-6	7-10.5	0.32	27	IRR	S01020B	ZZ Si	Solar Cell	6-8	10.5-14	0.35	35	IRR	S021020Z	ZZ Si	Solar Cell	4-6	14-21	0.64	27	IRR	SD21020B	ZZ Si	Solar Cell	6-8	21-28	0.70	35	IRR	SM51020A	ZZ Si	Solar Cell	4-6	35-52.5	1.60	27	IRR	SM51020B	ZZ Si	Solar Cell	6-8	52.5-70	1.75	35	IRR
SOLAR CELLS			INCIDENT ENERGY 100 MW/CMZ (1 SUN)																																																																																																																																																					
DIODE TYPE NO.	CASE & MAT	APPLICATION	AVERAGE CONVER. EFFICIENCY	OUTPUT POWER (mw)	APPROXIMATE VOLTAGE	APPROXIMATE CURRENT	MFR																																																																																																																																																	
S1020	Z Si	Solar Cell	4	7.0	0.35-0.4	17.5	IRR																																																																																																																																																	
S1020A	Z Si	Solar Cell	6	10.5	0.4	26.0	IRR																																																																																																																																																	
S1020B	Z Si	Solar Cell	8	14.0	0.4	35.0	IRR																																																																																																																																																	
S0520	Z Si	Solar Cell	4	3.0	0.35-0.4	7.5	IRR																																																																																																																																																	
S0520A	Z Si	Solar Cell	6	4.5	0.4	11.2	IRR																																																																																																																																																	
S0520B	Z Si	Solar Cell	8	6.0	0.4	15.0	IRR																																																																																																																																																	
S0510	Z Si	Solar-Cell	4	1.5	0.35-0.4	3.8	IRR																																																																																																																																																	
S0510A	Z Si	Solar Cell	6	2.25	0.4	5.6	IRR																																																																																																																																																	
S0510B	Z Si	Solar Cell	8	3.0	0.4	7.5	IRR																																																																																																																																																	
S01020A	ZZ Si	Solar Cell	4-6	7-10.5	0.32	27	IRR																																																																																																																																																	
S01020B	ZZ Si	Solar Cell	6-8	10.5-14	0.35	35	IRR																																																																																																																																																	
S021020Z	ZZ Si	Solar Cell	4-6	14-21	0.64	27	IRR																																																																																																																																																	
SD21020B	ZZ Si	Solar Cell	6-8	21-28	0.70	35	IRR																																																																																																																																																	
SM51020A	ZZ Si	Solar Cell	4-6	35-52.5	1.60	27	IRR																																																																																																																																																	
SM51020B	ZZ Si	Solar Cell	6-8	52.5-70	1.75	35	IRR																																																																																																																																																	
MA408	A	video det.	9000	1700-3100				MAS	<p>Sensitivity: TP-50 - Approx. 3 x 10⁻⁵ ma/Lux; TP-55 - Approx. 4 x 10⁻⁵ ma/Lux Dark Current: TP-50 - 3.5/μa @ 100 v; TP-55 - 5.0 μa @ 50 v.</p> <p>Output 7.2 μv above noise level Doppler low flicker, 20 kc flicker noise ratio @ 24 db; conv. loss = 6 db 0.6 mc dc output = 1 ma; E_{RMS} = 40 v dc output = 1 ma; E_{RMS} = 40 v</p>																																																																																																																																															
S-180	A Si	hi speed SW						SRC																																																																																																																																																
IN77A,B		photo					dark current 8 μa @ -10 v	SYL																																																																																																																																																

* Refer to Manufacturer's Drawings

MANUFACTURER ABBREVIATIONS

CBS - CBS-Hytron KEM - Kemtron PHL - Philco SYL - Sylvania
 GAH - Gabagan, Inc. MAS - Microwave Associates RRC - Radio Receptor TI - Texas Instruments
 IRR - International Rectifier NPC - Nucleonics Products SRC - Sperry Rand

SEMICONDUCTOR DIODES

SILICON ZENER OR AVALANCHE DIODES

DIODE TYPE NO.	CASE	VOLTAGE		I _Z (ma)	IMPED. Z (Ohms)	DIODE TYPE NO.	CASE	VOLTAGE		I _Z (ma)	IMPED. Z (Ohms)	DIODE TYPE NO.	CASE	VOLTAGE		I _Z (ma)	IMPED. Z (Ohms)
		MIN. (DR NDM.)	MAX.					MIN. (OR NOM.)	MAX.					MIN. (OR NOM.)	MAX.		

AUTOMATIC MANUFACTURING DIVISION General Instrument Corp., 65 Gouverneur Street, Newark 4, N.J.

R3.9		3.6	4.3	40	20	R22		20	24	10	120	3R10		9.1	11	60	12
R4.7		4.3	5.1	40	10	R27		24	30	10	200	3R12		11	13	30	25
R5.7		5.1	6.2	40	4.5	3R3.9		3.6	4.3	120	20	3R15		13	16	30	50
R6.8		6.2	7.5	20	6.5	3R4.7		4.3	5.1	120	10	3R18		16	20	30	70
R8.2		7.5	9.1	20	9	3R5.6		5.1	6.2	120	4.5	3R22		20	24	30	120
R12		11	13	10	25	3R6.8		6.2	7.5	60	6.5	3R27		24	30	30	200
R15		12	16	10	50	3R8.2		7.5	9.1	60	9						

HOFFMAN ELECTRONICS, Semiconductor Division, 930 Pitner Avenue, Evanston, Illinois

IN225	A	7.5	10	0.2		IN723	F	24		4	28	IN1355A	O	15	500		2
IN226	A	9	12	0.2		IN723A	F	24		4	28	IN1356	D	16	500		3
IN227	A	11	14.5	0.2		IN724	F	27		4	35	IN1356A	D	16	500		3
IN228	A	13.5	18	0.2		IN724A	F	27		4	35	IN1357	D	18	150		3
IN229	A	17	21	0.2		IN725	F	30		4	42	IN1357A	D	18	150		3
IN230	A	20	27	0.2		IN725A	F	30		4	42	IN1358	D	20	150		3
IN231	A	25	32	0.2		IN726	F	33		4	50	IN1358A	D	20	150		3
IN232	A	30	39	0.2		IN726A	F	33		4	50	IN1359	D	22	150		3
IN233	A	37	45	0.2		IN727	F	36		4	60	IN1359A	D	22	150		3
IN429	A	5.9	6.5	7.5	20	IN727A	F	36		4	60	IN1360	D	24	150		3
IN430	A	8	8.8	10	15	IN728	F	39		4	70	IN1360A	D	24	150		3
IN430A	G	8	8.8	10		IN728A	F	39		4	70	IN1361	D	27	150		3
IN430B	G	8	8.8	10		IN729	F	43		4	84	IN1361A	D	27	150		3
IN471	A	3	3.9	5	50	IN729A	F	43		4	84	IN1362	D	30	150		4
IN472	A	3.7	4.5	5	45	IN730	F	47		4	98	IN1362A	D	30	150		4
IN473	A	4.3	5.4	5	35	IN730A	F	47		4	98	IN1363	D	33	150		4
IN474	A	5.2	6.4	5	20	IN731	F	51		4	115	IN1363A	D	33	150		4
IN475	A	6.2	8	5	10	IN731A	F	51		4	115	IN1364	D	36	150		5
IN702	F	2.0	3.2	5		IN732	F	56		4	140	IN1364A	D	36	150		5
IN703	F	3.0	3.9	5		IN732A	F	56		4	140	IN1365	D	39	150		5
IN704	F	3.7	4	5		IN733	F	62		2	170	IN1365A	D	39	150		5
IN705	F	4.3	5	5		IN734	F	68		2	200	IN1366	D	43	150		6
IN706	F	5.2	6	5		IN735	F	75		2	240	IN1366A	D	43	150		6
IN707	F	6.2	8	5		IN736	F	82		2	280	IN1367	D	47	150		7
IN708	F	5.6	25	3.6		IN737	F	91		1	340	IN1367A	D	47	150		7
IN708A	F	5.6	25	3.6		IN738	F	100		1	400	IN1368	D	51	150		8
IN709	F	6.2	25	4.1		IN739	F	110		1	490	IN1368A	D	51	150		8
IN709A	F	6.2	25	4.1		IN740	F	120		1	570	IN1369	D	56	150		9
IN710	F	6.8	25	4.7		IN741	F	130		1	650	IN1369A	D	56	150		9
IN710A	F	6.8	25	4.7		IN742	F	150		1	860	IN1370	D	62	50		12
IN711	F	7.5	25	5.3		IN743	F	160		1	970	IN1371	D	68	50		14
IN711A	F	7.5	25	5.3		IN744	F	180		1	1200	IN1372	D	75	50		20
IN712	F	8.2	25	6.0		IN745	F	200		1	1400	IN1373	D	82	50		22
IN712A	F	8.2	25	6.0		IN1313	A	7.5	10	0.2		IN1374	D	91	50		35
IN713	F	9.1	12	7.0		IN1314	A	9	12	0.2		IN1375	D	100	50		40
IN713A	F	9.1	12	7.0		IN1315	A	11	14.5	0.2		IN1735	H	6.2	7.5	20	
IN714	F	10	12	8		IN1316	A	13.5	18	0.2		IN1736	I	12.4	7.5	40	
IN714A	F	10	12	8		IN1317	A	17	21	0.2		IN1736A	I	12.4	7.5	40	
IN715	F	11	12	9		IN1318	A	20	27	0.2		IN1737	J	18.6	7.5	60	
IN715A	F	11	12	9		IN1319	A	25	32	0.2		IN1737A	J	18.6	7.5	60	
IN716	F	12	12	10		IN1320	A	30	39	0.2		IN1738	J	24.8	7.5	80	
IN716A	F	12	12	10		IN1321	A	37	45	0.2		IN1738A	J	24.8	7.5	80	
IN717	F	13	13	11		IN1322	A	43	54	0.2		IN1739	K	31	7.5	100	
IN717A	F	13	12	11		IN1323	A	52	64	0.2		IN1739A	K	31	7.5	100	
IN718	F	15	12	13		IN1324	A	62	80	0.2		IN1740	K	37.2	7.5	120	
IN718A	F	15	12	13		IN1325	A	75	100	0.2		1740A	K	37.2	7.5	120	
IN719	F	16	12	15		IN1326	A	90	120	0.2		1741	K	43.4	7.5	140	
IN719A	F	16	12	15		IN1327	A	110	145	0.2		1741A	K	43.4	7.5	140	
IN720	F	18	12	17		IN1351	D	10	500	2		1742	K	49.6	7.5	180	
IN720A	F	18	12	17		IN1315A	D	10	500	2		1742A	K	49.6	7.5	180	
IN721	F	20	4	20		IN1352	D	11	500	2		IN1765	K	5.6	100	1.2	
IN721A	F	20	4	20		IN1352A	D	11	500	2							
IN722	F	22	4	24		IN1352D	D	12	500	2							
IN722A	F	22	4	24		IN1353A	D	12	500	2							
						IN1354	D	13	500	2							
						IN1354A	D	13	500	2							
						IN1355	D	15	500	2							

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SEMICONDUCTOR DIODES

SILICON ZENER OR AVALANCHE DIODES - (Continued)

DIODE TYPE NO.	CASE	VOLTAGE		I _Z (ma)	IMPED. Z (Ohms)	DIODE TYPE NO.	CASE	VOLTAGE		I _Z (ma)	IMPED. Z (Ohms)	DIODE TYPE NO.	CASE	VOLTAGE		I _Z (ma)	IMPED. Z (Ohms)
		MIN (OR NOM.)	MAX.					MIN (OR NOM.)	MAX.					MIN (OR NOM.)	MAX.		
HOFFMAN ELECTRONICS - (Continued)																	
IN1765A	B	5.6		100	1.2	IN1779	B	22		15	16	IN1795	B	100		5	260
IN1766	B	6.2		100	1.5	IN1799A	B	22		15	16	IN1796	B	110		5	320
IN1766A	B	6.2		100	1.5	IN1780	B	24		15	18	IN1797	B	120		5	390
IN1767	B	6.8		100	1.7	IN1780A	B	24		15	18	IN1798	B	130		5	450
IN1767A	B	6.8		100	1.7	IN1781	B	27		15	23	IN1799	B	150		5	600
IN1768	B	7.5		100	2.1	IN1781A	B	27		15	23	IN1800	B	160		5	700
IN1768A	B	7.5		100	2.1	IN1782	B	30		15	28	IN1801	B	180		5	900
IN1769	B	8.2		100	2.4	IN1782A	B	30		15	28	IN1802	B	200		5	1100
IN1769A	B	8.2		100	2.4	IN1783	B	33		15	33	IN1803	D	5.6		1000	1
IN1770	B	9.1		50	3	IN1783A	B	33		15	33	IN1803A	D	5.6		1000	1
IN1770A	B	9.1		50	3	IN1784	B	36		15	39	IN1804	D	6.2		1000	1
IN1771	B	10		50	3.5	IN1784A	B	36		15	39	IN1804A	D	6.2		1000	1
IN1771A	B	10		50	3.5	IN1785	B	39		15	45	IN1805	D	6.8		1000	1
IN1772	B	11		50	4.2	IN1785A	B	39		15	45	IN1805A	D	6.8		1000	1
IN1772A	B	11		50	4.2	IN1786	B	43		15	54	IN1806	D	7.5		1000	1
IN1773	B	12		50	5	IN1786A	B	43		15	54	IN1806A	D	7.5		1000	1
IN1773A	B	12		50	5	IN1787	B	47		15	64	IN1807	D	8.2		1000	1
IN1774	B	13		50	5.8	IN1787A	B	47		15	64	IN1807A	D	8.2		1000	1
IN1774A	B	13		50	5.8	IN1788	B	51		15	74	IN1808	D	9.1		500	1
IN1775	B	15		50	7.6	IN1788A	B	51		15	74	IN1808A	D	9.1		500	1
IN1775A	B	15		50	7.6	IN1789	B	56		15	88	IN1809	D	110		50	47
IN1776	B	16		50	8.6	IN1789A	B	56		15	88	IN1810	D	120		50	56
IN1776A	B	16		50	8.6	IN1790	B	62		5	105	IN1811	D	130		50	65
IN1777	B	18		50	11	IN1791	B	68		5	125	IN1812	D	150		50	82
IN1777A	B	18		50	11	IN1792	B	75		5	150	IN1813	D	160		50	93
IN1778	B	20		15	13	IN1793	B	82		5	175	IN1814	D	180		50	115
IN1778A	B	20		15	13	IN1794	B	91		5	220	IN1815	D	200		50	140

INTERNATIONAL RECTIFIER CORP., 1521 E. Grand Ave., El Segundo, Calif.

IN430	T	8	8.8	10	15	IN1525	V	13.0	16.0	65	15.0	IN605	X	11.0	13.0	850	2.0
IN430A	T	8	8.8	10	15	IN1526	V	16.0	20.0	55	30.0	IN1606	X	13	16	650	4.0
IN430B	T	8	8.8	15	15	IN1527	V	20.0	24.0	45	45.0	IN1607	X	16	20	550	7.5
IN1507	U	3.6	4.3	180	1.25	IN1528	V	24.0	30.0	35	60.0	IN1608	X	20	24	450	12.0
IN1508	U	4.3	5.1	150	1.25	IN1588	W	3.6	4.3	850	0.5	IN1609	M	24	30	350	15.0
IN1509	U	5.1	6.2	130	2.0	IN1589	W	4.3	6.1	700	0.5	H227	M	24	30	200	7
IN1510	U	6.2	7.5	110	2.5	IN1590	W	5.1	6.2	625	0.75	H233	M	30	36	150	10
IN1511	U	7.5	9.1	90	4.0	IN1591	W	6.2	7.5	525	1.0	H247	M	43	51	110	20
IN1512	U	9.1	11.0	75	6.0	IN1592	W	7.5	9.1	425	1.5	H268	M	62	75	75	60
IN1513	U	11.0	13.0	60	10.0	IN1593	W	9.1	11	350	2.5	H2100	M	91	110	50	180
IN1514	U	13.0	16.0	50	20.0	IN1594	W	11	13	275	4.0	H2150	M	130	160	35	370
IN1515	U	16	20	40	40	IN1595	W	13	16	225	7.5	Z24.7	Y	4.3	5.1	125	5
IN1516	U	20	24	33	60	IN1596	W	16	20	200	15.0	Z25.6	Y	5.1	6.2	100	7
IN1517	U	24	30	26	75	IN1597	W	20	24	160	22.5	Z26.8	Y	6.2	7.5	80	10
IN1518	V	3.6	4.3	250	1.0	IN1598	W	24	30	125	30.0	Z28.2	Y	7.5	9.1	70	14
IN1519	V	4.3	5.1	200	1.0	IN1599	X	3.6	4.3	2500	0.25	Z210	Y	9.1	11.0	60	20
IN1520	V	5.1	6.2	175	1.5	IN1600	X	4.3	5.1	2000	0.25	Z212	Y	11.0	13.0	50	27
IN1521	V	6.2	7.5	150	2.0	IN1601	X	5.1	6.2	1750	0.4	Z215	Y	13	16	40	42
IN1522	V	7.5	9.1	120	3.0	IN1602	X	6.2	7.5	1500	0.5	Z218	Y	16	20	30	75
IN1523	V	9.1	11.0	100	4.5	IN1603	X	7.5	9.1	1200	0.75	Z222	Y	20	24	25	105
IN1524	V	11.0	13.0	80	7.5	IN1604	X	9.1	11.0	1000	1.25	Z227	Y	24	30	20	140

MOTOROLA, INC., Semiconductor Products Div., 5005 E. McDowell Rd., Phoenix, Ariz.

IM10Z	A	10		85	700	IM19Z	A	19		44	750	IM39Z	A	39		20	1000
IM11Z	A	11		75	700	IM20Z	A	20		42	750	IM43Z	A	43		19	1500
IM12Z	A	12		70	700	IM22Z	A	22		38 max	750	IM45Z	A	45		18	1500
IM13Z	A	13		65	700	IM24Z	A	24		35	750	IM47Z	A	47		17	1500
IM14Z	A	14		60	700	IM25Z	A	25		32	750	IM50Z	A	50		16.5	1500
IM15Z	A	15		56	700	IM27Z	A	27		30	750	IM52Z	A	52		16	2000
IM16Z	A	16		53	700	IM30Z	A	30		28	1000	IM56Z	A	56		15	2000
IM17Z	A	17		50	700	IM33Z	A	33		26	1000	IM62Z	A	62		13	2000
IM18Z	A	18		46	750	IM36Z	A	36		24	1000	IM68Z	A	68		12	2000

SILICON ZENER OR AVALANCHE DIODE - (Continued)

DIODE TYPE NO.	CASE	VOLTAGE		I _Z (ma)	IMPED. Z (Ohms)	DIODE TYPE NO.	CASE	VOLTAGE		I _Z (ma)	IMPED. Z (Ohms)	DIODE TYPE NO.	CASE	VOLTAGE		I _Z (ma)	IMPED. Z (Ohms)
		MIN (OR NOM.)	MAX.					MIN (OR NOM.)	MAX.					MIN (OR NOM.)	MAX.		
MOTOROLA, INC., - (Continued)																	
1M75Z	A	75		11	2000	1.5M105Z	B	105		11.5	4000	L0M140Z	D	140		58	
1M82Z	A	82		10	3000	1.5M110Z	B	110		11	4000	10M150Z	D	150		54	
1M91Z	A	91		9	3000	1.5M120Z	B	120		10.5	4500	10M175Z	D	175		46	
1M100Z	A	100		8	3000	1.5M130Z	B	130		9	5000	10M200Z	D	200		40	
1M105Z	A	105		7.5	4000	1.5M140Z	B	140		8.5	5500	50M10Z	C	10		4.3a	
1M110Z	A	110		7.2	4000	1.5M150Z	B	150		8	6000	50M11Z	C	11		3.9a	
1M120Z	A	120		7	4500	1.5M175Z	B	175		7	7000	50M12Z	C	12		3.6a	
1M130Z	A	130		6	5000	1.5M200Z	B	200		6	8000	50M13Z	C	13		3.3a	
1M140Z	A	140		5.5	5500	10M10Z	D	10		860	250	50M14Z	C	14		3a	
1M150Z	A	150		5	6000	10M11Z	D	11		780	250	50M15Z	C	15		2.8a	
1M175Z	A	175		4.5	7000	10M12Z	D	12		720	250	50M16Z	C	16		2.65a	
1M200Z	A	200		4	8000	10M13Z	D	13		660	250	50M17Z	C	17		2.5a	
1.5M10Z	B	10		125	700	10M14Z	D	14		600	250	50M18Z	C	18		2.3a	
1.5M11Z	B	11		115	700	10M15Z	D	15		560	250	50M19Z	C	19		2.2a	
1.5M12Z	B	12		105	700	10M16Z	D	16		530	250	50M20Z	C	20		2.1a	
1.5M13Z	B	13		98	700	10M17Z	D	17		500	250	50M22Z	C	22		1.9a	
1.5M14Z	B	14		90	700	10M18Z	D	18		460	250	50M24Z	C	24		1.75a	
1.5M15Z	B	15		85	700	10M19Z	D	19		440	250	50M25Z	C	25		1.55a	
1.5M16Z	B	16		80	700	10M20Z	D	20		420	250	50M27Z	C	27		1.5a	
1.5M17Z	B	17		75	700	10M22Z	D	22		380	250	50M30Z	C	30		1.4a	
1.5M18Z	B	18		70	750	10M24Z	D	24		350	250	50M33Z	C	33		1.3a	
1.5M19Z	B	19		66	750	10M25Z	D	25		310	250	50M36Z	C	36		1.15a	
1.5M20Z	B	20		62	750	10M27Z	D	27		300	250	50M39Z	C	39		1.05a	
1.5M22Z	B	22		55	750	10M30Z	D	30		280	300	50M43Z	C	43		0.975a	
1.5M24Z	B	24		51	750	10M33Z	D	33		250	300	50M45Z	C	45		0.93a	
1.5M25Z	B	25		49	750	10M36Z	D	36		230	300	50M47Z	C	47		0.88a	
1.5M27Z	B	27		46	750	10M39Z	D	39		210	300	50M50Z	C	50		0.83a	
1.5M30Z	B	30		41	1000	10M43Z	D	43		195	400	50M52Z	C	52		0.79a	
1.5M33Z	B	33		38	1000	10M45Z	D	45		185	400	50M56Z	C	56		0.74a	
1.5M36Z	B	36		35	1000	10M47Z	D	47		175	400	50M62Z	C	62		0.66a	
1.5M39Z	B	39		31	1000	10M50Z	D	50		165	500	50M68Z	C	68		0.6a	
1.5M43Z	B	43		28	1500	10M52Z	D	52		160	500	50M75Z	C	75		0.54a	
1.5M45Z	B	45		27	1500	10M56Z	D	56		150	500	50M82Z	C	82		0.49a	
1.5M47Z	B	47		26	1500	10M62Z	D	62		130	600	50M91Z	C	91		0.42a	
1.5M50Z	B	50		25	1500	10M68Z	D	68		120	600	50M100Z	C	100		0.4a	
1.5M52Z	B	52		24	2000	10M75Z	D	75		110	600	50M105Z	C	105		0.38a	
1.5M56Z	B	56		22	2000	10M82Z	D	82		100	700	50M110Z	C	110		0.365a	
1.5M62Z	B	62		20	2000	10M91Z	D	91		85		50M120Z	C	120		0.335a	
1.5M68Z	B	68		18	2000	10M100Z	D	100		80		50M130Z	C	130		0.31a	
1.5M75Z	B	75		16	2000	10M105Z	D	105		75		50M140Z	C	140		0.29a	
1.5M82Z	B	82		14	3000	10M110Z	D	110		72		50M150Z	C	150		0.27a	
1.5M91Z	B	91		13	3000	10M120Z	D	120		67		50M175Z	C	175		0.23a	
1.5M100Z	B	100		12	3000	10M130Z	D	130		62		50M200Z	C	200		0.2a	

NORTH AMERICAN ELECTRONICS, INC. 212 Broad Street, Lynn, Mass.

PR504	A	4.26	4.73	2000	.5	PR522	A	16.5	17.85	500	3.0	PR615	B	9.5	10.5	80	4.5
PR505	A	4.75	5.25	2000	.5	PR523	A	17.1	18.9	500	3.0	PR616	B	10.45	11.55	80	4.5
PR506	A	5.23	5.78	1600	.7	PR524	A	18.05	19.95	500	3.0	PR617	B	11.4	12.6	70	7.5
PR507	A	5.70	6.30	1600	.7	PR525	A	18.05	19.95	500	3.0	PR618	B	12.35	13.65	70	7.5
PR508	A	6.18	6.83	1200	.8	PR544	A	20.9	23.1	400	8.0	PR619	B	13.3	14.7	70	7.5
PR509	A	6.65	7.35	1200	.8	PR545	A	228	25.2	400	8.0	PR620	B	14.24	15.75	60	15
PR510	A	7.13	7.88	1200	.8	PR546	A	24.7	27.3	350	8.0	PR621	B	15.2	16.2	60	15
PR511	A	7.60	8.40	1000	.8	PR604	B	4.28	4.73	200	1	PR622	B	16.5	17.85	50	15
PR512	A	8.08	8.93	1000	.8	PR605	B	4.75	5.25	200	1	PR623	B	17.1	18.9	50	30
PR513	A	8.55	9.45	1000	.8	PR606	B	5.23	5.78	160	1.5	PR624	B	18.05	19.95	50	30
PR514	A	9.04	9.98	1000	.8	PR607	B	5.70	6.30	160	1.5	PR625	B	19.0	21.0	50	30
PR515	A	9.5	10.5	800	1.5	PR608	B	6.18	6.18	120	2	PR644	B	20.9	23.1	40	45
PR516	A	10.45	11.55	800	1.5	PR609	B	6.65	7.35	120	2	PR645	B	22.8	25.2	40	45
PR517	A	11.4	12.6	700	2.0	PR610	B	7.13	7.88	120	2	PR646	B	24.7	27.3	35	45
PR518	A	12.35	13.65	700	2.0	PR611	B	7.60	8.40	100	3	PR704	B	4.3	5.4	2000	0.5
PR519	A	13.3	13.3	14.7	2.0	PR612	B	8.08	8.93	100	3	PR705	B	5.2	6.4	1600	0.7
PR520	A	14.24	15.75	600	3.0	PR613	B	8.55	9.45	100	3	PR706	A	6.2	8.0	1200	0.8
PR521	A	15.2	16.8	600	3.0	PR614	B	9.04	9.98	100	3	PR708	A	7.5	10.0	1000	0.8

revolutionary G-E Controlled Rectifier

"Controlled rectifiers may revolutionize the electrical industry." This statement was made a year ago by a respected news publication. Since then samples have been studied by hundreds of firms. Many new circuits have been developed which promise important improvements in functions, reliability, simplicity, accuracy and lower cost. In just one year prices have been reduced 75 percent (see chart below). And now, the G-E Silicon Controlled Rectifier is a standard, production-line item, warranted in writing and available at sharply reduced prices.

This is the time for design engineers to exploit the inherent advantages of the Silicon Controlled Rectifier in their circuit designs. Many applications are proved . . . the firing circuits have been refined . . . the product line is stabilized . . . and it makes sound economic sense. Call or write your G-E Semiconductor Sales Representative for complete details. The Controlled Rectifier is also available from many local G-E Distributors.

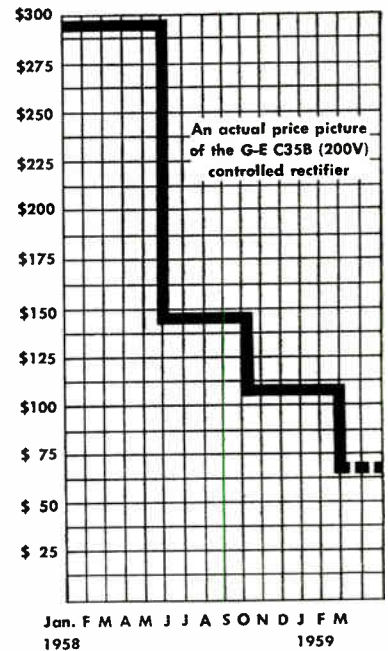
HOW THE G-E CONTROLLED RECTIFIER WORKS. The Silicon Controlled Rectifier is a three junction semiconductor device for use in power control and power switching applications requiring blocking voltages up to 400 volts and load currents up to 16 amperes. Series or parallel circuits may be used for higher power applications.

The G-E Controlled Rectifier's reverse characteristic is similar to a normal silicon rectifier in that it represents essentially an open circuit with negative anode to cathode voltage. The forward characteristic is such that it will block positive anode to cathode voltage below a critical break-over voltage if no signal is applied to the gate terminal. However, by exceeding the forward break-over voltage or applying an appropriate gate signal the device will rapidly switch to a conducting state and present the characteristically low forward voltage drop of a single junction silicon rectifier.

DETAILED NOTES are available on the application of the G-E Silicon Controlled Rectifier, plus reprints of articles that have appeared in technical journals. Write to Section S24659, Semiconductor Products Dept., General Electric Company, Electronics Park, Syracuse, New York.

STEADY PRICE DROP. Since its introduction one year ago, the price of the typical G-E Controlled Rectifier has dropped more than 75 percent. This results from improved manufacturing techniques and volume production. The G-E Controlled Rectifier is now a production-line item, warranted in writing for one year and subjected to the same quality control tests imposed on all General Electric transistors and rectifiers.

The G-E Controlled Rectifier is also available at even less cost (ZJ39L series) for use at 100°C and below, with currents up to 10 amperes.



MAXIMUM ALLOWABLE RATINGS (Resistive or Inductive Load)

	C35U	C35F	C35A	C35G	C35B	C35H	C35C	C35D
Continuous Peak Inverse Voltage (PIV)	25	50	100	150	200	250	300	400 volts
Transient Peak Inverse Voltage (Non-Recurrent < 5 millisecc.)	35	75	150	225	300	350	400	500 volts
RMS Voltage (V _{RMS}), Sinusoidal	17.5	35	70	105	140	175	210	280 volts
Average Forward Current (I _F)	Up to 16 amperes							
Peak One Cycle Surge Current (I _{surge})	150 amperes							
Peak Gate Power	5 watts							
Average Gate Power	0.5 watts							
Peak Gate Current (I _G)	2 amperes							
Peak Gate Voltage (V _G) (forward)	10 volts							
Storage Temperature	-65°C to +150°C							
Operating Temperature	-65°C to +125°C							
CHARACTERISTICS (At Maximum Ratings)	C35U	C35F	C35A	C35G	C35B	C35H	C35C	C35D
Minimum Forward Breakover Voltage (V _{BO})	25	50	100	150	200	250	300	400 volts
Maximum Reverse (I _R) or Forward (I _S) Leakage Current (Full Cycle Average)	6.5	6.5	6.5	6.5	6.0	5.5	5.0	4.0 ma
Maximum Forward Voltage (V _{F AVE})	0.86 volts (Full Cycle Average)							
Maximum Gate Current To Fire (I _{GF})	25 ma							
Maximum Gate Voltage To Fire (V _{GF})	3 volts							
Typical Gate Current To Fire (I _{GF})	10 ma at +1.5 volts (Gate to Cathode Voltage)							

ZJ39L Series—lower cost series with ratings similar to above, but for use up to 100°C maximum, with forward current ratings up to 10 amperes.
ZJ50 Series—a high-current series now in development, and available on a prototype-sample basis.



SEMICONDUCTOR DIODES

SILICON ZENER OR AVALANCHE DIODES -- (Continued)

DIODE TYPE NO.	CASE	VOLTAGE		I _Z (ma)	IMPED. Z (Ohms)	DIODE TYPE NO.	CASE	VOLTAGE		I _Z (ma)	IMPED. Z (Ohms)	DIODE TYPE NO.	CASE	VOLTAGE		I _Z (ma)	IMPED. Z (Ohms)
		MIN (OR NOM.)	MAX.					MIN (OR NOM.)	MAX.					MIN (OR NOM.)	MAX.		
NORTH AMERICAN ELECTRONICS INC. -- (Continued)																	
PR710	A	9.0	12.0	800	1.5	PR804	B	4.3	5.4	200	1	PR812	B	11.0	14.5	70	7.5
PR712	A	11.0	14.5	700	2	PR805	B	5.2	6.4	160	1.5	PR815	B	13.5	18.0	60	15
PR715	A	13.5	18.0	600	3	PR806	B	6.2	8.0	120	2	PR818	B	17.0	21.0	50	30
PR718	A	17.0	21.0	500	3	PR807	B	7.5	10.0	100	3	PR824	B	20.0	27.0	40	45
PR724	A	20.0	27.0	400	8	PR810	B	9.0	12.0	80	4.5						
PR804	B	4.3	5.4	200	1												
PACIFIC SEMICONDUCTORS, INC., 10451 W. Jefferson Blvd., Culver City, Calif.																	
IN465	A	2	3.2	5	60	IN1314	A	9	12	0.2		IN1321	A	37	45	0.2	
IN466	A	3	3.9	5	55	IN1315	A	11	14.5	0.2		IN1322	A	43	54	0.2	
IN467	A	3.7	4.5	5	45	IN1316	A	13.5	18	0.2		IN1322	A	52	64	0.2	
IN468	A	4.3	5.4	5	35	IN1317	A	17	21	0.2		IN1324	A	62	80	0.2	
IN469	A	5.2	6.4	5	20	IN1318	A	20	27	0.2		IN1325	A	75	100	0.2	
IN470	A	6.2	8	5	10	IN1319	A	25	32	0.2		IN1326	A	90	120	0.2	
IN1313	A	7.5	10	0.2		IN1320	A	30	39	0.2		IN1327	A	110	145	0.2	
TEXAS INSTRUMENTS, INCORPORATED, P. O. Box 312, Dallas, Tex.																	
IN746	N	3.3		28		IN1816	R	13		2		IN1830	R	51			8
IN747	N	3.6		3.6		IN1817	R	15		2		IN1831	R	56			9
IN748	N	3.9		3.9		IN1818	R	16		3		IN1832	R	62			12
IN749	N	4.3		22		IN1819	R	18		3		IN1833	R	68			14
IN750	N	4.7		19		IN1820	R	20		3		IN1834	R	75			20
IN751	N	5.1		17		IN1821	R	22		3		IN1835	R	82			22
IN752	N	5.6		11		IN1822	R	21		3		IN1836	R	91			35
IN753	N	6.2		7		IN1823	R	27		3		650C	M	3.7	4.5		
IN754	N	6.8		5		IN1824	R	30		4		651C	M	4.3	5.4		
IN755	N	7.5		6		IN1825	R	33		4		652C	M	5.2	6.4		
IN756	N	8.2		8		IN1826	R	36		5		653C9	M	6.2	8		
IN757	N	9.1		10		IN1827	R	39		5		654C9	M	8.5	9.5		
IN758	N	10		17		IN1828	R	43		6		655C9	M	9.5	10.5		
IN759	N	12		30		IN1829	R	47		7							
TRANSITRON ELECTRONIC CORP., 168--182 Albion St., Wakefield, Mass.																	
IN429		5.9	6.5	10		IN2041		4.3	5.4	1.0 a		SV128		8			10
3N39		8.3	9.8	5		IN2042		5.2	6.4	1.0 a		SV129		8.5			10
3N40		8.3	9.8	5		IN2043		6.2	8	1.0 a		SV131		9			10
3N41		8.3	9.8	5		IN2044		7.5	10	1.0 a		SV132		9.5			10
3N42		8.3	9.8	5		IN2045		9	12	0.5 a		SV133		10			5
3N43		8.3	9.8	5		IN2046		11	14.5	0.5 a		SV134		11			5
3N44		8.3	9.8	5		IN2047		13.5	18	0.5 a		SV135		12			5
IN761		4.3	5.4	10		IN2048		17	21	0.5 a		SV136		13			5
IN762		5.2	6.4	10		IN2049		20	27	0.15 a		SV137		-14			5
IN763		6.2	8	10		SV5		4.3	5.4	10		SV138		15			5
IN764		7.5	10	10		SV6		5.2	6.4	10		SV139		16			5
IN765		9	12	5		SV7		6.2	8	10		SV141		17			5
IN766		11	14.5	5		SV9		7.5	10	10		SV142		18			5
IN767		13.5	18	5		SV11		9	12	5		SV143		19			5
IN768		17	21	5		SV13		11	14.5	5		SV144		20			5
IN769		20	27	5		SV15		13.5	18	5		SV168		22			5
IN2032		4.3	5.4	10		SV18		17	21	5		SV169		24			5
IN3022		5.2	6.4	10		SV24		20	27	5		SV171		26			5
IN2034		6.2	8	10		SV121			4.5±5%	10		SV172		28			5
IN2035		7.5	10	10		SV122			5±5%	10		SV804		4.3	5.4		10
IN2036		9	12	5		SV123			5.5±5%	10		SV805		5.2	6.4		10
IN2037		11	14.5	5		SV124			6±5%	10		SV806		6.2	8		10
IN2038		13.5	18	5		SV125		6.5		10		SV808		7.5	10.5		10
IN2039		17	21	5		SV126		7		10		SV810		9	12		5
IN2040		20	27	5		SV127		7.6		10		SV812		11	14.5		5

SILICON ZENER OR AVALANCHE DIODES -- (Continued)

DIODE TYPE NO.	CASE	VOLTAGE		I _Z (ma)	IMPED. Z (Ohms)	DIODE TYPE NO.	CASE	VOLTAGE		I _Z (ma)	IMPED. Z (Ohms)	DIODE TYPE NO.	CASE	VOLTAGE		I _Z (ma)	IMPED. Z (Ohms)
		MIN (OR NOM)	MAX.					MIN (OR NOM.)	MAX.					MIN (OR NOM.)	MAX.		
TRANSITRON ELECTRONIC CORP. --(Continued)																	
SV824		13.5	18	5		SV2025		20		0.5 a		SV4043		43		1.0	
SV818		17	21	5		SV2044		22		0.15 a		SV4044		44		1.0	
SV824		20	27	5		SV2045		24		0.15 a		SV4045		45		1.0	
SV904		4.3	5.4	1.0 a		SV2046		26		0.15 a		SV4046		46		1.0	
SV905		5.2	6.4	1.0 a		SV2047		28		0.15 a		SV4047		47		1.0	
SV906		6.2	8	1.0 a		SV3140		1.15		10		SV4048		48		1.0	
SV908		7.5	10	1.0 a		SV3140A		1.15		10		SV4049		49		1.0	
SV910		9	12	0.5 a		SV3141		1.5		10		SV4050		50		1.0	
SV912		11	14.5	0.5 a		SV3141A		1.5		10		SV4051		51		1.0	
SV915		13.5	18	0.5 a		SV3142		1.9		10		SV4052		52		1.0	
SV918		17	21	0.5 a		SV3142A		1.9		10		SV4053		53		1.0	
SV924		20	27	0.5 a		SV3143		2.25		10		SV4054		54		1.0	
SV1004		4.5		10		SV3143A		2.25		10		SV4055		55		1.0	
SV1005		5		10		SV3144		2.65		10		SV4056		56		1.0	
SV1006		5.5		10		SV3144A		2.65		10		SV4057		57		1.0	
SV1007		6		10		SV3145		3		10		SV4058		58		1.0	
SV1008		6.5		10		SV3145A		3		10		SV4059		59		1.0	
SV1009		7		10		SV3170		6.7	7.4	10		SV4060		60		1.0	
SV1010		7.5		10		SV3171		6.7	7.4	10		SV4061		61		1.0	
SV1011		8		10		SV3173		8	8.8	10		SV4062		62		1.0	
SV1012		8.5		10		SV3174		8	8.8	10		SV4063		63		1.0	
SV1013		9		10		SV3175		8	8.8	10		SV4064		64		1.0	
SV1014		9.5		10		SV3176		8	8.8	10		SV4065		65		1.0	
SV1015		10		5		SV3206		16	17.6	10		SV4066		66		1.0	
SV1016		11		5		SV3207		16	17.6	10		SV4067		67		1.0	
SV1017		12		5		SV4010		10		1.0		SV4068		68		1.0	
SV1018		13		5		SV4011		11		1.0		SV4069		69		1.0	
SV1019		14		5		SV4012		12		1.0		SV4070		70		1.0	
SV1020		15		5		SV4013		13		1.0		SV4071		71		1.0	
SV1021		16		5		SV4014		14		1.0		SV4072		72		1.0	
SV1022		17		5		SV4015		15		1.0		SV4073		73		1.0	
SV1023		18		5		SV4016		16		1.0		SV4074		74		1.0	
SV1024		19		5		SV4017		17		1.0		SV4075		75		1.0	
SV1025		20		5		SV4018		18		1.0		SV4076		76		1.0	
SV1033		22		5		SV4019		19		1.0		SV4077		77		1.0	
SV1034		24		5		SV4020		20		1.0		SV4078		78		1.0	
SV1035		26		5		SV4021		21		1.0		SV4079		79		1.0	
SV1036		28		5		SV4022		22		1.0		SV4080		80		1.0	
SV2004		4.5		1.0 a		SV4023		23		1.0		SV4081		81		1.0	
SV2005		5		1.0 a		SV4024		24		1.0		SV4082		82		1.0	
SV2006		3.3		1.0 a		SV4025		25		1.0		SV4083		83		1.0	
SV2007		6		1.0 a		SV4026		26		1.0		SV4084		84		1.0	
SV2008		6.5		1.0 a		SV4027		27		1.0		SV4085		85		1.0	
SV2009		7		1.0 a		SV4028		28		1.0		SV4086		86		1.0	
SV2010		7.5		1.0 a		SV4029		29		1.0		SV4087		87		1.0	
SV2011		8		1.0 a		SV4030		30		1.0		SV4088		88		1.0	
SV2012		8.5		1.0 a		SV4031		31		1.0		SV4089		89		1.0	
SV2013		9		1.0 a		SV4032		32		1.0		SV4090		90		1.0	
SV2014		9.5		1.0 a		SV4033		33		1.0		SV4091		91		1.0	
SV2015		10		1.0 a		SV4034		34		1.0		SV4092		92		1.0	
SV2016		11		1.0 a		SV4035		35		1.0		SV4093		93		1.0	
SV2017		12		0.5 a		SV4036		36		1.0		SV4094		94		1.0	
SV2018		13		0.5 a		SV4037		37		1.0		SV4095		95		1.0	
SV2019		14		0.5 a		SV4038		38		1.0		SV4096		96		1.0	
SV2020		15		0.5 a		SV4039		39		1.0		SV4097		97		1.0	
SV2021		16		0.5 a		SV4040		40		1.0		SV4098		98		1.0	
SV2022		17		0.5 a		SV4041		41		1.0		SV4099		99		1.0	
SV2023		18		0.5 a		SV4042		42		1.0		SV4100		100		1.0	
SV2024		19		0.5 a													

SEMICONDUCTOR DIODES

SILICON ZENER OR AVALANCHE DIODES - (Continued)

DIODE TYPE NO.	CASE	VOLTAGE		I_Z (ma)	IMPED. Z (Ohms)	DIODE TYPE NO.	CASE	VOLTAGE		I_Z (ma)	IMPED. Z (Ohms)	DIODE TYPE NO.	CASE	VOLTAGE		I_Z (ma)	IMPED. Z (Ohms)
		MIN (OR NOM.)	MAX.					MIN (OR NOM.)	MAX.					MIN (OR NOM.)	MAX.		
U. S. SEMICONDUCTOR PRODUCTS, INC., 3540 West Osborn Rd., Phoenix, Ariz.																	
IN465		2.0	3.2	5	45	IN1876	D	9.1	11	25	1.3	IN1940	A	43	51	0.2	500
IN466		3.0	3.9	5	40	IN1877	D	11	13	25	1.8	IN1941	A	51	62	0.2	700
IN467		3.7	4.5	5	30	IN1878	D	13	16	25	2.0	IN1942	A	62	75	0.2	900
IN468		4.3	5.4	5	25	IN1879	D	16	20	25	2.6	IN1943	A	75	91	0.2	1200
IN469		5.2	6.4	5	10	IN1880	D	20	24	8	10	IN1944	A	91	110	0.2	1700
IN470		6.2	8.0	5	5	IN1881	D	24	30	8	18	IN1945	A	110	130	0.2	2800
IN471		3.0	3.9	5	65	IN1882	D	30	36	8	24	IN1946	A	130	160	0.1	
IN472		3.7	4.5	5	60	IN1883	D	36	43	8	26	IN1947	A	160	200	0.1	
IN473		4.3	5.4	5	50	IN1884	D	43	51	8	28	IN1948	A	200	240	0.1	
IN474		5.2	6.4	5	40	IN1885	D	51	62	8	30	IN1949	A	240	300	0.1	
IN475		6.2	8.0	5	25	IN1886	D	62	75	3	35	IN1950	A	300	360	0.1	
IN225		7.5	10	0.2		IN1887	D	75	91	3	45	IN1951	A	360	430	0.1	
IN226		9	12	0.2		IN1888	D	91	110	3	60	IN1952	A	430	510	0.1	
IN227		11	14.5	0.2		IN1889	D	110	130	3	85	IN1953	A	510	620	0.1	
IN228		13.5	18	0.2		IN1890	D	130	160	3	110	HP28.2		7.5	9.1	1000	0.5
IN229		17	21	0.2		IN1927	A	3.6	4.3	5	11	HP210		9.1	11	800	0.6
IN230		20	27	0.2		IN1928	A	43	5.1	5	10	HP212		11	13	700	0.8
IN231		25	32	0.2		IN1929	A	5.1	6.2	5	8	HP215		13	16	550	0.1
IN232		30	39	0.2		IN1930	A	6.2	7.5	5	7	HP218		16	20	450	1.5
IN233		37	45	0.2		IN1931	A	7.5	9.1	5	15	HP222		20	24	400	2
PZT-8.2		7.5	9.1	25	2	IN1932	A	9.1	11.0	5	22	HP227		24	30	350	3
PZT-10		9.1	11	25	3	IN1933	A	11	13	1	30	HP233		30	36	270	5
PZT-12		11	13	25	4	IN1934	A	13	16	1	50	HP239		36	43	200	7
PZT-15		13	16	25	5	IN1935	A	16	20	1	70	HP247		43	51	160	9
PZT-18		16	20	25	8	IN1936	A	20	24	1	100	HP256		51	62	140	12
PZT-22		20	24	7.5	20	IN1937	A	24	30	1	200	HP268		62	75	120	15
PZT-27		24	30	7.5	22	IN1938	A	30	36	0.2	300	HP282		75	91	100	18
PZT-33		30	36	7.5	24	IN1939	A	36	43	0.2	400	HP2100		91	110	80	22
IN1875		7.5	9.1	25	1												

continued

Watch For

El's forthcoming "Survey of Power Rectifiers"

with technical specifications and physical dimensions on the semiconductor diodes rated at above 1 ampere — units roughly described as "power rectifiers"

Combination reprints of this section, covering the 1959-60 SEMICONDUCTOR DIODE SPECIFICATIONS

as well as the

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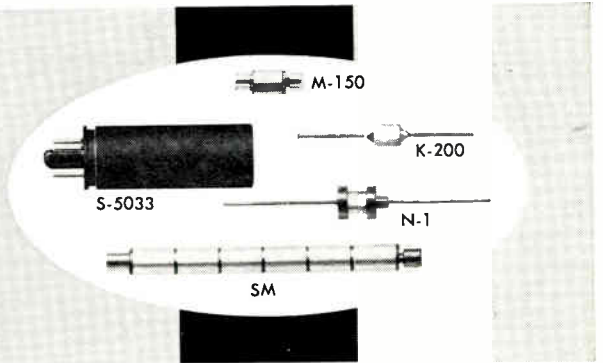
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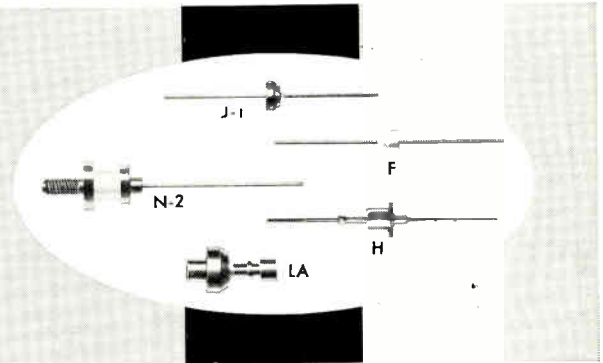
0.15 TO 0.5 AMPS. DC . . .

AMPS. DC	P.I.V.	TARZIAN TYPE
0.15	360	M-150
0.2	360	K-200
0.25	4500	S-5033
0.325	2800	280SM
0.35	2400	240SM
0.375	2000	200SM
0.4	1600	160SM
0.425	1200	120SM
0.45	800	80SM
	100-400	M Series
0.5	50-400	N-1 Series
	2800	S-5019



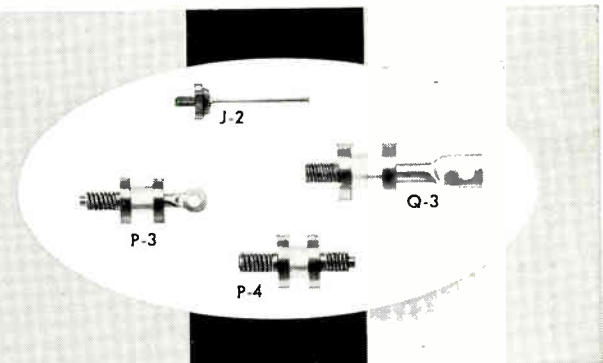
0.75 TO 1.5 AMPS. DC . . .

AMPS. DC	P.I.V.	TARZIAN TYPE
0.75	200-600	F Series
	100-600	H Series
	100-400	K Series
	1600	S-5011A, S-5017, S-5018
1.0	50-400	N-2 Series
	50-400	N-3 Series
	50-400	N-4 Series
1.5	100-400	J-1 Series
	100-400	LA Series
	50-400	P-1 Series



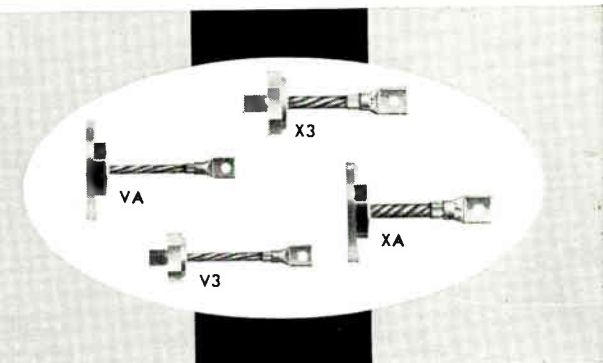
5 TO 15 AMPS. DC . . .

AMPS. DC	P.I.V.	TARZIAN TYPE
5.0	100-400	LF Series
	50-400	P-2 Series
	50-400	P-3 Series
	50-400	P-4 Series
10.0	100-400	J-2 Series
15.0	50-300	Q-3 Series
	50-300	Q-4 Series



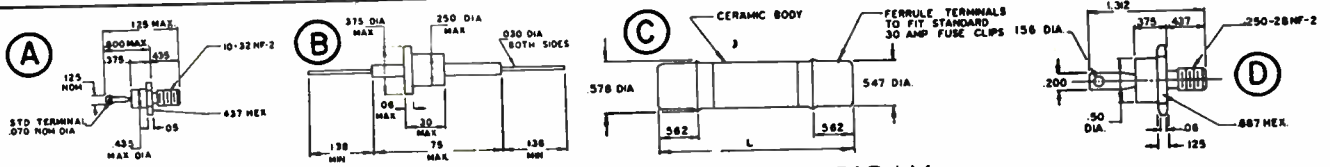
20 TO 200 AMPS. DC

AMPS. DC	P.I.V.	TARZIAN TYPE
20.0	50-300	RAN, RAP Series
35.0	50-300	SAN, SAP Series
	50-400	S3N, S3P Series
100.0	50-300	VAN, VAP Series
	50-400	V3N, V3P Series
150.0	50-300	WAN, WAP Series
	50-400	W3N, W3P Series
200.0	50-300	XAN, XAP, Series
	50-400	X3N, X3P Series

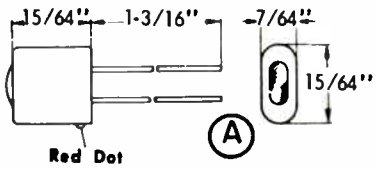


Sarkes Tarzian, Inc., Rectifier Division Dept. EE-3, 415 N. College Ave., Bloomington, Ind.

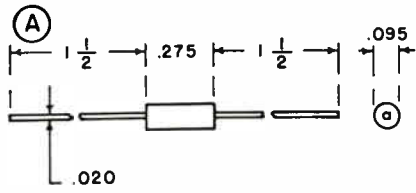
IN CANADA: 700 WESTON RD., TORONTO 9, TEL. ROGER 2-7535 • EXPORT: AD AURIEMA, INC., NEW YORK CITY



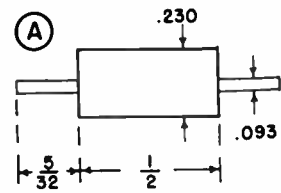
NORTH AMERICAN



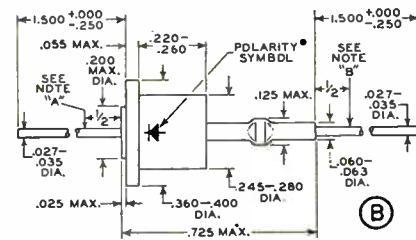
NUCLEONIC PRODUCTS



OHMITE MFG. CO.

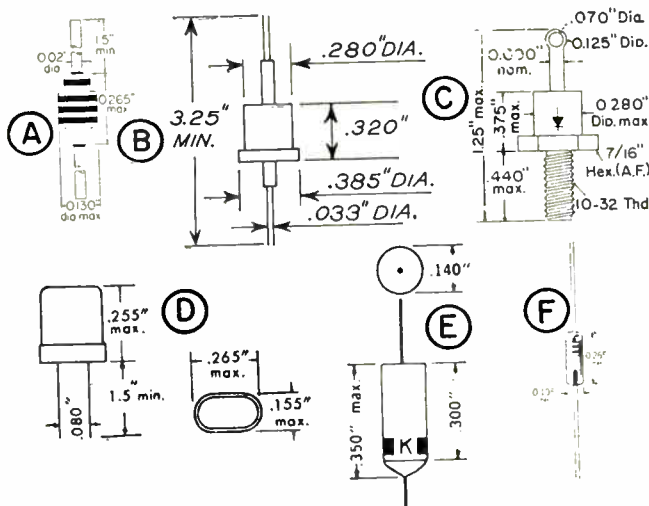


PHILCO CORP.

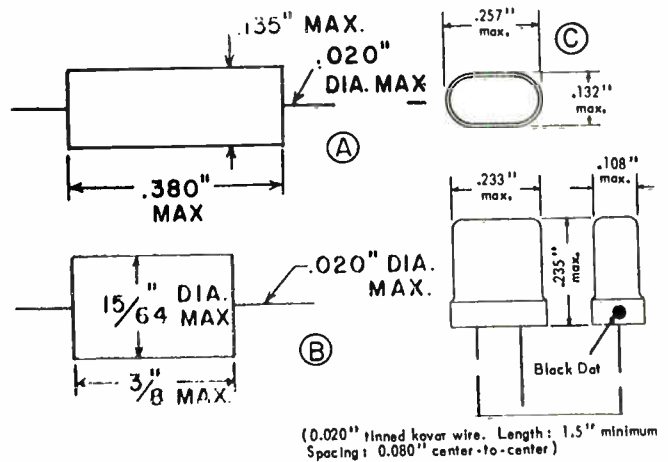


RCA

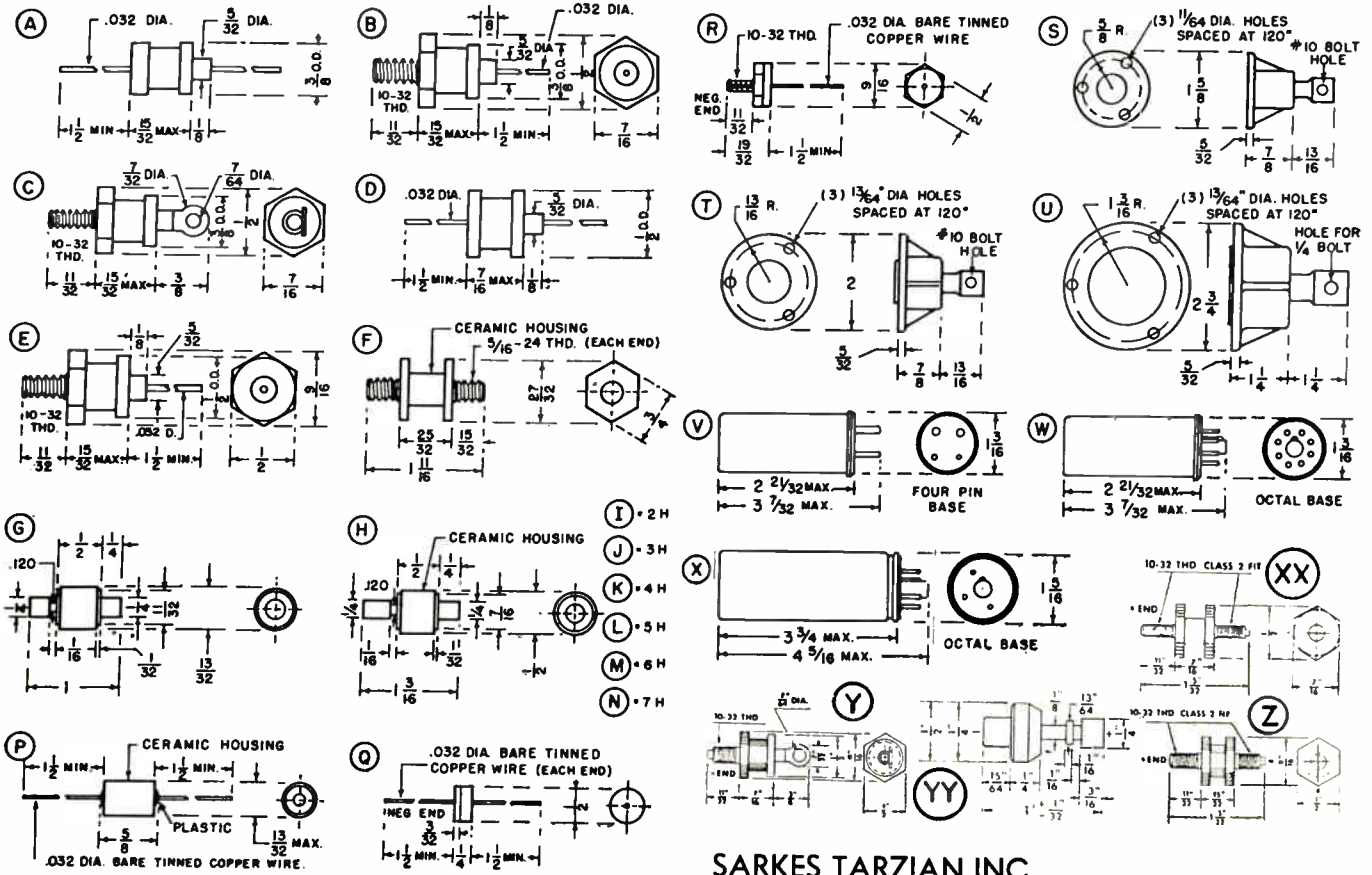
RAYTHEON MFG. CO.



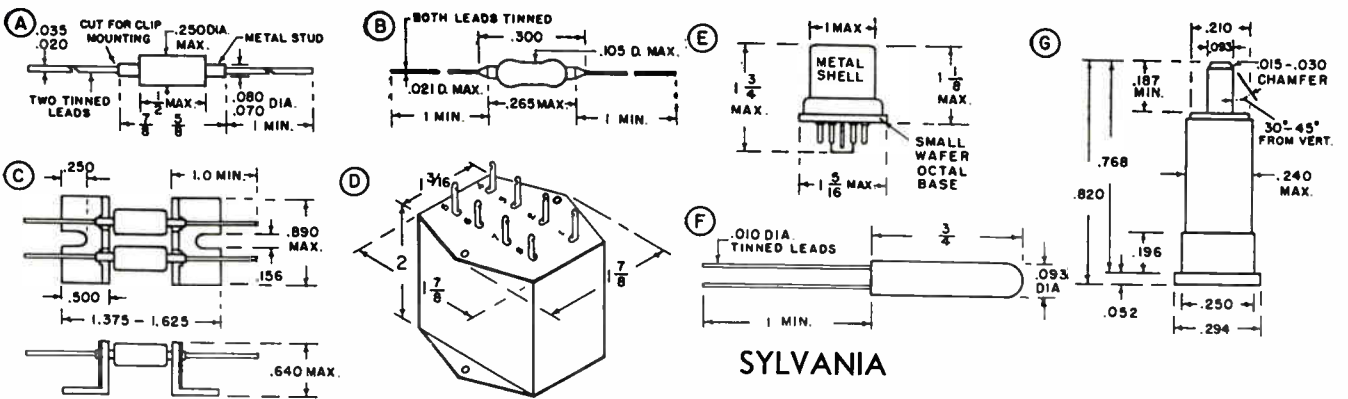
RHEEM MFG. CO.



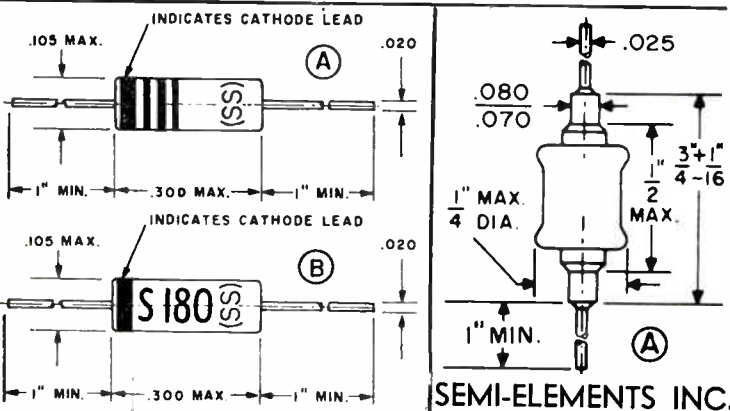
SEMICONDUCTOR DIODES



SARKES TARZIAN INC.



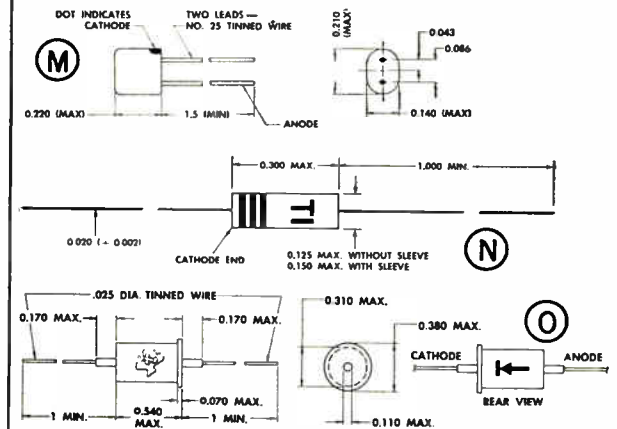
SYLVANIA

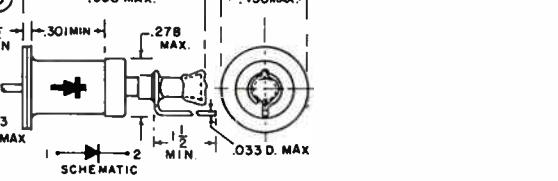
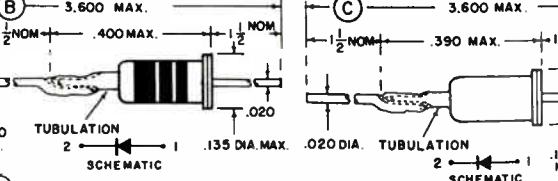
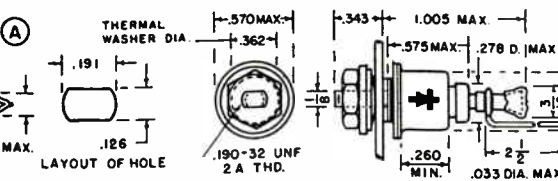
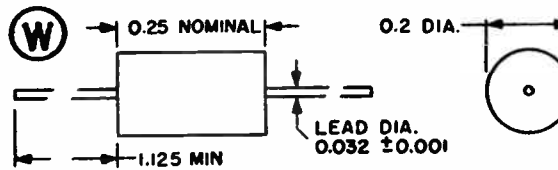
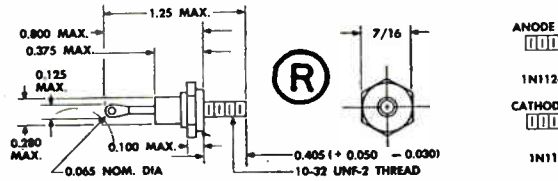
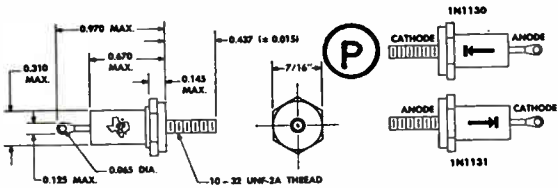


SEMI-ELEMENTS INC.

SPERRY SEMICONDUCTOR DIV.

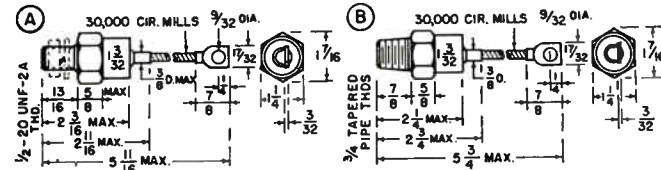
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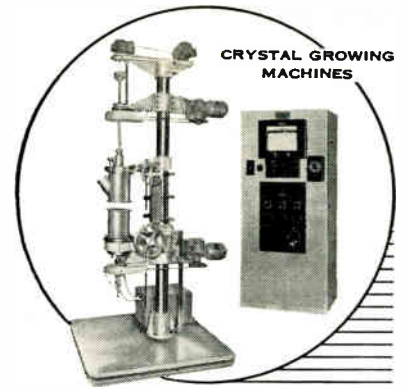
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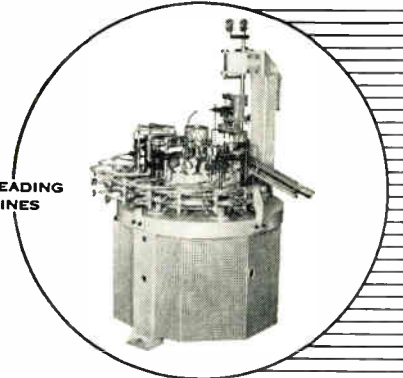
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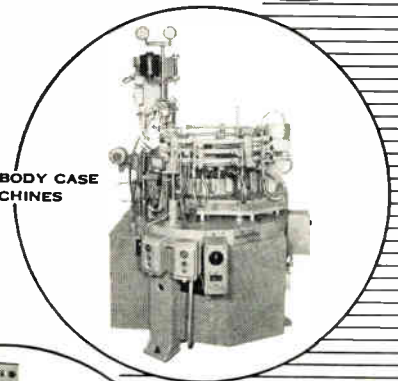
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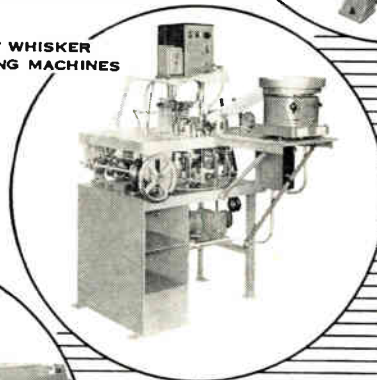
CRYSTAL GROWING
MACHINES



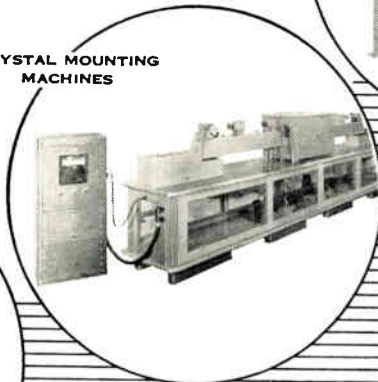
DIODE BEADING
MACHINES



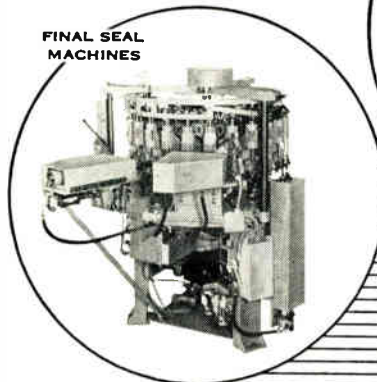
DIODE BODY CASE
MACHINES



CAT WHISKER
WELDING MACHINES



CRYSTAL MOUNTING
MACHINES



FINAL SEAL
MACHINES

Table of Atomic Weights

Name	Symbol	At. No.	Atomic Weight
Actinium	Ac	89	227
Aluminum	Al	13	26.98
Americium	Am	95	(243)
Antimony, stibium	Sb	51	121.76
Argon	A	18	39.94
Arsenic	As	33	74.91
Astatine	At	85	(211)
Barium	Ba	56	137.36
Berkelium	Bk	97	(249)
Beryllium	Be	4	9.01
Bismuth	Bi	83	209.00
Boron	B	5	10.82
Bromine	Br	35	79.92
Cadmium	Cd	48	112.41
Calcium	Ca	20	40.08
Californium	Cf	98	(249)
Carbon	C	6	12.01
Cerium	Ce	58	140.13
Cesium	Cs	55	132.91
Chlorine	Cl	17	35.46
Chromium	Cr	24	52.01
Cobalt	Co	27	58.94
Columbium, see Niobium			
Copper	Cu	29	63.54
Curium	Cm	96	(245)
Dysprosium	Dy	66	162.51
Einsteinium	E	99	(254)
Erbium	Er	68	167.27
Europium	Eu	63	152.0
Fermium	Fm	100	(252)
Fluorine	F	9	19.00
Francium	Fr	87	(223)
Gadolinium	Gd	64	157.26
Gallium	Ga	31	69.72
Germanium	Ge	32	72.60
Gold, aurum	Au	79	197.0
Hafnium	Hf	72	178.58
Helium	He	2	4.00
Holmium	Ho	67	164.94
Hydrogen	H	1	1.01
Indium	In	49	114.82
Iodine	I	53	126.91
Iridium	Ir	77	192.2
Iron, ferrum	Fe	26	55.85
Krypton	Kr	36	83.8
Lanthanum	La	57	138.92
Lead, plumbum	Pb	82	207.21
Lithium	Li	3	6.94
Lutetium	Lu	71	174.99
Magnesium	Mg	12	24.32
Manganese	Mn	25	54.94
Mendelevium	Mv	101	(256)
Mercury, hydrargyrum	Hg	80	200.61
Molybdenum	Mo	42	95.95
Neodymium	Nd	60	144.27
Neon	Ne	10	20.18
Neptunium	Np	93	(237)
Nickel	Ni	28	58.71
Niobium, columbium	Nb	41	92.91
Nitrogen	N	7	14.01
Nobelium	No	102	(253)
Osmium	Os	76	190.2
Oxygen	O	8	16.00
Palladium	Pd	46	106.7
Phosphorus	P	15	30.98
Platinum	Pt	78	195.09
Plutonium	Pu	94	(242)
Polonium	Po	84	210
Potassium, kalium	K	19	39.10
Praseodymium	Pr	59	140.92
Promethium	Pm	61	(145)
Protactinium	Pa	91	231
Radium	Ra	88	226.05
Radon	Rn	86	222
Rhenium	Re	75	186.22
Rhodium	Rh	45	102.91
Rubidium	Rb	37	85.48
Ruthenium	Ru	44	101.1
Samarium	Sm, Sa	62	150.35
Scandium	Sc	21	44.96
Selenium	Se	34	78.96
Silicon	Si	14	28.09
Silver, argentum	Ag	47	107.88
Sodium, natrium	Na	11	22.99
Strontium	Sr	38	87.63
Sulfur	S	16	32.07
Tantalum	Ta	73	180.95
Technetium	Tc	43	(99)
Tellurium	Te	52	127.61
Terbium	Tb	65	158.93
Thallium	Tl	81	204.39
Thorium	Th	90	232.05
Thulium	Tm	69	168.94
Tin, stannum	Sn	50	118.70
Titanium	Ti	22	47.90
Tungsten	W	74	183.86
Uranium	U	92	238.07
Vanadium	V	23	50.95
Xenon	Xe	54	131.30
Ytterbium	Yb	70	173.04
Yttrium	Y	39	88.92
Zinc	Zn	30	65.38
Zirconium	Zr	40	91.22

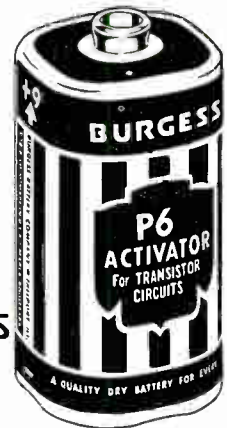
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ZINC-CARBON? MERCURY?
NICKEL-CADMIUM?
WATER-ACTIVATED?

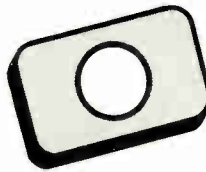
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each with the highest measure of uniform dependability! This is why 2 of 3 electronic engineers specify

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IS THE MOST COMPLETE ONE-SOURCE
LINE OF *Portable Power!*



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TRANSISTOR ACTIVATORS

Burgess Activator Batteries for transistor circuits are smaller and yet they deliver 30% more power because of the patented "Wafer-Cell" construction! Burgess Activators give you compact power, uniform performance, longer shelf life... all combined with modern packaging.



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High energy output in a compact power source. Can be stored dry for years! Activated only when immersed in water. No handling of dangerous electrolyte, no spilling or leaking! Wide range of efficient operating temperatures. Designed for your specific applications.



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BURGESS BATTERY COMPANY

FREEPORT, ILLINOIS

BATTERIES

The following charts have been compiled by the National Electronic Distributors Assoc. On the left are original battery manufacturers; on the right are private brands available.

VOLTAGE	BRIGHT STAR	BURGESS	EVER-EADY	MALLORY (General)	MARATHON	PHILCO	NEDA NUMBER	RCA	RAY-O-VAC	USALITE	WESTERN AUTO	WIN-CHESTER	ZENITH
6	866*	2F4	718		3001		1	VS010	A1				
6		Z4	724	M-2	3002		2	VS068	A2			4919*	
4½	360	F3	736	M-3	3003	P38	3	VS067	A3	688	3B-6135	3816	Z736
1½	462	4F	742	M-4	3004	P94	4	VS004	A4		3B-6110*	4816	Z94
1½	660	6F	743		3005	P96*	5	VS007*	A5		3B-6115*	4814*	Z96
6	646	F4P1	744	M-6	3006	P4F4R	6	VS009	A6	639	3B-6145*	4914	
4½	361	G3	746		3007	P100	7	VS002	A7	683	3B-6135	4918	Z83A
7½		B5	713	M-8	3008		8	VS129	8			5219	
7½	591	C5	717	M-9	3009	P31	9	VS065	9	685	3B-6160	5316	Z750
7½		T5	W360		3010		10		A10				
1½		2F	W353	M-11	3011		11	VS141	11				
1½		4FL			3012		12	VS005	12		3B-6750		
1½	10M	230	A100	M-13R	123	P920	13		2LP	75LP			Z2NL
1½	11M	130	635	M-14R	113	C	14	VS035	1LP	74		1311	Z7
1½	59-1	930	898 or 1015	M-15R or ZM9	173	P15	15	VS034	7R or 7LP	908	3B-6710	1711	Z8
6	868	2F4L	747		3016		16	VS011	16			4815	Z698L
1½	860	8F	741		3017		17		17	635		4819	
1½		2D	720	M-18	3018		18	VS069	18			2516	
4½	305	D3	726	M-19	3019		19	VS072	19			4516	Z450
1½	61R	21R	964	M-20	3020	P77	20	VS236	20	684	3B-6112* or 3B-6113*	2416	Z5
1½		8FL*	745		3021		21	VS008*	21	645		4813*	
7½		G5*					22	VS003*	22				
1½		8R	960P	M-23	3023		23	VS070	23				Z1 & Z955
1½	58	7	912	M-24	180	K	24	VS074	400		3B-6705	1911	
6		F4L*					25		25				
7½		D5	707	M-26	3026	P26	26	VS315	26				Z707
6		2F4S					27		27				
67½	45N	XX45	467	M-200	4200	P67	200	VS016	200	767	3B-6258	1710	Z67
45		XX30	455	M-201	4201	P105	201	VS055	201	745	3B-6242	6211	Z455
45	30-33	M30	482	M-202	4202	P45	202	VS013	202	640	3B-6241	6210	Z783
67½		K45	457	M-203	4203		203	VS082	203			1712	Z457
90	60N	N60	490	M-204	4204	P132	204	VS090	204	769	3B-6260	1713	Z490
22½, 45	30-59	Z30	738	M-205	4205	P104	205	VS015	205	620		6718*	
45		A30	W359	M-206	4206	P210	206	VS014	206		3B-6228	6118*	Z530
45	30-03	B30	484	M-207	4207	P305	207	VS012	207	624		6218*	
15		U10	411	M-208 or RM-411R	4208		208	VS083	208			1914*	Z11
30		U20	413	M-210 or RM-413R	4210		210	VS085	A210			1916	Z13
67½		P45M			4311	P175	211M	VS215 or VS216	211M				
67½	675	P45	477	M-211P	4211	P149	211P	VS218	211P	777	3B-6257	1709	Z477
75		XX50	437	M-212	4212	P144	212	VS217	212			1708	Z437
45		U30	415	M-213 or RM-415R	4213	P150	213	VS086	213			1909*	Z415
90		P60	479	M-214	4214	P176	214	VS219	214				Z90
22½	12P	U15	412	M-215 or RM-415R	4215	P612	215	VS084	215			1915*	
90		N60X	495	M-216	4216	P190	216						Z495
67½		UX45	416	M-217	4217	P217	217		217				
15	15P	Y10	504	M-220	4220		220		220				
22½	22P	Y15	505	M-221	4221		221		221				Z6
30		Y20S	507	M-222	4222		222						
30		Y20	506	M-223	4223		223						
15		K10	417		4224		224						
22½		K15	420		4225		225						
30		K20	430		4226		226						
103½		XX69	W361		4227		227		69N				
22½	12P	U15	412	M-215 or RM-415R	4215	P612	215	VS084	215			1915*	
4½			E233	TR-233R		P696	1300	VS400					
4							1301	VS311	1301				
4							1302	VS308	1302				
4½			2731				1303						
6		4D4	274		1400		1400						
5½							1401	VS310	1401				
5½							1402	VS307	1402				
9		P6M	226	M-1600	1600	P91	1600	VS300	1600				
9, 6, 3		D6P1	2506	M-1601	1601		1601	VS301	1601				
9		2M6	246	M-1602 or TR-246R	1602	P178	1602	VS305	1602		3B-6465		
9		D6	276	M-1603	1603	P88	1603	VS306	1603				Z276
9		2U6	216	M-1604 or TR-146R	1604		1604		1604				
9		M6	266		1605		1605						
9							1606	VS309	1606				
9							1607						
9			2761		1608		1608					6316	
9			2762		1609		1609						
4½				M-1610	1610		1610						
13½, 9		XX9	239	M-1900	1900		1900	VS304	1900				
-12,-21			2314*		2400*		2400						

"A" BATTERIES

"B" BATTERIES

TRANSISTOR and OTHER

For other battery types refer to the Battery Chart in EI's June 1958 All-Reference Issue. NEDA advises that the interchangeability information on these batteries is substantially unchanged

BATTERIES

FIRE-STONE	GAMBLE	GOOD-RICH	MONTG. WARD	SEARS	ARMY	NAVY	NEDA NUMBER	GENERAL DRY	OTHER	MAXIMUM DIMENSIONS IN INCHES				
										Length	Width	Overall Height		
					BA-203/U	19020	1	7*				4	2 ¹³ / ₁₆	5 ¹ / ₂
							2	39*				1 ³ / ₈	1 ³ / ₈	2 ³ / ₈
4D86			26	6441			3	38*				4	1 ¹ / ₁₆	4 ¹ / ₈
	17-263		21	6430	BA-65		4	3*	ACME 114			2 ³ / ₈	2 ³ / ₈	4 ³ / ₃₂
				6431*			5	5*				4 ³ / ₃₂	2 ³ / ₈	4 ¹ / ₈
				6451			6	4*				2 ²³ / ₃₂	2 ²³ / ₃₂	4 ¹ / ₄
	A17-266			6440	BA-226/U		7	8*	Air Castle FM5267			4 ¹ / ₁₆	1 ³ / ₈	4 ¹¹ / ₁₆
							8	226*				4 ¹ / ₁₆	1 ³ / ₁₆	3
4D136	A17-275		29	6444			9	31*	Admiral A47	Emerson EM717	Goodyear 21-5626	2 ⁵ / ₁₆	2	3 ¹ / ₁₆
							10		Crosley CR50			2 ³ / ₁₆	2 ¹ / ₃₂	4 ¹ / ₃₂
							11					2 ¹ / ₃₂	1 ³ / ₈	4 ¹ / ₄
							12					3 ² / ₃₂	1 ³ / ₈	5 ¹ / ₈
				4650	BA-30	C or 1903	13					1 ¹¹ / ₃₂	Diam.	2 ¹³ / ₃₂
				4659	BA-42		14	905*				1 ¹ / ₃₂	Diam.	1 ²³ / ₃₂
				4650	BA-58		15	938*	Acme 115	Advance 1AAT		3 ¹ / ₁₆	Diam.	1 ²³ / ₃₂
	43-268			6452*			16					3 ³ / ₃₂	1 ¹ / ₂	10 ¹³ / ₁₆
			20				17	46*	Acme 118	Advance 118		3 ² / ₃₂	2 ¹³ / ₁₆	5 ¹ / ₂
							18	225*				2 ⁵ / ₈	1 ³ / ₈	3 ¹ / ₃₂
							19	90*	Acme 31	Advance 31		3 ¹⁵ / ₁₆	1 ³ / ₈	3
4D71 or 4D133	A17-272	39-520	27	6442			20	77*	Emerson EM 236	Goodyear 21-5629		1 ³ / ₈	Diam.	4 ¹¹ / ₁₆
							21					3 ² / ₃₂	1 ¹ / ₁₆	10 ¹³ / ₁₆
							22					3 ³ / ₈	2 ¹¹ / ₁₆	4 ¹ / ₈
					BA-231/U		23	EF-728*				1 ¹¹ / ₃₂	Diam.	4 ¹ / ₁₆
7C50				4656			24	901*	Advance 1 RL			3 ¹ / ₁₆	Diam.	1 ³ / ₄
				6450*			25	97*				4	1 ¹ / ₁₆	5 ¹³ / ₁₆
							26					2 ¹ / ₁₆	2 ¹ / ₁₆	2 ³ / ₈
							27					3 ³ / ₈	2 ¹³ / ₁₆	5 ¹ / ₂
4D84	A17-304	39-522	43	6480	BA-51	19032	200	108*	Emerson EM467	Goodyear 21-5615	Oklahoma Tire 54-412	2 ¹ / ₁₆	1 ³ / ₈	3 ¹³ / ₁₆
4D132			79		BA-56		201	105*	Goodyear 21-5619			2 ² / ₃₂	1	3 ³ / ₄
4D89			42	6461	BA-59	19021	202	109*				3 ¹ / ₃₂	1 ² / ₃₂	5 ¹ / ₂
							203	172*				2 ¹ / ₁₆	1 ³ / ₈	2 ¹ / ₂
4D88			46	6465			204	132*	Goodyear 21-5622			3 ² / ₃₂	1 ³ / ₈	3 ³ / ₄
					BA-63		205	104*	Acme 530	Advance 530		3 ¹ / ₁₆	2 ⁵ / ₁₆	4 ¹ / ₈
	A17-302		41	6460*			206	110*	Acme 430	Advance 430		3 ¹ / ₁₆	2 ¹ / ₄	4 ³ / ₈
4D85			49	6462*	BA-223/U		207	111*	Acme 330	Advance 330	Andrea FM5266	4 ¹ / ₈	2 ⁵ / ₈	5 ³ / ₈
							208	611*				1 ¹ / ₃₂	3 ¹ / ₈	1 ²⁵ / ₆₄
							210	613*				1 ¹ / ₃₂	3 ¹ / ₈	2 ³ / ₁₆
				6482			211M	175*	Emerson EM216	Goodyear 21-5630		1 ¹ / ₁₆	1	5 ¹ / ₁₆
4D135	A17-310	39-521	40				211P	149*				1 ² / ₃₂	1	5 ¹ / ₁₆
	A17-311	21-5628	47				212	144*				1 ¹ / ₁₆	1 ¹⁵ / ₃₂	6 ¹⁵ / ₃₂
4D134				6485			213	150*	Emerson EM86			1 ³ / ₆₄	3 ¹ / ₈	3 ³ / ₄
4D139	A17-314		55	6470			214	176*				1 ³ / ₃₂	1 ¹ / ₃₂	7 ¹⁵ / ₃₂
			86		BA-261/U		215	612*	Regency 215			1 ¹ / ₃₂	3 ¹ / ₈	2
							216					1 ¹⁵ / ₁₆	1 ¹⁵ / ₃₂	7 ¹ / ₈
							217					1 ¹ / ₃₂	1	3 ¹ / ₃₂
							220	605*				5 ¹ / ₈	1 ⁵ / ₃₂	1 ³ / ₈
							221	606*				5 ¹ / ₈	1 ⁵ / ₃₂	2
							222	610*				5 ¹ / ₈	1 ⁵ / ₃₂	2 ³ / ₆₄
							223					1 ⁷ / ₃₂	3 ¹ / ₈	1 ²⁵ / ₆₄
							224					1 ⁷ / ₃₂	1 ⁵ / ₁₆	1 ³ / ₁₆
							225					1 ⁷ / ₃₂	1 ⁵ / ₁₆	2 ¹ / ₈
							226					1 ⁷ / ₃₂	1 ⁵ / ₁₆	2 ²⁵ / ₃₂
					BA-38		227					1 ¹ / ₁₆	1 ¹ / ₁₆	11 ²³ / ₃₂
			86		BA-261/U		215	612*	Regency 215			1 ¹ / ₃₂	3 ¹ / ₈	2
							1300	696*	Emerson EM233			1 ¹ / ₆₄	Diam.	2
							1301					3 ⁵ / ₆₄	Diam.	1 ¹ / ₃₂
							1302					3 ¹ / ₃₂	Diam.	1 ¹ / ₁₆
							1303					2 ¹ / ₁₆	1 ³ / ₄	8 ¹¹ / ₃₂
							1400					2 ³ / ₁₆	2 ¹ / ₃₂	7 ² / ₃₂
							1401					3 ⁵ / ₆₄	Diam.	1 ¹ / ₄
							1402					3 ¹ / ₃₂	Diam.	1 ¹ / ₃₂
			96	6418			1600	91*				3 ¹ / ₃₂	1 ¹ / ₁₆	1 ³ / ₃₂
				6420			1601	89*				8	2 ³ / ₄	1 ¹ / ₁₆
							1602	178*	Regency 515			1 ³ / ₈	1 ³ / ₈	2 ³ / ₄
	3B-6465		92				1603	88*				2 ³ / ₁₆	2 ¹ / ₃₂	3 ⁵ / ₃₂
			93	6419			1604	179*	Regency 156			1	1 ¹ / ₁₆	1 ³ / ₃₂
							1605					1 ¹³ / ₁₆	1 ¹ / ₄	2 ⁵ / ₁₆
							1606					3 ⁵ / ₆₄	Diam.	1 ² / ₃₂
							1607					6 ¹ / ₈	1 ¹ / ₁₆	2 ⁵ / ₁₆
							1608					2 ⁷ / ₃₂	1 ¹ / ₄	7 ³ / ₃₂
							1609					2 ¹ / ₁₆	1 ³ / ₈	8 ¹ / ₃₂
							1610		Regency 815			1 ³ / ₈	1 ³ / ₈	2 ³ / ₄
	A17-277		95				1900	177*				1 ² / ₆₄	1 ¹ / ₃₂	2 ¹ / ₁₆
							2400					1 ² / ₆₄	1 ¹ / ₃₂	2 ³ / ₈

"A" BATTERIES

"B" BATTERIES

TRANSISTOR and OTHER

A Review of

New Electronic Textbooks

A compilation of those textbooks, published in 1958 and 1959 which should be of interest to electronic engineers. For convenience, books are divided into categories of broad interest.

AUDIO

Designing and Building Hi-Fi Furniture

By Jeff Markell. 224 pages. Price \$2.90 (EL)

Stereo

By Herman Burstein. 224 pages. Price \$2.90 (GL)

High Fidelity Simplified, 3rd Edition

By Harold D. Weiler. 216 pages. Price \$2.95 (JR)

Fundamentals of High Fidelity

By Herman Burstein. 144 pages. Price \$2.95 (JR)

High Quality Sound Reproduction

By James Moir. 605 pages. Price \$14.00 (MC)

Magnetic Recording Techniques

By W. Earl Stewart. 268 pages. Price \$8.50 (MH)

Audio Design Handbook

By H. A. Hartley. 225 pages. Price \$2.90 (GL)

Audio Measurements

By Norman H. Crowhurst. 224 pages. Price \$2.90 (GL)

AUTOMATION & COMPUTING

Fundamentals of Digital Computers

By M. Mandl. 320 pages. Price \$9.00 (PH)

Introduction to Electronic Analog Computers

By John N. Warfield. 192 pages, Ill. Price \$6.00 (PH)

Programming Business Computers

By McCracker, Weiss and Lee. 504 pages (JW)

Punched Cards, 2nd Edition

Edited by R. S. Casey, J. R. Perry, A. Kent, and M. Berry. 736 pages. Price \$15.00 (RP)

Notes on Analog—Digital Conversion Techniques

Edited by Alfred K. Susskind. 417 pages. Price \$10.00 (JW)

Mathematics and Logic for Digital Devices (in preparation)

By James T. Culbertson. Price \$4.85 (DV)

Automation and Computing

By Booth. Price \$5.00 (MC)

Arithmetic Operations in Digital Computers

By R. K. Richards. 397 pages. Price \$9.00 (DV)

Digital Computer Components and Circuits

By R. K. Richards. 511 pages. 165 Ill. Price \$10.75 (DV)

An Introduction to Automatic Computers

By Ned Chapin. 107 Ill. 525 pages. Price \$8.75 (DV)

Automation: Its Purpose and Future

By Magnus Pyke. Price \$10.00. Ill. (PL)

Modern Computing Methods

Edited by British Imperial College of Science and Technology. Price \$8.75

Basics of Digital Computers

By John S. Murphy. 416 pages. Price \$7.50 and \$3.30 (JR)

Design of Transistorized Circuits for Digital Computers

By Abraham J. Pressman. 328 pages. Price \$9.95 (JR)

Symbolic Logic and Intelligent Machines

By Edmund C. Berkeley. 224 pages. Price \$6.50 (RP)

Automatic Control

By Werner G. Holzback. 266 pages. Price \$7.50 (RP)

An Introduction to Electronic Analogue Computers

By C. A. A. Wass. Price \$6.50 (PP)

Automatic Process Control

By Donald P. Eckman. 375 pages. Price \$9.00 (JW)

CIRCUITRY

Printed Circuits (in preparation)

By F. C. Mitchell. 224 pages, 48 plates. Price \$5.00 (IL)

(Continued on page 245)

Abbreviations

- AP Academic Press, Inc.
- GL Gernsback Publications, Inc.
- DV D. Van Nostrand Co.
- IL Iliffe & Sons
- IS Interscience Publishers, Inc.
- JR John F. Rider Publishers
- JW John Wiley & Sons
- MC The Macmillan Co.
- MH McGraw-Hill Book Co.
- PH Prentice-Hall
- PL Philosophical Library
- PT Philips Technical Library
- PP Pergamon Press
- RP Reinhold Publishing Corp.

Address of publishers at end of text.



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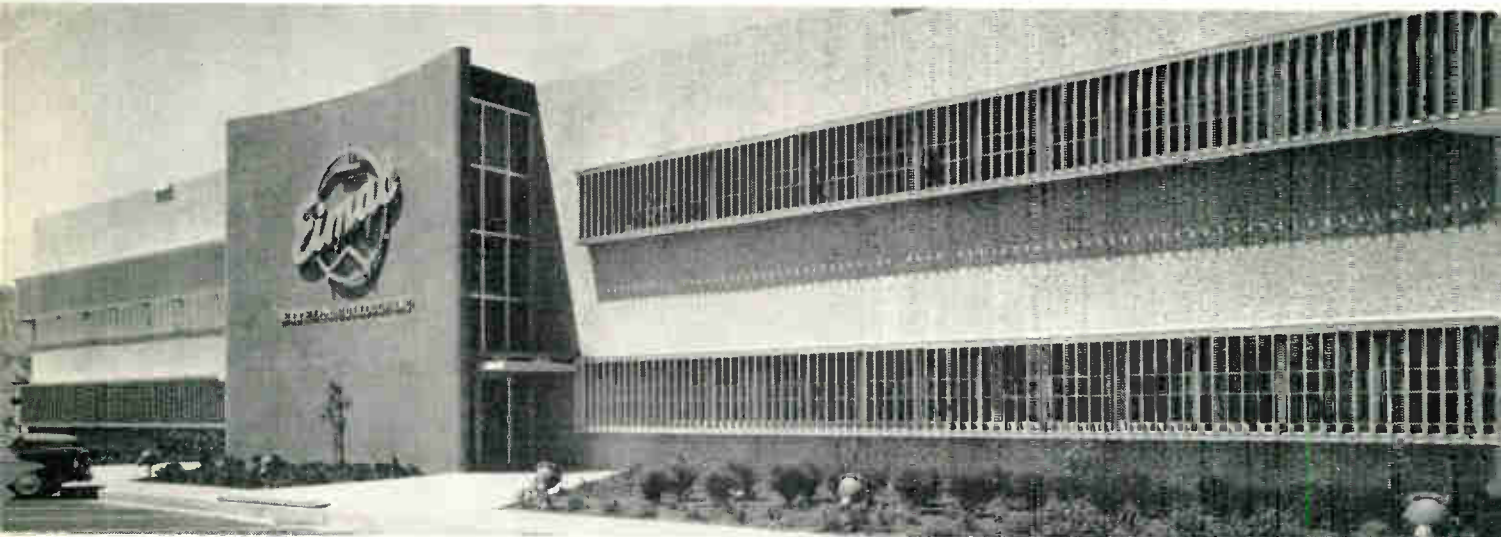
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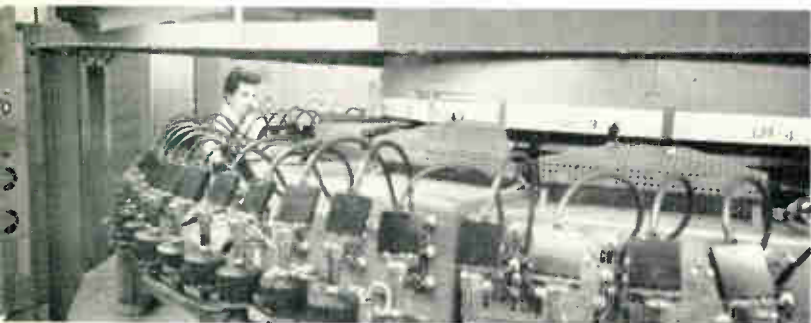
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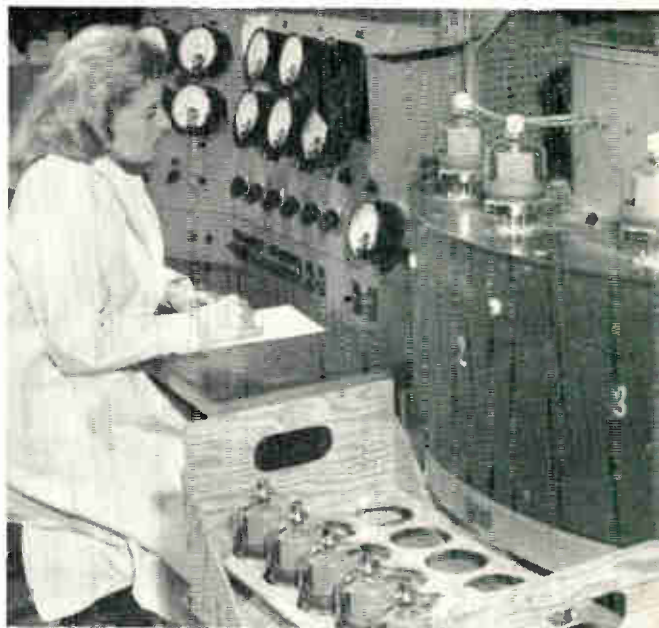
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(Continued from page 242)

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Industrial Control Circuits

By Sidney Platt. 200 pages. Price \$3.90 (JR)

Principles of Transistor Circuits

By S. W. Amos. 167 pages, 105 diagrams. Price \$3.00 (IL)

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Conductance Design of Active Circuits

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Printed Circuits

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Logical Design of Electrical Circuits

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Electronic Circuits

By T. L. Martin, Jr. 768 pages. Price \$13.00 (PH)

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By Sundoram Seshu and Norman Bala-
banian. 571 pages. Price \$11.75 (JW)

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Electronics of Microwave Tubes

By Werner Kleen, Translated by P. A. Lindsay A. Reddish, and C. R. Russell. Price \$9.00 (AP)

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By Riddle and Ristenblatt. 448 pages. Price \$10.00 (PH)

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Solid State Magnetic and Dielectric Devices

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Junction Transistor Electronics

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Reflex Klystrons

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Spectroscopy at Radio and Microwave Frequencies

By D. J. E. Ingram. Illust. Price \$15.00 (PL)

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Compiled by Electrical Review. 531 pages. Price \$4.90 (IL)

Electronics Industry Directory

Electronics Committee, Industrial Dept., Los Angeles Chamber of Commerce. Price \$2.50

Creative Discussion

By Cartright-Hinds. Price \$6.00 (MC)

Electrostatics

Edited by A. Schure. 72 pages. Price \$1.35 (JR)

The Practical Dictionary of Electricity and Electronics

By R. L. Oldfield. Price \$5.95 (American Technical Society, Chicago)

Industrial Electronics Handbook

Edited by William D. Cockrell. 1408 pages. Price \$22.50 (MH)

Dynamical Analogies (in preparation)

By Harry F. Olson. Price \$6.75 (DV)

Electromechanical Energy Conversion

By White and Woodson. 646 pages. Price \$12.50 (JW)

Cryogenic Engineering

By Russell B. Scott. Price \$9.75 (DV)

Light

By Alexander Efron. 136 pages. Price \$2.75 (JR)

Electron Physics and Technology

By Thomson-Gallick. Price \$10.00 (MC)

Introduction to Electric Magnetic Engineering

By Robert F. Harrington. 312 pages. Price \$8.00 (MH)

Basic Electronics

By Zbar and Schildkraut. Price \$2.25 (MH)

Basic Electricity

By Zbar. Price \$2.25 (MH)

Electronic Fundamentals and Applications, 2nd Edition

By J. D. Ryder. 768 pages, illust. Price \$13.35 (PH)

Introduction to Electromagnetic Fields

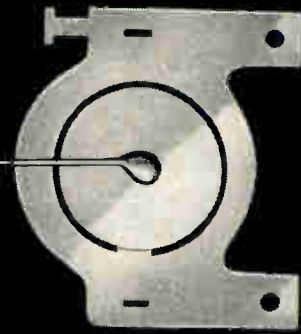
By Samuel Seely. 308 pages. Price \$8.50 (MH)

Principles and Applications of Random Noise Theory

By Julius S. Bendat. 431 pages. Price \$11.00 (JW)

(Continued on page 492)

In Thermistors, the key name is **KEYSTONE**.



20 YEARS OF

Keystone THERMISTOR*

RESEARCH and PRODUCTION

Within the brief span of two decades, Keystone Carbon Company pioneered the development and commercial introduction of *negative temperature coefficient resistance thermistors, and has become the principal supplier of these remarkable units to American industry, in the widest variety of forms.

It is an historic fact that the first thermistor shipment from Keystone, totalling 5000 units, occurred early in 1941 after three years of laboratory and pilot work. These units were for bomber intervalometers—a temperature compensation application. Later that year, 125,000 thermistors were supplied as sensing units for tank engine water temperatures—and the production flood began.

Since then, Keystone Thermistors have been supplied to the great names in American manufacturing for many measurement, control, and temperature compensation applications, including such uses as automobile temperature gauges, in meat probes for modern ovens, clinical thermometers, aircraft liquid fuel level indicators, and surge reducers in radio and TV circuits.

Today, some of the most interesting and promising new applications for Keystone Thermistors are in the very low temperature ranges, where stability and workable resistance values as low as -250°C are necessary.

Let us suggest that you bring your temperature sensing and compensation problems to **KEYSTONE**—thermistor headquarters for 20 years. Our full cooperation is always available.

Keystone

CARBON COMPANY

ST. MARYS, PA.

Circle 101 on Inquiry Card

Thermistors

These tiny units are finding ever increasing uses in the electronic industry. On these pages will be found basic information about the devices as well as typical characteristics. Circuits for the most common applications are included.

Description

THERMISTORS are thermally sensitive resistors that exhibit a resistance change of about 4 percent per degree Centigrade. They have a stable, ceramic-like structure consisting mostly of metallic oxides, and are commercially available in a variety of shapes such as disks, washers, rods, and beads.

The high temperature coefficient of thermistors, about ten times that of typical metals, makes these devices useful for temperature control, temperature measurement, and temperature compensation. Other less common applications include electrical time-delay or surge suppression, volume limiting and regulation in communication circuits, and micro-wave power measurement.

The temperature coefficient of a thermistor is negative; that is, the resistance of a thermistor decreases as temperature increases. Roughly a thermistor doubles its resistance for every 25°C decrease in temperature. The room temperature resistance of a given thermistor can vary from a few ohms for the lowest resistance disk or washer type, to several megohms for the highest resistance rod or bead type.

These units have good long term resistance stability. After suitable pre-aging treatment by the vendor, disk units have been used at temperatures of about 100°C for several years without changing their calibration for as much as 0.1°C.

Types and Mounting

The disk type is furnished either with or without leads. Disks with leads can be soldered into a circuit in the same manner as conventional resistors. Using this mounting arrangement, the thermistor senses the surrounding air temperature. Disks without leads are furnished with the flat faces of the disk metallized to serve as the electrical contacts. Such disks can either be held between spring contacts or clamped to an object whose temperature is to be sensed. The disk can also be mounted in a probe assembly similar in appearance to a standard resistance thermometer.

Another form of probe consists of a thermistor bead sealed in the end of a glass rod. Washer type units are similar to disks without leads except for a central hole used for bolting the thermistor into position.

The single bead-type thermistors are usually glass-coated with platinum alloy leads. These beads can be used in corrosive atmospheres or embedded in solid objects.

Credit for much of the material in this section goes to Mr. Bernard R. Schwartz, RCA. Information obtained from Keystone Carbon Co., General Electric Co., and Fenwal Electronics, Inc.

Type Selection Factors

Size, response time, maximum rated temperature, and precision of manufacture are some of the factors involved in selecting the proper type thermistor.

The response time of the thermistor is closely related to its size and also to the mounting arrangements and operating conditions. Maximum rated temperature depends on whether a unit is glass-coated and whether it has attached leads.

Disks and rods with leads are usually rated at 125°C continuous ambient temperature; disks and rods without leads are rated at 150°C, glass-coated beads will withstand 300°C continuously. The types with soldered leads are limited by the melting point of the solder; types without soldered leads will not be destroyed by exposure to higher temperatures for short periods, but may show a slight permanent shift.

In terms of temperature accuracy, disks, rods, and washers are usually furnished in a given resistance within 2°C of a specified temperature. Disks have been furnished with a precision of 0.05°C.

Another type of precision has to do with the difference from unit to unit in following the nominal resistance-temperature curve specified by the vendor. This departure from the curve is about $\pm 0.5^\circ\text{C}$ over a 100°C range for disks and rods and about $\pm 2.5^\circ\text{C}$ over a 100°C range for beads.

Power Rating

The factor most commonly overlooked in the application of thermistors is the power level at which the unit is operated. Normally thermistors must be operated at much lower power levels than other resistors would be.

The maximum power rating is usually not as important as a knowledge of its actual temperature rise when dissipating a given amount of power. There is a proportionality between the dissipated power and the temperature rise, that is usually expressed as a "dissipation constant" of so many milliwatts per resultant degree Centigrade rise in temperature. The exact specification of this constant is difficult since it depends on the environment and method of mounting. The value given is usually that which applies when the thermistor is suspended by its own leads in still air. The same unit in oil, or in moving air, or clamped to some other object may have a constant that is 10 or more times the value given for still air.

Temperature rise should be restricted to, at most, a few times the accuracy of temperature to which the measurements should be made. Otherwise undesirable effects, such as long warm-up time and variation in readings, may result.

SELECTION OF COMMON THERMISTOR TYPES

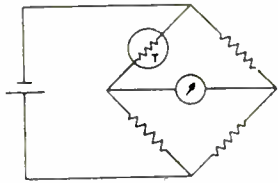
TYPE	Max. Operat'g. Temperature (°C)	Max. Wattage Rating (W)	Dimensions (approx.) (inches)	RANGE OF AVAILABLE			Estimated Long-Term Stability At 25°C-1 Year (°C)	Application Areas (see explanation below)
				Resist. Values At 25°C (ohms)	Temp. Coeff. Of Resistance At 25°C (%/°C)	Dissipation Constant At 25°C-Still Air (mw/°C)		
ROD	150	1	5/32 Dia. x 1/2 Len.	5 to 125,000	-1.1 to -3.4	3-4	0.25	5,6,7,9
		3	1/4 Dia. x 1.0 Len.	11 to 300,000	-1.2 to -3.4	6-8		
DISC (with leads)	150	3/8	0.1 Dia. x 0.05 Th.	1000 to 500,000	-3.8 to -5.2	3 to 3.5	0.25	1,2,3,4,5,6,7,9,13
		3/4	0.1 Dia. x 0.15 Th.	1000 to 800,000	-3.8 to -5.2	3.5 to 4.5		
		3/4	0.2 Dia. x 0.05 Th.	100 to 75,000	-3.8 to -5.2	6 to 7		
		1	0.3 Dia. x 0.08 Th.	80 to 35,000	-3.8 to -5.2	7 to 8		
		1 1/4	0.4 Dia. x 0.04 Th.	25 to 10,000	-3.8 to -5.2	10 to 13	0.50	
		2	0.5 Dia. x 0.15 Th.	50 to 50,000	-3.8 to -5.2	15 to 20		
3	0.75 Dia. x 0.06 Th.	10 to 250	-3.8 to -4.5	16 to 25				
		4	1.0 Dia. x 0.10 Th.	10 to 500	-3.8 to -4.5	24 to 35		
WASHER (unassembled)	150	5	0.20 O.D. x 0.06 I.D. x 0.05 Th.	150 to 1000	-3.8 to -4.5	90 to 100	1.0	2,5
		10	0.75 O.D. x 0.28 I.D. x 0.05 Th.	50 to 200	-3.8 to -5.0	50 to 100		
BEAD (glass-coated)	500	-	0.10 Dia.	1,000 to 1 meg.	-3.3 to -4.7	0.09	0.50	1,7,8,9,10,11,12,13
		-	0.13 Dia.	1,000 to 1 meg.	-3.4 to -4.7	0.1 to 0.3		
		-	0.43 Dia.	100 to 5 meg.	-3.1 to -5.2	0.7 to 0.8		

APPLICATION AREAS
1. Temperature Measurement

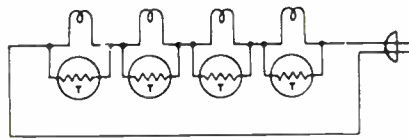
2. Temperature Compensation
3. Temperature Control
4. Liquid Level Control
5. Time Delay

6. Remote Control
7. Switching
8. Power Measurement
9. Voltage Control

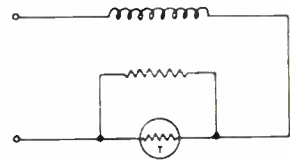
10. Power Level Control
11. Gas Content Analysis
12. Flow Rate Meter
13. Altimeter



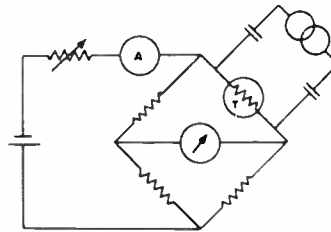
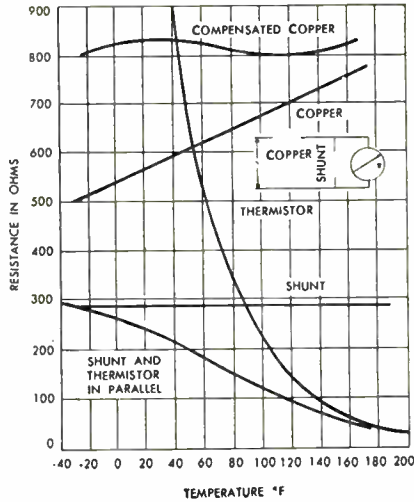
Area 1: This arrangement should be used for sensitive temperature measurement.



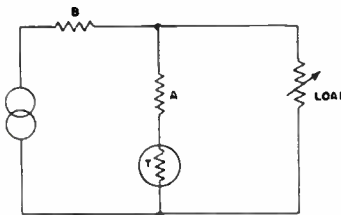
Area 7: In switching, very little current passes through thermistor until lamp fails. Then full voltage heats it over its peak, quickly dropping voltage to original value.



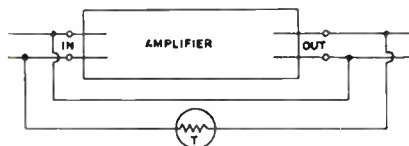
Area 2: Used in this circuit, thermistor compensates for the change in electrical resistance due to temperature change. The graph beneath it illustrates the operation.



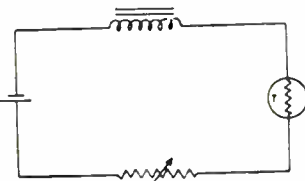
Area 8: Arrangement for power measurement.



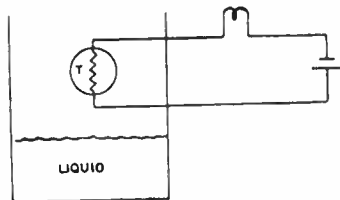
Area 9: With a suitable series resistor, thermistor in parallel with load will maintain constant voltage across the load.



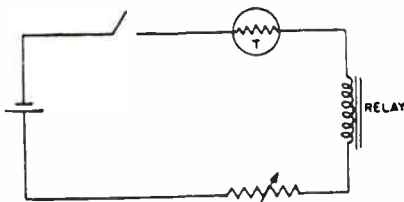
Area 10: One approach to automatic power level control in amplifiers through the use of thermistors.



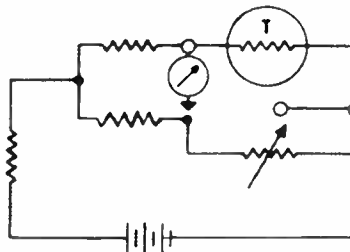
Area 3: Temperature control is achieved by adjusting the variable resistor to operate the relay at any desired temperature of the thermistor.



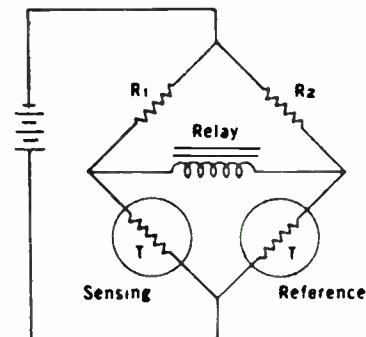
Area 4: When sensing unit is in air, resistance is lowered, by heating of unit, enough to light lamp. Control would be accomplished by replacing bulb with relay.



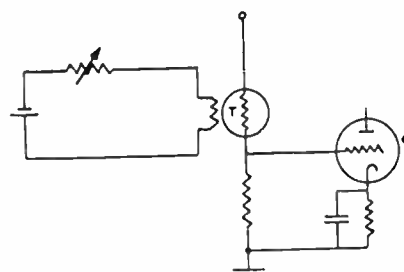
Area 5: Time delay circuit. As thermistor heats up, resistance reduces to point where current is high enough to actuate the relay. Time delay is controlled by variable resistor.



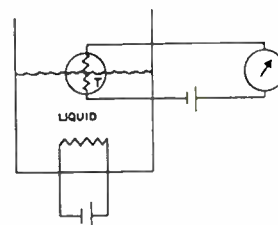
Area 11: Gas content analysis is accomplished with this circuit.



Area 12: Thermistors can be used to measure the flow of either liquids or gases.



Area 6: Remote control of amplifier gain is achieved by controlling heater of thermistor.



Area 13: Hypsometers, or altimeters, have a precision of better than 1% from sea level to over 125,000 ft.

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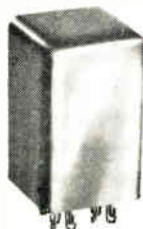
CRYSTAL CASE RELAY, Series 165: The microminiature concept for airborne applications demanding the ultimate in small size, light weight. Contact life 100,000 operations minimum at rated load and temperature range (-65°C. to +125°C.) Hermetically sealed, rugged and reliable, the Series 165 is available in a variety of terminal and mounting arrangements for plug-in, printed circuit or soldered lead connections. Designed to MIL-R-5757C and MIL-R-25108.

CONTACTS: DPDT
 CONTACT RATING: 2 AMPERES
 COIL VOLTAGE: MAY BE SPECIFIED
 DC COIL RESISTANCE: 5K
 SENSITIVITY: 0.350 WATTS
 COIL DISSIPATION: 1.1 WATTS
 WEIGHT: 0.4 OZ.



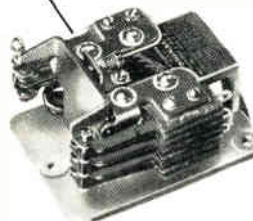
TUBULAR RELAYS, Series 120, 121, 123: For military, airborne and missile applications. High immunity to shock, vibration and temperature cycling. Hermetically sealed, dropout at up to 50% of pull-in current. Available in lengths down to 1 inch.

CONTACTS: SPDT
 CONTACT RATING: 2 AMPERES
 COIL VOLTAGE: MAY BE SPECIFIED
 DC COIL RESISTANCE: 8K
 SENSITIVITY: .080 WATTS
 COIL DISSIPATION: 2 WATTS



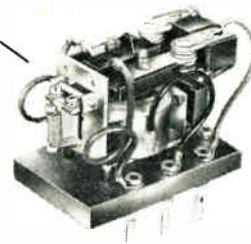
MINIATURE SENSITIVE RELAYS, Series 100, 105, 106: Ideal for navigation, radar, telemetry and communications. Can function in dry circuit applications. Hermetically sealed with high shock, vibration and temperature immunity. Meets MIL-R-5757C

CONTACTS: DPDT
 CONTACT RATING: 2 AMPERES
 COIL VOLTAGE: MAY BE SPECIFIED
 DC COIL RESISTANCE: 12K
 SENSITIVITY: .020 WATTS
 COIL DISSIPATION: 1 WATT



MULTIPLE ARM GENERAL PURPOSE RELAYS, Series 10, 20: Balanced armature, superior shock and vibration resistance. Available hermetically sealed. As keying relay will respond faithfully to DC impulses up to 50 per second. Long life and high operating stability.

CONTACTS: 4PDT
 CONTACT RATING: 5 AMPERES
 COIL VOLTAGE (MAX.) 230 VOLTS
 SENSITIVITY: 0.125 WATTS
 COIL DISSIPATION: 3 WATTS



GENERAL PURPOSE INDUSTRIAL RELAY, Series 130, 140: Extremely versatile and conservatively rated. Contact life runs to millions of operations. Supplied with screw connections or plug-in base, with or without DPDT auxiliary contacts (5 amperes rating), with or without dust cover. Meets U. L. requirements.

CONTACTS: DPDT
 CONTACT RATING: 20 AMPERES
 COIL VOLTAGE (MAX.): 230 VOLTS
 SENSITIVITY: 2.7 WATTS
 COIL DISSIPATION: 3.3 WATTS

CATALOG LITERATURE ON ONE OR MORE OF THESE RELAYS WILL BE MAILED UPON REQUEST. LETTERHEAD INQUIRIES ON SPECIAL RELAY PROBLEMS ARE INVITED.

Wheelock **SIGNALS**
 INC.
 LONG BRANCH, N. J.

Relay Engineering

In the last few years, relay engineering has come a long way. This accomplishment must be attributed to the National Association of Relay Manufacturers. Its committee on standardizing test procedures summarizes this progress.

PRESENTED on these pages is an information round-up of electromagnetic relays. The most recent data was presented at the Seventh National Conference on Electromagnetic Relays, Oklahoma State University, Stillwater, Oklahoma, May 5-7, 1959. This conference was sponsored by the National Association of Relay Manufacturers (NARM).

Included also in this section is a compilation of the major papers on the subject that have become available within the last two years, foreign as well as domestic. Information on obtaining copies of papers published in the foreign journals may be obtained by writing on company letterhead to *Electronic Industries*.

A complete definition of relay terms, as approved by NARM, was published in the June 1958 Directory and All Reference Issue of *Electronic Industries*, page 6.

The Working Electromagnetic Relay Committees

In October 1957, the National Association of Relay Manufacturers formed Technical Committee II for the purpose of establishing standard relay testing procedures. The progress of this committee was reported at the Seventh National Conference on Electromagnetic Relays, held at Oklahoma State University on May 5-7, 1959.

Actually, Committee II was the expansion and outgrowth of a previous committee assigned the task of the dry circuit relay switching problem. Test procedures had also been requested in their study. It was obvious that standard testing should not be limited to the dry circuit problem.

This original committee was ab-

sorbed into the new Technical Committee and redesignated Subcommittee A. Five other subcommittees were appointed to cover tests for other categories of relay characteristics, making a total of six subcommittees.

The work of these subcommittees aids in meeting the increasingly important problem of relay reliability. The results of the great amount of component testing associated with reliability are more meaningful if the testing methods are valid and recognized by all parties concerned.

The subcommittees are aware of similar work by other groups and are in close liaison with them.

Before summarizing the progress of Technical Committee II, it is only proper to give credit where credit is due. The work accomplished was due in large manner to the excellent leadership of the subcommittee chairmen who served until February of this year. These men were:

Subcommittee A—Dry Circuits

John Schmidt, Guardian Electric
Subcommittee B—Electrical Characteristics

Herbert Steinbeck, Magnacraft
Electric

Subcommittee C—Contact Life Testing

V. E. James, Automatic Electric
Co.

Subcommittee D—Environmental Testing

George Hausler, General Electric
Co., Waynesboro

Subcommittee E—Vibration Testing

Bruce Gray, Couch Ordnance

Subcommittee F—Shock, Acceleration & Tumbling

Arvid Moltitor, Elgin Electronics
Div.

The General Chairman of Tech-

nical Committee II is D. R. Dooley, C. P. Clare Co.; the Vice-Chairman and Technical Coordinator is Prof. Charles F. Cameron, Oklahoma State University.

The names of the new chairmen, in parentheses, follow the subcommittee designations in this summary section.

A—Dry Circuits (Max Adkins, Union Switch & Signal Co.)

Appointed to study the problems connected with the switching of low-energy or dry-circuit loads by relay contacts, the committee was charged with recommending a definition of this type of circuit and a standard test. During its investigation, it felt constrained to further delineate its functions.

The committee has been concerned mainly with monitoring work being done by other groups in the dry circuit area; defining terminology covering the entire range of relay contact loading; determining proper test procedures; and, establishing an abbreviated procedure for acceptance and inspection testing.

B—Electrical Characteristics (Earl F. Olsen, C. P. Clare & Co.)

In its interim progress report, this committee has established tentative test procedures for the following: contact resistance; contact bounce; insulation resistance; dielectric strength; coil resistance and inductance; pull-in or drop-out current or voltage; and operate and release time. The methods for each include a definition, procedure, equipment, and precautions.

C—Contact Life Testing (Arthur Woods, Leach Relay Co.)

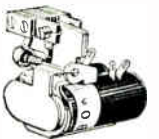
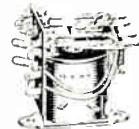
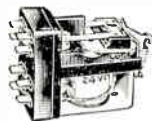
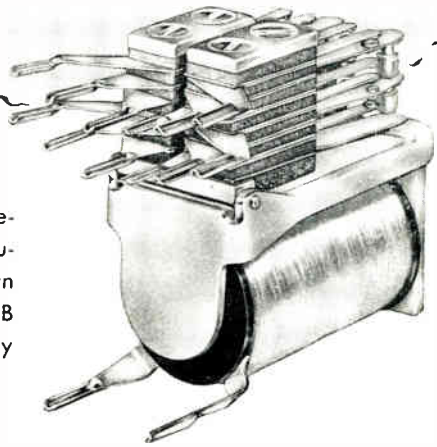
This committee has rendered a preliminary draft of a proposed contact life test specification. Very

(Continued on page 253)

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SPECIFIC NEEDS IS A P&B FORTE-
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Relay Engineering

(Continued from page 251)

thorough definitions have been prepared for just about every conceivable facet. For every operating condition, there is a definite procedure.

D—Environmental Testing (J. David Marks, G-V Controls)

A preliminary testing procedure had also been achieved by this group. Their accomplishment includes procedures for testing the following: salt spray (corrosion); altitude testing of sealed relays; standard humidity; temperature shock and thermal life; and, high and low temperature operation.

E—Vibration Testing (J. W. Ayers, Phillips Control Co.)

The prime objective of this group is to obtain a good degree of correlation so that a 20 or 30 g relay will perform as specified regardless of who conducts the test. Their work has not produced anything radically different, but has endeavored to present an acceptable code for manufacturers and users. Much effort has been directed to the proper mounting.

F—Shock, Acceleration & Tumbling (Louis LaFlamme, Sigma Instruments, Inc.)

The committee has concentrated on shock testing because tumbling is hardly ever specified and because acceleration was a fairly well established test. The requirements of a machine for non-destructive testing have been prepared. The next step is a polling of relay manufacturers and other component manufacturers to allow for a more fully integrated pooling and requirements of the proposed shock equipment.

A composite progress report of these subcommittees will be available about July 15, 1959. It can be obtained by a request addressed to National Association of Relay Manufacturers, Box 6, Stillwater, Oklahoma.

The NARM, and especially Technical Committee II, desires and needs comments on their work.

The committee wants the final test codes to represent a fully workable document, reflecting the ideas and thought of all interested parties.

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- A Study of the Ferroresonant Relay, L. L. Weber, Essex Wire Corporation.
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- Evaluation of Relay Transients, C. F. Cameron & Dan Lingelbach, Oklahoma State University.
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John L. Pfeffer, President NARM
President, Struthers-Dunn, Inc.
- An Effort to Promote the Selection of Reliable Contact Systems
H. P. Lynch, Electrical Engineer
General Electric Company
- Modifying the Product Through the Use of Epoxy Resins
A. C. Johnson, Asst. Mgr. of Relay Division
The Adams and Westlake Company
- Double Coil Relay With Single Working Gap
John Schuessler, Senior Design Engineer
Leach Corporation, Leach Relay Division
- Relays Versus Semi-Conductors as Switching Devices
G. L. LaPorte, Product Engineer &
- R. A. Marcotte, Project Engineer
I-B-M Corporation
- Simplified Monitoring Circuits for Contact Life Tests
N. C. Shaw, Sr., Design Engineer
Price Electric Corporation
- Development of a Thermal Relay for Missile Environment
William C. Broekhuysen, V.P. and Director of Research, G-V Controls, Inc.
- An Instrument for Plotting Relay Characteristics
John S. Jordan, Project Engineer
North Electric Company
- Relay Coil Surge Voltage Effects at High Altitudes
K. B. Austin, Director of Research
Allied Control Company, Inc.

(Continued on page 255)

RELAYS

Mounting Arrangements and Their Influence on Vibration, John Schmidt, Guardian Electric Manufacturing Co.

Electromagnet Configuration Having Improved Efficiency and Shock Resistance, Charles Packard, Struthers-Dunn, Inc.

Use of the Optron for Study of Contact Bounce and Noise, G. A. Hotnam, Optron Corporation.

Relay Contact Protection for D. C. Application, Lewis W. Hill, IBM Corporation.

Design of Rectifier-Relay Combinations, P. N. Martin & T. McLaughlin, Price Electric Company.

A Stacked Ceramic 50 Ampere Vacuum Relay, James W. Daniels, Jennings Radio Manufacturing Corporation.

Testing for Relay Reliability, Paul Gottfried, Cook Technological Center.

Transient Analysis of Relays with Slugs and Sleeves, C. F. Cameron, D. D. Lingelbach, & Douglas Jeng, Oklahoma State University.

Performance Analyzer for Relays, Akira Hirata, & E. J. Duff, Cook Technological Center.

Contact Resistance as it Affects Dry Circuit Relays, John W. Scannell, C. P. Clare & Company.

Relay Production Testing, K. B. Austin & Ralph Ferry, Allied Control Company.

The Molded Switch Stack Module, George O. Wagner, George O. Wagner & Associates, & Walter Schapira, Ohmite Manufacturing Company.

A New Approach to a 200° C Reliable Miniature Relay, Dr. P. N. Bossart, Union Switch & Signals Company.

Relay Reliability is a Design Problem and Not a Statistical Problem, L. E. Massie, Convar.

An Improved Method of Measuring Contact Resistance, Alex Schnipper, Picatinny Arsenal.

Recent Relay Developments in the United Kingdom, Norman E. Hyde, Royal Radar Establishment, England.

Photographic Analysis of Relays, John H. Waddell, Fairchild Camera and Instrument Corporation.

Solution of Logic Problems by Means of Relays, D. D. Lingelbach & C. C. Freeny, Oklahoma State University.

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**THE MOST EXCITING
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Compact CLARE TYPE HG6F Relay ready for mounting. Overall dimensions: 3.640" x 3.125" x 1.046".



**NEW
 6-IN-LINE**

**HG6F RELAY BRINGS BIG SAVINGS
 IN SPACE, POWER, AND COST**

Latest in the Clare line of Mercury-wetted Contact Relays, world famous for their billions of operations*, is Type HG6F, a six-in-line flat-pack relay. This striking new design provides the most reliable, durable, maintenance-free relays ever made anywhere, *plus these savings:*

SAVES SPACE—Unique packaging affords up to 50% savings in space over cylindrical multi-element mercury-wetted contact relays.

SAVES POWER—Six switches per coil saves operating power.

SAVES COST—Switch cost as much as 26% below cost of same number of switches in cylindrical packages.

**Mercury-wetted contact relays on test have completed over 8 billion operations with a contact-load of 250 volt-amperes, and are still going strong.*

MECHANICAL FEATURES

Flat, rectangular package makes most efficient use of chassis space.

Printed circuit mounting eliminates customary internal wiring except for coil leads.

Units can be stacked in line without interaction.

No shelf deterioration; requires no maintenance.

Contacts cannot wear, get dirty, stick by locking or welding, nor chatter.

Tamper proof.

Completely protected against dust and dirt, corrosive fumes, and explosive atmospheres.

No mechanical damage when subjected to usual military shock and vibration tests.

SEND FOR BROCHURE CPC-2

For complete information, contact C. P. Clare & Co., 3101 Pratt Blvd., Chicago 45, Illinois. In Canada: C. P. Clare Canada Ltd., 2700 Jane Street, Toronto 15. Cable Address: CLARELAY

CLARE RELAYS

FIRST in the industrial field

Circle 138 on Inquiry Card

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 complete
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 time/delay/relays**

This free folder contains complete specs on 24 models of the miniature AGASTAT Time Delay Relay for missile, aircraft, computer, electronic and industrial applications. They're small as 1-13/16" x 4-7/16" x 1 1/2", with adjustable timing ranges starting at .030 and as high as 120 seconds.

The folder gives operating and environmental specs, coil data, contact capacities, dimensions, diagrams of contact and wiring arrangements. *Write:* Dept. A-33-632.

AGA ELASTIC STOP NUT CORPORATION OF AMERICA
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Elizabeth, New Jersey
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(Continued from page 253)

Electrical Contacts in an Electric Watch

Dr. J. A. Van Horn, Director of Research

Hamilton Watch Company

Video Relay

H. Hamano, Chief Apparatus Design Section and Y. Hosokawa

Probability Mathematics as a Relay Design Tool

Peter T. Millunzi, Senior Project Engineer

P. R. Mallory & Company, Inc.

Application of Basic Research to Low Level Phenomena

E. R. Dubas, Project Director

Union Switch & Signal

Realistic Relay Specifications

John Schmidt, Electrical Engineer

Guardian Electrical Manufacturing Company

Why Run Mechanical Life Tests

S. M. Depuy, Electrical Engineer

General Electric Company

Armature Overtravel in Relays

C. F. Cameron, D. D. Lingelbach,

and C. C. Freeny

Oklahoma State University

Multicoil Reed Relays

Engineer O. Wuyts

Bell Telephone Manufacturing

Company (Belgium)

Comparative Tests on Electromagnetic Relays

Charles Bono, Components Engineer

General Electric Company

Design and Application of a Crossbar Switch

Leonard Johnson, Electromechanical Engineer

Kellogg Switchboard & Supply

Company

Comparison of Various Types Receiving Relays for Carrier Telegraph and Carrier Telephone System

H. Hamano, Y. Hosokawa, and H.

Kikuchi

Nippon Electric Company, Limited

Effect of Shunting Circuits on Relay Operation

Lewis D. DeLalio, Chief Engineer

Filtors, Inc.

Single-Pulse Operation of DC Relays

L. B. Stein, Jr., Electrical Engineer

Sigma Instruments, Inc.

Large Bomber Aircraft Requirements for Relays

Floyd M. Kinney, Electrical & Electronics Design

Boeing Airplane Company

Evaluating RF Interference Properties of Relays

Z. V. Grobowski and Martin Abramovage

Jansky & Bailey, Inc.

Effects of high (1500°F) and Low (-320°F) Temperature on Components

Otto N. Bloom, President

Tur-Bo-Jet Products Company, Inc.

Measurement of Pull-in and Drop-out

T. Ross Welch, Manager of Relay

Division

Telecomputing Corporation

Monitoring Relay Life Tests

Howard H. Brewer, Chief Field

Engineer

North Electric Company

Radiation Leak Detection on Hermetic Sealed Assemblies

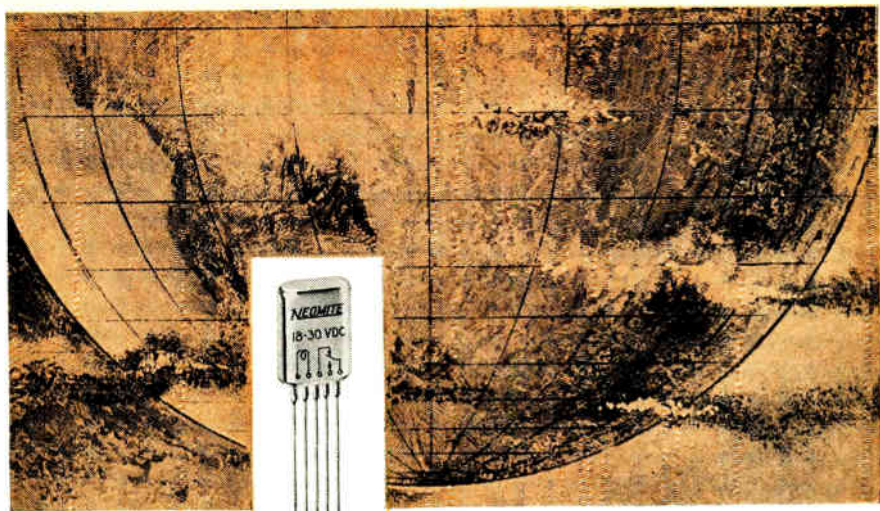
Dale Cropsey, Director of Market-

ing

American Electronics, Inc.

Compiling a Complete Relay Directory

(Continued on page 257)



NM Series
(actual size)

ADVANCE "NEOMITE"

— smallest relay in the world ...

in transistor-size can.

Use it where there's no space left!

Compact circuitry needs the Neomite — a subminiature relay less than .05 cubic inch in size, and weighing only .09 ounce.

Reliable — recent tests have proven life of 1,000,000 operations minimum at rated load and 25°C.

Sensitive — the Neomite operates on only 100 milliwatts power ... switches .25 — ampere loads.

Rugged — relay withstands vibration of 10 G's to 500 cps. It's leak tested on RADIFLO equipment to insure long shelf life ... produced to military standards under RIQAP program approval.

Versatile — it can be used in printed circuits, or to switch dry circuitry. Neomites are offered in 5 resistance values: 50 ohms... 200, 500, 1000, and 2000 ohms. Contact arrangement is SPDT. Several units can be used to provide a multiple-pole relay occupying small space.

Our Applications Engineering Dept. will be pleased to work with you on your special application problems and on supplying built-up packages of Neomites and other components.



ADVANCE RELAYS



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FILTORS, INC.

LEADING MANUFACTURERS OF HERMETICALLY SEALED ROTARY MICRO AND SUB-MINIATURE RELAYS

NEW!

Filtors is first with a crystal can relay for AC operation! The new Powmite® micro-miniature relay for AC operation is the smallest, lightest AC relay made today.



NEW!

Filtors is first with relays with a built-in arc suppressed coil. In the same micro-miniature size Filtors' Powmite is also made with a built-in arc-suppressed coil to cut radio interference a minimum of ten to one. Available also in four and six-pole sub-miniature relays. Filtors arc suppressed relays increase life and reliability of associated circuitry.



NEW!

Filtors now manufactures the smallest, lightest four and six-pole sub-miniature relays for AC operation.



POWRMITE®

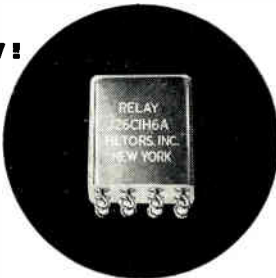
new MICRO MINIATURE relay by Filtors, leading specialists in development and manufacture of micro miniature relays.

SPECIFICATIONS:

AMBIENT TEMPERATURE RANGE	-65°C. TO +125°C.
DIELECTRIC STRENGTH	1000 VOLTS (750 VOLTS BETWEEN OPEN CONTACTS).
INSULATION RESISTANCE	10,000 MEGOHMS MINIMUM AT 25°C.
CONTACT ARRANGEMENT	2C (2 POLE DOUBLE THROW).
CONTACT RATING	2 AMPS RESISTIVE AT 28 VOLTS DC OR DRY CIRCUITS.
SHOCK	100 Gs 11 MILLISECONDS.
VIBRATION	10-55 CPS AT .06 AMPLITUDE.
	55-2000 CPS AT 30 G.
PICK-UP TIME	5 MILLISECONDS MAXIMUM AT NOMINAL COIL VOLTAGE, 25°C. TEMPERATURE.
RELEASE TIME	5 MILLISECONDS MAXIMUM.
NOMINAL COIL VOLTAGE	26.5 VOLTS DC.
COIL RESISTANCE	550 OHMS ± 10% AT 25°C.
ALTITUDE	70,000 FEET
DUTY	CONTINUOUS.
PICK-UP	RELAY SHALL PICK-UP WHEN COIL VOLTAGE IS 18 VOLTS DC MAX.

NEW!

All types of Filtors Powmite micro-miniature relays are now available in .2 grid space in all mounting styles; .2 grid space relays feature Filtors' new "Sensitork" motor, a Filtors development for greatest reliability and sensitivity.



GENERAL PURPOSE

precision manufactured under rigid quality control. Offers lightweight, rugged, compact construction for high environmental conditions. Applicable to instrument, geophysical, aircraft controls and many other circuits where high reliability and multiple switching are required. Available in 2 DPDT, 4 DPDT and 6 DPDT.



LATCHING

relay remains in "energized" position indefinitely without consuming power. As an overload relay it can be electrically reset from a remote position. Contacts can be closed by one circuit and opened by another. It has many applications in fail-safe circuits. Its small size, light weight and hermetically sealed enclosure make possible its use in airborne and other equipment. Either coil may be energized continuously without damage to the relay.

It affords the designer great latitude in circuitry, particularly in "lock-up" circuits, e.g., where the contacts of one conventional relay are used to lock-up the coil of another relay. Thus it avoids redundancy. Available in 2 DPDT, 4 DPDT and 6 DPDT.



5/8 INCH STYLE

A rugged 2 pole double throw relay of small size and weight designed for high reliability under extreme conditions. Available with either 2 amp or dry circuit contacts.

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(Continued from page 255)

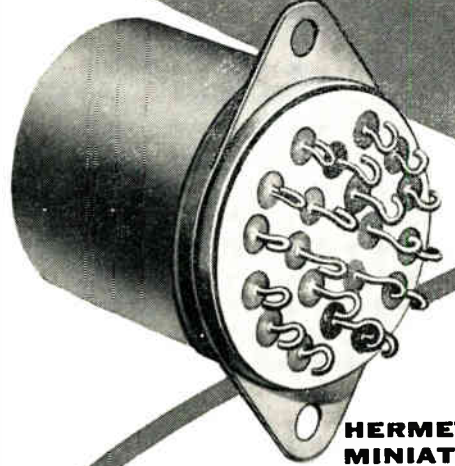
Raymond N. Auger, Technical Editor
Automatic Control
An Investigation of Relay Contact Resistance by Means of Voltage Current Characteristics
Dr. T. B. Thompson and R. C. Sadler
Oklahoma State University and Sandia Corporation
Further Information on United Kingdom Relay Development
Norman E. Hyde
Royal Radar Establishment

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I. S. Mayer, *Electrical Manufacturing*, April 1957
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J. G. Bannoche & R. A. E. Fursey, *ATE Journal*, Oct. 1958 (England)

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Style 520 GENERAL PURPOSE RELAY

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Simplicity of design and perfect performance make the Style 520 an ideal, low cost, high reliability relay for general purpose and low level circuit use.

Produced in pressurized, dust-free rooms to prevent contamination, the 520 is quality-controlled from order through production.

Meets the following specifications and drawing:

- MIL-R-5757C**
- MIL-R-25018 (USAF)**
- MS24115-6 (USAF) Class B;**
- Type II, Grade 3**

Let Price stepped-up production and service solve your relay problems.

GENERAL CHARACTERISTICS	
For 26.5 VOLT OPERATION	
CONTACT ARRANGEMENT	Six Pole Double-Throw (6 Form C)
COIL RESISTANCE (Nominal)	240 Ohms (at 25° C)
MINIMUM CONTACT PRESSURE	25 Grams on N.C. Contacts 35 Grams on N.O. Contacts
CONTACT CAP	0.010"
OPERATING TIME	10 Milliseconds maximum at 26.5 Volts, 25° C.
DROP-OUT TIME	7 Milliseconds maximum at 26.5 Volts, 25° C.
AMBIENT TEMPERATURE RANGE	-65° C. to plus 125° C.
VIBRATION	15 G to 2,000 c.p.s.—no contact chatter, 20 G if specified.
SHOCK	50 G, 11 Milliseconds—no contact chatter.



For further details, call or write for Bulletin 12

PRICE ELECTRIC CORPORATION
Frederick, Maryland MOument 3-5141

This is the first of a series which describes hardware for the electronic industry. Part one presents, in tabular form, a complete description of pins, rivets, eyelets, and panel fasteners. Each item is clearly described and illustrated along with uses, types of material they are made of, size ranges, and known suppliers.

Electronic Hardware— Fastening Devices

By L. H. Henschel

*Member, Standards Engineers Society
202 Garfield Ave.
Collingswood N. J.*

DESIGN and packaging engineers are quite often faced with the problem of selecting the right type of electronic hardware for their job. In this issue and succeeding issues, various types of hardware will be presented. This *Electronic Industries'* hardware series should make the job a little easier as far as hardware is concerned. The information presented here is intended as a general reference.

This, the first of a series, deals with pins, rivets, eyelets, and panel fasteners. The articles in this series will cover only those items used in electronic equipment and includes only those size ranges normally considered applicable to this industry. The material is presented in a chart or tabular type presentation to facilitate its use for quick, handy reference. Drawings are representative for each item and minor variations are possible for some of the hardware items.

The pins discussed in this section include solid pins, cotter pins, spring pins, and quick release pins. The pins are used for locators for other parts, fastening rotating components, pivots, keys, and locking knobs and gears to shafts. Pins may be considered as semi-permanent fasteners because they can be removed and reused a few times without replacing with new ones. Generally, they are used where removals are not expected but sometimes required. They are held in place by friction. To eliminate any possibility of misalignment, the mating holes should be drilled at assembly.

Rivets are divided into three main categories: the standard smaller diameter solid rivets, the tubular

and semi-tubular rivets, and the blind rivets. Rivets are intended primarily as permanent fasteners for making tight joints. The solid rivet is usually used where there are high shear and tensile loads, and where a light weight, simple, dependable, low cost fastener is desired.

The tubular and semi-tubular rivets are used where the loads are primarily in shear and compression. They are generally used to fasten soft or brittle material such as plastic laminates, insulation material, and similar materials. With tubular and semi-tubular rivets it should be remembered that the manufactured head should be pressed against the thinner of the materials being joined and against the softer or more brittle material so that the driving is done against the harder or thicker material.

The blind rivets are very useful when access to one side of the assembly only is possible. They are also useful in attaching components to the chassis and for repair work as they are installed simply with a minimum of equipment or effort. The blind rivets are set either mechanically or chemically. The chemically set rivets make use of a small chemical charge placed in the center of the rivet. These charges cause the rivet to expand when an electric riveting iron is applied to the rivet head.

Under each item there is listed one or two Known Suppliers to aid in the quick location of suppliers. Many more companies will be found listed in the directory section of this issue.



DOWEL PIN

The dowel pin is a straight cylindrical pin which comes in two varieties, the hardened and ground variety, and the unhardened type. The hardened and ground type is the better of the two and has one end chamfered for ease of insertion and the other end crowned for appearance. The unhardened type has both ends chamfered and can be inserted with either end first. The hardened and ground variety comes in the standard size range and an oversized range. The standard range pins are .0002 in. over the nominal hole size while the oversized range is 0.0012 inches larger than the nominal. The dimensions of these pins are

held very close with the diameter ± 0.0001 inches, and the surface finish 6μ in. max. The pins, which have a shear strength of 150,000 PSI, are pressed or driven into reamed holes. Although these pins are most often used as locators for other parts, they are also used for fastening rotating components, for bearing surfaces, pivots, keys, etc. The unhardened pins have the same use but are not kept to as close tolerances.

Sizes— $1/8$ to $7/8$, $1/2$ to $5/2$ long varying with diameter
Material—Heat treated alloy steel Rockwell C 60 to 62



STRAIGHT PIN

Straight pins are similar to dowel pins, straight and cylindrical in shape and have similar usage. These pins are not as precision made as the dowel pin however, and the tolerance of the diameter is 0.020 in. on sizes up to 0.312 in. dia. and 0.030 in. on the larger diameters, and the tolerance on the length is ± 0.012 in. There are two types

of straight pins. One with both ends chamfered and the other with square cut ends. These pins are often cut to length from stock on an as required basis.

Size—0.062 to 0.500 (12 standard diameters)
Material—Steel, brass, bronze.

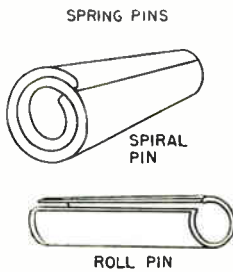


TAPER PINS

Taper pins are usually used to fasten cylindrical components which have been pre-assembled. The typical installation of medium diameter pins requires the drilling of a 3 step hole and finishing by reaming to the required taper. However, there are special reamers which will prepare this tapered hole from a drilled through hole. Smaller pins require only one or two steps; larger pins, 4 or 5. As the pin is driven into this tapered hole, it wedges itself securely. All pins have a taper of $1/4$ inch per foot of length. Both ends of the

pin are crowned for appearance and ease of installation. The larger end of the pin is usually $1/4$ the diameter of the smallest component being fastened for good practice. These pins come in two series, the commercial series and the precision series. The first having concavity tolerances and the second not. Some pins are threaded at the larger end to facilitate removal.

Sizes—#8/0 (0.047 in. dia.) to #13 (1.523 in. dia.) Large end dia.
Material—Steel, brass, stainless steel.



SPRING PINS

SPIRAL PIN

ROLL PIN

Spring pins are made of flat spring stock and rolled into shape leaving a hollow center. There are two main types of spring pins, the tubular type and the spiral type. The first is rolled into a cylindrical shape having the two ends of the material almost meet. The second has the metal rolled into a spiral configuration. The tubular type pins are inserted in holes equal to the nominal pin diameter. As the pin, which is chamfered at either end, is inserted in this hole which is slightly less than the pin diameter, the tube is compressed and deflection caused by the compression holds it securely in position. The pin is highly reusable. For additional shear strength, one tubular pin can be installed inside another, the larger size being installed first. The slot on the tubular pin is chamfered so as to minimize its broaching of soft metals into which it is installed.

Sizes—0.062 in. to 0.500 in. dia. $1/8$ to $5/2$ in. long varying with dia.

Material—heat treated carbon steel, stainless steel, beryllium copper

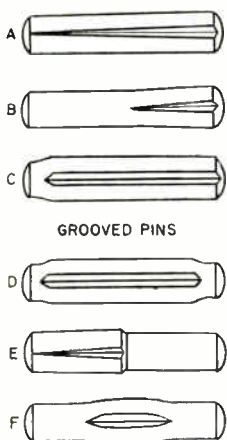
Known suppliers—Standard Pressed Steel Jenkintown, Pa.; Elastic Stop-Nut Co. Union, N. J.

The spiral type spring pins are available in light, medium, and heavy duty depending on the shear load requirements. The coil spiral or spring characteristics of these pins prevent them from coming loose after installation. These pins are also highly reusable and can be inserted directly in drilled holes.

Sizes—0.037 in. to $1/2$ in. dia. $1/8$ in. to 4 in. long varying with dia.

Material—Heat treated 1070 steel (1/16 in. and over), stainless steel

Known supplier—C. E. M. Co. Danielson, Conn.



GROOVED PINS

Although the ASA has standardized on 6 styles of grooved pins, manufacturers are able to supply many additional variations. The grooved pin is a cylindrical pin either chamfered or rounded at the ends and with equally spaced longitudinal grooves (usually 3) formed on its surface. The pin is pressed or driven into a drilled hole and the grooved portion, having been displaced into a cylindrical shape, exerts sufficient force to hold the pin captive and hold the components together. The pin is reusable and can be used in place of screw nut combinations, keys, lock washers and other pin types. Best results are obtained if the drilled hole diameter is equal to the nominal pin diameter.

end. These pins are often used as hinge pins as they lock only over half their length.

Type C pin has a full length groove which has no taper but has a pilot or ungrooved section at one end to facilitate insertion. It gives the best locking action as the full force of the groove acts over its entire length.

Type D pin is similar to type B but the groove has just the opposite taper. It is ideal for installations in blind holes.

Type E pin has a half length groove in its center section making it very useful where one component moves relative to its two adjacent members.

Type F pin is almost identical to C except that both ends have pilots. This facilitates automatic assembly as either end can be inserted first.

Sizes— $3/64$ in. diameter to $1/2$ in. diameter— $1/4$ in. long to $4 1/2$ in. long varying with diameter

Material—B1112 steel

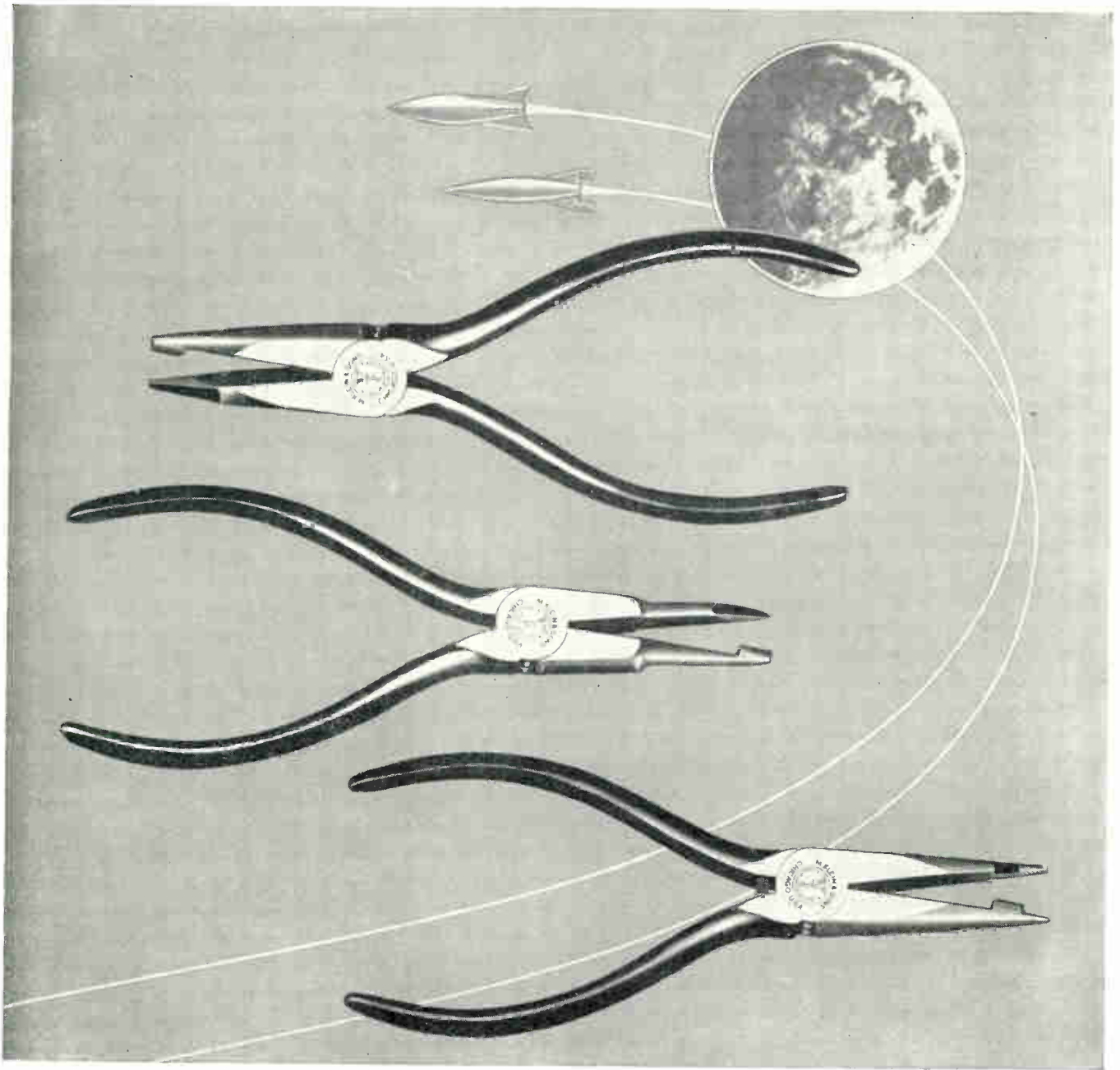
Known suppliers—Groove Pin Corp. Ridgefield, N. J.; Driv-Lok Pin Co. Sycamore, Ill.

Type A pin is a general all purpose pin which has a tapered groove for the entire pin length. The end with the smallest groove width is inserted first.

Type B pin also has a tapered groove with the groove over one half of the pin length. The smallest section of the groove is at the center of the pin and the groove widens as it approaches the

THREE KLEIN PLIERS

to make electrical wiring easier



Here are three newly engineered Klein Pliers which will solve difficult problems in the wiring of electronic assemblies. Catalog 101-A illustrates and describes these and twenty other new pliers in the Klein line. If you wire electronic assemblies, write for a copy.

ALL-PURPOSE ELECTRONIC PLIER

Patent pending

Shear blade cuts flush and holds clipped end of wire

Requires no sharpening; will cut hard or soft wire. Smooth, continuous action prevents shock which may damage resistors. For bare wire up to 18 gauge.

No. 260-6—length 6 $\frac{3}{8}$ "

No. 260-6C—with coil spring that holds jaws open

NEEDLE-NOSE PLIER

Patent pending

Similar to No. 260-6 but nose has been slimmed down to permit use in confined areas.

No. 261-6—length 6 $\frac{3}{8}$ "

No. 261-6C—with coil spring to hold jaws open

LONG-NOSE PLIER—KNIFE AT TIP

Pat. No. 2,848,724

Jaws behind blade hold clipped wire end firmly

A shear-cutting plier that will cut hard or soft wire. Blade is at the tip of the plier. Supplied with coil spring to keep jaws apart.

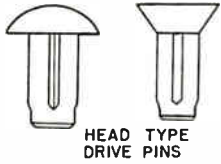
No. 208-6PC—length 6 $\frac{5}{8}$ "



Mathias KLEIN & Sons
 Established 1857 Chicago, Ill., U.S.A.
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Write for Catalog 101-A, which shows the complete line of Klein Pliers, including 20 pliers recently developed.

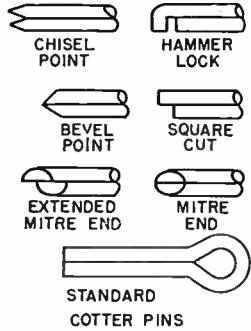




HEAD TYPE DRIVE PINS

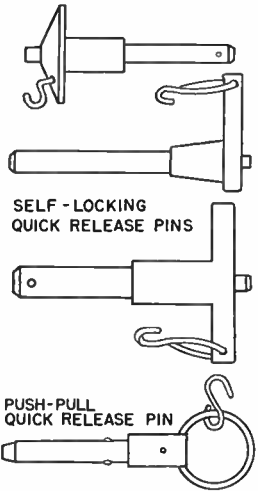
Head type drive pins are available in both round and flat heads. They work on the same principle as the grooved pins and are particularly useful in joining thin material to heavier material, plastics, casting and wrought material, etc. They can be used to attach name plate, covers, springs, brackets, etc. The pin can be removed without

damage to itself of the parent material.
 Size—0.067 in. to 0.250 in. dia. 1/8 to 1/2 in. long varying with diameter
 Material—Steel
 Known supplier—Groove Pin Corp. Ridgefield, N. J.; Driv-Lok Pin Co. Sycamore, Ill.



Cotter pins have varied uses including the locking of castle or slotted nuts, locking of clevis pins and the fastening of small components together, etc. It is perhaps the most common and simplest to use fastening pin. It is merely inserted through a hole or slot and its ends separated. When used with slotted or castle nuts, it allows for a wide adjustment of the nut in reference to its mating

thread. There are seven standard cotter pin point styles and 18 diameter sizes and two basic head styles (the symmetrical eye and the offset eye). The inside eye diameter is approximately equal to the pin diameter.
 Sizes—0.031 in. dia. to 0.750 in. dia.
 Material—Steel, brass, bronze, stainless steel, aluminum

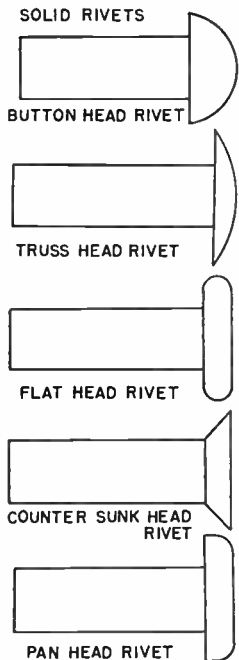


Quick release pins are available in two types, those which are merely pushed in and pulled out, and those which require a secondary operation for removal. The first type has some sort of detent such as a spring loaded ball, located on the cylindrical portion of the pin. As the pin is installed, the detent is depressed reappearing as it clears the drilled hole. This type, which can be installed in a normal drilled hole, takes a controlled amount of axial force to depress the detent both in the installation and removal making it safe for use under both static loads and mild vibration. These pins are usually furnished with some sort of handle to aid in the push-in and pull-out. The self locking variety of quick release pin has the same sort of detent but is positively locked in position after installation so that the detent cannot be depressed. These pins, are also installed in normal drilled holes and can be sub-

jected to greater shock, vibration and centrifical loads. They usually have some sort of handle with a push button or other means of unlocking the detent to allow removal. In some designs the detent is unlocked by pulling a release. In others, the release is affected by pushing a device. There are many varieties of quick release pins made by several manufacturers.

Sizes—Push-Pull—3/16 in. to 1 1/4 in. dia. 1/2 in. to 4 in. length, varying with dia.
 Self loading 1/4 in. to 1 in. dia.
 Material—Steel heat treated, brass, stainless steel
 Known sources—D. W. Price Corp. Los Angeles, Calif.; Harley Patents, Inc. New York 17, N. Y.; Aviation Developments Inc. Burbank, Calif.; Danuser Machine Co., Fulton, Mo.; Waldick Engineering Co., Garden City, N. Y.

RIVETS



Solid rivets are the most commonly used type of rivet and are used in the permanent joining of sheet metal. They can be used to join almost any type of sheet material although soft and brittle materials should be avoided as they may be damaged by the pressure required to form the rivet head.
 The amount required to make the formed head of

a solid rivet is approximately 1.5 times nominal diameter of rivet body. Rivets can be driven by cold-hammering, cold squeezing or by automatic riveting machines.
 Sizes—1/16 in. to 7/16 in. diameter 1/8 in. to 4 in. long varying with dia.
 Material—Steel, Stainless steel, brass, copper, monel, aluminum



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HI-SPEED HEATING UNITS
& THREAD-ON MINI-TIPS*

Ungar exclusive new development
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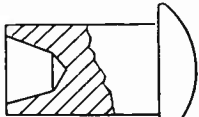
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Mini-Tips thread onto the Heating Units....develop a superior heat path.... make for more efficient soldering.



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SEMI-TUBULAR RIVET

Tubular and semi-tubular rivets are used to hold components together where the tensile load is at a minimum. They are particularly useful in joining plastics, wood, and soft materials because the force required to "drive" the rivet is much less than in the case of the solid rivet. The semi-tubular rivet differs from the tubular in that it has a hole depth up to approximately 1½ times the nominal body diameter while the tubular has a hole depth which is almost the entire length. The rivet should always be clinched against the hard-

er or less brittle of the two materials being joined. The diameter of tubular and semi-tubular rivets does not expand to fill the drilled hole, as do the solid rivets, hence the hole tolerance must be kept tighter to get a satisfactory joint. The head styles and diameters for these rivets are similar to the solid rivets.

Material—Brass, steel, aluminum

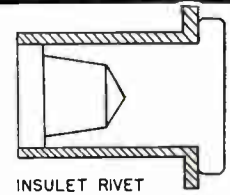
Size—1/16 in. dia. to 5/16 in. dia. lengths 3/16 to 1¼ varying with dia.



SHOULDER RIVET

Another variation of tubular rivets are the shoulder rivets which actually are solid rivets of one diameter with an additional section which is a reduced diameter semi-tubular rivet. These rivets are used for pivots and to fasten parts

which must move in relation to each other. They are available in limited sizes and are often made to customers requirements and constructed of any material required.



INSULET RIVET

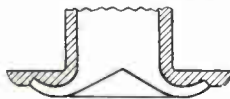
The Pylon Insulet Rivet is very useful in the electronic field. It is a standard semi-tubular rivet whose shank and under-head is covered with a uniform layer of insulation (0.015). The rivet head is flat giving a low silhouette and the nylon insulation permits its use to 300°F. Its dielectric strength is over 325 volts per mil. As the insulet is

assembled and the tubular portion is rolled over, the nylon rolls first assuring insulation on the underside of the clinched portion.

Material—Aluminum, brass, steel

Sizes—3/32-3/16 in. dia. 1/8 to 1/4 in. length

Known supplier—Pylon Co., Attleboro, Mass.



PYLON CAPLET RIVET

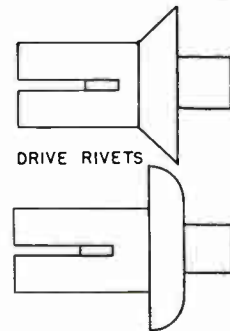
The Pylon Caplet is similar to the Insulet but only the head is covered with plastic. They serve as insulated "feet" and spacers, and can be used to fasten metal parts to plastic materials, such as printed circuit boards, without fear of the rivet head shorting against other components. Heads

can be colored for coding purposes.

Sizes—1/16 in. dia. to 3/16 in. dia.

Material—Rivet steel, brass, aluminum, head-cycaloc.

Known supplier—Pylon Co., Attleboro, Mass.



DRIVE RIVETS

Drive rivets are one piece pre-assemblies of a rivet portion which is flared out by a self contained pin. After the rivet is inserted in the components to be fastened, the pin is hit with a hammer or press. As this pin is driven flush with the head, the part of the rivet under the assemble spreads out holding the components firmly together. These are the simplest blind rivets manufactured. Head styles include universal 100° countersink and truss head. They can also be

supplied with a rubber ring under the head and used as sealing rivets.

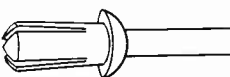
Sizes—1/8 in. dia. to 1/4 in. dia. grip lengths 1/32 in. to 1 in.

Materials—Aluminum, steel

Known suppliers—South Chester Corp., Lester, Pa.; Star Expansion Industries, N. Y. C.;

Olympic Screw & Rivet Co., Downey, Calif.;

Deutsch Fastener Corp., Los Angeles, Calif.



DRIVE TYPE PLASTIC RIVET

The "plasti" rivet is a drive rivet which is made of one piece of plastic. After insertion in the hole, a blow to the pin breaks it away from the rivet portion and forces it into that portion where it expands the prangs. Being made of plastic it is non-corrosive and non-conductive. Round and countersunk heads are available in a large variety of colors for coding and decorative

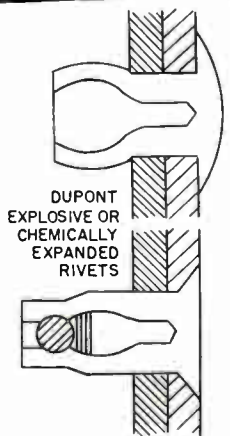
purposes.

Sizes—1/8 to 3/8 in. dia. with grip length 1/64 in. to 5/8 in.

Material—Nylon, acetate, butyrate, polystyrene

Known supplier—Illinois Tool Works, Des Plaines, Ill.;

United-Carr Fastener Corp., Cambridge, Mass.



DUPONT EXPLOSIVE OR CHEMICALLY EXPANDED RIVETS

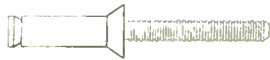
The Dupont blind expansion rivets are merely inserted in a hole and expanded by means of applying heat to the rivet head. The rivet, which is tubular, contains a material which when heated causes the walls to expand both filling the drilled hole and forming the end of the rivet. They are available in Brazier and 100° countersunk heads and can be had with both an open end or a sealed end. The heat is applied by a simple electric riveting iron which is similar to a large soldering iron. These rivets are especially

handy for repair work because of their ease of installation and their blind feature. Each length of rivet has a wide grip range making it possible to use the same rivet size in many applications. Setting of these rivets is almost silent.

Size—1/8 to 1/4 in. dia.; grip length 0.010 to 0.510

Material—Brass, aluminum, nickel

Known source—E. I. du Pont de Nemours & Co., Wilmington, Del.



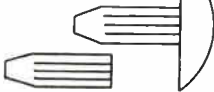
HOLLOW OR PULL-THRU RIVETS



"POP" BREAK HEAD RIVET



PLUGS FOR HOLLOW RIVETS



The hollow or pull-thru blind rivet is installed with special tools ranging in size from the plier type manual hand tool to large automatic hydraulic and pneumatic equipment. The rivet is furnished as an assembly of a hollow tube and a mandrel or pin. After inserting the rivet in the hole the mandrel is pulled through the rivet from the head side. The mandrel first forms the end of the rivet and then, as it reaches the portion of the rivet contained in the parent metal, it collapses its end and slides through the remainder of the rivet exerting only enough force to expand the rivet wall to meet the dimensions of the drilled hole. The mandrel is completely removed from the rivet leaving a hollow rivet which can be left open or subsequently filled with either an umbrella head

The "Pop Break Head" rivet is similar to the hollow or pull-thru rivet except that the mandrel breaks apart. A portion of the mandrel falls out of each end of the rivet. Because of this, the hole is not completely filled.

The Chobert blind rivet is installed by a special high speed system. The rivets, hollow in configuration, are packaged in a plastic tube. At time of installation a special mandrel is slipped through the center of these rivets, the plastic tube removed, and the mandrel and rivets inserted in the riveting tool. As the rivets are required, the tool, with one rivet projecting out of its end, is placed against the work so that this rivet is properly seated. The tool next draws the mandrel

pin or a headless pin. These rivets are very useful in hard to reach places and for fastening components to chassis, etc. where appearance is not of prime importance and where access to one side only is available. One rivet can be used over a wide grip range, the longest being suitable for fastening very thin sheets in order to reduce stockage. Head styles include, Brazier, Universal, 100° countersink and truss head. Hole tolerances are important in using these rivets.

Sizes—1/32 to 1/4 dia. Grip length 0.020 to 1 in. Materials—Monel, aluminum, stainless, steel, brass

Known suppliers—Olympic Screw & Rivet Corp., Downey, Calif.; Townsend Co., Brighton, Pa.; Huck Manufacturing Co., Detroit, Mich.

Sizes—3/32 in. dia. to 0.200 in. dia. Grip lengths 0.010 in. to 0.625 in.

Material—Aluminum and monel

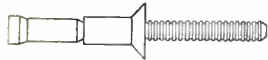
Known supplier—United Shoe Machinery Corp., West Medway, Mass.

through the first rivet completely forming its end and preparing itself for insertion of another rivet. Head styles include Brozier, 100° countersunk, and truss. The end product is a hollow rivet which can be plugged similar to the other hollow rivets.

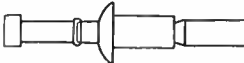
Size—3/32 to 1/2 in. diameter—grip length 1/8 to 1 in.

Material—Aluminum, monel, steel

Known supplier—Aviation Developments Inc., Burbank, Calif.



FLUSH SELF PLUGGING RIVETS



"POP" BREAK STEM RIVETS

Flush self plugging rivets are very similar to the hollow rivets but the mandrel breaks off at the rivet head leaving a solid rivet. The mandrel usually has to be shaved or cut off at the break in order to leave a smooth surface. The mandrel portion left in the rivet is securely held in place by its force fit and by its shape. Hole sizes are

The "Pop Break Stem" rivet is similar to the other self plugging rivet except that the mandrel breaks off inside the rivet, allowing part to remain captive and part to be removed from the head end of the rivet. The result is a plugged rivet where the plug is not flush with the head.

the same as for the hollow rivets.

Size—1/8 to 9/32 in. dia.—Grip length 0.020 to 3/4 in.

Material—Aluminum, monel, steel

Known supplier—Olympic Screw & Rivet Corp., Downey, Calif.; Townsend Co., New Brighton, Pa.; Huck Mfg. Co., Detroit, Mich.

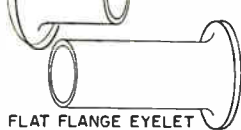
Size—7/64 to 0.200 in. dia.—grip length 0.010-0.625 in.

Material—Aluminum, monel, steel

Known source—United Shoe Machinery Corp., West Medway, Mass.



ROLLED FLANGE EYELET



FLAT FLANGE EYELET

Eyelets are thin rolled tubes which have one end flanged. The two basic types of flanges are the flat, which is flanged perpendicular to the body, and the rolled which gives a domed effect. There are many variations of these eyelets including tapered barrel and fancy flanged types. The eyelets have two uses in the electronic industry, one is

as a fastener and the other is to protect wiring from sharp edges. After the eyelets are inserted a second flange is made on the other end by eyeletting tools.

Size—0.060 in. to 0.500 in. OD with length 0.093 to 3/4 in.

Material—Brass, aluminum and plastic

FASTENERS



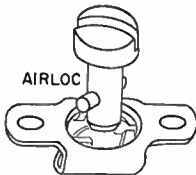
FASTEX Q-ONE

The Fastex Q-one is a 3 piece fastener. The receptacle is mounted on the underside of the bottom panel by rivets, screws or welds. The stud is slipped through a drilled hole and the pin then inserted with a special plier type tool. The spring action is in the receptacle.

Sizes—200, 500 and 700 lb. with rivet spacing 3/4, 1 and 1 3/8 in. respectively and stud diameter—0.167, 1/2 and 3/16 in. respectively.

Head styles—flush, oval and wing

Known supplier—Fastex Div. Illinois Tool Works, Des Moines, Ill.



AIRLOC

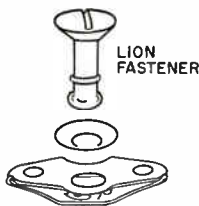
The Airloc fastener is a 3 piece fastener similar to the Fastex. The receptacle is fastened to the underside of the bottom sheet. The stud is inserted in a drilled hole in the top panel and the pin then inserted. The spring action is contained in the receptacle.

Sizes—100, 200, 500 and 700 lb. with rivet spac-

ing 1/2, 3/4, 1, 1 3/8 in. respectively and stud diameter—1/8, 11/64, 17/64, 5/16 in respectively.

Head styles—flush, round, wing

Known supplier—Monadrock Mills, San Leandro, Calif.



LION FASTENER

The Lion fastener is a three piece assembly, the receptacle being fastened to the underside of the lower panel, it being the spring component. The stud is inserted in a drilled hole and then captivated by a washer or grommet on the underside of the top panel. Because of the oversized hole in the top panel, allowed for the clearance of the

integral pin, the stud can "float" 0.070 in. in all directions.

Sizes—200 and 500 lb. and stud diameter 0.156 and 0.195 in. respectively with rivet spacing of 3/4 in. and 1 in. respectively.

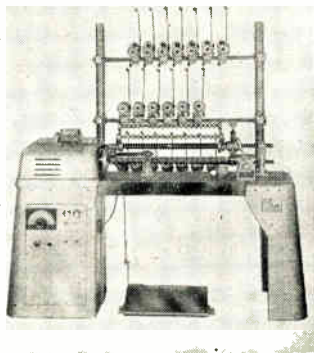
Head styles—flush, oval, wing, ring, knurled

Known supplier—South Chester Corp., Lester, Pa.

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7 TIME-SAVING FEATURES: 1) Unique wire carriage quickly shifts into coils' margin, adds extra turns for lead purposes. 2) Shorter set-up time. 3) No gear changing—pitch selector permits instant selection of turns per inch range. 4) Instantly adjustable winding width. 5) Winding cycle instantly reset by touching counter lever. 6) Instant spiral/rapid traverse device. 7) Front loading of tension permitted by compact machine design.

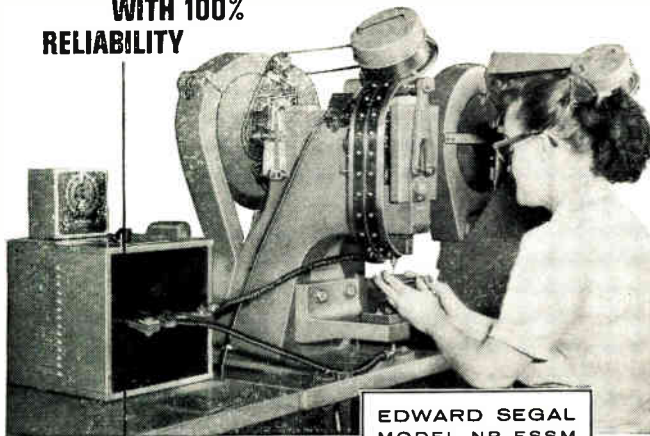


Model 405-AM multiple winds paper section power, audio, fluorescent ballast and similar transformer coil types up to 9" OD if round, 4½" OD if rectangular, 6" long, using wire sizes 16-44. Maximum center to center distance for adjustable wire guide rollers 23½", distance between head and tailstock 33" max. & 21" min., winding range 19-454 turns per inch, winding speed up to 2000 RPM, output end of spindle ⅞" flatted shaft. Furnished with motor, counter, brake, tailstock, tilting table paper feed & 20 tensions with new support bracket permitting vertical, horizontal & angular tension adjustment.

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This revolutionary machine, supplied as a complete installation, is obsoleting manual eyelet attaching and soldering. Leading manufacturers, in many cases using batteries of them, find Segal's new Model NR-ESSM is a completely dependable automatic method of making continuous electrical circuits of the printed elements on opposite sides of a board — or a single side if desired. Stakes and fuses 30 eyelets or more a minute, top and bottom, with never a reject.

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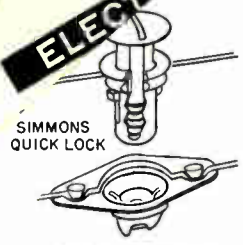
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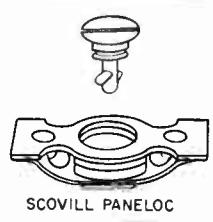
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SIMMONS QUICK LOCK

The Simmons Quick Lock is a three part fastener with a self ejecting stud. The receptacle is fastened in the normal way. The stud contains the spring mechanism but after assembly the load is taken by the receptacle and cross bar. The stud is captivated by a washer or grommet. A receptacle is also available which can be screwed into castings or fastened with a nut to sheet

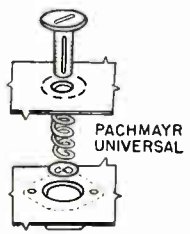
material.
 Sizes—200, 500 and 700 lb. and stud diameter 5/16, 3/8 and 7/16 in. with receptacle spring of 3/4, 1 and 1 3/8 in. respectively.
 Head styles—oval, flush, wing
 Known supplier—Simmons Fastener Corp., Albany, N. Y.



SCOVILL PANELOC

The Scovill Paneloc panel fastener is a three piece assembly with the option of using a fourth piece, a grommet, to protect the surface of the outer panel or to reinforce the panel. The stud is inserted in a hole of such diameter to clear the stud wings or cross bar and is captivated by a retaining ring. The receptacle is inserted in the conventional way and is available both with and

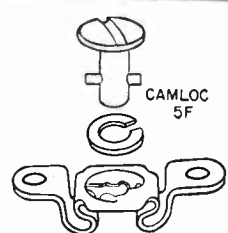
without float.
 Sizes—500 and 700 lbs. with rivet spacing of 1 and 1 3/8 in. respectively and stud diameter of 5/16 and 3/8 in. respectively.
 Head styles—flush, oval and wing
 Known supplier—Scovill Mfg. Co., Waterbury, Conn.



PACHMAYR UNIVERSAL

The Pachmayr Universal is a four piece fastener. The stud is inserted in a drilled hole and then captivated by a spring and retainer combination which also serves as a stud ejector. The receptacle is installed in the normal manner. The stud cross section is round with two flattened surfaces. The rounded portion is threaded with a multiple thread which permits the stud to be inserted with a mating nut in the receptacle and then turned a

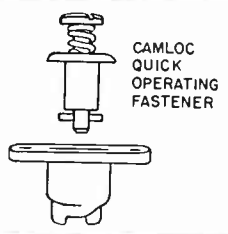
quarter turn to draw the panels together and lock in position. Each stud has a long grip range because of this technique.
 Sizes—200, 500, 700 lbs. with rivet spacing of 3/4, 1 and 1 3/8 in. respectively.
 Head styles—flush and round
 Known supplier—Pachmayr Corp., Los Angeles, Calif.; Airtex Dynamics Inc., Los Angeles, Calif.



CAMLOC 5F

The Camloc 5F is a three piece fastener. The stud, which has the cross pin preassembled, is inserted in a drilled hole by cocking it and is then retained by a split retaining ring. The receptacle, which is the spring element, is riveted, screwed or welded in place.

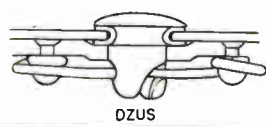
Size—100 lb. with 3/4 in. rivet spacing and 1/8 in. diameter stud.
 Head styles—wing, pan, and flush
 Known supplier—Camloc Fastener Corp., Paramus, N. J.



CAMLOC QUICK OPERATING FASTENER

The Camloc quick operating fastener is a 2 piece assembly with optional variations which include retaining devices. The self ejecting stud is installed in a drilled hole by depressing the spring and cocking the cross pin. The receptacle is mounted in the standard manner. Long studs require an additional retaining ring to captivate

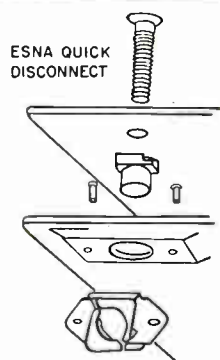
them. Large stud float can be obtained by using an oversized hole and snap ring to retain the stud.
 Sizes—200, 500 and 700 lbs. with rivet spacing of 3/4, 1 and 1 3/8 in.
 Head styles—flush, wing, oval
 Known source—Camloc Fastener Corp., Paramus, N. J.



DZUS

The Dzus spiral cam is a three piece fastener. The stud, which contains the camming surface, is captivated in a drilled hole with a grommet. The receptacle which is a spring, is riveted in position.
 Sizes—3/16 to 7/16 dia. studs for loads from

359 to 1800 lbs.
 Head styles—oval, flush, hex, wing, knob
 Known supplier—Dzus Fastener Co., Babylon, N. Y.



ESNA QUICK DISCONNECT

The Esna Quick Disconnect is a three piece fastener. A screw, not supplied, is inserted through a drilled hole and mated with an all metal, high torque, internally threaded, specially shaped, lock nut. The receptacle is riveted in a normal manner. The screw is tightened, with the receptacle holding the nut, until the panels are together. Once set, the quarter turn feature

comes into operation. This fastener offers a large range of grips by varying the screw and gives desired float by changing the hole diameter.
 Sizes—1/4—20 thread—7/8 in. rivet spacing
 Head styles—any style screw (supplied by customer)
 Known supplier—Elastic Stop Nut Corp., Union, N. J.

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NEW SPEED CLIP[®] ANCHORS WIRES, CABLES, TUBING, RELIEVES STRAIN, SIMPLIFIES ASSEMBLY

Made specifically to attach cables, wires, harness, or tubing firmly to panels, this newest Tinnerman SPEED CLIP is readily snapped into place in only 3 simple steps. Prelatch it on the conductor or tubing, insert SPEED CLIP in panel hole, then push home to lock. Assembly costs are reduced because assembly time is cut to the minimum.

Tinnerman SPEED CLIPS also serve as trouble-free strain-relief clamps—they are used extensively on appliances for attaching 3-wire round or horizontal section rib cord, and easily withstand the 35-pound pull test requirements. Double latch permits pre-assembly and accurate retention of SPEED CLIPS to wire or harness before panel assembly for further savings in assembly time. Double-rib retainers grip tightly on round or rectangular cords from .175" round to .306 x .515" rectangle. Important, too, SPEED CLIPS can easily be removed from the mounting side.

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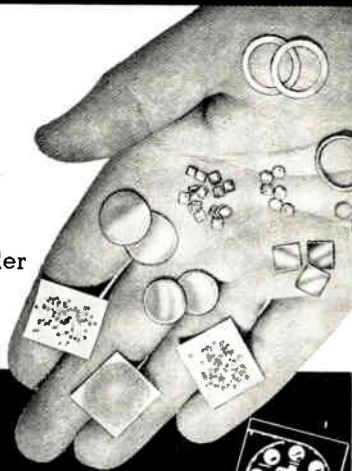
CANADA: Dominion Fasteners Ltd., Hamilton, Ontario. GREAT BRITAIN: Simmonds Aerocessories Ltd., Treforest, Wales.
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Reduces to seconds maintenance which otherwise could
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obsoletes old switches.

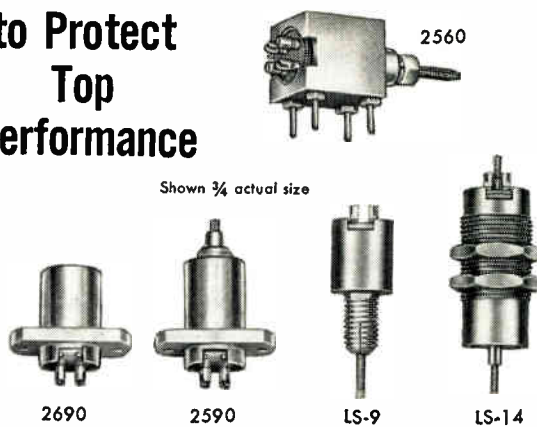
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Switches may be manually, motor or solenoid operated for
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Geometrical design establishes equal resistance path to chassis surface for each termination. Provides minimum ohmic resistance between terminations.

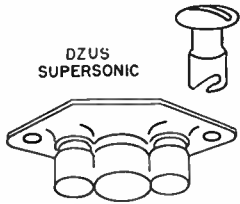
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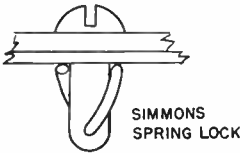
Circle 153 on Inquiry Card



The Dzus supersonic fastener is similar to the spiral cam but comes with either a rigid or floating receptacle.

Sizes—200, 500, 700 lbs. with rivet opening of

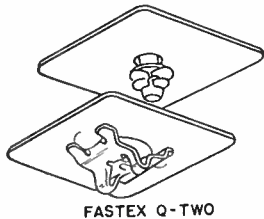
$\frac{3}{4}$, 1 and $1\frac{3}{8}$ in.
Head styles—oval, wing and flush
Known supplier—Dzus Fastener Corp., Babylon, N. Y.



The Simmons Spring-Lock is a one piece fastener. It is inserted in an elongated hole whose major dimension is slightly less than that of the top section of the spring wire. As the fastener is pushed into the hole, the spring wire is deflected, but springs back when it clears the panel captivating the fastener in the top panel. The fastener then enters a larger specially prepared hole and as it is rotated the spring bends, fasten-

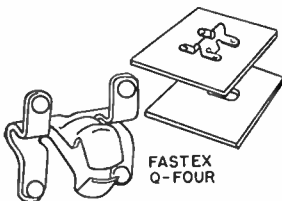
ing the panels. Because of its design, it is self adjusting and can be used in blind applications. Grommets can be used on the underside of the bottom panel if the material is soft.

Sizes— $\frac{1}{8}$, $\frac{5}{32}$, $\frac{3}{16}$, $\frac{1}{4}$ in. diameters.
Head styles—round, hex, wing
Known supplier—Simmons Fastener Corp., Albany, N. Y.



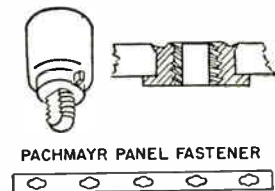
The Fastex Q-Two fastener is composed of 3 pieces—the stud which is captivated by a special washer and the receptacle which is snapped in place. It accommodates misalignment up to $\frac{1}{8}$ in.

Sizes— $\frac{1}{4}$ in. stud
Head styles—flush, wing
Known supplier—Illinois Tool Works, Des Plaines, Ill.



The Fastex Q-Four is a one piece fastener which can be used in blind applications. It is snapped into a drilled hole in the first panel and held captive. The second panel has an elongated hole. The fastener is locked by a quarter turn.

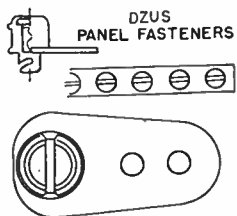
Sizes—grips from 0.065 to 0.225 in.
Head styles—as shown
Known supplier—Illinois Tool Works, Des Moines, Ill.



The Pachmayr Panel Fastener is similar to the Pachmayr Universal except that the receptacle is very thin and the head of the stud contains most of the mechanism. The two piece assembly consists of a stud which is staked into one sheet and a receptacle which is clinched or staked in place. As an alternate to this receptacle an angle type nut strip is available for use with multiple studs.

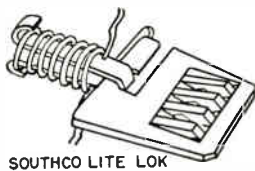
A key shaped hole is required in the top panel to prevent the stud assembly from rotating.

Sizes—200 lbs.
Head styles—as shown (slotted)
Known suppliers—Pachmayr Corp., Los Angeles, Calif.; Airtex Dynamics Inc., Los Angeles, Calif.



The Dzus Panel Fastener is similar to the Pachmayr except that it has a cam surface on the stud which connects with a cross wire in a receptacle or on an angle nut strip. The stud is captivated in the

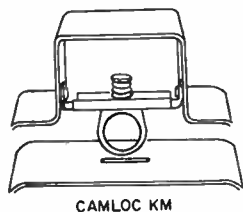
normal Dzus manner with a grommet.
Known supplier—Dzus Fastener Co., Babylon, N. Y.



The Southco Lite Lok is a 3 piece sheet metal fastener. The yoke part is dropped through the spring and drilled hole, and engages in the tab part, captivating the assembly in the first sheet. The second sheet has an elongated hole to accommodate the tab. After insertion the tab is

turned 90° to lock the panels and can be folded out of the way.

Size—one part for grips up to $\frac{5}{32}$
Style—as shown
Known supplier—South Chester Corp., Lester, Pa.



The Camloc KM is a multi-piece fastener. The handle part is installed through a hole in one sheet and assembled with 2 washers, a spring and a cross pin so as to captivate it. The second sheet has an elongated hole through which the handle passes. A quarter turn of the handle fastens the panels. A fold away handle is optional. The fast-

ener can be preassembled and installed as one piece in a specially prepared key hole in the first panel.

Style—as shown
Known supplier—Camloc Fastener Corp., Paramus, N. J.



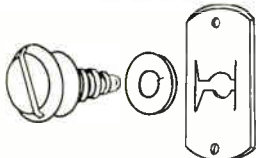
VIBREX

The Vibrex Fastener is composed of 4 elements. The stud is inserted through a drilled hole, rubber sleeve, and nylon cam and is captivated by the installation of a cross pin. There is no receptacle as the stud assembly is merely inserted in a drilled hole in the bottom panel and then is rotated 1/2 turn which cams up the nylon and compresses the rubber. If sheet separation is required, it can be

allowed for.

Sizes—stud assembly 5/16 and 1/2 in. diameter
Head styles—flush, button, wing, knob, cushion and handle

Known suppliers—Vibrex Fastener Corp., Mt. Kisco, N. Y.; General Tire and Rubber Co., Wabash, Ind.



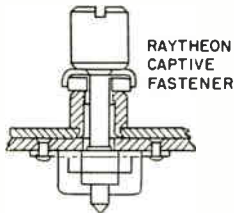
SOUTHCO SCREW FASTENER

The Southco screw fastener is a 3 piece fastener. The screw, which has a single thread similar to a thread forming screw, is inserted through a hole and captivated by a washer. The washer is threaded on the screw to a relieved portion of the screw. The receptacle can be a riveted speednut,

welded nut, saddle or a U or J type speednut.

Size—screw diameters 0.2330 and 0.312 in.—length 0.486 to 1.501 in.

Head styles—knurled, wing and slotted
Known supplier—South Chester Corp., Lester, Pa.



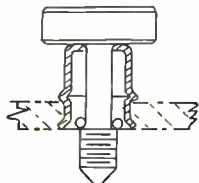
RAYTHEON CAPTIVE FASTENER

The Raytheon captive fastener is a 4 part, assembly of a slotted thumbscrew, a captivating bushing, a floating nut assembly, and a dust proofing rubber gasket. The thumbscrew is captivated to the top panel and the nut plate riveted to the bottom panel. The thumbscrew, bushing and gasket retainer are stainless steel, while the nut is steel

and the nut retainer brass.

Size—8-32, 10-24, 10-32, 1/4-20 and 5/16-18 with rivet spacing of 11/32, 7/16, 7/16, 7/16 and 11/16 respectively. The grip range is 0.048 to 0.250.

Known supplier—Raytheon Mfg. Co., Waltham, Mass.



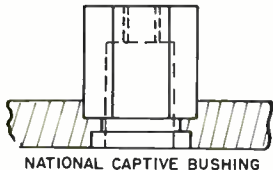
SOUTHCO CAPTIVE FASTENER

The Southco retractable screw assembly is in 3 parts; the thumbscrew (plain or slotted), the retaining bushing, and the captivating plastic "O" ring. The brass bushing is flared into a hole in the panel. The screw is then inserted and captivated by the "O" ring which is slid over the screw threads up to the relieved portion of the screw. The thumbscrews are available in brass or

stainless steel. No nut or mating female threaded device is supplied. The screw is allowed to float within the bushing eliminating the need of a floating nut.

Size—10-24, 10-32, 12-24, and 1/4-20 with varying lengths.

Known supplier—South Chester Corp., Lester, Pa.



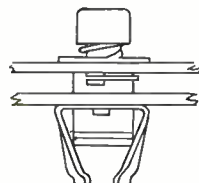
NATIONAL CAPTIVE BUSHING

The National captive bushing is a self clinching retainer for captivating externally relieved screws. The bushing is pressed into sheet material such as aluminum, magnesium, brass, and plastics. It clinches itself in the parent material by cold flow. The screw is installed in the bushing by threading it through the first few threads, after which it be-

comes captive and can be retracted into the counterbored section. These are very easy to install, only a press and a drilled hole are required. Material is stainless steel.

Size—6-32, 8-32, 10-32, 1/4-20

Known supplier—National Co., Malden, Mass.



DEUTSCH PRES - LOC

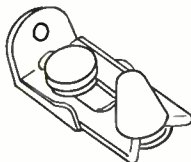
The Deutsch Pres-loc is a 3 piece fastener. The receptacle is riveted to the underside of one sheet and the stud is captivated in the other panel by a special retaining ring. After the panels meet, the stud button is pressed locking the stud to the receptacle. Another press of the button unlocks the assembly. This spreads the leaves of the re-

tainer allowing the stud to withdraw.

Sizes—0.386, 0.453 and 0.515 in. stud diameter with 7/8 in. rivet spacing

Head styles—protruding and flush

Known supplier—Deutsch Fastener Corp., Los Angeles, Calif.

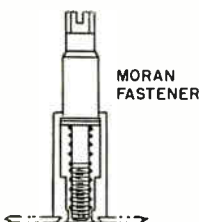


SNAP SLIDE

The snapslide is a 5 piece assembly consisting of a slide, a slide guide, spring washer, stud, and rivet. The stud is staked to the bottom panel while the rivet holds the spring washer, slide and guide to the top panel. To lock, the slide is slid along the guide and around the undercut portion

of the stud which protrudes through a hole in the top panel. A small hole is provided in the slide so that it can be lock wired to the stud when desired.

Known suppliers—Aircraft Radio Corp., Boonton, N. J.; Dimco-Gray Co., Dayton Ohio



MORAN FASTENER

The Moran captive fastener assembly is composed of a retaining bushing which is staked to the panel and a spring loaded stud which is captivated by this bushing. The stud is both slotted and hex.

It is often used to fasten one chassis, which has a flange, to another chassis or cabinet.

Size—8-32 screw

Known supplier—Moran Co., El Segundo, Calif.



1959 ELECTRONIC INDUSTRIES *Verified* DIRECTORY

(Seventeenth Edition)

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Directory Section

1959 Electronic Industries Directory and All-Reference Issue

Featuring Verified Listings Only

Contents—Changes—What's New—in this 17th Edition

- **Product Finding Index** pages 274 to 281
A fast reference guide that enables you to find the product you want in the Product Directory—quickly.
- **Product Listings** pages 282 to 383
101 major product sections contain 2919 specific product identifications. Alphabetical listings on manufacturers in each section tell who makes what. See data contained in "Verification" below.
- **Brand and Trade Names Index** pages 384 to 391
Alphabetically listed, this section tells what brand and trade names are used by which manufacturer.
- **Electronic Sales Representatives** pages 392 to 403
State by state listing of independent sales organizations selling electronic products. Tells territory covered, types of products handled and indicates if warehouse facilities are available. See additional data below.
- **Manufacturers Alphabetical Index and Localizer Index**..... pages 404 to 433
Alphabetical listing of names and addresses of electronic manufacturers making the products shown in the Product Listing Section. Localizer index enables you to contact manufacturers sales representative closest to you. Advertisers in this issue are listed in larger bold-faced type. Detailed information on their products may be found in the advertisers index (see pages 1-8).

Verification

What verification means: In previous years the information contained in the Product Listing Section was developed as the result of an extensive questionnairing program. In some instances it was found that respondents indicated not only the products they were making but also products that they would like to make. This year, thanks to the EIC (Electronic Industries IBM Classification) program, such erroneous information has been detected and eliminated. Again, in the interest of the reader, where a company has failed to respond to the EIC questionnairing program, no listing for the company has been included in the section. No carry-overs are included. (In some directory operations, listing

information obtained from a previous year's questionnaire will be carried over to the current issue). A verified directory is obtained by having tangible written evidence that a company is now physically manufacturing the products under which it is listed.

A verified directory will thus not contain the names of all manufacturers of a given item. For those manufacturers listed, however, there is written evidence that they are making the products shown. The aim of a verified directory is to assure the reader of a live source list compiled in a short period and to thus save him time and effort in locating the product he is seeking.

Electronic Sales Representatives

In the interests of improved directory user service, the listings in this section which begin on page 392 have been expanded. In previous editions independent "Rep" organizations were listed by name and address alphabetically by state. Telephone number as well as association affiliation were also included. In this new

edition this information has been expanded and now indicates the territory covered by the sales organization, the types of products handled, and whether or not the organization maintains warehousing facilities. All data listed in earlier editions have been retained and up dated.

Fast Section Identification

The listings in this directory involve more than 150 editorial pages. In order to facilitate directory use, a fast section identifying slug has been included on every spread. These are located in the upper right hand corner of each right hand page and

are printed in white on a black field. Thus the reader can quickly determine what section he has turned to and can rapidly locate the section he desires to use. A similar fast identification slug is located on editorial features in the All-Reference Section as well.

Product Finding Index

Here's How To Use This Index:

● Find the product in the alphabetical list below.

Products are listed by their basic description (i.e. a wheatstone bridge will be found listed as "bridge, wheatstone"). Cross-referencing is also provided where a product may be known by a number of different names—for instance, volume control; resistor, variable; and potentiometer will be found listed separately in alphabetical order but all indicating Section 79 as the major grouping where their manufacturers will be located.

● The FIRST NUMBER indicates the Section Number (Major Grouping).

And for quick indexing the top of each right hand page carries a line indicating which "Section" is listed on that and the preceding page.

● The SECOND NUMBER indicates the specific product that the manufacturer makes.

At the head of each section are listed individually the various products found in that grouping; over 2,900 products are included altogether in 101 major product sections.

Product	Section & Code No.	Product	Section & Code No.	Product	Section & Code No.	Product	Section & Code No.
A							
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Absorbers, nuclear radiation	14-48	Amplifiers, computer	19-2	Amplifiers, null	3-17	Analyzers, differential	5-9
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Product Listings

This is a verified listing of equipment, test and measuring instruments, and components manufactured by the electronic industries. Also listed are supplementary items such as cabinets, chemicals, hardware, raw materials and services related to the electronic field. Names and addresses of manufacturers are given for 2919 product categories which are arranged into 101 major groups. Com-

panies making these products or offering services in the field are arranged alphabetically in each of the 101 major groups. Addresses of the companies are contained in the alphabetical listing of manufacturers at the end of the directory. Numbers printed at the right of each column indicate the products each firm manufactures.

1—AMPLIFIERS, AUDIO

Amplifiers, audio	1	Barrett Electronics Corp	1-22	Electronic Instrument Co Inc	1-5-19-24
Amplifiers, cuing	2	Baughman Co E J	23	Electronic Production & Development	1
Amplifiers, decade	3	Bellaire Electronics Inc	1	Electronic Research Associates	11-22
Amplifiers, distribution	4	Bell Sound Div/Thompson-Ramo Woodridge Inc	1-5-6-17-19-20	Electronics Inc	1-5-19-22
Amplifiers, hearing aid	25	Bendix Aviation Corp/Bendix Radio Div	1	Electronic Systems Development Corp	22
Amplifiers, high-fidelity	5	Bergen Labs	1-11-16-20-22	Electronic Systems Eng'g Co	1-6-8-9-10-13-15-17-18
Amplifiers, industrial sound	6	B J Electronics Borg-Warner Corp	22	Electrosolids Corp	1-7-22
Amplifiers, isolation	7	Bogen-Presto Co/Div Siegler Corp	1-5-6-10-12-13-14-16-19-20-22	Electro-Voice Inc	3
Amplifiers, limiting ..	8	Bosch Inc M Ten	1	Elk Electronics Labs Inc	1-11-16-23
Amplifiers, line	9	Brach Mfg Corp/Div General Bronze Corp	1-14	Ely Sales Co	1
Amplifiers, microphone	10	Brush Instruments Div/Clevite Corp	6-10-16-22	Emerson Electric	6-7-8
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Amplifiers, mixing	12	Bunnell & Co J H	13-24	Engineered Magnetics/Div Gulton Industries Inc	22
Amplifiers, modulator	24	Burr-Brown Research Corp	1-3-16-22-23	E O Electronics Inc	3
Amplifiers, monitoring	13	B-W Mfgs Inc/Phillips Radio Div	1	Eprad Inc	1
Amplifiers, musical instrument ..	14	Calbest Electronics Co	1-5-19	Ercona Corp	1-15-17-18-19-20
Amplifiers, noise-suppressing ..	15	Cal-Lee Mfg Co	1	Erco Radio Labs Inc	8-24
Amplifiers, plug-in	16	Canadian Marconi Co	1-2-4-8-9-10-11-13	Erie Resistor Corp	1
Amplifiers, recording	17	Canadian Research Institute	1-5-6	Erie Resistor of Canada Ltd	1
Amplifiers, remote	18	Centralab Div/Globe-Union Inc	1-10-11-22-24	Erwood Inc	1
Amplifiers, stereophonic	19	Central Electronics Inc	1-8-22	Fairchild Astrionics Div Fairchild Engine & Airplane Corp	3
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		Chicago Standard Transformer Corp	5	Ferrotron Electronics Co Inc	1-10-11-13-16-22-23
		Cinema Eng'g Div		Fidelity Amplifier Co	1-19-22
		Aerovox Corp	1-9-10-16-17-20	Fisher Berkeley Corp	1-4-5-6-18-22
		Cirilo Ultrasonic Corp	6	Frederick Tool & Eng'g Corp	11
		Clegg Laboratories/Div Clegg Inc	1	Gai-Tronics Corp	1-6-11-22
		Coils Electronics Co	1	Gates Radio Co	1-4-5-6-7-8-9-10-12-13-16-18-20-22-24
		Collins Radio Co	1-2-7-8-9-10-12-13-16-17-18-24	General Controls Co	22
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		Convair (San Diego)	9-22	Gotham Audio Development Corp	1-4-5-6-13-17
		Courter Products/Div Model Eng'g & Mfg Inc	1	Gray Mfg Co	1-5-17-22
		Crosby Labs Inc	19	Greene Co L Charlton	1-5-10-16
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		Daystrom-Weston Industries	1-22	Heath Co (Benton Harbor)	1-5-19-20
		Dayton Aviation Radio & Equipment Corp	1-4-7-11-17-22-24	Hewlett-Packard Co	1
		Deltron Inc	1-23	Hoffman Electronics Corp	15
		Denrad Mfg Co Inc	1-5-6-9-10	Holland Electronics	1-3-4-6-7-8-9-11-12-13-16-17-18-20-22-23
		Denson Electronics Corp	1	Honeywell Controls Ltd	1-6
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		Elcor Inc	23	Kaiser Aircraft & Electronics Div/Kaiser Ind	1-20-22
		Electrend Products Corp	1-5		
		Electro Instrument Inc	1-3-7-16-22-23		
		Electronic Applications Inc	8-9-10-18-20-22		
		Electronic Equipment Supply Co	1-22		
Acoustic Research Inc	1-6-14-17-18-19-21-23				
Advanced Technology Labs	22				
Aeroflex Labs	22				
Aeromotive Eng'g Products Ltd	2-4-24-27-28				
Aerovox Corp (New Bedford)	1-2-11-16-21				
Aircraft Radio Corp	1-7-10				
Airtronics International	22				
Allied Radio Corp	1-5-6				
Alpha Instrument Co	23				
Altec Lansing Corp	1-2-4-5-6-7-8-9-10-11-12-15-16-19-20-21-22-23				
Alto Scientific Co	22				
Amelco Inc	1-22-23				
American Concertone Div/American Electronics Inc	1-5-13-17-20				
American Research & Mfg Co	11-22-24				
American Electronics Inc	1-5-20				
Amplifier Corp of America	1-8-17-20-22				
Amplivox Ltd Abbey Mfg	10-22				
Anderton Electronic Lab	1-2-5-6-7-9-12-13-17-19-21				
Antennavision Inc	4-10-23-24				
Ardente Acoustic Labs Ltd	1-11-22				
Arenberg Ultrasonic Laboratory	23				
A R F Products Inc (River Forest)	1-22-23				
A R F Products Inc (Ranton)	1-4-5-13				
Arma Div/American Bosch Corp	3-8-15-22-23				
Atlantic Research Corp	16-23				
Audicon Electronics Inc	1-2-3-5-6-8-9-10-12-13-14-15-16-17-18-19-20-21-22-23-24				
Audio Equipment Co	1-10-14-22-25				
Audio Instrument Co	10				
Autocrat Electronics Co	1-5				
Auto Test Inc	1				
Avion Div ACF Industries Inc	22				
Avionics Ltd	1-5-10-11-16-22				
Axler Associates Inc	1-9				
Baird-Atomic Inc	23				
Baldwin Piano Co	1-14-22				
Ballantine Labs Inc	3				
Barker & Williamson Inc	1-3-22-24				

PRODUCT MFRS

Sects. 1 & 2—Amplifiers

Kaiser Aircraft & Electronics (Toledo)	22
Kay Electric Co	1-16-22
Kay-Townes Antenna Co	1
Kearfott Co Inc (Pasadena)	22
Kearfott Co Inc (Clifton)	22
Keithley Instruments Inc	3-7-23
Kelsey-Hayes Co	11-22
Keystone Products Co	22
Krohn-Hite Corp	1-23
Kurtz John O	1-5-22
Lake Mfg Co	1-4-6
Lane Electronics Mfg Corp	1
Langevin Div The W L Maxson Corp	1-2-4-6-7-9-10-11-12-13-16-17-18-22
Lear Inc (Santa Monica)	7
Lear Inc (Grand Rapids)	8-13-22-24
Leak Div/British Industries Corp	1-19
Leeds Co Inc Gerard G	1-16-22-23
Lehigh Valley Electronics Enc'g & Mfg Co	1-6-22
Lel Inc	8-22
Lewyt Mfg Corp	22-23
Ling Electronics Inc	1-8
Linlar Inc	1-5-6-10-11-18-19-20-22
Loge Sound Engrs J M	1-6
Madison Fielding Corp	1-12-19-20-21
Magnasync Mfg Co	1-9-10-11-12-13-17-19-20
Magnavox Corp	1-5-22-23
Magnecord Div/Midwestern Instruments Inc	17-20
Magnetic Amplifiers Inc	1-7-11-22-24
Magnetic Shield Divn Perfection Mica Co	12-45-54
Maico Electronics Inc	1-11-22-25
Marine View Electronics Inc	1
Medcraft Electronic Corp	17-22
Medtronics Assoc	3-22
Melody Master Mfg Co	1-5-14
M F Electronics Co	1-22
Microgee Products Inc	1-16-22
Microwave Eng'g Labs Inc	7-8-15-22-23
Midwestern Instruments	17-20
Millen Mfg Co James	24
Millivac Instruments Div/Cohu Electronics Inc	22
Minn-Honeywell Regulator Co/Mil Prod Gp/Aeronautical & Ordnance Div	3-7-9-11-16-22
Minn-Honeywell Regulator Co/Davies Labs Div	17-20
Miratel Inc	1-4-6-7-9-23-24
Missouri Research Labs Inc	17
Model Eng'g & Mfg Inc	1-5-7-8-9-12-13-23-24
Moeller Instrument Co	7
Molded Fiber Glass Co	5
Mosler Research Products Inc	13
Motigraph Inc	1-5-6-19
MP Engineering Co	1-5-6-21
Multi-Products Co	24
Nems-Clarke Co/Div Vitro Corp of America	1
Newcomb Audio Products Co	1-4-5-6-9-10-12-14-17-18-19-21
New London Instrument Co Inc	23
Nichols & Clark Inc	1-22
North Atlantic Industries Inc	11-16
Northeast Electronics Corp	22
Northern Radio Mfg Co Ltd	9
Northronics Co Inc	17-20
Oberline Inc Ultraaudio Div	1-2-4-5-6-10-13-16-18-19
Olympic Radio & TV	1-5-19-20
Otarion Listener Corp	1-25
Pampa Electronics Corp	17-20
Panatron Dev Div/Delta Broadcasting Sys	1-2-4-5-8-9-10-11-12-13-16-17-18-19-20-21-23
Patterson-Moos Div/Universal Winding Co	22
Peebles & Co Ltd Bruce	1-3-4-8-9-11-13-16-18-22-23-24
Pentron Corp	1-12-17-19-20
Perfection Mica Co	12-45-54
Permoflux Products Co	1-5-6-10-11-18-19-20-22
Peer Inc	1-8
P & H Electronics	1-8-10
Philbrick Researches Inc George A	3-12-16
Philo Corp/G & I Div	1-5-6-15-25
Philmore Mfg Co Inc	5-22
Pilot Radio Corp	1-5-19-20-21
Polytronic Research Inc	1-20-22
Polytronics Inc	1-5-6-7-10-14-17-18-19-20-22
Potter Instrument Co	20-22
Precision Hearing Aids	1-5-19-22
Printed Electronic Research Inc	1-5-6-9-19-20-22
Pulse Techniques Inc	1-10
Pye Telecommunications Ltd	1-6-10-18-22
Quan-Tech Laboratories	3-7-22
Radio Eng'g Co	1-5
Radio Eng'g Labs	23
Radio Music Corp	1-5-6

Radionic's Inc	22
Radio Receptor Co Inc	1
Rauland-Borg Corp	1-5-6-8-9-10-11-12-13-14-15-16-17-18-19-22
Raven Electronics Mfg Co	10
Raytheon Co	4-5-25
Rea Co J R	4-17
Recoton Corp	1
Reed & Reese-Repron Corp	1-11-16-22
Reed Research Inc	20
Remler Co	1-6-10-18-22-25
Rheem Mfg Co/Electronics Div	1-22-23
Rixon Electronics Inc	1-4-9-13-22
Roanwell Corp	22
Roberts Electronics Inc	1-17-20
Robertshaw-Fulton Controls Co/Aeronautical & Inst Div	22
Roesch Communications Douglas	1
Roffan Co	1-10-22
Ronan Kunzel	2-3-4-5-6-7
RS Electronics Corp	8-11-22-23-24
Sargent-Raymont Co	1-5-19-20-21
Schindlers	6-22
Schulmerich Electronics Inc	1-14-22
Scientific-Atlanta Inc	8-15-23
Scott Inc H H	1-3-5-6-7-9-10-15-19-21-23
Seeburg Corp	1-5-6-10-19-22
Sequoia Wire & Cable Co/Div Maderel Industries	1-22
Setchell-Carlson Inc	19
Sherwood Electronics Labs Inc	5-19
Sierra Electronic Corp	22
Simpson Mfg Co Mark	1-4-5-6-10-12-14-17-19
Solartron Electronic Group Ltd	1-7-22-23-30
Sorenson Industrial Electronic Co	22
S O S Cinema Supply Corp	1-5-10-17
Southwestern Industrial Electronics Co Div Dresser Industries Inc	1-6-8-13-16-17-20-22-23-24
Sparton Electronics Div	1-22-23
Stancil-Hoffman Corp	8-10-11-17-19-20-22
Standard Electromagnetics Inc	1
Standard Electronics/Div Radio Eng'g Labs	1-8-23
Stelma Inc	1-22
Stromberg-Carlson/Div Gen Dynamics Corp	1-2-4-5-6-9-10-12-13-18-19-21
Taber Instrument Corp	1-3-4-7-9-10-11-12-13-14-16-18-22-23-24
Tabet Mfg Co	1
Taffet Radio & TV Co	1-3-6-24
Tapco Group Thompson Ramo Wooldridge Inc	22
Tarzian Inc Sarkes	1-8-13
Tech-Master Corp	1-15-19-22
Technical Materiel Corp	1-4-8-18-23-24
Teledrome Mfg Corp	1-4-22-23
Telecontrol Corp	1-4-7-11-17-22
Telectro Industries Corp	1-4-5-6-10-12-13-17-19-20-22-23-24
Tele-Dynamics Inc	16-23
Telemarine Communications Co	1-6-24
Telephonics Corp	1-10
Teleton Co of America	14
Temco Aircraft Corp	17-20-22
Topper Mfg Co Inc	11-16-22
Transistor Electronics Co	1-11-20-22
Transonic Inc	16-22
Transval Electronics Corp	11-22
Tri-Point Plastics Inc	1-14-22
Trott Electronics Inc	1-16
TV Utilities Corp	1-4-9-13
United Control Corp	11-16-22
United Research Lab	1-2-6-13-17
Univox Corp	1-10
U S Recording Co	1-2-5-6-9-10-12-13-17-18-20-21-22-23
Vacuum Equip Div/N Y Air Brake Co	3
Valandy Electronics Corp	1-5-6-10-14-20-22
Valco Mfg Co	14
Vanity Fair Electronics	1
Venner Electronics Ltd	1-10-16-22
Video Instruments Co Inc	22-23
Virginia Electronics Co	1-4-7-8-9-10-11-12-13-16-17-18-22-23-24
V-M Corp	5-17-20
Voron & Co George	1-4-5-6-8-9-10-12-13
Waber Electronics	5
Wald Electronics	1-5-6-7-8-9-10-11-12-16-17-19-20-21-22
Waldorf Electronics Div F C Huyck & Sons	16-18-22
Walkirt Co	1-11-16-22
Waltham Electronics	23
Warwick Mfg Corp	1-5-17-19-22
Webster Electric Co	1-5-6-12-14-17-19-20
Wells-Gardner & Co	1-5-19
Westinghouse Electric Corp	1-7-9-21-23
Westinghouse Electric Corp/X Ray & Industrial Electronics Div	1

Westrex Corp	1-8-10-12-13-16-17-20-22
Westlab Electronics Inc	1
Wheeler Electronic Corp	1-9-10-11-16-22-24
White Instrument Labs	16
Whitley Electronics Inc	5-19-20
Wilcox Gay Corp	17-19
Winder Aircraft Corp of Fla	15
Wurlitzer Co	1-5-14-19

2—AMPLIFIERS, RF-IF

Amplifiers, antenna	1
Amplifiers, distribution	2
Amplifiers, IF	3
Amplifiers, isolation	4
Amplifiers, keying	5
Amplifiers, limiting	7
Amplifiers, line	8
Amplifiers, microwave	9
Amplifiers, mixing	10
Amplifiers, monitoring	11
Amplifiers, noise-suppressing	12
Amplifiers, radar	13
Amplifiers, R-F	14
Amplifiers, R-F, klystron	16
Amplifiers, single-sideband	15

Adler Electronics Inc	3-10-14
Aeronautical Electronics Inc	14
Airborne Instrs Lab/Div	3-9-10-13-15
Cutler Hammer Inc	9
Aircom Inc/(Winthrop)	3-9-13-14-15
Airtron Inc/Div Litton Ind	4-9
Alfred Electronics	1-3-7-13-14
Amerco Inc	9-11-13
Amerac Inc/(Beverly)	1-9-13-14
American Electronic Labs	13
American Electronic Labs Inc	13
American Machine & Foundry Co/Gen Eng Labs	1-9-11-13-14
Amtron Co	1-2-4-9-14
Antennavision Inc	2-14
Applied Science Corp of Princeton	3
Arenberg Ultrasonic Laboratory	2-9-13
A R F Products Inc (Ranton)	1-2
A R & T Electronics Inc	3-5-7-8-9-10-11-12-13-14
Audicon Electronics Inc	9
Avion Div/ACF Industries Inc	3-14-15
Barker & Williamson Inc	4-24
Relock Instrument Corp	4
Bendix Aviation Corp/Bendix Radio Div	14
Bergen Labs	5
Boehme Inc H O	14
Bunnell & Co J H	1-2-3-4-5-7-8-9-10-11-12-13-14-15-16
California Magnetic Controls Corp	7
Canadian Marconi Co	3-9-13
Canoga Div/Underwood Corp	14-15
Central Electronics Inc	1-2-5-10-11-12-14
Centronix Inc	9-15
Clegg Labs/Div Clegg Inc	1-2-3-14-18
Coils Electronics Co	3-9-14-15-16
Collins Radio Co (Cedar Rapids)	1
Commercial Radio Sound Corp	1-14
Community Eng'g Corp	13-14-15-16
Continental Elec Mfg Co	3-14
Continental Electronics Corp	9-13-14-16
Convoir (San Diego)	1-15
Corbin Corp	10-15
Crosby Labs Inc	2-3-4-8-10-14
Daven Co	1-2-3-4-12-13-14
Dayton Aviation Radio & Equipment Corp	3-14
Denson Electronics Corp	1-3-13-14-15
Divco-Wayne Electronics	1-14
Dow-Key Co Inc	1-2-7-9-10-12-13-14-15
Dynamic Electronics Inc	5-14-15
Eldico Electronics	3-10-13-14-15
Electronic Communications Inc	1-4-9-13-14
Electronic Specialty Co	3-13-14
Elk Electronics Labs Inc	1-2-3-9-10-12-13-14-16
Emerson Electric	3-13-14-16
E M I Cossor Electronics	9-13-14
Empire Devices Products Corp	16
English Electric Valve Co Ltd	1-2-10-14-15
Entron Inc	

Erco Radio Labs Inc	1-5-15
Federal Mfg & Eng'g Corp	13
Ferrotran Electronics Co Inc	3-14
Gates Radio Co	3-5-7-8-11-12-14-15
General Devices Inc	14-20
General Electric Co/Technical Products Dept	2-3-4-7-10-11-12-13-14-15
General Radio Co	3-14
Grem Eng'g	9
Gulton Industries Inc	1-2-9-13-14-16
Haller Raymond & Brown	1-2-8-9-14
Hazeltine Electronics Div/Hazeltine Corp	1-3-4-7-9-13-14
Hewlett-Packard Co	9-14
Hoffman Electronics Corp	3-12-14-15
Hycor Mfg Co	2-14
Industrial Development Eng'g Assoc	14
Instrument Corp of Fla	2-14-15
Instruments for Industry	2-3-14
Interstate Electronics Corp	3-14
ITT Federal Div/I T T	1-2-3-4-5-7-8-9-14-15-16
Jerrold Electronics Corp	14
Johnson Co E F	14-15
J-V-M Microwave Co	9-13-14
Kaiser Aircraft & Electronics Div/Kaiser Ind	3-9-14
Kay Electric Co	3-14
Kearfott Co Inc (Pasadena)	9
Kearfott Company Inc/Microwave Div	9-14
Keithley Instruments Inc	4
Land-Air Inc Instrument & Electronic Div	3-14
Land-Air Inc	3-14
Lear Inc (Santa Monica)	14
Lear Inc (Grand Rapids)	3
Leeds Co Inc Gerard G	3-12
Lel Inc	1-2-3-4-7-8-9-13-14-16
Levinthal Electronic Products Inc	9-13-14-15
Lewyt Mfg Corp	1-2-3-9-13-14
Ling Systems Inc	9-14
Magnasync Mfg Co	8
Magnavox Corp	3-9-13-14-15
Magnetic Amplifiers Inc	4-5-7-15-20-24-28
Maico Electronics Inc	3-14
Marine View Electronics Inc	1-3-14
Martin-Merrill Inc	18
Maxson Corp W L	3-9-13-14
Menlo Park Eng'g	9
Microwave Eng'g Labs Inc	1-2-4-7-8-9-10-13-14
Millen Mfg Co James	3-14
Miratel Inc	3-4-9-11-14-15
Model Eng'g & Mfg Co	3-7-8-11-14-15
Morrow Radio Mfg Co	15
Mullard House	9
Multi-Products Co	14-15
Narda Microwave Corp	9
New London Instrument Co Inc	3
Olympic Radio & TV	3
Opto Engineering Co	3
P & H Electronics	3-10-14-15
Peebles & Co Ltd Bruce	3-9-13-14-15
Philco Corp/G & I Div	9-13-14-16
Polarad Electronics Corp	9-13-14
Polytronic Research Inc	3
Polytronics Inc	1
Precision Hearing Aids	2-3-28
Pye Telecommunications Ltd	8
Radio Eng'g Co	3-4-11-14
Radionic's Inc	3
Radio Mfg Engineers Inc	14
Radioplane Div	13-14
Radio Receptor Co Inc	9-14-16
Reed & Reese-Reatron Corp	3-13-14-15
Remler Co	1-2-3
Resdel Eng'g Corp	1-3-9-13-14
Rhem Mfg Co/Electronics Div	14
Rixon Electronics Inc	1-2-14-15
RS Electronics Corp	1-2-3-4-7-9-10-13-14
Rue Products	14
Scientific Atlanta Inc	9-14
Scott Inc H H	12
Seg Electronics Co Inc	14
Sierra Electronic Corp	9-13-14-16
Southwestern Industrial Electronics Co	7-12
Sparton Electronics Div	3-14
Spectralab Inst Co	9-14
Spencer-Kennedy Labs Inc	1-2-8-14
Sperry Gyroscope Co/Electronic Tube Div	9-10-13
Standard Electronics Div/Radio Eng'g Labs	9-14-15
Stelma Inc	5
Sturupp Inc	8
Taffet Radio & TV Co	3
Technical Materiel Corp	1-2-4-5-7-8-14-15
Technical Oil Tool Corp	9-13
Teledrome Mfg Corp	2-3-4-5-7-8-9-10-11-14-16
Teletron Industries Corp	1-2-5-9-10-11-13-14-15
Telerad Mfg Corp	3-9-13-14
Tel-Instrument Electronics Corp	2-3

Temco Aircraft Corp	1-2-4-13-14
Tri-Point Plastics Inc	3
Underwood Corp/Canoga Div	3-9-12
United Electrodynamics	3
Univox Corp	14
Varian Associates	9
Virginia Electronics Co	2-3-4-5-7-8-10-11-14
Voron & Co George	5
Walham Electronics	3
Warwick Mfg Corp	3-14
Weinschel Eng'g	14
Wells-Gardner & Co	14
Westinghouse Electric Co/Air Arm Div	13
Westinghouse Electric Corp/(Pittsburgh)	4-8
Westrex Corp	15
Winder Aircraft Corp of Fla	1-2-4-7-13-15
Young Spring & Wire Co/Gonse Div	14
Zenith Radio Corp	9-13

Analogue Controls	4-5-7-10-13-24-27
Anderton Electronic Lab	5-18-19
Andromeda Inc	7
Antlab Inc	1
Applied Research Labs	19
Applied Science Corp of Princeton	10
Applied Technology Corp	4-5-6-7-8-10-13-22-26
Arenberg Ultrasonic Lab	29
A R F Products Inc (River Forest)	11-20-28-29
A R F Products Inc (Ranton)	21-22-28
Arma Div/American Bosch Corp	1-6-7-8-10-13-15-17-24-27-28-29-30
Arnoux Corp	2-7-11-15

3—AMPLIFIERS, SPECIAL PURPOSE

Amplifiers, bolometer	1
Amplifiers, cathode followers	2
Amplifiers, compressor	3
Amplifiers, computer	4
Amplifiers, control	5
Amplifiers, data recording	6
Amplifiers, DC	7
Amplifiers, decade	8
Amplifiers, differential	10
Amplifiers, encapsulated	11
Amplifiers, facsimile	12
Amplifiers, intergrading	13
Amplifiers, logarithmic	14
Amplifiers, magnetic	15
Amplifiers, maser	31
Amplifiers, null	17
Amplifiers, oscilloscope	18
Amplifiers, photocell	19
Amplifiers, power	20
Amplifiers, printed circuit	21
Amplifiers, pulse	22
Amplifiers, seismograph	23
Amplifiers, servo	24
Amplifiers, standingwave	32
Amplifiers, strain gage	25
Amplifiers, sweep	26
Amplifiers, synchro	27
Amplifiers, thyatron	33
Amplifiers, transistor	28
Amplifiers, ultrasonic	29
Amplifiers, vibration pick-up	30
Arrestors, electrical urge	34
Cavities, tuned, wavemeter	35

Acoustica Associates	29
Acromag Inc	5-7-10-11-13-15-17-19-20-24-25
Acton Laboratories Inc	8
Adler Electronics Inc	2-7-15-20-28
Advanced Technology Laboratories	15-28
Aero Electronics Co	4-24-27-28-30
Aeromotive Eng'g Products Ltd	4-6-24-27
Airborne Instrs Lab	4-6-7-13-14-21
Aircorn Inc (Winthrop)	1-32-35
Aircorn Inc (Roselle)	22
Airesearch Mfg Co Ariz Div/Garrett Corp	11-15-20-21-24
Airpax Electronics Inc	6-7-15-28-25
Airtronics Inc	4-6-11-15
Airtronics International	21
Alfred Electronics	7
Allegheny Instrument Co	2-5-7-10-13-18-25-30
Altec Lansing Corp	2-3-20-21-29
Alto Scientific Co	28
Amelco Inc	4-5-7-14-21-24-28
American Electronics Inc	5-15-24-28
American Electronics Inc/Instrument Div	24
American Electronic Labs	1-7-10-28
American Electronic Labs Inc	10
American Machine & Foundry Co/Gen Eng Labs	24
American Measurement & Control Inc	24
American Research & Mfg Co	7-10-11-15-19-20-24-25-28-30
Amplifier Corp of America	3-20-28
Amplivox Ltd Abbey Mfg Est Mt Plant	28
Amtron Co	20
Anadex Instruments Inc	4-5-6-7-10-11-13-15-17-24-25-28-29

Arnold Corp	2-7-11-15
A R & T Electronics Inc	28
Atchley Inc Raymond	2-4
Atlantic Research Corp	23
Audicon Electronics Inc	11-18-20-21-24-28-29-30
Audio Instrument Co	2-14
Aurex Corp	28
Automatic Timing & Controls Inc	24
Automation Dynamics Corp	28
Auto Test Inc (Chicago)	20
Autotron Inc	15-19-28
Avion Div/ACF Industries Inc	4-10-11-15-24-28
Avionics Ltd	19-21-30
Axler Associates Inc	17-19-28
Baird-Atomic Inc	2-6-7-22-25-28
Baldwin-Lima-Hamilton Corp/Electronics & Instrumentation Div	25
Baldwin Piano Co	11-19-21-22
Ballantine Labs Inc	3
Barker & Williamson Inc	17
Barrett Electronics Corp	5-28
Barton Electronics Inc	19
Basic Controls Inc	5-7-8-15-19-21-28
Beckman Instruments Inc/Systems Div	4-6-7-10-18-21-25-28
Beckman Instruments Inc/Scientific & Process Inst Div	7
Beckman Inst Inc/Berkeley Div	4-7
Bell Sound Div/Thompson Ramo Wooldridge Inc	20
Belock Instrument Corp	4-5-13-15-27-28
Bendix Aviation Corp/Bendix Radio Div	28
Bendix Aviation Corp/Eclipse-Pioneer Div	4-5-15-24-28
Bently Scientific Co	4-20
Bergen Labs	13-15-24-28
Beva Laboratory	22
B & F Instruments Inc	6
B J Electronics/Borg-Warner Corp	14-21-22
Blackstone Corp	29
Bliss Electronic Corp	5-7-28
Bogen-Presto Co/Div Siegler Corp	28
Bogue Electric Mfg Co	15-24
Boonton Electronics Corp	7-17-19-25
Bosch Inc M Ten	24
Briggs Associates	4-5-6-15-22-24
Bristol Co	4-5-6-7-17-24-25
Brown & Sharpe Mfg Co	25
Bruno-New York Industries Corp	11-28
Brush Instruments Div/Clevite Corp	6-10-21-24-25-27-28-30
Bundy Electronics Corp	15-23
Burr-Brown Research Corp	4-5-7-8-10-13-17-21-28-29
Burroughs Corp	2-4-5-15-21-22-24-28
Bush Transformer Corp	15
Calif Magnetic Controls Corp	7-24-25-27-29
Calif Technical Industries/Div Textron Inc	1-14-32
Calmag Div/Calif Magnetic Cont Corp	7
Canadian Applied Research Ltd	24-28
Canadian Research Institute	17-20-29-30
Cedar Eng'g/Div Control Data Corp	6-11-15-24-27
Centralab Div/Globe-Union Inc	7-11-21-28
Central Electronics Inc	3-21
Centronix Inc	4-6-7-8-20-21-25-28-29
Century Electronics & Instruments Inc	6-13-25-30
Century Projector Corp	2-19-20
CGS Laboratories Inc	15
Chicago Electronic Engg Co	15
Chicago Magnetic Control	15
Cirio Ultrasonic Corp	29
Clark Controller Co	5-15-20-28
Cleveland Metal Specialties Co	21
Clevite Corp/Texas Div	23
Coast Coil Co	15
Coil Winders Inc	15
Coils Electronics Co	30
Collins Radio Co (Cedar Rapids)	20-24
Colorado Research Corp	4-5-7-13-21-31
Columbia Research Labs	2-6-30
Communication Accessories Co	15-24
Community Eng'g Corp	18-21
Compton Corp	4-6-21-28
Computer Engg Assocs Inc (Monrovia)	4-5-6-7-13-25

Sect. 3—Amplifiers, Special

Computer Eng'g Assocs Inc (Pasadena) 4-6-7-13-25
 Computing Devices of Canada Ltd 4-24-28
 Consolidated Controls Corp 6-7-15-24
 Consolidated Electrodynamics Corp (Pasadena) 6-7-25-30
 Control/Div Magnetics Inc 5-7-11-15-20-24
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Kay Electric Co	1-2-3-4-5-7-8-14-16-21-24-28-30-31-32
Kearfott Company Inc/Microwave Div	24
Kearfott Co Inc (Clifton)	20-23
Kingston Electronics	5
Kistler Instrument Corporation	13-18-21-36
Land-Air Inc/Instrument & Electronic Div	13-30
Land-Air Inc (Chicago)	13-30-38
Lavoie Labs Inc	5-24
Leeds & Northrup Co	15
Lektra Labs Inc	7
Ling Electronics Inc	30
Liquidometer Corp	4
Litton Industries of Maryland	38
Magnavox Corp	4
Magnetic Amplifiers Inc	23-28
Maico Electronics Inc	88
Marconi Instruments Ltd	24
Marquardt Aircraft Co/Pomona Div	23
MB Mfg Co/Div Textron Inc	30
Measurements/Div McGraw-Edison	17
Measurements Research Co/Div Prudential Indust	3-4-5-28
Meterlog Corp Sub/Air Logistics Corp	5-23
Metronix Inc	28
Microwave Eng'g Labs Inc	20
Mine Safety Appliances Co	15-21
Minn-Honeywell Regulator Co/Davies Labs Div	14-16-24
Miratel Inc	24-31-32
Missouri Research Labs Inc	22-23
Moran Instrument Corp	23
Muirhead & Co Ltd	14-16-23-30-32

PRODUCT MFRS

4—Amplifiers, TV; 5—Analyzers

National Instrument Labs Inc	5-15
Nat'l Spectrographic Labs Inc	15-24
National Ultrasonic Corp	29
Norden Div/United Aircraft Corp	28
North Atlantic Industries Inc	5
Northeast Electronics Corp	22
Northeastern Eng'g Inc	24
Northrop Aircraft Inc/Nortronics Div	5-9-10-14-28
NRC Equipment Corp	15
Nuclear-Chicago Corp	24
Nuclear Corp of America/Instrument & Research Div	24
Opto Engineering Co/Div Remanco Inc	24
Owen Labs Inc	28
Pacific Automation Products	3
Packard Bell Computer Corp	9-10
Panoramic Radio Products	24
Perkin-Elmer Corp	7-24
Peschel Electronics Inc	3
Phillips Electronics Inc	36
Photographic Analysis Inc	11
Polarad Electronics Corp	1-14-20-22-23-24-32
Polypphase Instrument Co	13-28
Polytechnic Research & Development Co	1-20-24
Potter Instrument Co	10-14
Precision Apparatus Co	4-5-28
Probescope Co Inc	2-14-16-17-21-24-25-26-29-30-31-32-33-34-36-37-38
Process & Instruments	15
Pye Telecommunications Ltd	8-5-31-32
Quantametric Devices Inc	7-24
Quan-Tech Labs	16-17-21-32
Radar Measurements Corp	24
Radiation Counter Labs Inc	9-24-35-36
Radiation Instrument Development Lab Inc	6-35-36
Radio City Products Co	4-5
Railway Communications Inc	32
Raytheon Mfg Co (Waltham)	24-30-31-32
Rea Co J B/Electronics Div	10-14-19-38
Reed Research Inc	14
Rese Eng'g Inc	19
Rowe Industries	10-29
Royco Instruments Inc	36
Schaffer Air Industries	5
Schmeling Electronics	40
Scientific-Atlanta Inc	1
Scott Inc H H	2-14-21-30-37
Sequoia Wire & Cable Co/Div Mandrel Industries	15
Servo Corp of America	23
Shalloross Mfg Co	5
Short Brothers & Harland Ltd	23-27
Sierra Electronic Corp	3-14-16-28-32
Solartron Electronic Group Ltd	6-13-18-20-23-27
Southwestern Industrial Electronics Co	4-5-30
Specialty Eng'g & Electronics Co	15
Sperry Microwave Electronics Co/Div Sperry Rand	20-21-22-24
Sprague Electric Co	4
Stelma Inc	5-33
Suffolk Products Corp	24
Suncoast Instruments/Div Milton Roy Co	7-12
Taller & Cooper	15
Taro Electronics Inc	31
Technical Oil Tool Corp	20-22-24
Technical Products Co Instrument Div	30-32
Telechrome Mfg Corp	6-7-9-20-31-32
Teletro Industries Corp	2-4-38
Telerad Mfg Corp	20-22
Tel-Instrument Electronics Corp	30-31
Theta Instrument Corp	28
Towaco Electronics	83-35
Transistor Electronics Co	28
Triplet Electrical Instrument Co	5-28
Tronex Inc	15
Univox Corp	5
Varian Associates	12-24
Varo Mfg Co	14
Victoreen Instrument Co	9-24-34
Victory Eng'g Co	15
Virginia Electronics Co	2-5
Voron & Co George	4
Wang Labs Inc	6
Waterman Products Co	32
Wayne-Kerr Corp	21-30-32
Weinschel Eng'g	1
West Coast Research Corp	30
Westinghouse Electric Co/Air Arm Div	3-5-22
Westrex Corp	17
Winder Aircraft Corp of Fla	1
Winston Electronics Inc	2-32

6—ANTENNAS, COMMERCIAL

Absorbers, R-F radiation	26
Antennas, aircraft	1
Antennas, amateur	2
Antennas, broadcasting, AM	3
Antennas, broadcasting, FM & TV	4
Antennas, direction finding	5
Antennas, dummy load	27
Antennas, ferrite core	28
Antennas, fixed station	6
Antennas, ground plane	7
Antennas, loop	8
Antennas, loop-core	9
Antennas, marine	10
Antennas, microwave	11
Antennas, mobile	12
Antennas, radar	13
Antennas, radiation test	14
Antennas, railroad	15
Antennas, receiving, FM & TV	16
Antennas, rotary beam	17
Antennas, slotted line	18
Antennas, telescopic	19
Antennas, transmitting	29
Antennas, UHF	20
Antennas, VHF	21
Radiators, FM & TV	22
Reflectors	23
Rotators	24
Towers & supports, Commercial	25

Adler Electronics Inc	3-4-16-20-21
Advance Electronics Co	16-20-21
Aerolite Electronics Corp	8-9-13-23
Aeronautical Electronics Inc	6-7-12-21
Aeronautic Systems Inc	13
Airborne Instrs Lab	13-14-18-20-21
Aircrom Inc (Winthrop)	11-13-14-18-27
Aircrom Inc (Roselle)	11-13
Aircraft Radio Corp	1-8-12-20-21-28
Airtron Inc/Div Litton Ind	11-18-26-27-28
Alford Mfg Co	4-11-20-21
All Products Communication Products	1-2-3-4-5-6-7-8-11-12-13-14-20-21-23-24-25
Alpar Mfg Corp	2-3-19-23-25
Alproco Inc	25
American Aluminum Co	23
American Brass Co	12
American Electronics Co	2-4-16
American Electronics Labs	1-4-11-13-18-20-21
American Electronic Labs Inc	11-18-20-21
American Machine & Foundry Co/Gen Eng Labs	1-6-11-12-13-14
American Machine & Foundry Co	11-13-20-21-23-24-25
American Tower Co	25
Amphenol Connector Div	1-2-8-11
Amplint Inc	16-20-21
Andrew Antenna Corp	3-4-6-7-11-12-15-19-20-21-29
Andrew Corp	4-6-7-11-12-13-15-18-20-21-22-23
Andrew California Corp	1-4-5-6-7-11-12-13-15-18-20-21-22-23
Antenna Designs Inc	2-4
Antenna Specialists Co	1-2-4-6-7-10-12-15-16-19-20-21-29
Antlab Inc	24-25
Apparatus Development Co	16-24
Appleton Co Inc Harry	2
Applied Electronics Co	10
A R F Products Inc (River Forest)	5-8-20-21-27
A R F (Ranton)	21
Arrow Tool Co Inc	1-13
Arted Co Inc	28
Atlas Precision Products Co	1-5-11-12-13-23-24
Automatic Coil Co Inc	8-9
Automation Dynamics Corp	1-6-10-11-20-21
Avco Mfg Corp/Crosley Div	5-11-12-13-16-29
Avion Div/ACF Industries Inc	11
Bart Mfg Corp (Belleville)	11-23
Bart Mfg Corp (Newark)	11-23
Bellaire Electronics Inc	11
Bendix Aviation Corp/Bendix Radio Div	1-5-8-9-13-15-21
Bendix Aviation Corp/Eclipse Pioneer Div	13-25
Birdair Structures Inc	13-25
Blaine Electronics Inc	1-5-7-11-13-14-23-25
Blaw-Knox Co/Blaw-Knox Equip Div	3-4-11-25
Bogart Mfg Corp	11-20-21

Brach Mfg Corp/Div General	
Bronze Corp	11-13-16
Breeze Corp	13
Brooks & Perkins Inc	13-23
Budd Stanley Co	11-13-18
Budelman Radio Corp	21
Buggie Inc H H	12
Caddell-Burns Mfg Co	8-9
Calbest Electronics Co	9
Calif Technical Industries/Div Textron Inc	11-14
Canadian Marconi Co	3-4-5-22
Cascade Research Div/Monogram Precision Industries Inc	11-13
Canoga Div/Underwood Corp	1-7-11-13-20-21-23
Caswell Electronics Corp	11-12
Channel Master Corp	16-20-21
Chu Associates	5-6-11-13-18-20-21-29
Coaxial Connector Co Inc	1-8-11-13-20-21
Coilcraft Inc	8-9
Coils Electronics Co	8-9
Collins Radio Co (Cedar Rapids)	1-4-6-11-20-21
Columbia Products Co	1-2-6-7-10-12-15-20-21
Commercial Radio Sound Corp	3-16
Communications Co	6-7-12-21
Conn Marine Instrument Co	10
Conrad & Moser	5-10-13
Consolidated Wire & Associated Cos	2
Continental Elec Mfg Co	26-27
Convair (San Diego)	1-11-13-27
Copperweld Steel Co Wire & Cable Div	3-4-16
Corbin Corp	1-5-6-7-17-20-21
Craig Systems Inc	25
Dale Products Inc (Columbus)	1
Dayton Aviation Radio & Equipment Corp	1-5-8-13-20-21-28-29
Defiance Eng'g & Microwave Co	1-5-6-7-10-11-13-14-15-17-18
Demornd-Bonardi Corp	11-27
Diamond Antenna & Microwave Corp	1-7-10-11-12-13-15-18-23
Dorne & Margolin	1-5-6-8-11-13-18-20-21
Douglas Microwave Co	11-18
Dresser-Ideco Co	25
D & S Mfg Co	11-13-18-20-21
Dumont Airplane & Marine Instrument Inc	8
Dynamic Electronics Inc	1-2-5-11-12-13-20-21-22
Dynatronc Inc	1-5-11-17-20-21
Electrend Products Corp	3-12
Electro Impulse Lab Inc	27
Electro-Mechanical Eng'g Co Inc	2-10-12
Electronic Craftsmen	20
Electronic Specialty Co	1-11-13-20-21
Electron-Radar Products	11-13
Electro Products/Div Western Gear Corp	7
El-Rad Mfg Co	8-9
Elsin Electronics Corp	11
Emerson & Cuming Inc	23-26
Emerson Electric	11-13-14-18
E M I Cossor Electronics	3-4-20-21-25
Energy Controls Inc	11
Erco Radio Labs Inc	5-20-21
E-Z Way Towers Inc	2-3-4-11-19-23-24-25
Finney Co	2-16-20-21
Frederick Tool & Eng'g Corp	2
Fugle-Miller Labs Inc	9
Gabriel Electronics Div	1-5-6-7-10-11-12-13-18-19-20-21-23-24-29
Gabriel Co	18-19-20-21-23-24-29
Gates Radio Co	4-21-22-27
Gavitt Wire & Cable Co	8-9-28
G B Electronics Corp	1-13-23
General Bronze Corp	1-5-8-9-10-11-12-13-14-17-18-19-20-21-23-24-25
General Cement Mfg Co	8-9-16-19
General Electric Co/Technical Products Dept	4-6-11-20-21
Gulton Industries Inc	1-2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17-18-19-20-21-22-23-24-25-27-28-29
Hackensack Cable Corp	1
Haller Raymond & Brown	1-11-13-18-20-21-23
Hazeltine Electronics Div/Hazeltine Corp	1-6-7-11-12-13-14-20-21-23
Hi-lo Mfg Corp	16-20-21-25
Hoffman Electronics Corp	6-10-13
Houston Fearless Corp	13-24
Hudson American Div	10
Hycan Mfg Co	20-21
Hy-Gain Antenna Products Co	2-7-17-24
Illumintronc Eng'g Co	2-10-12
Industrial Development Eng'g Assoc	12-21
Industrial Products-Danbury Knudsen Div	12
Interstate Electronics Corp	20
Isolantite Mfg Corp	12
I-T-E Circuit Breaker Co	1-5-6-7-10-11-12-13-14-17-18-20-23-25
ITT Federal Div/ITT Corp	1-7-8-10-11-13-17-29
Jefferson Inc Ray	10
Johnson Co E F	2-6-17-24-29

Jones & Laughlin Steel Corp	16
J-V-M Microwave Co	1-11-13-18-20-23
Kay Townes Antenna Co	12-29
Kearfott Co Inc (Clifton)	5-8-9-10-11-13-28
Kearfott Co Inc (Pasadena)	11
Kearfott Company Inc/Microwave Div	11-13
Kelsey-Hayes Co	11-13
Kennedy & Co D S	11-12-13-20-21-29
Kings Electronics Co Inc	1-7-11-13-18-19-20-21-23
Kline Iron & Steel Co	25
K-W Eng'g Works	2-12
Lance Antenna Mfg Co	13-16-20-21
Land-Air Inc	1
La Pointe Industries Inc	1-2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17-18-19-20-21-22-23-24
Lear Inc (Santa Monica)	1-5-8-9-20-21
Lear Inc (Grand Rapids)	1-5-8-21-28
Lieco Inc	11
Ling Systems Inc	7-11
Litton Industries of Maryland	1-5-11-13-20-21-29
McMillan Industrial Corp	26
Mackay Radio & Telegraph Co/Marine Div	5-10
Magnavox Corp	1-13
Magnesium Products of Milwaukee Inc	25
Mark Products Co	1-2-6-7-10-11-12-13-14-15-20
Master Mobile Mounts Inc	2-6-7-10-11-21
Mathis Co G E	11-23-25
Maxson Corp W L	11-18-18
Melpar Inc	1
Meridian Metalcraft Inc	11-13
Metal Fabricators Corp	5-11-13-23-24
Microtech Inc	11
Microwave Associates Inc	11
Mosley Electronics Inc	2-6-7-12-17-21-29
Munston Mfg & Service Inc	10
Narda Microwave Corp	11-20-23
National Moldite Co	28
N R K Mfg & Eng'g Co	11-13
Nuclear Products-Erco	11-13-25
Parsons Co/Ralph M Elect-Ronics Div	20-21
Pearce Simpson Inc	10
Peerless Products Industries	16-19
Phaestron Instrument & Electronics Co	1
Philmore Mfg Co Inc	3
Photo-Crystals	11
Pioneer Industries Inc	3-4-11-13-23-25
Polarad Electronics Corp	11
Polytronc Research Inc	10-12
Premax Prods Chisholm Rider Co	1-2-6-7-10-12-19-20-21
Premier Instrument Corp	11
Prodelin Inc	4-8-10-11-12-15-16-20-21-23
Pye Telecommunications Ltd	5-6-8-10-11-12-15-19-21
Q-Line Mfg Corp	1-2-8-9-10-11-12-13-16-19-20-21-23
Radar Measurements Corp	18-27
Radiation Eng'g Labs	1-10-11-13-20-21
Radio Activities Inc	1-2-3-4-5-6-7-10-11-12-13-14-15-16-18-19-20-21
Radio City Products Co	5-24
Radio Corp of America/Comm. Elec Prods	3-4-11-20-21-23-24-25
Radio Merchandise Sales Inc	16-20-21-24
Radio Receptor Co Inc	5-11-12-13-16-20-25
Radioplane Div/Northrop Aircraft Inc	7-11-13-18
Raytheon Mfg Co (Waltham)	10-11-13
Reeves Instrument Corp	24
Remler Co	10-16
Renfrew Electric Co Ltd	1-2-11-13-14-16-17-18-20-21-27-28
Rich Electronics Inc	10-12-21
Roflan Co	1-8-13-18-20-21
Rohn Mfg Co	25
Rostan Corp	25
Royal Communication Systems	12
S & A Electronics	20-21
Sanders Associates	1-11-13-18
Scala Radio Co	6-7-10-12-15-16-20-21-23-29
Scientific-Atlanta Inc	13-14-24
Seiscor Mfg Co	5-25
Sickles F W Div GIC	28
Sparton Electronics Div	1-9-20
Spaulding Products Co	25
Specific Products Co	6
Sperry Gyroscope Co/Air Arm Div	13
Spincraft Inc	11
Spivey Inc James S	1-7-21
Stainless Inc	3-4-5-6-13-14-16-19-23-25
Stanwyck Winding Co	28
Stavid Eng'g Inc	1-11-13-20-21
Steward Mfg Co D M	9
Suffolk Products Corp	13-24
Superec Electronics Corp	8-9-28
Swift Textile Metallizing & Laminating Corp	13-23

Taco	3-4-11-16-20-21-29
Ta-Mar Inc	1-11-13-18-20-21
Tapco Group Thompson Ramo Wooldridge Inc	11
Tarzian Inc Sarkes	11-22
Technical Appliance Corp	1-2-5-6-7-10-11-12-13-15-16-17-20-21-23
Technicraft Labs Inc	11
Technical Materiel Corp	2-6
Technical Oil Tool Corp	11
Tele-Beam Industries	1-4-5-10-11-12-13-20-21-29
Telectro Industries Corp	7-11-13
Tele-Dynamics Inc	7
Telerad Mfg Corp	11-13
Tele-vue Towers Inc	25
Telkor Inc	4-20-21
Telrex Labs	2-3-4-5-6-16-17-20-21-22-23-24-25
Temco Aircraft Corp	11-20-21
Tenatronics Ltd	12
Tennalab	2-16-17-21-22
Tenna Mfg Co	1-2-3-4-5-11-12-13-16-19-20-21-22-27
Thordarson Meissner Mfg Div Maguire Industries Inc	8-9
Topp Industries Inc	1-5-7-8-21
Torngren Co C W	23
Tower Construction Co	11-25
Tricraft Products Corp	16-20-21-25
Tri-Ex Tower Corp	2-3-11-12-19-22-24-25
Trilsch Inc John D	25
Underwood Corp	13-23
U S Testing Co	1
Valandy Electronics Corp	9
Victor RF & Microwave Co	11
Vidaire Electronics Mfg Corp	9
Video Industries Co	16
Virginia Electronics Co	12-19
Waber Electronics	16
Walworth Co/Electronics Div	10-23
Waveguide Inc	1-11-13-17-18
Waveline Inc	11
Webcor Inc	1-5-12
Webster Mfg Co	1-2-6-10-12-20
Western Felt Works	10
Western Gear Corp/Electro Products Div	2-7
Westinghouse Electric Co/Air Arm Div	13
Westrex Corp	6
White & Son James L	2-6-10-12-20
Wind Turbine Co	2-3-11-17-21-24-25-27-34
Winegard Co	16-20-21
Young Spring & Wire Co	2-6-7-12-16-17-19-20-21
Gonset Div	2-6-7-12-16-17-19-20-21
Zenith Plastics Co	11-13-23
Z & W Mfg Corp	1-7-10-12-20-21

C B C Electronics Co	4
Channel Master Corp	4-7-8-9-10-11-12-13
Clear Beam Antenna Corp	3-4-8-9-10-11-13
Coils Electronics Co	6
Colman Electronic Products	17
Columbia Products Co	1-2-10-11
Consolidated Wire & Associated Cos	1
Convair (San Diego)	10-11
Cornell-Dubilier Electrical Corp	2-3-4-8-9-10-11-12
Dress-Ideco Co	13
Dynamic Electronics Inc	4-5-6
Electrend Products Corp	2
Electro-Mechanical Eng'g Co Inc	1
El-Rad Mfg Co	5-6
E-Z Way Towers Inc	1-9-12-13
Ferrocube Corp of America	6
Finney Co	1-3-4-7-8-10-11
General Cement Mfg Co	2-3-4-5-6-8-9-10-11-13
General Crystal Co Inc	1-3
Gerrard & Co A J	13
Gulton Industries Inc	1
Hi-Lo Mfg Corp	4-8-10-11-13
Hy-Gain Antenna Products Co	1-12
Illumintron Eng'g Co	1
Jerrold Electronics Corp	7
JFD Electronic Corp	2-4-8-9-10-11-13
Johnson Co E F	1
Jones & Laughlin Steel Corp	8
Jontz Co Inc	13
Kearfott Co Inc (Clifton)	5-6
Kenwood Eng'g Co	13
K-G Electronics Corp	4-9
Kline Iron & Steel Co	13
KTV Towner & Communication Eq Co	13
Lab-Tronics Inc	4
Lance Antenna Mfg Co	1-2-3-4-7-8-10-11
La Pointe Industries Inc	1-2-3-4-5-6-7-8-9-10-11-12-13
Mark Products Co	1-10-11
Miller Co J W	5-6
Morse Instrument Co	11
Mosley Electronics Inc	1-11
Multronics Inc	5
Narda Microwave Corp	10
National Coil Co	6
National Moldite Co	14
Peerless Products Industries	4-9
Philson Mfg Co Inc	1-8-9
Pioneer Industries Inc	13
Premax Products/Div Chisholm-Ryder Co	1-2-3-9-10
Pye Telecommunications Ltd	2
Q L C Corp	5-6-14
Q-Line Mfg Corp	1-3-4-5-6-8-9-10-11
Radio Activities Inc	1-2-3-4-8-9-10-11
Radio Merchandise Sales Inc	4-8-10-11-12-13
Radion Corp	4-10-11
Rego Insulated Wire Co	2-4
Renfrew Electric Co Ltd	1-4-5-8-10-11
Rohn Mfg Co	13
Rostan Corp	13
S & A Electronics	1-8-10-11
Saxton Products Inc	5-6
Scale Radio Co	7-8-10-11
Sickles F W Div GIC	14
Snyder Mfg Co	2-4-8-9-10-11
Spaulding Products Co	18
Spiraling Products Co	2-4-10-11
Springfield Enterprises	1
Stainless Inc	13
Standard Winding Co	5-6-14-15
Superex Electronics Corp	5-6-14
Tabet Mfg Co	13
Technical Appliance Corp	1-4-8-10-11
Television Labs Inc	4
Tele-vue Towers Inc	13
Telkor Inc	4-8-10-11
Telrex Labs	1-4-8-10-11-12
Tenatronics Ltd	2
Tennalab	1-7-8-11
Tenna Mfg Co	1-2-4-8-9-10-11
Teveco Insulated Wire	2
Tower Construction Co	13
Tricraft Products Corp	4-8-10-11-13
Trio Mfg Co	8-10-11
Tri-Ex Tower Corp	13
TV Hardware Mfg Co	13
Vidaire Electronics Mfg Corp	6
Video Accessory Mfg Co	13
Video Industries Co	1-8
Volta Mfg Co	5-6
Waber Electronics	4
Walsco Electronics Mfg Co	4-5-8-10-11
Western Coil & Electrical Co	1
Western Gear Corp/Electro Products Div	1
Wiancko Eng'g Co	14
Wind Turbine Co	1-12-13
Young Spring & Wire Co/Gonset Div	1-8-10-11

PRODUCT MFRS

6-7-8—Antennas & Accessories

8—ANTENNA ACCESSORIES

Assemblies, HF	1
Antennas, erection accessories..	29
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Antennas, reflectors	31
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Baluns	2
Clamps, ground	3
Clamping & phasing units	4
Diplexers	5
Dummy loads	6
Duplexers	7
Feed systems	8
Forms, antenna	34
Hardware	9
Heaters	10
Housing	11
Insulators	12
Isolation units	13
Lenses, R-F	15
Lightning arresters	14
Links	16
Masts	17
Monitors	18
Monitors, R-F power	19
Mounts	20
Multi-set couplers	21
Outlets	22
Remote controls	23
Spreaders, feeders	24
Springs, grounding	25
Switching equipment	26
Tower lighting	27
Tuning units	28

Abalon Precision Mfg Corp	9-11
Adler Electronics Inc	4-6-28
Aerolite Electronics Corp	14-15
Airborne Instrs Lab	19
Aircorn Inc (Winthrop)	4-5-6-8-30-31-33
Aircorn Inc (Roselle)	6-7
Airtron Inc/Div Litton Ind	6-7-8-9-14-15-26-28
Alford Mfg Co	5
Allmetal Screw Products Co	9
All Products Communication Products	2-3-4-5-7-8-9-12-13-14-17-20-23-24-27-29-30-31-32-34
Amaton Electronic Hardware Co Inc	28
Amelco Inc	4-19-28
American Brass Co	9
American Electronics Co	2-4-21
American Lava Co	12-24
American Machine & Foundry Co/Gen Eng Labs	8-10-30-31
American Tower Co	17
Amphenol Connector Div	9-14-21
Anchor Products Co	4-21-26
Anchor Wire Co	9-29-32
Andrew Antenna Corp	4-5-7-8-9-10-17-26-28-33
Andrew Corp	4-5-8-9-10-12-17-20-26-28-30-31
Andrew California Corp	4-5-8-9-10-12-17-20-26-28-30-31
Antenna Specialists Co	1-2-17
Antennavision Inc	2-5-21-22
Antlab Inc	17-20-23-32
Apparatus Development Co	2
A R F Products Inc (River Forest)	30
A R F Products Inc (Ranton)	8-23
A R & T Electronics Inc	21
Atlas Precision Products Co	1-23-28-31-33
Automatic Metal Products Corp	19
Autoentics Div/North American Aviation Corp	26
Rache & Co Semon	15
Barker & Williamson Inc	2-4-6-8-9-12-13-16-19-26-27
Bendix Aviation Corp/Eclipse-Pioneer Div	32
Bernard Franklin Co Inc	9-17
Blaco Mfg Co	3
Blaine Electronics Inc	1-2-8-31-32
Blaw-Knox Co/Blaw-Knox Equip Div	17-31-32
Blonder-Tongue Labs	2-4-21-23
Bogart Mfg Corp	1-6-7-26
Bomac Labs Inc	5-7
Boonton Electronics Corp	19
Brach Mfg Corp/Div General Bronze Corp	6-14-21

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Antennas, auto radio	2
Antennas, ferrite core	14
Antennas, home all-wave	3
Antennas, indoor FM & TV	4
Antennas, loop	5
Antennas, loop-core	6
Antennas, master community ..	7
Antennas, outdoor FM & TV ...	8
Antennas, telescopic	9
Antennas, tuning units	15
Antennas, UHF	10
Antennas, VHF	11
Rotators	12
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All Channel Products Corp	4-8-10-11
Alpar Mfg Corp	13
Alproco Inc	13
American Brass	2
Amphenol Connector Div/Amphenol-Borg Electronics Corp	1-4-8-10-11
American Electronics Co	1-4
American Tower Co	13
Antenna Specialists Co	1-2-4-9-10-11
Apparatus Development Co	3-12
Appleton Co Inc Harry	1
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Argonne Electronics Mfg Corp	6
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Bassett Inc Rex	1-2-5
Brach Mfg Corp/Div General Bronze Corp	2-4-9-10-11
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Brooks & Perkins Inc	11-15	1-T-E Circuit Breaker Co	8-9-15-16-17-20	Saxton Products Inc	2-14
Budd Stanley Co	5-7-8	ITT Federal Div/ITT Corp	12-23-31-33	Scala Radio Co	2-10-31
Carborundum Co/Globar Pit	12	Janco Corp	16	Scientific Atlanta Inc	18-20-23-30
Cascade Research Div/Mono-	4-7-8-13-30-31	Javex Electronics	4-9-21-22-23-26	Sierra Electronic Corp	6-18-19-28
gram Precision Industries Inc		Jerrold Electronics Corp	4-21-22-26	Snyder Mfg Co	17
Caswell Electronics Corp	5-7-8-26	JFD Electronic Corp	2-4-5-9-12-14-17-20-21-29-32	Sperry Microwave Electronics Co	1-5-6-7-8-15-19-26-31
Centralab Div/Globe-Union Inc	12-14-24-26	Joclin Mfg Co	12	Spiraling Products Co	3-9-17-20
Ceramtronics Inc	12	Johnson Co E F	4-12-13-24-26-30-33	Stainless Inc	14-17-20-27
CGS Laboratories Inc	21-26	Jones Electronics Co Inc M C	6-19	Standard Electronics/Div Radio Eng'g Labs	2-5-6-7
Channel Master Corp	3-4-9-12-14-17-20-21	Jontz Mfg Co Inc	17-20-27	Suffolk Products Corp	6
Chemalloy Electronics Corp	6	J-V-M Microwave Co	1-2-4-5-6-7-8-19	Superex Electronics Corp	1-2-4-13-21
Chicago Rivet & Machine Co	9	Kahn & Co	23	Swedlow Plastics	12
Chu Associates	1-2-8	Kaiser Aircraft & Electronics Div/Kaiser Ind	17	Swenson Co V H	11
Clear Beam Antenna Corp	4-5-9-12-17-20-21	Kay-Townes Antenna Co	4	Sylvania Electric Products Inc/Parts Div	22
Clegg Labs/Div Clegg Inc	1-7	Kearfott Co Inc (Clifton)	4-5-6-7-13-15-30-33	Tabet Mfg Co	27
Coils Electronics Co	2	Kelsey-Hayes Co	15-20	Taffet Radio & TV Co	1-6-9-11-17-28
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Cornell-Dubilier Electrical Corp	14	Lapp Insulator Co Radio Specialties Div	6-12	Telkor Inc	4-9
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Cunningham Son & Co James	18-23-26	Lettine Radio Mfg Co	28	Tenatronics Ltd	21
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Diamonite Products Mfg Co	12	Lorentzen Inc H K	17	Topp Industries Inc	5-17-19-32
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Du-Co Ceramics Co	12	Mast Development Co Inc	23	TV Hardware Mfg Co/Div	3-9-12-14-17-20-29-32
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El-Rad Mfg Co	2	Miller Co	2	Walsco Electronics Mfg Co	9-14-17-20-21-26
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General Cement Mfg Co	3-4-9-13-17-20-21	Premax Products/Div Chisholm-Ryder Co	9-12-17-20		
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Holland Electronics	7-9	Measurements Research Co/Div Prudential Indust	13	Radioplane Div/Northrop Aircraft Inc	20-21-26-35
Homelite/Div Textron Inc	15	Melpar Inc	1-2-24-29-30	Radio Receptor Co Inc	29-30-31-32-33-34-38-39-40
Howell Controls Ltd	3-4-6-7-18-19-20-29-35	Meredith & Co Ltd C C	9	Rahm Instruments/Div American Machines & Metals Inc	6-14-19
Hoover Electric Co	4-13-19-20-21	Merz Eng'g Inc	13	Rauland Borg Corp	7-8-9-15-27-33-34
Hoover Electronics Co	13-26	Meridian Metalcraft Inc	1	Raytheon Co (Waltham)	31-33-34
Houston Fearless Corp	26	Microwave Eng'g Labs Inc	17-20-26-26-29-31-32-33-35	Raybestos-Manhattan Inc (Bridgeport)	15
Hughes Aircraft Co—El Segundo	18-29-31	Mid-Century Instrumental Corp	18-24	Reflectone Corp	4-7-19
Hughes Aircraft Co/Electronic Mfg Co	16-18-19-29-31-33-34	Mid Continent Mfg Co	14	Rea Co J B	7-9-11-18-27
Hughes Products Hughes Aircraft Co	18	Milco Electronic Corp	12-18	Reed & Reese-Retron Corp	6-7-8-9-14
Hycos Mfg Co	7-9-10-13-25-27-32-33-34	Minneapolis Honeywell/Helland Div	13	Reeves Instrument Corp	6-20-26-31-32
I-L-S Instrument Div/Meriam Instrument Co	13-14	Minn-Honeywell Regulator Co/Davies Labs Div	11-12	Reliance Electric & Eng'g Co	13
Industrial Control Co	13	Minn-Honeywell/Boston Div	3-6-9-13-14-19-20	Remler Co	5
Industrial Test Equipment Co	13	Minn-Honeywell Regulator Co/Aeronautical Div	3-4-6-13-14-16-18-19-20-29-35	Renfrew Electric Co Ltd	2
Industrial TV Inc	22	Minn-Honeywell Regulator Co/Mil Prod Gp	3-4-6-13-14-16-18-19-20-29-35	Republic Aviation	29
Inertia Switch Inc	19-20-24	Miskella Infra-Red Co	1	Readel Eng'g Corp	26-31-32-33
Infrared Industries Inc	42	Missileonics Inc	18-19-24-26-30-31	Revere Corp of America	14
Inco Co/Div Barry Controls	13	Missouri Research Labs Inc	18-29	Rheem Mfg Co/Electronics Div	7-13-24-26
Instrument Corp of Fla	26-33-34	Mitchell Industries Inc	2-3-19-29-33-34	Rich Electronics Inc	4
Instrument Development Labs Inc	13-26	Model Rectifier Corp	7-9	Riverbank Labs Eng'g Dept	9
Intl Equip Co	13	Moran Instrument Corp	7-11-13-26-32	Robinson Technical Products Inc	15
International Radiant Corp	13	Motorola Communications & Electronics Inc	31-32	Rosemount Eng Co	14
Interstate Electronics Corp	26	Mullard Equipment Ltd	24-33-34	Royco Instruments Inc	13
Iron Fireman Mfg Co/Electronics Div	16	Munston Mfg & Service Inc	33-34	RS Electronics Corp	31-33
Isolantite Mfg Corp	1	National Aeronautical Corp	2-16-29-33	Rue Products Co	13
I T E Circuit Breaker Co	1-2	Natl' Radio Co Inc	30	Ruge Assoc Inc Arthur Sanders Associates	3-6-17-19-20-29-31
ITT Industrial Products Div	3-7-8-9	Navigation Devices Inc	3	Scaico Controls Inc	4
ITT Federal Div/ITT Corp	10-13-16-20-22-24-26-29-30-31-32-33-34-38-39-40-42	New London Instrument Co Inc	34	Schaffer Air Industries	13
Jackson Electronics Inc	3-19	New York Mfg & General Supply Co	28	Seaboard Electric Products Corp	4-13
Jordan Electronics Div Victoreen	7-9	NJE Corp	7-8-9	Seg Electronics Co Inc	7
J-V-M Microwave Co	31-32	Non-Linear Systems Inc	13	Seisec Mfg Co	19-29-30-33-34
Kahl Scientific Instrument Corp	36	Norden Div/United Aircraft Corp	6	Sequoia Wire & Cable Co/Div Mandrel Industries	7-21-26-33
Kahn & Co	4-7-18-20	North Atlantic Industries Inc	13	Servo Corp of America	18-29-30-33
Kaiser Aircraft & Electronics/Div of Kaiser Industries Corp (Toledo)	4-7-9-13-16-18-19-24-29-30-31-32	Northeastern Eng'g Inc	7-13	Servomechanisms Inc	3-4-7-9-13-14-18-19-20-29-35
Kaiser Electronics Inc	7-8-9	North Electric Co	27	Servonic Instruments Inc	14
Kauke & Company	13-14-26	Northrop Aircraft Inc/Nortronics Div	4-13-18-19-20-29-35	Servo-Tek Products Co	7-13
Kay Electric Co	13	Norwood Controls Unit/Detroit Controls Div	14	Sierra Electronic Corp	13-34
Kearfott Co Inc (Pasadena)	6-13-18-19-20-22-29-30	Nuclear Products-Erco/Div of ACF Industries	13-18-24	Simpson Electric Co	13
Kearfott Co Inc (Chifton)	1-2-3-4-6-13-14-18-19-20-22-29-35-41	Nyt Electronics Inc	7-9	Skiatron Electronics & TV Corp	18-23-24-30-31
Keithley Instruments Inc	13	Olympic Radio & TV	11-12-29-30-31-32-33-34	Solartron Electronic Group Ltd	13-18-24
Kelsey-Hayes Co	4	Opad Electric Co	7-8-9-13	Sorenson Industrial Electronic Co	13-27-41
Kemlite Labs Inc	20-23-35	Opto Eng'g Co/Div Remanco Inc	24-31-32-33-34	Soroban Eng'g Inc	18
Kepeco Inc	7-8-9	Orbitran Co Inc	38	Southwestern Industrial Electronics Co	7-9-11-13-14
Ketay Dept-Norden Div/United Aircraft	6	Otis Elevator Co/Electronic Div	24	Spartan Electronics Div	29-33
Kidde & Co Walter	5-9	Pacific Scientific Co	4-5-6-20	Specialties Inc	14
Kings Electronics Co Inc	19-32-33-34	Packard Bell Electronics Corp	7-11-13-18-19-20-22-24-26-29-31-32-33-34	Specialty Eng'g & Electronics Co	18-20-29-31-34
Kingsston Electronics	13	Parsons Co Ralph M/Elect-Ronics Div	7-9-13-17-22-26-32	Spectra Electronics Corp	22-35
Kollmorgen Optical Corp	21	Patterson Moos Div/Universal Winding Co	35-42	Spectralab Inst Co	26-32
Land-Air Inc Instrument & Electronic Div	33	Pearce Simpson Inc	33-34	Spectrol Electronics Corp	7-8-9-19-20-29
Land-Air Inc	2-9-14-16-24-25-27-33	Peebles & Co Ltd Bruce	13-21-40	Sperry Farragut Co/Div	18-20-26-29
La Point Industries Inc	1-2	Peer Inc	19-21-30-34	Sperry Rand Corp	18-20-26-29
Lavoie Labs Inc	27-31-32	Perkin Eng'g Corp	7-8-9	Sperry Gyroscope Co/Sunnyvale Dev Center	6-31-36
Leach Corp/Inet Div	7-9-11-13	Perma-Power Co	21	Sperry Gyroscope Co/Air Arm Div	6-18-20-29-31-32-33-34
Lear Inc (Santa Monica)	1-2-3-6-19-20-21-26-29-33-34	Permoflux Products Co	7-8-9-14-27	Sperry Microwave Electronics Co/Div	24
Lear Inc (Grand Rapids)	1-2-3-4-6-13-14-16-18-19-20-21-26-29-33-34-41	Peschel Electronics Inc	7-8-13	Spivey Inc James S	4-13-27
Lewyt Mfg Corp	7-13-18-19-20-21-24-25-26-29-30-31-32-33-34	Pesco Products Div/Borg Warner	7-8-9	Springer Aircraft Radio Corp	33
Link Aviation Inc	13-18-24	Phaoston Instrument & Electronic Co	2	Springfield Enterprises	33-34
Linlar Inc	7-8-9-14-27	P & H Electronics	7-34	Stancil-Hoffman Corp	11
Lehigh Valley Electronics Eng'g & Mfg Co	13	Philco Corp	3-18-20-26-30-31-33-34-35	Standard Electronics/Div Radio Eng'g Labs	7
Lel Inc	26-27-32-33	Philco Corp/G&I Div	18-20-25-26-29-31-33-34-35	Stanley Aviation Corp	5-13-24
Lenkurt Electric Co	8	Philips Electronics Inc	4	Statham Instruments Inc	13-14
Leland Airborne Products	5-7-8-9-13	Piezo Products Co	4	Stavid Eng'g Inc	18-19-20-21-26-31-32-33-34
Levinthal Electronic Products Inc	34			Stratocorp Corp/Geophysical Services Div	4-13-24-26-34
Librascope Inc (Glendale)	18-19-20-21-29-30-35			Stromberg-Carlson/Div General Dynamics Corp (Goodman St)	13

Stromberg-Carlson/Div General Dynamics Corp (Carlson St)	13-22-27-29-33-34
Suffolk Products Corp	31
Superior Electric Co	7-9
Systron Corp	22
Tabor Instrument Corp	14
Taffet Radio & TV Co	1-4-7-13-21-33
Ta-Mar Inc	1-2
Tapco Group/Thompson Ramo Wooldridge Inc	4-9-19-20
Technical Appliance Corp	5-27-33-34
Technical Apparatus Builders	7-8-9-13
Technical Materiel Corp	1-21-33-34
Technical Oil Tool Corp	13-16-20-22-24-29-31-32
Telechrome Mfg Corp	7-10-13-26-34-35
Telecomputing Corp	1-6-29-30-32-38
Telectro Industries Corp	7-8-10-11-12-13-16-19-20-21-22-23-24-25-27-29-30-31-32-33-34
Tele-Dynamics Inc	20-26-33-34
Telemarine Communications Co	25-33-34
Telemetering Corp of America	26
Telephonics Corp	5-27-33-34
Tele-Beam Industries	2
Telkor Inc	7
Telex	14
Tel-Instrument Electronics Corp	9
Temco Aircraft Corp	10-11-13-20-26-35
Tempo Instrument Inc	4
Tevco Insulated Wire	1
Theta Instrument Corp	13
Thomas Electronics Inc	13
Thor Ceramics Inc	1
Times Facsimile Corp	23
Topper Mfg Co Inc	14
Topp Industries Inc	1-4-7-14-16-18-19-20-25-26-29-30-33-34
Torwico Electronics Inc	7-9
Transdyne Corp	18-24
Torwico Electronics Inc	7-9
Transformer Technicians Inc	7
Trans-Sonics Inc	14
Transval Electronics Corp	7-8-9
Transonic Inc	7-9
Tricraft Products Corp	1
Ultradyn Inc	14
Underwood Corp/Canoga Div	1-7-13-32
United Aircraft Products Inc	4-13
United Control Corp	29
United Electric Controls Co	4
United Electrodynamics	7-9-13-26-34
United Mfg Co	7-9-13
Universal Transistor Products Corp	7-8-9
Univox Corp	4-7-11-16-19-20-22-27-29-31
U S Radium Corp	5-28
U S Recording Co	27
Vapor Heating Corp	4
Varo Mfg Co	7-8-9-19-20-21-26-33-34
Vectrol Eng'g Inc	7
Vickers Inc/Electric Products Div	3-4-7-8-9-13-20-26
Victor RF & Microwave Co	14
Video Instruments Co Inc	7
Virginia Electronics Co	21-27-30-33-34
Voltron Products	13
Voron & Co George	27-33-34
Waelin Inc	13-20
Waldorf Electronics/Div F C Huyck & Sons	12-13-16-18-20-21-22-24-25-29-30
Waltham Electronics	34
Waltham Horological Corp	1
Wang Labs Inc	13-18
Waterman Products Co	13
Waugh Eng'g Co	13-14
Waveguide Inc	1-2
Webcor Inc	4-5-11-32-33
Webster Electric Co	7-27
West Coast Research Corp	14
Western Gear Corp/Electro Products Div	7-8-9
Westgate Lab Inc	18-20-24
Westinghouse Electric Co/Air Arm Div	3-13-14-18-20-29-31-35-42
Westinghouse Electric Corp (Pittsburgh)	3-6-7-9-29-31
Weston Instruments/Div of Daystrom Inc	13
Westrex Corp	10-11-12-33-34
Wheeler Electronic Corp	27
White Dental Mfg Co/S S Industrial Div	4-19-21
Wickes Eng'g & Construction Co	25
Wincharger Corp	7-8-9
Winder Aircraft Corp of Fla	1-2-4-7-8-9-13-15-16-24-29-30-31-32
Winslow Co	13
WRL Electronics Inc	34
Wyly Mfg Corp Manteq Div	13
Young Spring & Wire Co	27-33-34
Zenith Plastics Co	1

10—BATTERIES, CHARGERS & ACCESSORIES

Batteries, dry cell	1
Batteries, hearing aid	2
Batteries, lead-acid	3
Batteries, mercury	4
Batteries, nickel alkaline	5
Batteries, nickel cadmium	6
Batteries, nuclear	7
Batteries, silver	8
Batteries, silver zinc	9
Batteries, solar	19
Batteries, standard cell	10
Batteries, storage	11
Batteries, storage nonspill	12
Batteries, transistor	13
Battery adapters	14
Battery chargers	15
Battery charging regulators	16
Battery testers	17
Calibrators, synchro	20
Fuel Cells	18

Accurate Electronics Co	15
Acme Battery Corp	1-2-13
Acme Electric Corp	15-16
Aeromotive Eng'g Products Ltd	15
Airdesign Corp	15
Amelco Inc	15-16
American Machine & Foundry Co	9
American Television & Radio Co	15
Auto Test Inc (Chicago)	15-17
Auto Test Inc (Neillsville)	17
Bach-Simpson Ltd	17
Barnett Instrument Co	17
Bogue Electric Mfg Co	15-16
Bowers Battery & Spark Plug Co	3-11
Bright Star Industries	1
Bundy Electronics Corp	15-16
Burgess Battery Co	1-2-13
Burgess Battery Co/Div Servel (Canada) Ltd	1-2-13
Canadian Research Institute	15-17
Carol Electronics Corp	15
Central Scientific Co of Canada Ltd	1
Christie Electric Corp	15-17
Consolidated Diesel Electric Corp	15
Cook Co Frank R	8-9-11-12-13
Cornell-Dubilier Electrical Corp	15
D & S Mfg Co	7
Dresser Electric Co	15
Eagle-Picher Co/Couples Plant	6-8-9
Eagle-Picher Co	6-9
Electric Auto-Lite Co/Wire and Cable Division	3-11-12
Electric Products Co	15-16
Electric Regulator Corp	15-16
Electric Storage Battery Co/Exide Ind Div	1-3-6-8-9-10-11-12-15-16-17
Electronic Batteries Inc	12
Electronic Instrument Co Inc	15-17
Electronic Measurements Corp	15
Electro Products Labs Inc	15
Ely Sales Co	14
Emerson Radio & Phonograph Corp	15
Epeco Products Inc	15
Ercona Corp	9-15
Fedco Inc/Federal Electronics Sales Div	1-13
Florman & Babb Inc	6-15
Fox Products Co	15-16-17
Gates Electronic Co	14-15-16-17
General Cement Mfg Co/Div Textron Inc	14
General Electric Co/Apparatus Sales Div	15
General Railway Signal Co	15-16
General Scientific Equipment Co	15-17
Georator Corp	15
Gray Instrument Co	10
Green Rectifier Co	15-16-17
Gulton Industries Inc	5-6-10-11-12-13-14-15
Heath Co	15-17
Hobart Bros Co	15
Hoffman Electronic Corp	19
Honeywell Control's Ltd	10
Industrial Control Co	17
International Rectifier Corp	19
ITT Industrial Products Div	15
Kahl Scientific Instrument Corp	17
Kearfott Co Inc (Clifton)	15-16
Keystone Electronics Corp	14
Knopp Inc	15
Kost Products Co	14
La Marche Mfg Co	3-11-15-16
Leach Corp/Inet Div	15-16-17

PRODUCT MFRS

10—Batteries; 11—Cabinets, Racks

Leeds Co Inc Gerard G	16
Leland Airborne Products	15
Lincoln Electric Co	15
Lytel Eng'g & Mfg Co	9
Mackay Radio & Telegraph Co/Marine Div	6-15
Magnavox Corp	4-8-13
Magnetic Amplifiers Inc	16
Magnetic Research Corp	15
Mallory & Co Inc P R (Washington St)	1-2-3-4-9-13-14-15
Marathon Battery Co	1-2-13
Meredith & Co Ltd C C	15-16
Model Eng'g & Mfg Co Inc	15
Model Rectifier Corp	15
National Carbon Co/Div Union Carbide Corp	1-2-4-10-13-18
North Electric Co	15
Nicad Div/Gould Natl Batteries Inc	5-6-11-12-13
NJE Corp	15
Onan & Sons D W	15
Opad Electric Co	15-16-17
Patterson Moos Div/Universal Winding Co	1-2-7-13-18
Perkin Eng'g Corp	15-16
Power Supplies Inc	15-16
Precise Development Corp	14-15
Precision Apparatus Co	15
Pye Telecommunications Ltd	15
Radiation Research Corp	7
Radio Corp of America/Electron Tube Div	13-17
Ray-O-Vac Co	1-2-4-10-13
Raytheon Co (Waltham)	15
Rheem Mfrs Co/Electronics Div	15-16-17
Sanford Miller Co	15
Schauer Mfg Corp	15
Schreck Electrical Sales Corp	15
Sel Rex Corp	15-16
Schurite Meters	17
Simpson Electric Co	17
Solartron Electronic Group Ltd	20
Sonotone Corp	6-15
S O S Cinema Supply Corp	6
Stancil-Hoffman Corp	16
Sterling Mfg Co	17
Syntro Co	15
Technical Apparatus Builders	15-16-17
Telecomputing Corp	6-9-11
Telkor Inc	15
Terado Co	15-16
Tracerlab Inc	7
Triplet Electrical Instrument Co	17
U S Radium Corp	7
U S Rubber Co	1-17
Vapor Heating Corp	16
Vectrol Eng'g Inc	16
Ward Leonard Electric Co	15
Western Coil & Electrical Co	11
Westinghouse Electric Corp (Pittsburgh)	15
Wickes Eng'g & Construction Co	15-16
Willard Storage Battery Div	3-8-9-11-12-15-17
Winder Aircraft Corp of Fla	15-16
Yardney Electric Corp	8-9-11-12-13-15

11—CABINETS, RACKS, PANELS & ACCESSORIES

Accessories, mounting	1
Bins	2
Boards, plug-in	3
Boxes	4
Boxes, storage	5
Cabinet covering	6
Cabinets, audio radio equip.	7
Cabinets, metal	8
Cabinets, plastic	9
Cabinets, wood	10
Cases, portable	11
Cases, transformer	12
Cases, tube	13
Chassis	14
Consoles	15
Dollies, equipment	16
Enclosures, speaker	17
Felt	18
Film Finishes	19

Handles, leather	20
Housings, instrument	21
Housings, metal	22
Leatherette	23
Louvres, chassis ventilating.....	24
Panels, fibre	25
Panels, metal	26
Panels, plastic	27
Racks	28
Slides, chassis	29
Slides, equipment	30
Trays	31

A A Metal Products Inc	2-4-8-14-22-24-26-28
Abalon Precision Mfg Corp	4-5-7-8-11-12-14-15-21-22-26-28-29-30
Accurate Electronics Corp	3-25-27
Ace Plastic Co	27
Ackerman Engravers	25-26-27
Aerolite Electronics Corp	3-4-5-7-8-11-14-15-16-21-22-26-27-28
Aerovox Corp/(New Bedford)	14
Aircraft Armaments Inc	8-22
Akro-Mills Inc	2-4-5-8-9-11
Alac Inc	3
Alden Products Co	3-8-11-14-15-28
Allied Fabricating Corp	1-8-14-22-26
Alpitech Inc	1-4-6-7-8-11-12-14-15-17-21-22-24-26-28
Amco Eng Co	1-6-7-8-14-15-16-21-22-24-26-28-29-30-31
Amelco Inc	8
American Aluminum Co	11-17-21-22
American Brass Co	22
American Electronics Inc	8
American Insulator Corp	9-27
American Machine & Foundry Co/Gen Eng Labs	6-8-15-16-28-29-30
American Machine & Foundry (New York)	6-7-8
Anchor Specialty Mfg Co	8-10-26
Antlab Inc	15
Arcan Eastern Ltd	2-4-5-8-16-28
A R F Products/(Ranton)	8-14-22-26
Argos Products Co	10-11-13-17
Artisan Metal Works Co	4-8-11-14-15-16-21-22-24-26-31
Audio Accessories	27
Autocrat Electronics Co	11
Auto Test Inc	4-8-11-14-21-22-26-31
Barnett Instruments Co	21
Becks Inc	3
Belmet Products Inc	4-11-12-21-22
Bennett Mfg Co Inc	1-2-3-4-5-6-7-8-11-12-13-14-15-21-22-24-26-28-29-30-31
Bernard Franklin Co Inc	2-4-5-6-7-8-14-22-28-30
Berno Eng's Corp	8-14-22-26
Birtcher Corp/Industrial Div	8-14
Blickman Inc	4-12-22
Bodnar Industries Inc	27
Bone Eng's Corp	16
Brooks & Perkins Inc	4-7-8-11-14-15-16-21-22-26-28-31
Brooks Radio & TV Corp	1-10-14-27
Brown Corp	17
Bucks County Enterprises	4-8-16-26-28-31
Bud Radio Inc	1-4-7-8-11-14-15-17-21-22-24-26-28-31
Burr-Brown Research Corp	3
Calbest Electronics Co	10-17
California Chassis Co	1-4-7-8-14-17-21-26-28
Cal-Ohm Labs Inc	3-9
Cambridge Pattern Werks	10
Campro Co	5-8-9
Centronix Inc	6-7-8-14-15-28
Chassis-Trak Inc	29-30
Clark Controller Co (Los Angeles)	15
Cleveland Metal Specialties Co	25-26-27-30
Coils Electronics Co	8-11-14-17-21-22-24-25-26-31
Collins Radio Co/(Cedar Rapids)	7-8
Columbia Metal Box Co	4-5-6-7-8-11-14-15-17-21-22-26
Conrad & Moser	8-14-15-21-22-24-26-28
Continental Can Co Inc	4-5
Continental Elec Equipment Co	3-8-15-24-26
Cortland Industries	25-27
Craft Mfg Co	2-4-5-7-8-12-13-14-17-22-26-29-31
Craig Systems Inc	8-9-11-15-16-21-22-24-26-29-30-31
Croname Inc	8-11-22-26
Crystal-Westlake Corp	9-27
Cutler Metal Products Co	2-3-5-6-7-8-11-14-15-22-24-26-28-29-31
Dahlstrom Metallic Door Co	8-21-26-28

Davis & Co J W	17
Davies Molding Co Harry	9-21
Devco Eng's Inc	8-26-27
Dolin Metal Products Inc	4-5-8-22-26-31
Donnelly Mfg Co	8-14-15-22-24-26-28-29-31
Duralith Corp	27
Dynamic Electronics Inc	1-7-8-9-10-11-14-15-17-21-22-23-29-31
Electric Cord Co	2
Electronics Corp	25-27
Electronics Corp of America	26
Electro-Products Inc	17-22-26
Elgin Metalformers Corp	7-8-15-16-17-21-22-24-26-28-29-30
Elzee Metal Products Co	1-2-3-4-5-6-7-8-11-12-13-14-15-16-17-21-22-26-28
Emerson Plastics Corp	21-25-27-31
EMI Cossor Electronics	8-15-16-26
Eng'g & Mfg Corp of Texas	7-8-11-12-14-15-16-22-24-26-28
Equipto Div/Aurora Equipment Co	2-8
Erca Tool Die & Stamping Co	14
Eric Resistor Corp	9-27
Eugene Eng's Co	8-14-26
Factory Service Co	2-14-16-28-31
Fairbanks Co	16
Falstrom Co	2-4-6-7-8-11-14-15-16-21-22-26-28
Federal Machine Co	22
Federal Shockmount Corp/Div Korfund Co	28
Felters Co	18
Fischer & Porter Co	21-27
Fisher Berkeley Corp	7-8-22
Fisher Co Inc Oscar	81
Flexaust Co	24
Formica Metal Products Co	4-8-12-14-15-22-26-28
Fourjay Industries	7-15-17
Gates Radio Co	1-7-8-10-11-12-14-15-22-24-26-28
G B Electronics Corp	14-15
General Bronze Corp	8
General Cement Mfg Co/Div Textron Inc	29
General Electric Co/Audio Components Product Sec	7-17
General Electric Co/Dist Assemblies Dept	22-25
General Electric Co/Technical Products Dept	6-7-8-15-16
General Railway Signal Co	3-8-28
Grand Sliding Mechanisms Inc	29
Granelly Furniture Co	10
Grant Pulley & Hardware Corp	29-30
Gray Pantograph Engraving Co	26-27
Greene Co L Charlton	11
Green Rectifier Co	8-22-26
Hamner Electronics Co Inc	14-26
Hermes Plastics Inc	26-27
Hinde & Dauch	4-5
Hoffman Eng Corp	8-15-21-22-26
Honeywell Controls Ltd (Toronto)	26
Houston Fearless Corp	2-7-8-9-11-14-16-22-25-26-27-28-29-31
Hudson Tool & Die Co	12
Industrial Condenser Corp	2-5-6-12-13-17-18-20-21-22-26
Industrial Wire & Cable Co Inc	1
Instrument Case/Div Ta Mfg Corp	11
Instruments Inc	21-22
Insulating Fabricators Inc	27
Jansa Woodworking Corp	4-6-10-11
Jensen Mfg Co	17
Jodee Plastics Inc	9-27
Kahn & Co	1-8-21-22-26-28
Kaiser Aircraft & Electronics Div/Kaiser Ind (Oakland)	14-15-22
Karlson Associates Inc	7-8-9-10
Kees Mfg Co F D	4-5-6-8-21-22
Kelsey-Hayes Co	4-5-7-8-11-17-22-26-28-31
Kent Lighting Corp	4-8-24-26-31
Keystone Electronics Corp	1-3-25-27
Kibby Instrument Company	14
Kling Metal Spinning & Stamping Co	12-13-22-31
Koch & Sons H	9
Kollman Case Corp	11
Lancaster Glass Corp	9
Land-Air Inc	12-14-15-26-28
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Capacitors, mica trimmer	6
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Electrix Terminals & Connectors Inc	13-21-24
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Fedtro Inc/Federal Electronics Sales Div	11
Ferroxcube Corp of America	33
Fidelity Amplifier Co	50
Flurocarbon Products Inc/Div U S Gasket Co	6-11-15-16-17-18-19-22-24
Frederick Tool & Eng'g Corp	8
Frenchtown Porcelain Co	24
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Garde Mfg Co	25-26
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Gavitt Wire & Cable Co	8
G C Electronics Mfg Co	4-5-6-11-12-13-19- 20-21-22-25
General Bronze Corp	8
General Cement Mfg Co	5-6-11-13-20- 21-22-24-25
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Globe Electrical Mfg Co	24
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Hamner Electronics Co Inc	37
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National Radio Co Inc	6-11-19
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Tracerlab Inc	37-39
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Tubular Rivet & Stud Co	24
Union Electronics & Machine Corp	1-7
United Screw & Bolt Corp	13
Univox Corp	7
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U S Plastic Molding Corp	8-24-26
U S Rubber Co	23-40
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Waltham Horological Corp	7-11
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Warren Corp	37-39
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Westinghouse Electric Corp (Pittsburgh)	25-26-27
Westline Products Div/Western Lithograph Co	23-24
Whitaker Cable Corp	13-18-24-46
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Bentley Harris Mfg Co	38-51
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Fisher Scientific Co	5-6-7-10-13-23-24-40-42
Flamemaster Chemical Inc	15-20-26-29
Fluorulon Labs Inc	34-51
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Fuller Co H B	1-14-15-35
Furane Plastics Inc	1-2-14-15-18-35-40-44-45
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G C Electronics Mfg Co	1-12-13-14-15-19-25-26-40-41
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Luminous Resins Inc	8-9-27-34
Mackay Inc A D	6-8-9-10-11-27-31-32-37
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Manostat Corp	5-6-7-23-24
Mansol Ceramics Co	1-4-34-35-48-51
Marbon Chemical/Div Borg-Warner Corp (Gary)	1
Marbon Chemical Div/ Borg-Warner Corp (W Va)	1-2-14-18-28-29-30-31-34-35-36-50-51
Markem Machine Co	24
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Matthews Co Jas	24
Merix Chemical Co	5-15-17-26-28-34-36-42
Metal & Thermit Corp	6-7-14-15-19-20-22-25-30
Mico Instrument Co	21
Micro-Circuits Co	14-15-28-29-30-36-39-40
Midland Industrial Finishes Co	19-25-29-30-41
Millen Mfg Co James	16
Miller Dial & Nameplate Co	10
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Modern Adhesives & Electronics Inc	1
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Moore Corp John B	5-12-13-17-40
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New England Nuclear Corp	11
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NRC Equipment Corp	23
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Roberts Toledo Rubber Co	36
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Rosco Labs Inc	1-3-7-13-24-25
Rubber & Asbestos Corp	1-2-3
Ruby Chemical Co	21
Rue Products	35-36
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Sampson Chemical & Pigment Corp	8-9-11-14-27-28-30-32-47-50-52
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Sel Rex Corp	6-7-12-14-15-17
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Sethco Mfg Co	6
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Sparta Mfg Co	15
Special Chemicals Corp	7-21-28-29
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Stanley Chemical Co	1-2-15-18-19-25-30-51
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Jackson Electronics Inc	3-7-23-25-26-29-40	P S P Eng'g Co/Div Induction Motor N Y	28	Thor Transformer & Electronics Inc	1-2
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21—CONTROL EQUIPMENT, COMMUNICATIONS

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Dictaphone Corp	1
Dietz Co Inc Henry G	13
Dynapar Corp	4-7-16
Electric Regulator Corp	4-6-9
Electronic Applications Inc	1
Electronics Corp	5
Electronic Communications Inc	2-4-10-14
Electronics Corp of America (Cambridge)	5-7
Electronics Corp of America (Toronto)	5-7
Electronics Design Co	10
Electron-Radar Products	5-7-12
E T A Products Co of America	6-13
Erco Radio Labs Inc	10
Engineered Magnetic/Div Gulton Industries Inc	6
Farmer Electric Products Co	7
Fedtro Inc/Federal Electronics Sales Div	10-11
Fisher Co Inc Oscar	7-8
Fisher Pierce Co	7
Flight Research Incorp	7-8
Gates Radio Co	1-3-10
General Controls Co	6
General Electric Co/Dist Assemblies Dept	6-9
General Electric Co/Industry Control Dept	6
General Electric Co/Specialty Control Dept	6-7
General Precision Lab Inc (Pleasantville)	11
General Radio Co	5
Globe Industries Inc	6

Gordon Enterprises	1-8
Green Rectifier Co	6
Guardian Electric Mfg Co	11
Hammarlund Mfg Co	3-5-9-10-12-13
Hanson-Gorrill Brian	17
Hathaway Instrument/Div Hamilton Watch Co	4
Haydon Co A W	6
Houston Fearless Corp	11
Hughey & Phillips	7-12
Holland Electronics	3-4-7
Hycan Mfg Co	8
Ideal Electric & Mfg Co	6
Industrial Control Co	6
Industrial Timer Corp	8
ITT Industrial Products Div	11
Jerrold Electronics Corp	11
Johnson Service Co	13
Kintel	11
Kurman Electric Co/Div Norbute Corp	7
Lane Electronics Mfg Corp	10
Lavoie Labs Inc	4
Leach Corp/Inet Div	6
Lektra Labs Inc	7-8
Leland Airborne Products	6
Ling Systems Inc	4
McCoy Electronics Co	4
Magnasync Mfg Co	1
Manson Laboratories Inc	4
Magnecord Div/Midwestern Instruments Inc	1
Mallory & Co Inc P R (Gray St)	1-9-10-11-13-14
Meredit & Co Ltd C O	4-5-6-7-12
Miratel Inc	1-11
Modine Mfg Co	13
Multi-Products Co	10
Nevada Air Products Co	14
Norrman Laboratories Ernst	4
North Electric Co	5-11
Northern Radio Mfg Co Ltd	4
Ohmart Corp	4-16
Onan & Sons D W	6
Par Products Corp	8
Peebles & Co Ltd Bruce	4-5-6-7-9-15-16-17
Peer Inc	10
Perma-Power Co	10
Philco Corp	3-11
Philco Corp/G & L Div	11
Philips Electronics Inc	10
Photo-Crystals	5-7-12
Photographic Analysis Inc	2-3
Photomation Inc	7
Power Supplies Inc	6
Pye Telecommunications Ltd	10
Radio Corp of America/Commercial Electronic Products	6-11
Ransom Research	7
Regent Controls Inc	6-16
Rich Electronics Inc	7
Ripley Co	5-7-9
Rolab Photo-Science Laboratories	8
Schafer Custom Eng'g	10
Scott Inc H H	1
Secode Corp	10
Servomechanisms Inc	21
Servo-Tek Products Co	6-9
Shand & Jurs Co	6
Skiatron Electronics & TV Corp	4-5-7-8-11
Southwestern Industrial Electronics Co/Div Dresser Industries Inc	1-13
Spectra Electronics Corp	7
Stewart Corp F W	10-11
Stewart & Stevenson Services Inc	6
Stromberg-Carlson/Div Gen'l Dynamics Corp (Carlson Rd)	14
Superior Electric Co	5
Syston Corp	4
Tabet Mfg Co	7
Taller & Cooper	13
Tapco Group/Thompson Ramo Wooldridge Inc	4
Tech Labs	3
Tech-Master Corp	11
Technical Materiel Corp	2-4-10
Telechrome Mfg Corp	11
Telectro Industries Corp	1-2-9-10
Teleton Co	10
Tensor Electric Development Co	1-2
Topp Industries Inc	8-10
Tri-Tronics Co	7
Trott Electronics Inc	7
United Electric Controls Co	6
Vectrol Eng'g Inc	4-5-6-7-17
Virginia Electronics Co	10
Waldo Electronics	1-4
Wacline Inc	6
Wang Labs Inc	4
Warren Mfg Co	4
Wayne-Kerr Corp	16
Wells-Gardner & Co	10

Webeor Inc	1
Westinghouse Electric Corp (Pittsburgh)	6
Weston Instruments/Div Daystrom Inc	5-16
Westerx Corp	10
White Dental Mfg Co/S S Industrial Div	10-11
Winder Aircraft Corp of Fla	4-6-9
Worner Electronic Devices	5-7-12-18
Young Spring & Wire Co/Gonset Div	11

22—CONTROL EQUIPMENT, INDUSTRIAL

Controls, alarm system	1
Controls, chemical	2
Controls, combustion	3
Controls, computer	4
Controls, conductivity	5
Controls, counting & sorting	6
Controls, density	7
Controls, dimension	8
Controls, door	9
Controls, dynamometer	10
Controls, electronic	11
Controls, elevator	12
Controls, film thickness	13
Controls, fire	14
Controls, flame failure	15
Controls, fluid conductivity	78
Controls, fluid flow	16
Controls, food processing	17
Controls, gas	18
Controls, grading & sorting	19
Controls, guided missile	20
Controls, heat treating	21
Controls, humidity	22
Controls, illumination	23
Controls, inspection	24
Controls, liquid level	25
Controls, machine safety	26
Controls, loop regulation	79
Controls, materials thickness	27
Controls, mechanical overload	28
Controls, mechanical, switch	80
Controls, moisture	29
Controls, motor & generator	30
Controls, oxygen	31
Controls, package wrapping	32
Controls, pH	33
Controls, photoelectric	34
Controls, photographic	35

Acme Model Eng Co	7-13-17-25-27-29
Acoustica Associates	25
Adler Electronics Inc	11-30
Advanced Instruments	2-7-33-34
Advanced Technology Laboratories	1
Aeromotive Eng'g Products Ltd	1-2-6-11-14-16-17-19-20-24-25-30-32-34
Aerotron Associates Inc	35
Airborne Instrs Lab/Div Cutler Hammer Inc	11
Airescher Mfg Co/Ariz Div	11-16-30
Garrett Corp	
Airpax Electronics Inc	1-11-26
Alfred Electronics	56
Allegany Instrument Co Inc	34
Allen-Bradley Co	25-30
Amelco Inc	19
American Electronics Inc/Taller & Cooper Div	1
American Instrument Co	13-22-29
American Machine & Foundry Co/Gen Eng Labs	6-7-8-11-19-32-34
American Measurement & Control Inc	11-16
American Moistening Co	22
American Research & Mfg Co	11-24
American Tradair Corp	27
Anglo Corp	52-70-71-73-75
Analogue Controls Inc	2-4-11-20
Applied Technology Corp	11-30
A F R Products Inc (River Forest)	9-11
Arzone Electronics Mfg Corp	59
Arma Div/American Bosch Corp	30
Arizona Telemetering Corp	20
Arrow-Hart & Hegeman Electric Co	30-80
Assembly Products Inc	1-2-3-11-14-15-21-23-24-25-26-27-28-29-30-33-34
Atlas Overhead Door Co/Div Industrial Corp of America	9-11
Atmosphere Control Co	22
Atronic Products Inc	6
Audicon Electronics Inc	1-11

Audocall Co	1-42
Auerbach Electronics Corp	4-11
Auth Electric Co	1
Authorized Mfrs Service Co	1
Automatic Control Co	1-16-25
Automation Dynamics Corp	11-22
Automation Inc	6-11-19-34
Automation Management Inc	6-17-19
Autotron Inc	6-23-24-34
Avionics Ltd	34
Avitron Mfg Inc	11
Axler Associates Inc	34
Bailey Meter Co	3-5-16-17-18-21-25-33
Baird-Atomic Inc	4-11
Barber-Colman Co	1-2-3-11-15-17-21-22-32-33
Barlowe Electronics	11-25
Barrett Electronics Corp	11-34
Barton Electronics Inc	6-8-11-27-34
Basic Controls Inc	1-2-3-5-6-7-8-9-11-12-13-14-15-17-19-20-21-22-23-24-25-26-27-28-30-31-32-34-35-78-79-80
Beck Co Harold	11-16-21-25-33
Beckman Instruments Inc/Systems Div	1-2-11
Beckman Instruments Inc/Scientific & Process Inst Div	31-33
Beckman Inst Inc/Beckley Div	6-11-34
Belock Instrument Corp	4-11-20
Bendix Aviation Corp/Bendix-Pacific Div	1-20-25-49
Bendix Aviation Corp/Eclipse-Pioneer Div	4-11-20
Bently Scientific Co	1-6-8-11-13-27
Bergen Labs	2-11
Bernco Eng'g Corp	11-20-21-25-26
B I F Industries	16
Bogue Electric Mfg Co	4-11-20-25-30
Bowmar Instrument Corp	5-6-14-16-25-28
Branson Corp	20
Briggs Associates	1-2-4-6-7-8-11-16-19-20-24-27-34
Bristol Co	1-2-3-4-5-6-7-11-15-16-17-18-21-22-23-25-29-31-33-34-78
Brooks Rotameter Co	1-16-25
Bruno-New York Industries Corp	11
Bunnell & Co J H	1
Burling Instrument Co	50
Burroughs Corp (Detroit)	20
B/W Controller Corp	1-11-25
Cable Electric Products	23
Calbest Electronics Co	9
Caltron Products Co	69
Canadian Applied Research Ltd	20-35
Canadian Research Institute	2-5-6-8-11-19-22-23-24-29-30-33-34
Cardinal Instrumentation Corp	14
CDC Control Services Inc	2-3-4-8-11-16-18-21-22-27-29
Cedar Eng'g/Div Control Data Corp	41-64
Centronix Inc	11-20
CGS Laboratories Inc	30
Chatham Controls Corp	1
Clark Controller Co (Los Angeles)	6-9-11-12-14-15-17-19-20-21-26-28-30-32-34-79-80
Clark Controller Co (Cleveland)	1-3-5-7-8-9-10-11-19-25-26-30-34
Cleveland Instrument Co	8-24-27
Coen Controls Co	3-15-16-18
Colorado Research Corp	4-11-25
Compton Corp	50
Computer Control Co Inc	11
Computer Measurements Co/Div Pacific Industries Inc	6-30
Computing Devices of Canada Ltd	4-7
Conoflow Corp	2-16-17-18
Consolidated Controls Corp	20
Consolidated Electro Dynamics Corp (Pasadena)	2-11-29
Consolidated Productions Inc	11-20
Continental Elec Equip Co	30
Control Circuits Inc	1-5
Control Data Corp	4-20
Controls Co of America	3-15-16-18-20-25-80
Cramer Controls Corp	52-71-72-73-75
Cosa Corp	10-18
Crescent Eng'g & Research Co	8-11-16-20-25
Crown Engineering	1-6-9
Cunningham Son & Co James	4-6-19
Curtiss-Wright Corp/Electronics Div	1-7-11-13-16-24-25-29-37
Cutler-Hammer Inc	11-25-27-30
Daco Instrument Co	14-20
Datascan Inc	1-6-19-22-29-34
Deitz Co S J	6-11-26-32-34
Daytronic Corp	8-11-19-24-26-27-28
Davenport Mfg Co	7
Deltron Inc	11
Denrad Mfg Co Inc	1-6-11-17-26-34
Designers for Industry	4-7-11-20-34
Devco Eng'g Inc	1-2-17-24

Dial Products Co	28
Di-An Controls Inc	2-4-6-11
Dice Co J W	5-8-13-24
Diehl Mfg Co	51
Dietz Co Inc Henry G	25
Digital Equip Corp	4
Dimco-Gray Co	73
Dormeyer Industries	9-25
Durant Mfg Co	7-34
Dymec Inc	11
Dynamic Control Co	58-67-68
Dynatomic Div/Eaton Mfg Co	10-11
Dynapar Corp	6-8-10-11-16-19-24-25-27-30-32-34
Dynatronic Inc	49-70-73
Eagle Signal Corp	6-11-52-54-70-71-72-73-75
Eastern Industries Inc	16-20
Eclipse Fuel Eng'g Co	3-15-16-18-21
Edcliff Instruments	20-36-38-53
Edison Industries Thomas A Instrument Div	1-15-20
Electric Eye Equipment Co	11-13-24-27-29-34
Electric Machinery Mfg Co	30
Electric Regulator Corp	11-20-30
Electrodata Div/Burroughs Corp	4
Electro-Devices Inc	11
Electronic Control Corp	1-3-5-6-9-11-25-34
Electro Instrument Inc	11
Electronic Machine Parts Inc	34
Electronic Processes Corp of Calif	11
Electronics Corp of America (Cambridge)	1-3-5-6-7-9-11-14-15-17-19-21-23-24-25-26-32-34-78
Electronics Corp of America (Toronto)	1-3-6-7-9-11-14-15-23-25-34
Electronics Corp	9-11-14-20-23-26-29
Electronics Eng Co of Calif	6-20
Electronic Specialty Co	1-10-11-12-14-20-30
Electron-Radar Products	3-11-14-15-18-22-23-29
Electro Products Labs Inc	6-26
Electro Vision Lab	1-6-11-34
Ellison Draft Gage Co	1-3
Energy Kontrols Inc	3
Engis Equipment Co	8-24
E T A Products Co of America	4-11-26-30
F AE Instrument Corp	80
Farmer Electric Products Co	11-34-52-71-73-74
Fasco Industries Inc	30
Feedback Controls Inc	4-20-36-41-46
Fenwal Inc	1-2-11-14-15-20-25-32-35
Fischer & Porter Co	1-2-3-7-11-16-17-25
Fisher Co Inc Oscar	35
Fisher Pierce Co	23-24-34
Flight Research Inc	11-34-35
Ford Instrument Co/Div Sperry Rand Corp	4-20
Foxboro Co	1-2-5-7-8-11-13-16-17-18-22-27-29-33
Franklin Dales Co	11-26-28-30
Friez Instrument/Div Bendix Aviation Corp	22
Furnas Electric Co	9-25-30
General-American Valve Co	16
General Communication Co	7-45
General Controls Co	3-6-11-15-16-18-20-21-22-25-30-34
General Controls Co (Canadian) Ltd	6-15-16-17-18-20-21-22-25-26
General Devices Inc	11
General Electric Co/Apparatus Sales Div	1-6-11-12-15-16-21-23-24-25-26-33-34
General Electric Co/Dist Assemblies Dept	30
General Electric Co/Industry Control Dept	7-10-12-19-27-30
General Electric Co/Specialty Control Dept	7-9-11-19-20-25
General-Electro Mechanical Corp	10-20
General Kinetics Inc	4
General Radio Co	23
General Railway Signal Co	9
General Ultrasonics Co	25
Geotechnical Corp	25
Giannini & Co G M	11-20-36-38-41-42-50-64
Globe Industries Inc	11
Green Rectifier Co	30
Guardian Electric Mfg Co	1-4-6-9-11-12-16-20-30-34
Guide Lamp Div	11-23-34
Gulton Industries Inc	1-13-16-20-25
G-V Controls Inc	50-52-76
Hagan Chemicals & Controls Inc	2-3-4-11-16-18-25-31-33
Hallamore Electronics Co	11-20
Haller Raymond & Brown	11-20
Hallikainen Instruments	7-16
Hamilton Standard Electronics Dept	11
Hammarlund Mfg Co	1-2-3-5-6-7-8-11-14-16-17-18-19-20-25-78
Hart Mfg Co	11
Haydon Co A W	4-11-30
Hays Corp	3-16-24-25
H-B Instrument Co	11
Healy-Ruff Co	1-25

Hewson Co Inc	1-5-11
Hill & Co E Vernon	21
Holland Electronics	11-19-34
Honeywell Controls Ltd	1-3-4-5-7-11-15-16-17-18-21-22-23-25-26-29-30-31-33
Hughes Products/Hughes Air Craft Co	4-11
Hughey & Phillips	34
Ideal Electric & Mfg Co	26-30
Illinois Testing Labs Inc	21-50
I-L-S Instrument Div/Meriam Inst Co	6-16
Industrial Control Co	6-11-80
Industrial Electronic Engineers Co	4-6-11-80
Industrial Instruments Inc	5-22-31-78
Industrial Nucleonics Corp	4-7-8-11-13-24-25-27-45
Industrial Timer Corp	35
Industrial TV Inc	12
Infrared Industries Inc	34
Inscoc/Div Barry Controls Co	46
Instruments Inc	7-25
Int'l Instruments Inc	11
Jackson Electronics Inc	4
Janitrol Aircraft Div/Surface Combustion Corp	3
Jo-Bell Products Inc	25
Kahn & Co	11-20-22-29
Kearfott Co Inc (Pasadena)	11-36-41-64
Kearfott Co Inc (Clifton)	1-2-3-4-6-8-11-13-16-17-18-19-20-25-27-30-36-41-64
Kelsey-Hayes Co	4-11-16-18
Kieley & Muller Inc	25
Kingston Electronics	30
Kinney Mfg Div/Vacuum Equip/Div N Y	13
Kurman Electric Co/Div Norbut Corp	1-11-12-34
Lamotte Chemical Products Co	2-33
Land-Air Inc/Instrument & Electronic Div	11
Larson Instrument Co	6-11
Lavoie Labs Inc	11
Leach Corp/Inet Div	1-11-30
Lear Inc (Santa Monica)	16-18-20-36-41-64
Lear Inc (Grand Rapids)	11-20
Leeds & Northrup Co	2-3-5-18-21-22-25-31-33
Lehigh Valley Electronics Eng'g & Mfg Co	11-24-25
Lektra Labs Inc	7-34
Leland Airborne Products	11-20-30
Lenkurt Electric Co	1-30
Leslie Co	16-25
Librascope Inc (Glendale)	1-2-4-6-11-16-17-20-25
Librascope Inc/Commercial Div	4
Link Aviation Inc	4-11
Liquidometer Corp	11
Litton Industrial of Calif	20
Logeman Co C W	52
McDonnell & Miller Inc	1-16-25
Machine O Matic	11
Magnavox Co Research Labs	1
Magnetic Amplifiers Inc	4-11-20-34
Magnetic Instrument Co Inc	7-11-25
Magtrol Inc	10-46-53
Maico Electronics Inc/Subsidiary W A	6-8-11
Sheaffer Pen Co Fort Madison Iowa	11
Mallory & Co Inc P R (Gray St)	11
Manostat Corp	38-59
Mast Development Co Inc	35
Maxson Corp W L	16
Measurements Research Co/Div Prudential Industries	6
Meredith & Co Ltd C C	11-23-25-30-34
Merix Chemical Co	2-5
Merz Engineering Inc	6-19-24
Meterlog Corp/Sub Air Logistics Corp	41
Microgee Products Inc	11-79
Mid-Century Instrument Corp	4
Milgo Electronic Corp	4-11-20
Minatron Corp	6-8
Minn-Honeywell/Boston Div	11-20
Minn-Honeywell Regulator Co/Aeronautical Div	10-20-25
Minn-Honeywell Regulator Co/Commercial & Residential Divs	1-3-11-15-18-22
Minn-Honeywell Regulator Co/Brown Instruments Div	1-2-3-5-6-7-11-13-15-16-17-18-20-21-22-23-25-26-27-28-29-30-31-33-78
Minn-Honeywell Regulator Co/Mil Prod	11-20
Gp-Aeronautical & Ordnance Div	1-11
Miralte Inc	1-11
Missouri Research Labs Inc	1
Modelectric Products Corp	1-6-10-11-26
Moog Valve Co	11
Mullard Equipment Ltd	6-11-12-19-25
Multi-Products Co	11
National Instrument Laboratories Inc	16-18-34
Newark Controls Co	25
Norden Div/United Aircraft Corp	64
North Atlantic Industries Inc	11

PRODUCT MFRS

22—Control Equipment, Industrial

Northeast Electronics Corp	11
North Electric Co	1-4-6-11-12-14-23
Nuclear-Chicago Corp	7-13-16-25-27
Nuclear Corp of America/Instrument & Research Div	7-25
Nuclear Products-Erco/Div ACF Industries	4-20
Nuclear Systems/Div Budd Co	7-8-27
Ohmart Corp	7-13-17-25-27
Ohmite Mfg Co	30
Opad Electric Co	11
Optimized Devices Inc	1-11-24
Packard Bell Electronics Corp	4-11-16-20
Panellit Inc	1-2-3-4
Par Products Corp	35
Partlow Corp	3-15-17-18-21-22
Patterson Moos Div/Universal Winding Co	1-2-3-14-20
Peebles & Co Ltd Bruce	1-2-4-6-7-8-9-10-11-12-15-16-17-18-19-23-24-25-26-27-28-30-32-34-78-79-80
Pegasus Labs Inc	11-16-20
Penn Controls Inc	1-3-15-18-22-25
Perkin-Elmer Corp	2-14
Perkin-Elmer Corp/Vernistat Div	20
Perma-Power Co	1-9-11-23
Peschel Electronics Inc	11-24
Phila Scientific Glass Co	1
Philbrick Researches Inc George A	4-11
Phileo Corp/G & I Div	4-11-14-20
Phileo Corp	20
Photobell Co	1-3-6-9-11-12-13-14-15-16-17-19-21-22-23-24-25-26-27-29-32-33-34-35
Photo-Crystals	1-3-6-11-14-15-18-22-23-29-34-43-74
Photographic Analysis Inc	4-8-17-26
Photomat Inc	3-6-7-8-15-17-19-23-26-32-34
Piezo Products Co	1-11-15-20
Pioneer Patents & Products Co	11-26
Plastic Factors Inc	27
Polytronic Research Inc	1-3-14
Polytronics Co	50-58-74
Potter Instrument Co	4-6-7-8-11-17-19-26-27-28-30-32-34
Power Supplies Inc	11-30
Precise Measurements Corp	11-67-68
Precision Scientific Co	2-17-21-29
Precision Thermometer & Ins Co	1-2-7-17
Quality Control	24
Quarie Controllers	2-4-5-11-17-33
Radio City Products Co	1-20
Radio Corp of America/Commercial Electronics Products	4-6-8-11-18-24-27-34
Radio Corp America/Industrial Automation Equip	1-6-8-11-19-24-26-27-28-34
Rahm Instruments/Div American Machines & Metals Inc	1-16-18-20-25
Ransom Research	4-6-11-20-34
Ranco Products	1-14
Rank Cintel Ltd	1
Rauland-Borg Corp	1
Rea Co J B/Electronics Div	4-20
Reeves Instrument Corp	4-11-20
Regent Controls Inc	11-25-30
Reliance Electric & Eng'g Co	2-4-10-11-16-17-25-30-79
Republic Flow Meters Co/Sub Rockwell Mfg Co	3
Research Industrial Lab of Electronics	11
Revere Corp of America	16-25
Rich Electronics Inc	11-34
Ripley Co	5-11-34
Robertshaw-Fulton Controls Co/Fulton Syphon Div	1-16-17-18-25-26
Robotron Corp	11-34
Royal McRee Corp	4
Seaco Controls Inc	1-3-11-14-15
Schrack Electrical Sales Corp	28-30
Scantlin Electronics Inc	4-11
Scientific Eng'g Lab	56
Secode Corp	1-9-11
Security Controls Inc	1-6-11-13-16-22-24-25-26-27-29
Seneca Falls Machine Co	8-11-26-27-79
Serdex Inc	22
Servo Corp of America	20
Servomechanisms Inc	4-11-20-25
Servon Instruments Inc	36-38-41
Servo Systems Co	11
Servo-Tek Products Co	11-30
Shand & Jurs Co	1-25-30
Short Brothers & Harland Ltd	79
Simplex Valve & Meter Co	16-25
Skiatron Electronics & TV Corp	23-34-86

Sperry Farragut Co/Div Sperry Rand Corp	41-64
Sperry Gyroscope Co/Sunnyvale Dev Center	36-64
Standard Electric Time Co	70-71-72-73
Standard Instrument Corp	43-44-50-54-63-70-72-73-74
Stanley Aviation Corp	63
Statham Instruments Inc	38-47
Stevens Mfg Co	50-76
Stokes Corp F J	56
Stow Mfg Co	86
Streeter Amet	60-70-73
Suncoast Instruments/Div Milton Roy Co	38-59
Superior Electric Co	46-58-68
Taller & Cooper	36-39-42-49-60-63
Tapco Group/Thompson Ramo Wooldridge Inc	36-41-46
Technical Apparatus Builders	58-67-68
Technical Oil Tool Corp	52-63-70-73-75
Teledyne Mfg Corp	26-49
Telectro Industries Corp	41-49
Telemeter Magnetics Inc	71
Tel-Instrument Electronics Corp	58
Telemetering Corp of America	49
Teller Co	36-41
Tempo Instrument Inc	52-58-71-73
Texas Instruments Inc/Metals & Controls Div	50
Therm-o-Disc Inc	50
Thermo Electric Co	50
Thermo Electric Mfg Co	50
Times Facsimile Corp	52
Tipptronic Inc	38-45-50-53-60
Titeflex Inc	65
Toledo Scale Co	60
Topp Industries Inc	50-52-73-75
Tork Time Controls Inc	73
Torq Engineered Products Inc	30-34-46
Tracerlab Inc	62-77
Trans Electronics Inc	58-67-68
Transistor Devices Inc	67-68
Transonic Inc	67-68
Transval Electronics Corp	67-68
Trimount Instrument Co	36
Triplet & Barton	62-77
Tri-R-Instruments	50
Trott Electronics Inc	36-42-46-52-58-63-70-71-72-73-74-75
Tullamore Electronics Lab	63-70
Tuttle Electric Products Inc	50
Ulanet Co George	50-76
Union Switch & Signal Div	54
United Electric Controls Co	38-50-56
United Control Corp	41-50
Unit Process Assemblies Inc	71
U S Controls Inc	50-52
Vacuum Equip Div/N Y Air Brake Co	43-50
Vacuum Specialties Co	56
Vacuum Tube Products/Div Hughes Aircraft Co	56-61-71-73-75
Valverde Labs	42-50
Vapor Heating Corp	50
Varo Mfg Co	36-46-58
Vectrol Eng'g Inc	36-41-46-50-51-53-58-61-67-68
Vermaline Products Co	52-70-71-72-73-74-75-76
Vickers Inc/Electric Products Div	36-37-38-41-46-47-53-58-61-67-68
Victory Eng'g Co	49-50
Video Instruments Co Inc	47
Wacline Inc	41-46-53-58-68-70-73
Waldorf Electronics/Div F C	36-38-41-42-
Huyck & Sons	49-51-54-59-64
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Crystal blanks	16
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Crystals, barium titanate	1
Crystals, color TV frequency control	2
Crystals, communication	3
Crystals, diode	4
Crystals, frequency control	5
Crystals, galena	6
Crystals, germanium	7
Crystals, hermetically sealed	8
Crystals, mixers	29
Crystals, quartz	9
Crystals, raw	30
Crystals, rockelle salt	10
Crystals, scintillation	11
Crystals, silicon	12
Crystals, synthetic sapphire	13
Crystals, tourmaline	14
Crystals, transducer	15
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Atomic Accessories Inc	11
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Automatic Metal Products Corp	21-24
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Bassett Inc Rex	3-5-8-9-20-22
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Electro-Flex Heat Inc	20
Elektro-Serv Co	20
E M I Cossor Electronics	2

Ely Sales Co	23
Enflo Corp	21-23-24
Engelhard Industries Inc	9
Erle Resistor Corp	1
Fedtro Inc/Federal Electronic Sales Div	17
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Fluorocarbon Products Inc	23
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Great Eastern Mfg Co	4
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Meridian Metalcraft Inc	21-24
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Miller Labs August E	2-3-5-9-14-16-19-22-23
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National Beryllia Corp (N Bergen)	26
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National Radio Co Inc	21
Northern Eng'g Labs	3-5-8-9-15-22
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Phillips Control Corp	21
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Pilot Chemicals Inc	11
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Precision Radiation Instruments Inc	11
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Detectors, lie	8
Detectors, light intensity	24
Detectors, magnetic	9
Detectors, metal	10
Detectors, mineral	11
Detectors, null	12
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Detectors, resistance	15
Detectors, scintillation	16
Detectors, smoke	17
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Detectors, vibration	19
Detectors, voltage	20
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American Electronics Inc	14-16
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Anadex Instruments Inc	1-4-9-12-20
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Atomic Accessories Inc	14-16
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Automatic Metal Products Corp	1
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Barber-Colman Co	14
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Bendix Aviation Corp/Cincinnati Div	14
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Boonton Electronics Corp	1-12-20
Bram Metallurgical-Chemical Div	10
Branson Instruments Inc/Branson Ultrasonic Corp	3
Brilmayer Laboratories E W	10
Bruno-New York Industries Corp	12-20
Calif Technical Industries/Div Textron Inc	18
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Chesapeake Instrument Corp	19
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Electro Products Labs Inc	10-19
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Erwood Inc	19
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General Electric Co/Technical Products Dept	10
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General Radio Co	1-12-18-19-20
General Scientific Equipment Co	5-17
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Gertsch Products Inc	4-12
Green Rectifier Co	7
Gulton Industries Inc	3
Hammer Electronics Co Inc	16
Harworth Mfg Co	10
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Highside Chemicals Inc	7
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Hoffman Electronics Corp	14
Honeywell Controls Ltd	2
Hycon Eastern Inc	1
Hycon Mfg Co	16
Industrial Control Co	12
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Linde Co Div/Union Carbide & Carbon Co	7
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Magnetic Instrument Co Inc	14-16
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Piezo Products Co	2
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Tullamore Electronics Lab	1
Turner Brass Works	7
Ultra-Violet Products Inc	3
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Topflight Corp	25
Tracerlab Inc	24
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Tronex Inc	31
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Wayne-Kerr Corp	5-7
Weksler Instruments Corp	3-5-8
West Coast Research Corp	3-4
West Instrument Corp	5
Weston Instruments/Div Daystrom Inc	3-5-7-10
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Cords, line	73
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Abalon Precision Mfg Corp	4-5-8-10-49-58-65
Ace Plastic Co	7-33-67

Ace Spring Mfg Co Inc	57
Accurate Electronics Corp	4-5-20-21-22-34-46-58-60-63-65-67
Accurate Spring Mfg Co	57-58
Acme Mfg & Gasket Co	29-30-56-58-60-62-63-67-68
Acro Tool & Die Works	39-58
Actioncraft Products	39
Advanced Products	30
Advance Electronics Co	40
Aerolite Electronics Corp	4-8-10-12-15-16-20-21-22-26-34-41-45-46-47-53-54-58
Acromark Co	39
Aeromotive Eng'g Products Ltd	2-37-44
Aircraft Radio Corp	21-28
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Airtron Inc/Div Litton Industries	10-30-32-34-37-44-64
Alac Inc	13-33-34-49-56
Alden Products Co	5-11-15-28-52-72
Allen Mfg Co	28-51
Allied Fabricating Corp	4-10-58-65
Allmetal Screw Products Co Inc/West Coast Div	3-25-28-37-43-44-45-48-49-50-51-52-64-65
Allmetal Screw Products Co (Garden City)	1-3-10-25-28-34-37-43-44-45-48-49-50-51-52-64-65
Alpha Metals Inc	30-58-65
Alpha Wire Corp	19
Aluminum Co of America	3-8-10-24-28-43-44-45-48-49-65
Amaton Electronic Hardware Co Inc	4-7-10-12-13-14-17-20-21-22-26-27-28-32-33-34-47-48-49-54-56-58-63-67
American Brass Co	4-5-8-10-27-28-32-34-45-60-65
American Insulator Corp	33
American Lava Co	6-7-25-27-32-54-56-61
American Nut & Bolt Fastener Co	60-64-65
American Screw Co	3-28-44-49-50-52
American Sealants Co	28-37-64
American Silver Co	18-23-58-60-65
Amplex Div/Chrysler Corp	2-22-31-56-65
Anchor Metal Co	58-60-65
Anchor Plastics Co	26-33-56
Anchor Specialty Mfg Co	17
Anchor Wire Co	43
Anasco Div/Genl Aniline & Film Corp	5-31-49-58
Arch Instrument Co	31
Armstrong Bros Tool Co	10
Arrow Fastener Co Inc	28
Arrow Tool Co Inc	31
Associated Eng Corp	12-17
Associated Mfg Co	49
Associated Production Co	49
Atlantic Research Corp	3
Atlas Precision Products Co	10-21-22-31-54-72
Atlas Screw & Specialty Co	3-4-48-49-50-51-52-60-64-65
Auburn Mfg Co	7-23-29-30-32-56-58-60-62-63-65-66-67-68
Augat Bros	10-11-13-16-58
Automatic Coil Co Inc	4-5-8-58
Automatic & Precision Mfg Co	6-28-30
Autoscrew Co	3-28-37-44-48-49-50-51-52-56-60-65
Avco Mfg Corp/Crosley Div	41
Avnet Co	28
Bache & Co Semon	40
Baldwin Products Corp	18-16-23-58
Barden Corp	2
Barker & Williamson Inc	20-21
Barry Controls Inc/Western Div	41-42-70
Bead Chain Mfg Co	45-65
Beaver Gear Works Inc	31
Beckman Instruments Inc/Heliport Div	20-22-31-34
Belmet Products Inc	8-34-58
Belmont Smelting & Refining Works	24
Bendix Aviation Corp/Friez Inst Div	33
Bendix Aviation Corp/Eclipse-Pioneer Div	24-71
Bernco Eng'g Corp	4-5
Bestcraft Products Co	29-30-56-59-69
Bethlehem Steel Co	3-28-32-37-43-44-49
Birtcher Co	11-13-42
Blaco Mfg Co	4-10-58
Boots Aircraft Nut Corp	28-37-44-49-56
Borden Chemical Co/Resinite Dept	19
Bowmar Instrument Corp	31
Brady Co W H	30-39
Brainin Co C S	18
Bram Metallurgical/Chemical Div	66
Brand & Co William	39
Bridgeport Brass Co	24
Bristol Co	23-25-28-46-49-51
Brooks & Perkins Inc	8
Brooks Radio & TV Corp	5
Brush Nail Expansion Bolt Co	28
Buckbee Mears Co	69
Bud Radio Inc	4-5-8-9-20-21-33-35-38-53-58

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Cambridge Thermionic Corp	4-5-11-13-33-34-46-49-56
Carborundum Co/Globar Plant	6-7-59-61
Carroll Pressed Metal Inc	4-5-10-32-33-34-58-65
C E M Co	25-28-43
Central Scientific Co of Canada Ltd	10
Central Screw Co	3-28-37-44-50-52
Channel Master Corp	4-48-49
Chase Brass & Copper Co	3-28-32-43-44-48-60-64-65-69
Chassis-Trak Inc	55-74
Chatillon & Sons John	57
Chicago Gasket Co	7-21-30-67
Chicago Rivet & Machine Co	48
Chicago Screw Co/Div Standard Screw	3-28-44-49-51-52
Circon Components Corp	3-27-28-34-44-48-49-60
Cleveland Cap Screw Co	3-25-28-44-51-52
Cleveland Metal Specialties Co	58
Cleveland Wire Cloth & Mfg Co	69
Coils Electronics Co	58
Contacts Inc	18
Continental-Diamond Fibre Corp	63-66
Continental Screw Co	50-51-52
Cortland Industries	31-32-49-58-62-63-67
Craft Mfg Co	8
Craig Systems Inc	55
Crane Packing Co	67
Crescent Eng'g & Research Co	34
Croname Inc	58
Crucible Steel Co of America	57
Custon Gear Co	31
Cutler Metal Products Co	58
Dalmore Corp	49
Deutsch Co	10-28-48-49
Dial Products Co	21-72
Dietzen Co Eugene	16
Dimco-Gray Co	28-33
Division Lead Co	65
Dixon Corp	2-28-30
D & S Mfg Co	34
Du-Co Ceramics Co	7-32-61
Dudek & Co R C	28-34-37
Dumore Co	53
Duremia Products Inc	7-61
Dynamic Gear Co	31-54-56
Dzus Fastener Co	19-21-22-28-31-35
Eagle Electric Mfg Co	7-28-46-73
Eastern Specialty Co	49-58
Educational Electronics Co	12-14
Elastic Stop Nut Corp of America	25-28-37-44-45
Elco Tool & Screw Corp	28-44-50-52
Electrical Specialty Co	19-63-66-67
Electric Auto Lite Co/Wire & Cable Div	24-61
Electronics Div/Metal Textile Corp/Div Gen'l Cable Corp	30-69
Electro-Products/Div Western Gear Corp	31
Elzee Metal Products Co	4-5-10-41-42-49-58-65
Emerson Plastics Corp	2-7-23-25-30-32-46-63-66-67-68
Enflo Corp	2-6-7-20-21-22-23-30-32-54-56-58-67
Engelhard Industries Inc	18
Eng'g & Mfg Corp of Texas	58
Eprad Inc	71
Erca Tool Die & Stamping Co	15-34-58-60-63-65-66-67
Ercona Corp	46
Erie Resistor Corp	56-58
Erwood Inc	5-21-33
Exact Eng'g & Mfg Inc	47
Eyelet Tool Co	27-28-32
F&E Instrument Corp	10-21-31
Fafnir Bearing Co	2
Fastex Div/III Tool Works	10-16-28-31-32-34-37-46-48-58-59
Federal Machine Co	3-4-5-20-22-44-54-56
Federal Screw Products Inc	3-5-12-14-26-27-28-32-34-37-44-48-50-51-52
Federal Shockmount Corp/Div Korfund Co	41-42-70
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Fischer Special Mfg Co	44
Flexonics Corp	20
Fluorulon Laboratories Inc	67
Fluorocarbon Products Inc/Div U S Gasket Co	7-15-30-32-49-67
Foote Bros Gear & Machine Corp	1-20-21-31-47
Forbes & Wagner Inc	58

Ford Instrument Co/Div Sperry		Litton Industries of Calif	5-33-84-37	Radio Frequency Labs Inc	55
Rand Corp	31	Litton Industries/U S		Rapid Specialties Co	17
Foredom Electric Co Inc	21-26-53	Engineering Co Div	4-33-34-49	Raybestos-Manhattan Inc	
Franke Gear Works Inc	31	Lord Mfg Co	21-23-32-41-42-70	(Passaic)	23-30-42-68
Frankel Connector Co	17	Lorentzen Inc H K	4-5-58	Rectifier Corp	58
Franklin Co Inc Bernard	4-5-8-9-33-55-68	Maclean & Hanopol	4	Red Seal Electric Co	7
Frechtown Porcelain Co	6-7-61	Magnesium Products of Milwaukee Inc	58	Reeves Instrument Corp	20-21-22-31-47-54
Garde Manufacturing Co	56-53	Magtrol Inc	72	Reiner Electronics Co	5-41-49-58
Garlock Packing Co	23-30-32-63-67-69	Malco Mfg Co	4-5-34-58	Reliance Mica Co Inc	66
Gates Radio Co	4-5-26-29	Malkin-Illion Co	58	Remler Co	10-11-41-55
G C Electronics Mfg Co	10-12-13-14-15-16-17-20-21-34-37-46-49-50-51-52-56-57-60-62-64-65-68	Mandol Mfg Co Inc	4-5-18-45-49-58-60-63-65-67	Renbrandt Inc	21
Gear Specialties Inc	31	Mansol Ceramics Co	4-5-18-45-49-58-60-63-65-67	Renfrew Electric Co Ltd	10-26-37
General Cement Mfg Co/	3-5-10-12-14-15-16-	Marlin-Rockwell Corp	2	Republic Steel Corp	3-37-43-48-51-52-69
Div Textron Inc	17-19-20-22-26-27-28-29-30-37-39-40-44-45-46-47-48-50-51-52-54-56-57-58-59-60-62-63-64-65-67-68	Mass Gear & Tool Co/ Div		Research Development Mfg Inc	31-49-54
Gerrard & Co A J	4	Geartronics Corp	31	Research Inst Co Inc	6-8-13-16-27-36-49-58
Gibson Electric Co	18	Matthews & Co Jas	39	Resistoflex Corp/Southwestern Div	23
Globe Industries Inc	31	MB Mfg Co/Div Textron Inc	42	Reynolds Metals Co	43-58
Goe Eng'g Co	22-27-33-34-49-56	McCormick Selph Associates	3	Reynolds Wire Div/National-Standard Co	69
Goodrich Aviation Production/		Meredith & Co Ltd C C	49-58	Rhodes & Sons Co M M	10-43
Div B F Goodrich Co	28-48	Metal Products Inc/Div Mid West		Richards	7-58-67
Goodrich Sponge Products B F/		Conveyor Co Inc	4-5-8-56-58	Richards Electrocraft Inc	18-46
Div B F Goodrich Co	68	Methode Mfg Corp	58	Richardson Co	7-58-67
Gordon Enterprises	4-5-31-40-49-57-58	Metpro Inc R I	8-27-32-48	Rimak Inc	8-58
Grant Pulley & Hardware Corp	55	Mica Insulator Co	7-30-32-66-67	Rodale Mfg Co	4-12-32
Grayhill Inc	12-13-16-67	Micromold Products Corp	67	Rogers Corp	7-23-30-32-63-68
Graphite Metallizing Corp	2-7-18	Mid-West Spring Co	57-58	Romac Products Co	58
Greene Co L Charlton	41-65	Milford Rivet & Machine Co	48	Ross Metals Co Milton	8-31-32-33-49-67
Gries Reproducer Corp	44-45-48-51-56-67	Millen Mfg Co James	8-11-15-20-22-26-34-38-46	Rotor Clip Co	34
Grip Nut Co	28-32-37-44	Miller Dial & Nameplate Co	39-58	Russell Burdsall & Ward	3-44-48-50-51-52
Groov-Pin Corp	84-45	Milwaukee Stamping Co	4-5-10-49-56-58-60-65	St Marys Carbon Co	2-7
Gudebrod Bros Silk Co	19	Minerals & Insulation Co	63-66-67	Schjeldahl Co G T	30-67
Guide Lamp Div	24-30-58-71	Minnesota Mining & Mfg Co	61	Schuyler Mfg Corp	18-30-69
Hallett Mfg Co	10-32	Minor Rubber Co	30-32-41-42-67-68	Scientific Glass Apparatus Co	10
Halogen Insulator & Seal Corp	30-67	Mitronics Inc	61	Segal Edward	27
Hamilton Kent Mfg Co	30-41-42	Molly Corp	28	Servomechanisms Inc	31
Handy & Harman	69	Moody Machine Products Co	49	Servo Systems Co	31
Hassall Inc John	28-43-45-48-56	Morris Co J I	28-34-44-48-49-51-60	Shakeproof/Div Illinois	
Havel Industries Inc	7-30-32-67	Motigraph Inc	31-49	Tool Works	28-37-44-50-58-64-65
Heli-Coil Corp	28	Mueller Electric Co	12-17	Sightmaster Corp	58
Heminway & Bartlett Mfg Co	19	Multronics Inc	34	Simmons Fastener Corp	28-33-35-37-48-55
Hermetite Corp	6	My-T-Grip Mfg Co Inc	23	Simplatrol Products Corp	72
Heyman Mfg Co	7-32-58-59	Nat'l Beryllia Corp	2-61	Simpson Optical Mfg Co	40
Hi-Shear Rivet Tool Co	3-25-28-37-45-48-49	National Coil Co	49	Sinclair Mfg Co	18-34-37-44-45-49-56-58-60-63-65-67
Hobbs Mfg Co	45-64	National Lock Washer Co	64	S K F Industries Inc	2
Hobson Bros	15-58	National Radiac Inc	33	Skydyne Inc	33-34
Hoffman Electronics Corp	31	National Radio Company	15-20-22-26-34	Smith Inc Herman H	4-11-12-14-15-17-21-22-26-32-34-44-46-49-50-51-53-54-56-59-60-63-64-65
Hudson Tool & Die Co	8-58	National Screw & Mfg Co	3-28-37-44-45-48-49-50-51-52	Southco Div/South Chester Corp	28-34-48
Hunter Spring Co	10-16-28-57-58	National Standard Co	69	Southern Screw Co	50
Industrial Devices Inc	17	National Tel Tronics Corp	4-5-34-49-58-67	Sparta Mfg Co	7-23-30-67
Ind Hardware Mfg Co Inc	4-5-84-58	National Vulcanized Fibre Co (Wilmington)	56-58-63-66-67-68	Spaulding Fibre Co	7-32-63-67
Industrial Retaining Ring Co	28	National Vulcanized Fibre Co (Newark)	7-30-31-32-49-58-63-67	Split Ballbearing Div/MPB Inc	2
Insulating Fabricators Inc	30-32-58-63-66-67-68	Newark Wire Cloth Co	69	Stamford Stamping Co	28
Insulation Mfrs Corp	25-63	Newcomb Spring of Conn Inc	4-10-16-57-58-65	Standard Electric Time Co	46
Isolatite Mfg Corp	6-7-61	New Departure/Div GMC	2-31-72	Standard Locknut & Lock-washer Inc	28-37-44-49-58-64-65
Jacobson Nut Mfg Corp	44	Newman Corp M M	19	Standard Pressed Steel Co	3-25-28-37-44-45-49-51-52
Jan Hardware Mfg Co Inc	2-20-21-22-26-34-37-47	Nichols Products Co	63-67	Standard Screw Co	8-28-44-45-49-51-52
Janitrol Aircraft Div/		Norden Div/United Aircraft Corp	31	Star Porcelain Co	61
Surface Combustion Corp	10-11-20	Northern Metal Products Corp	4-5-8-58	Staver Co	8-11-15-16-23-27-28-30-56-58-60-62-63-65-67-68
JFD Electronic Corp	5	Nutt-Shel Co/SPS Western	3-28-37-44-52	Steel Co Herman D	49
Joclin Mfg Co	2-6-7-10-11-23-30-32-67	Nylok Corp (Skokie Ill)	3-37-44-51-52	Sterling Bolt Co	8-44-50-51-52-60-65
Jodee Plastics Inc	7-8-31-32-49-56-57	Nylok Corp (El Segundo)	3-28-34-37-44-49-51-52	Stewart Corp F W	21-63
Johnson Co E F	20-21-22-26-46-53-54	Nylok Corp (Paramus)	3-28-34-37-49-51-62	Stimpson Co Edwin B	10-16-27-28-48-49-60-64
Johnson & Hoffman Mfg Corp	58	Oak Mfg Co	21	Stone City Products Co	4-5-8-10-11-17-34-58
Jones & Laughlin Steel Corp	43	Ohio Carbon Co	2-7	Superex Electronics Corp	46
Kaynar Mfg Co Inc	28-34-37-44	Olympic Plastics Co	32-52	Superior Steatite & Ceramic Corp	61
Kees Mfg Co F D	4-5-33-56-58	Optical Coating Lab Inc	40	Swenson Co W H	7-47-67
Kelsey-Hayes Co	8-31-58	OPW-Jordan	20	Swiss Jewel Co	2
Kenwood Eng'g Co	4	Pacific Universal Products Corp	20	Switchcraft Inc	46
Keystone Electronics Corp	4-5-7-13-17-28-34-45-46-49-56-58-63-67	Palnut Co	28-37	Sylvania Electric Products Inc/Parts Div	19-58
Kirchberger & Co M	61	Panduit Co	19	Symphony Electronics Corp	5
Klincher Locknut Corp	37	Parker-Kalon Div/Gen'l American Transportation Co	28-50-51	Taffet Radio & TV Co	16-57-58
Kling Metal Spinning & Stamping Co	58-60-65	Peerless Electronics Inc	4-10-11	TA Manufacturing Corp	4-5-10-11-17-28-33-56
Kolton Electric Mfg Co	58	Peerless Products Industries	62-63-65-66-67	Taurus Corp	49
Kost Products Co	8-13-28	Penn Eng'g & Mfg Corp	28	Technical Oil Tool Corp	31-49-54-56
LaBelle Industries Inc	38-58	Penn Fibre & Specialty Co	30-32-39-56-59-60-62-63-64-65-66-67-68-69	Technical Wire Products Inc	18-30-42-69
Laminated Sheet Products Corp	31-58-63-67	Perfection Mica Co	66	Techniques Inc	18-23-20-56-57-58-69
La Moree C D	66-67	Peschel Electronics Inc	31	Techron Corp	6-7-46
Lamson & Sessions Co	3-10-28-37-44-49-50-51-52	Pheoll Mfg Co	3-28-44-48-50-51-52-60-64-65	Telegraph Construction & Maintenance Co Ltd (Cables Group)	25-57
Lance Antenna Mfg Co	10-20	Pic Design Corp/	1-2-6-7-10-20-21-22-24-25-	Telex	31-46
Lear Inc (Grand Rapids)	20-21	Sub Benrus Watch Co Inc	26-31-33-44-45-47-49-51-53-54-56-57-64-65-72	Teveco Insulated Wire	46
Lee Chemical Corp Walter	7-23-30-32-45-46-49-66-67-68	Pix Mfg Co	11-16-34-45-58	Thomas & Betts Co	19
Lee Spring Co/Div Leetronics Inc	57-58	Plasteck Inc	67	Thomas & Sons William	58
Lestershire Spool Div/National Vulcanized Fibre Co	31	Plastic Accessories Inc	67	Thompson Bremer Co/	
Lerco Electronics Inc	13-18-27-33-34-44-49-56	Pneumafil Corp	41-42	Sub AMF	28-49-50-57-60-64-65
Librascope Inc (Glendale)	31	Polymer Corp	2-7-30-32-67	Thomson Industries Inc	2-7-54
Line Material Industries	3-4-5-10-37-44-45-50-52-64-65	Porter Co Inc H K	5-10-28-34-41-48	Thor Ceramics Inc	61
Link Aviation Inc	31	Positive Lock Washer Co	64	Timber Top Inc	10
		Premax Products/Div Chisholm-Ryder Co	5	Times Facsimile Corp	11
		Printloid Corp	67	Tinnerman Products Inc	10-11-16-28-37-44
		Q-Line Mfg Corp	4-5-58-65	Titan Metal Mfg Co	24-49
		Radio Corp of America/Commercial Electronic Products	31-37	Titchener & Co E H	5-33
				Titeflex Inc	10-11-20
				Toman & Co E	24-33

PRODUCT MFRS

29—Headphones; 30—Indicators

Torres Engineering Co Inc	30
Torrington Co	2-25-28-44-45-50-52
Townsend Co/Cherry Rivet Div	3-28-37-48
Townsend Co (New Brighton)	3-28-37-45-48-58
Transistor Electronics Co	17
Trico Fuse Mfg Co	10
Tricon Mfg Co	48
Tricraft Products Corp	49-58
Tri-Ex Tower Corp	4-5
Tronex Inc	6
Tubular Rivet & Stud Co	18-28-44
Turner Brass Works	24-33-58
TV Hardware Mfg Co/Div Textron Inc	3
Ucinite Co/Div United-Carr	
Fastener Corp	42
Unimatic Mfg Corp	24
United Aircraft Products Inc	4-5-8-30-49
United Screw & Bolt Corp	1-3-28-37-44-45-49-50-51-60-64-66
United Shoe Machinery Corp	27-28-32-43-48-58-60-65
U S Gear Corp	31
U S Rubber Co	30
Utilities Service Co	3-4-5-10-27-28-37-44-45-58-64-65
Vallorbs Jewel Co	49
Vector Electronic Co	4-5-8-12-27-28-34-37-46-56
Vermaline Products Co	6-20-21-22-28-33-34-37-38-49-60
Video Industries Co	5-58
Volkert Stamping Inc	58
Wabash Metal Products Co	58-60-65-67
Waldes-Kohinoor	28
Waldom Electronics Inc	3-28-30-31-32-34-37-44-50-51-52-63-64-65-73
Walsco Electronics Mfg Co	3-4-5-10-12-14-16-17-19-27-28-29-32-34-37-39-40-41-43-44-45-46-48-49-50-51-52-55-56-57-59-60-61-62-63-64-65-68
Waltham Screw Co	18-20-22-26-28-34-44-45-46-47-49-54
Walton Tool & Die Co	33
Warren Components Div/Eltronics Inc	6-13-15-18
Waterbury Cos Inc	27-58-67
Watson Mfg Co	55
Waveguide Inc	34
Webeor Inc	10
Wedglock Corp of Calif	10-28
Western Felt Works	7-29-32-41-42-62-67-68
Western Gear Corp/Electro Products Div	31
Western Gold & Platinum Co	55-65
Westfield Metal Products Co	3-44-52-56
Westline Products Div/Western Lithograph Co	39
White Dental Mfg Co/ S S Industrial Div	21-53
Whitehead Metals Inc	3-43-44-45-48-60-64-65-69
Wilmington Fibre Specialty Co	7-30-32-58-63-67
Winder Aircraft Corp of Fla	5-34-39-41-42-58-70
Wind Turbine Co	5
Winslow Co	28-58
Winzeler Mfg & Tool Co	31-58
Wisconsin Porcelain Co	7-33-61
Wrought Washer Mfg Co	28-56-58-60-61-63-64-65-66-67
Zell Products Corp	58
Zierick Mfg Corp	10-14-15-34-58
Z & W Mfg Corp	49

29—HEADPHONES

Headphones, crystal	1
Headphones, dynamic	2
Headphones, hearing aid	3
Headphones, magnetic	4

Allied Radio Corp	1-2-4
Amplivox Ltd Abbey Mfg Est Mt Plsnt	2-3-4
Argonne Electronics Mfg Co	2-4
Ardente Acoustic Labs Ltd	3-4
Audiotex Mfg Co	2-3
Audiovox Inc	3
Audiosears Corp	2-4
Bennett & Co Paul	1
British Industries Corp/Brown Div SG	2
Cannon Co C F	4
Continental Electronics Corp	2
Educational Electronics Co	1-4
Electronic Applications Inc	2
Fanon Electric Co	1-2-4
Fedtro Inc/Federal Electronics Sales Div	1-2-3-4
Fen-Tone Corp	2-4
Gary Wells Co	4
Gates Radio Co	2
Gotham Audio Development Corp	2

Knowles Electronics Inc	3-4
Linlar Inc	2
Magnetic Recorders Co	1-2
Melody Master Mfg Co	2-3
Myers & Son Inc E A	3
Mytron Mfg Co	1
Nichols & Clark Inc	3
Permoflux Products Co	2
Philmore Mfg Co Inc	1
Plastic Mold & Eng'g Co	4
Printed Electronic Research Inc	1-2-4
Remler Co	3
Roanwell Corp	2-4
Roflan Co	1-2-3-4
Rye Sound Corp	1-2-3-4
Stanley Aviation Corp	14-16
Stromberg-Carlson/Div Gen'l Dynamics Corp (Carlson Road)	4
Super Electronics Corp	1
Superex Electronics Corp	1-2-3-4
Symphony Electronics Corp	4
Telephonics Corp	2-4
Telex	2-3-4
Trimml Inc	1-2-3-4
U S Instrument Corp	4
Valandy Electronics Corp	3

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Barographs	45
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Indicators, antenna position	2
Indicators, arc-over	3
Indicators, broadcast	4
Indicators, capacitor leakage	5
Indicators, data display	6
Indicators, deviation	7
Indicators, dew point	8
Indicators, dielectric constant	9
Indicators, film thickness	10
Indicators, frequency	11
Indicators, ground detector	12
Indicators, illumination	13
Indicators, industrial	14
Indicators, linear displacement	15
Indicators, magnetic field	16
Indicators, materials thickness	17
Indicators, medical electronic	18
Indicators, modulation	19
Indicators, moisture	20
Indicators, moving target	21
Indicators, null	22
Indicators, oxygen	23
Indicators, phase	24
Indicators, plan position	25
Indicators, power level	26
Indicators, pressure	27
Indicators, proximity	27
Indicators, pulse time rise	28
Indicators, radar	28
Indicators, radiation	29
Indicators, R-F	30
Indicators, servo	31
Indicators, shorted turn	32
Indicators, sound level	33
Indicators, speed	34
Indicators, strain	35
Indicators, telemetering	36
Indicators, temperature	37
Indicators, timing	38
Indicators, torque	39
Indicators, vacuum	40
Indicators, vibration	41
Indicators, volume	42
Pyrometers	47

Abbeon Supply Co	20
Acme Model Eng Co	29
Acromag	11
Advanced Products	38
Advanced Technology Laboratories	37
Aero Electronics Co	6-7-31
Aero Instrument Co	11-38
Aeronautical Comm Equip Co	44
Aeromotive Eng'g Products Ltd	1-37-47
Aero Research Instrument Co	44-47
Aerotee Corp	26-42
Airborne Instrs Lab/Div Cutler Hammer Inc	6-17-21-25-43

Aircraft Radio Corp	7-42
Airpax Electronics Inc/Seminole Div	11
Airtron Inc/Div Litton Industries	11
Alexandria Div/American Machine & Foundry	11
Allard Instrument Corp	1-6
All Products Communication Products	2
Amelco Inc	11-31
Amerac Inc	11
American Electronic Labs	30
American Instrument Co	8-10-20
American Machine & Foundry Co/Gen Eng Labs	11
Analogue Controls	6-31
Analytic Systems Co/Div Research Instrument Corp	23
Anso Div/Gen'l Aniline & Film Corp	31
Antlab Inc	2
Applied Science Corp of Princeton	36
A R F Products Inc (River Forest)	7
Arma Div/American Bosch Corp	2-6-14-31-34
Argonne Electronics Mfg Corp	33
Arizona Telemetering Corp	26-35-36-37-39
Arnoux Corp	36-37
Assembly Products Inc	37-47
Associated Research Inc	12-34-46
Atlas Precision Products Co	2-7-22-31-38
Audocall Co	1
Auth Electric Co	1
Authorized Mfrs Service Co	7
Automatic Timing & Controls Inc	31-33-39-42
Automation Dynamics Corp	6-36
Auto Test Inc (Chicago)	26
Bach-Simpson Ltd	11-22-30
Bailey Meter Co	2-3-26-34-36-37
Baird-Atomic Inc	18-29
Baldwin-Lima-Hamilton Corp/Electronics & Instrumentation Div	26-35-39
Ballantine Labs Inc	22
Barber-Colman Co	22-26-37
Barker & Williamson Inc	22-30
Barlowe Electronics	18
Basic Controls Inc	13-15-17-20-27-34-37-38
Beach-Russ Co	20-40
Beckman Instruments Inc/Systems Div	6
Beckman Inst Inc/Scientific & Process Inst Div	20-23
Beckman Inst Inc/Berkeley Div	6-11-14-20-34-38
Beckman & Whitley	37-44
Bendix Aviation Corp/Bendix-Pacific Div	36-43
Bendix Aviation Corp/Pioneer Central Div	23-31
Bendix Aviation Corp/Friez Instrument Div	14-20-37
Bendix Aviation Corp/Eclipse-Pioneer Div	6-7-31
Bendix Aviation Corp/Cincinnati Div	14-29
Benson-Lehner Corp	6
Bently Scientific Co	10-15-17-27-41
Bergen Labs	23-37-39
B & F Instruments	35-39
B & H Instrument Co Inc	11-22-34-37
Biddle Co James G	19
B I F Industries	36
B J Electronics/Borg-Warner Corp	29
Bonton Electronics Corp	11-25-30-35
Bowman Instrument Corp	15-27-31
Branson Instruments Inc/Branson Ultrasonic Corp	10-17
Bristol Co	7-8-11-20-22-23-25-26-31-34-35-36-37-38-40-47
Bruno-New York Industries Corp	22
Burroughs Corp/Electronic Tube Div	6
Cambridge Instrument Co	20-23-41
Canadian Applied Research Ltd	16-38
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Canoga Div/Underwood Corp	43
Cardinal Instrumentation Corp	36-37
Central Electronics Mfrs/Div Nuclear Corp of America	40
Central Research Labs	9
Central Scientific Co	20-40
Chatham Electronics/Div Tung-Sol Electric Inc	36
Chemalloy Electronics Corp	25
Chesapeake Instrument Corp	33
Chrono-Log Corp	6-38
Clark Controller Co (Cleveland)	27-37-39-47
Cleveland Instrument Co	7-15
Columbia Research Labs	41
Comptometer Corp	36
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Conn Ltd C G	11

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Consolidated Electrodynamics Corp/Rochester Div	40	Haydon Div/General Time Corp	38	Opad Electric Co	12-14
Crescent Eng'g & Research Co	7-15-17-22-26-31-39	Hays Corp	23-26-37	Oster Mfg Co/John Avionic Div	31
Curtiss-Wright Corp/Electronics Div	7-10-17-22	Hazeltine Electronics Co/Div Hazeltine Corp	6-21-43	Owen Labs Inc	35
Custom Scientific Instruments Inc	15	Hewlett-Packard Co	11-22-25-28	Face Electrical Instruments Co	22-38-42
Data-Control Systems Inc	37	High Vacuum Equipment Corp	40	Panelit Inc	1
Datex Corp	2-6	Hill & Co E Vernon	8-20-24-26-37	Parsons Co Ralph M Elect-ronics Div	27-36
Davenport Mfg Co	33	Hoffman Electronics Corp	26-31-38-39	Partlow Corp	37
Daystrom Pacific	6-26-31-36	Hogan Labs Inc	6-36	Patent Button Co	6
Dayton Aviation Radio & Equipment Corp	6-19-22-25-29-30	Honeywell Controls Ltd	9-31-37	Patrick & Wilkins Co	1
Daytronic Corp	15-17-26-35-39	Illinois Testing Labs Inc	8-37	Patterson Moos Div/Universal Winding Co	12-29-38
Decker Corp	15-17-26-27-40-41	I-L-S Instrument Div/Merian Instrument Co	2-3-4-9-11-13-34-38	Peebles & Co Ltd Bruce	6-14-15-18-27-34-36-38
DeJur-Amsco Corp/Electronic Sales Div	13-25-33-37-38	Impact-o-graph Corp	15-41	Peerless Products Industries	6-15-26-31-34-35-37-39
Designers for Industry	6-43	Industrial Control Co	31-35	Peschel Electronics Inc	5-9-14
Dialight Corp	13-14	Industrial Development Eng'g Associates	6	Phaostron Instrument & Electronic Co	22
Digitran Co	6	Industrial Dev Labs Inc	22	Philco Corp/Lansdale Tube Co Div	8-14-20
Donner Scientific Co	22	Industrial Electronics Engineers Inc	1-6-14	Photocon Research Products	10-15-26-27
Dwyer Mfg Co F W	14-23-26-40-42	Industrial Nucleonics Corp	10-17	Photo-Crystals	8-13-20
Dymec Inc	6-11	Industrial Test Equipment Co	22-46	Photographic Analysis Inc	21
Dynamic Electronics Inc	27-28-29-30-43	Industrial Timer Corp	38	Piezo Products Co	37
Dynapar Corp	6-11-14-15-17-27-34	Instrument Labs	14	Plasteck Inc	1
Dynatronic Inc	36	Instruments Inc	9	Polarad Electronics Corp	30-31-43
Eastern Specialty Co	46	ITT Industrial Products Div	9-11-22	Precision Apparatus Co	22-33-42
Eberline Instrument Corp	29	Irwin Labs Inc	16	Precision Scientific Co	20
Edcliff Instruments	15-26-39	Isotopes Specialties Co	29	Precision Thermometer & Instrument Co	37-40
Edison Industries Thomas A Instrument Div	26-31-37	Jeffrey Mfg Co	17	Probescope Co Inc	7-11-36-41
Electric Auto-Lite Co (Toledo)	37	Johnson Co E F	2-6-13-14	Process & Instruments	40
Electric Tachometer Corp	31-34	Jordan Electronics/Div Victoreen	18-29	Pyrometer Instrument Co	37
Electro Instrument Inc	6-14	Kahn & Co	8-11-17-20-38-41	Radar Measurements Corp	29-30
Electro-Measurements Inc	22	Kaiser Aircraft & Electronics Div (Oakland)/Kaiser Ind	6-43	Radar Relay Inc	1-6
Electronic Communications Inc	7-11-30-43	Kartron	32	Radio City Products Co	2-5-43
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Electronics Corp	6-13-19-36	Knopp Inc	46	Radio Frequency Labs Inc	16
Electronics Corp of America	47	Kearfott Co Inc (Pasadena)	31	Rahm Instruments/Div American Machines & Metals Inc	26
Electronic Specialty Co	30	Kearfott Co Inc (Clifton)	6-31	Ram Meter Inc	11
Electronic Tube Corp	35	Kintel	22	Rawson Electrical Instrument Co	16
Electron-Radar Products	8-13-20	Kirkland Co H R	1-13	Raytheon Co (Waltham)	43
Electro-Pulse Inc	11	Kistler Instrument Corp	26-40	Reed & Reese-Retron Corp	15-26-35
Electro-Voice Inc	34	Land-Air Inc Instrument & Electronic Div	38	Reeves Instrument Corp	31
Elk Electronics Labs Inc	11-30	Land-Air Inc	29-41	Reliance Electric & Eng'g Co	34
Ellis Associates	35	Landsverk Electrometer Co	29	Research Industrial Lab of Electronics	10-40
Ellison Draft Gage Co	14-26-40	Larson Instrument Co	14	Revere Corp of America	27-42
Electro Products Labs Inc	11-27-34-41	Learn Inc (Santa Monica)	6-7-31	Rich Electronics Inc	19
Emerson Electric	2-6-21-24-31-43	Learn Inc (Grand Rapids)	6-31	Richmont Inc	39
Empire Product Sales Corp	19	Leeds & Northrup Co	13-22-37-47	Rinco Inc	22
Engelhard Industries Inc	8-23	Lewis Engineering Co	37	Royco Instruments Inc	37
Engler Instrument Co	34	Liquidometer Corp	6-23-31-36-37-42	Ruge Assoc Inc Arthur C	37
Enso Inc	6	Loral Electronics Corp	6-30	Scaico Controls Inc	26-37-38
Erie Pacific/Div Erie Resistor Corp	11	McHugh & Son Raymond F	37-47	Scam Instrument Corp	1
Erwood Inc	41	Magnaflux Corp	10-16-17-35	Schaevitz Eng'g	15
ESC Corp	28	Magnavox Corp	43	Scientific Eng'g Lab	40
Essex Mfg Co	23	Magnecessories	16	Scherr Co George	10-14-15-17-34-37-39
Exact Eng'g & Mfg Inc	6-21-31-38-43	Magnetic Research Corp	36	Scientific Atlanta Inc	2
Federal Products Corp	10-14-16-17	Magtrol Inc	34-39	Scott Inc H H	22-33-41
Feedback Controls Inc	31	Maico Electronics Inc	23	Seaboard Electric Products Corp	6-11
Fenwal Inc	37	Manufacturers Eng'g & Equip Corp	20	Seisior Mfg Co/Div Seismograph Service Corp	6-31
Fidelity Amplifier Co	1	MB Mfg Co/Div Textron Inc	41	Serdex Inc	20-37
Fischer & Porter Co	6-14-26-36-37-40-42	Metron Instrument Co	34-39	Servomechanisms Inc	6
Fisher Research Lab Ltd	20	Mid-Continent Mfg Co	35	Servo-Tek of California	34
Ford Instrument Co/Div Sperry Rand Corp	37	Microgee Products Inc	15-36	Servo-Tek Products Co	25-34
Forro Scientific Co	29	Milgo Electronic Corp	6-38	Shalleross Mfg Co	22
Foxboro Co	38-40-42	Millen Mfg Co James	11	Shand & Jurs Co	1-6-26-36-37
Freed Transformer Co	22	Miller Electro-Research Labs	37	Shannon Luminous Materials Co	6
Gates Radio Co	4-7-11-19-42	Millers Falls Co	84	Sierra Electronic Corp	36
General Communication Co	11-30-43	Millitest Corp	22	Signalite Inc	13
General Controls Co (Glendale)	2-14-15-26-31-37-40-47	Minatron Corp	15-27	Simplex Valve & Meter Co	36
General Devices Inc	36	Mine Safety Appliances Co	8-20-23-33	Simpson Electric Co (Chicago)	22-47
General Electric Co/Apparatus Sales Div	10-11-14-17-34-36-37-38-40-41	Minn-Honeywell/Boston Div	22	Simpson Electric Co (Lac De Flambeau)	5-11-22-25-30-33-37-42
General Railway Signal Co	6-12-36	Minn-Honeywell Regulator Co/Aeronautical Div	6-9-15-22-23-25-26-31-34-37-42	Skiatron Electronics & T V Corp	6-13-21-36-37-38-43
General Radio Co	7-11-19-22-33-34-41	Minn-Honeywell Regulator Co/Rubicon Instruments	32	Solartron Electronic Group Ltd	46
General Scientific Equipment Co	23	Minn-Honeywell Regulator Co/Mil Prod Gp/Aeronautical & Ordnance Div	6-9-15-22-23-25-26-34-37-42	Specialty Eng'g & Electronics Co	29
Genisco Inc	41	Missileonics Inc	36-38-43	Standard Electronics Research Corp	10-17
Geotechnical Corp	41	Missouri Research Labs Inc	21-39-43	Stanley Aviation Corp	27-29
Gertsch Products Inc	22	Moeller Instrument Co	37-40	Stevens Manufacturing Co Inc	14-37
Gilbert & Baker Mfg Co	12-14-42	Moran Instrument Corp	31	Stewart Instrument Co	14-25-26
Godfrey Mfg Co	1	Muirhead Instruments Inc	17-22-31	Sticht Co Herman H	11
Good Electronics Corp	35	Mullard Equipment Ltd	29	Strandberg Eng'g Labs Inc	20
Goodrich Chemical Co B F	27	National Union Electric Corp/Electronics Div	6	Stratocon Corp/Geophysical Services Div	12-22
Gordon Co Claude S	37	Naybor Laboratories Inc E V	1	Stokes Corp F J	40
Gordon Enterprises	38-39	New London Instrument Co Inc	19-36	Stromberg-Carlson Co/Genl Dynamics Div (San Diego)	48
Gray Mfg Co	43	Non-Linear Systems Inc	6-7-35-37	Stromberg-Carlson/General Dynamics Corp Div (Carlson St)	43
Green Rectifier Co	26-40	Norden Div/United Aircraft Corp	31-34	Studebaker Hydraulic Products Co	26
Gulton Industries Inc	2-9-10-36-37-38-41	North Atlantic Industries Inc	6-22-31-37	Sturtevant Co P A	39
Hagan Chemicals & Controls Inc	14-26-40	Northeast Electronics Corp	25-30-36	Suffolk Products Corp	43
Hallamore Electronics Co	36	Norwood Controls Unit/Norwood Controls Div	26-36	Surface Combustion Corp	8
Haller Raymond & Brown	1-6	NRC Equipment Corp	40	Systron Corp	11-29-38
Hallikainen Instruments	9	Nuclear-Chicago Corp	10-17-20-29-38	Taber Instrument Corp	26-44
Handley Inc	37	Nuclear Corp of America/Instr & Res Div	29-40	Taller & Cooper	1-6-36
Hastings-Raydist Inc	26-40-44	Nucleonic Corp of America	29	Tatnall Measuring Systems Co	35
Hathaway Instrument/Div Hamilton Watch Co	11				

Tech Labs	20
Technical Oil Tool Corp	34
Technicraft Co	32
Telectro Industries Corp	6-7-11-19-21-29-31-36-43
Telerad Mfg Corp	36-43
Tel-Instrument Electronics Corp	41
Tempil Corp	37
Thermo Electric Co	37
Thermo Electric Mfg Co	37
Theta Instrument Corp	31-46
Thwing Albert Instrument Co	22-35-37-47
Tipptronic Inc	20-26-27-39
Topp Industries Inc	6-31-46
Tracerlab Inc	10-29
Transistor Devices Inc	11
Transistor Electronics Co	6
Trimount Instrument Co	26-27-40-42
Triplett Electrical Instrument Co	25-30-33
Tri-R Instruments	37
Tri-Tronics Co	27
Tullamore Electronics Lab	6-25-29
Union Switch & Signal Div	6-36
United Electric Controls Co	14-37
United Electroynamics	36
Universal Transistor Products Corp	29
Vacuum Tube Products/Div	
Hughes Aircraft Co	26-40
Varo Mfg Co	11
Veeco Vacuum Corp	40
Veeder Root Inc	6-14-17-34
Victoreen Instrument Co	29
Victory Eng'g Co	23-26-36-37-44
Voltron Products	11-19
Wabash Metal Products Co	37
Waeline Inc	11-16-22-25-27-30-33-34
Waldorf Electronics/Div	2-6-7-21-
F C Huyck & Sons	31-34-43
Walkirt Co	3-11
Waltham Electronics	19-36
Wang Labs Inc	11
Waugh Eng'g Co	11-34
Wayne-Kerr Corp	10-15-17-37-41
Weighing & Control Components Inc	8
Weinschel Eng'g	30
Weksler Instruments Corp	26-37-40
West Coast Research Corp	2-8-15-31-35-37-41
West Instrument Corp	37
Westinghouse Electric Co/Air Arm Div	43
Westinghouse Electric Corp (Pittsburgh)	11-12-25-27-30-33-36-37-38
Weston Instruments	10-11-12-13-17-20-22-25-30-33-34-37-42-46
Winder Aircraft Corp of Fla	43
Wind Turbine Co	2
Westronics Inc	6-8-11-14-15-18-23-25-26-31-34-35-37-39-47
Winslow Co	11-22-46
Wood Counter Lab N	29
Yellow Springs Instrument Co	37

31—INDUSTRIAL ELECTRONIC EQUIPMENT

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Amplifiers, thyatron	28
Analysis equipment, electro-chemical	2
Anemometers	29
Balancing equipment, dynamic	3
Barographs	30
Dielectric heating equipment	4
Dryers, electronic dehydration	31
Dynamometers	5
Electric furnaces	6
Electronic photoflash	7
Electroplating equipment	8
Flaw locators, metal	9
Flaw locators, non metal	10
Geophysical instruments	11
Heating elements	12
Induction heating equipment	13
Infrared equipment	14
Ionization chambers	15
Meteorological equipment	16
Ovens, infra-red drying	17
Precipitators, electrostatic	18
Thickness equipment, electronic	19
Thickness equipment, ultrasonic	20
Transducers	21
TV industrial	22
Ultrasonic cleaners	23

Ultrasonic soldering	24
Ultra-violet equipment	25
Vacuum tube aging racks	26
Valves, servo	32
Valves, solenoid	33
Vibrators, ultrasonic	27

Acme Electric Heating Co	12
Acme Mfg & Gasket Co	9-14-15-27-31
Acoustica Associates	23-24-27
Actuator Prods Corp	1
Adler Electronics Inc	22
Advanced Instruments	2
Advanced Technology Laboratories	21
Aeromotive Eng'g Products Ltd	1-21
Aero Research Instrument Co	21
Aerotec Corp	18
Aerotron Associates Inc	7
Airborne Accessories Corp	1
Air-Maze Corp	18
Airtronics Inc	6
Alcar Instruments Inc	20-23-24
Allied Control Co Inc	33-69
Alto Scientific Co	11
Ameco Div/Antennavision Inc	22
American Electronics Inc	1-21
American Machine & Foundry Co/Gen Eng Labs	3
American Measurement & Control Inc	1-21-32-33
American Optical Co/Instrument Div	2-9
Anglo Corp	7
Amplifier Corp of America	15
Analytic Systems Co	2-14-25
Annis Co	3
Anton Electronic Labs	15
Applied Technology Corp	21
Arma Div/American Bosch Corp	5-19-20
Arnold Eng'g Co	21
Arnoux Corp	21
Artisan Electronics Corp	1
Associated Research Inc	11
Atlantic Research Corp	21
Atlas Precision Products Co	26
Atmosphere Control Co	12
Atomic Accessories Inc	15-23
Audicon Electronics Inc	7-13-23-24
Automatic Timing & Controls Inc	19-21
Automation Dynamics Corp	16
Avion Div/ACF Industries Inc	14-22
Axler Associates Inc	14-25
Bach-Simpson Ltd	2
Baird-Atomic Inc	1-2-14-25
Baldwin-Lima Hamilton Corp	3-5-21
Barber Coleman Co/Aircraft Controls Div	1
Barry Electronics Corp	7-14
Barton Electronics Inc	9
Basic Controls Inc	14-21-28
Beckman Inst Inc/Scientific & Process Inst Div	2-14-25
Beckman Inst Inc/Berkeley Div	21
Beckman & Whitley	11-16
Bendix Aviation Corp/Pioneer-Central Div	23
Bendix Aviation Corp/Friez Inst Div	16-21-22-29-30
Bendix Aviation Corp/Cincinnati Div	15
Benson-Lehner Corp	11
Bently Scientific Co	3-9-19
Birtcher Corp/Industrial Div	23
B J Electronics/Borg-Warner Corp	16-21
B & K Mfg	22
Black Light Products Inc	25
Blackstone Corp	8-21-23-27
Blonder-Tongue Labs	22
Blue M Electric Co	6
Bogue Electric Mfg Co	18
Boonton Radio Corp	19
Branson Instruments Inc	9-10-19-20-21-23
Bristol Co	1-2-16-19-20-21
Burke & James Inc	7
Butcher Co L H	2-8-17-19-20
Canadian Applied Research Ltd	11
Canadian Marconi Co	22
Canadian Research Institute	2-4-8-11-25
Cardinal Instrumentation Corp	21
Cawtell Electrical Eng'g A E	21
Central Scientific Co of Canada Ltd	2-6
Centronix Inc	21
Christie Electric Corp	8
Circo Equipment Co	20-23-24
Cirlo Ultrasonic Corp	9-10-20-21-23-24-27
Clark Controller Co	1-4-6-8-12-13-14-17-18-27
Cleveland Instrument Co	19-21
Clevite Corp/Texas Div	11
Coils Electronics Co	1
Coleman Instruments Inc	2

PRODUCT MFRS

31—Industrial Electronic Equip.

Columbia Research Labs	21
Conoflow Corp	1
Conrac Inc	22
Consolidated Controls Corp	1
Consolidated Electroynamics Corp (Pasadena)	2-21
Consolidated Electroynamics Corp/Rochester Div	6
Controls Co of America	1
Corbin Corp	3-16
Cosa Corp	3-5
Cox & Co	12
Crescent Eng'g & Research Co	21
Curtiss-Wright Corp/Electronics Div	11-19
Cutler-Hammer Inc	19
Cunningham Son & Co James	1
Dallons Labs	25
Dalmotor Div/Yuba Consolidated	1
Davenport Mfg Co	7-18
Daytronic Corp	19-21
Decker Corp	21
Designers for Industry	10-20-23-27
Diamond Power Specialty Corp	22
Di-An Controls Inc	16
Dice Co J W	9-10-19-20
Dietzen Co Eugene	11
Donner Scientific Co	21
Dymec Inc	21
Dynamic Div/Eaton Mfg Co	5
Dynapar Corp	21
Dynex Inc	1
Eberline Instrument Corp	11-15
Edcliff Instruments	21
Eisler Eng'g Co	6-13-26
Electric Eye Equipment Co	19
Electrofilm Inc	12
Electronic Communications Inc	1
Electronics Corp of America (Mass)	14
Electronics Corp of America (Toronto)	14
Electronic Systems Development Corp	16
Electro Products Labs Inc	11-21
Electro-Technical Labs	11
E M I Cossor Electronics	3-9-11-15-22-23
Endevco Corp	21
Engelhard Industries Inc	2-6-14-21-25
Entron Inc	22
Epsco Inc	11
Ercona Corp	2-11-16
Erco Eng'g Corp	4-13
Exact Eng'g & Mfg Inc	1
Exact Weight Scale Co	3
Fairchild Controls Corp/Components Div	21
Federal Mfg & Eng'g Corp	1
Federal Products Corp	19
Fenwal Inc	21
Filmohm Corp	14
Fisher Research Lab Ltd	11
Fisher Scientific Co	2
Fleetwood Labs Inc	19
F & M Scientific Corp	2
Footo Bros Gear & Machine Corp	1
Forster-Teichmann Co	6
Fostoria Pressed Steel Corp	14-17
Franklin Dales Co	12
Franklin Electronics Inc	9
Garrett Corp/Airesearch Mfg Co Div	1-21
Gates Electronic Co	8-9-10
General Controls Co	1-33
General Controls Co (Canadian) Ltd	32-33
General Electric Co/Apparatus Sales Div	5-6-12-13-15
General Electric Co/Technical Products Dep't	13-22
General Electric Co/X-ray Dep't	2-9-10-19
General Electroynamics Corp	4-13
General-Electro Mechanical Corp	1-5
General Kinetics Inc	23
General Precision Lab Inc (Pasadena)	22
General Precision Lab Inc (Pleasantville)	22
General Ultrasonics Co	23-27
Geophysical Specialties Co	11-19
Georator Corp	11
Geotechnical Corp	11-16-21
Giannini & Co G M	21
Girdler Process Equipment Div/Chematron Corp	4
Gisholt Machine Co	3
Globe Industries Inc	1
Green Instruments Inc H J	16-29-30
Green Rectifier Co	8
Grieve-Hendry Co	6

32—Insulation Materials & Components

American Insulator Corp 27
 American Lava Co 3-10-33
 American Machine & Foundry Co/Gen Eng Labs 17-39
 American Products Mfg Co 5-6-27
 American Super-Temperatures Wires Inc 35
 Amp Inc/Capitron Div 10
 Aries Labs Inc 5-6-10-27-28-30-44
 Armstrong Cork Co 9-27
 Arvey Corp 28
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Minn-Honeywell Regulator Co/Mil Prod Gp Aeronautical & Ordnance Div	6-8-11
Minn-Honeywell Regulator Co/Aeronautical Div	6-8-11

Norco Products Mfg Co	9
Nucleonic Corp of America	7
Oxford Components Inc	14
P & H Electronics	3-6-10-12
Peebles & Co Ltd Bruce	5
Philbrick Researches Inc George A	5-6
Philmore Reg Co Inc	1-6-10
PIC Design Corp/Sub Benrus Watch Co Inc	2-4-5
Pomona Electronics Co	2
Precise Development Corp	10-11
Printed Electronic Research Inc	4-11-14-15
Q-Line Mfg Corp	1
Radio City Products Co	6-7-11
Radio Corp of America/Commercial Electronic Products	12
Radio Merchandise Sales Inc	1
Radio Receptor Co Inc	8
Reeves Instrument Corp	2-13
Renfrew Electric Co Ltd	14
Richards Electrocraft Inc	4
Rimak Inc	2-6
Roflan Co	8
Rollan Electric Co	1
Saxton Products Inc	1
Schirmer Nat'l Alarm Co	2-7-10-12
Science-Electronics Inc	2-7-10-12
Seco Mfg Co	11
Servo Corp of America	2-13
Servomechanisms Inc	2-4-5
Servo Systems Co	2-6
S O S Cinema Supply Corp	9
Southwest Products Inc	11
Specific Products Co	2
Sprague Electric Co	4
Springfield Enterprises	3
Stanley Aviation Corp	2
Superex Electronics Corp	4-6-10
Taffet Radio & TV Co	8
Tech-Master Corp	6-10-14
Technical Appliance Corp	1
Techniques Inc	2-5
Tec Kit Co	2-3-4-5-6-8-10-11-12
Television Specialty Co Inc	9
Torocoil Co	4-6
Transistor Electronics Co	2
Transval Electronics Corp	8
Tricraft Products Corp	1
Ti-Point Plastics Inc	10
TV Hardware Mfg Co	1
Universal Scientific Co Inc	2-3-6
University Loudspeakers Inc	15
Vector Electronic Co	2
Victory Eng'g Co	4
Video Industries Co	1
Videon Electronic Corp	6
Veron & Co George	8
Waber Electronics	14
Waldo Electronics	6
Waldorf Electronics/Div F C Huyck & Sons	2-5-8-11-13
Walsco Electronics Mfg Co	1-2
Warren Mfg Co	8
Webor Inc	6-13
Western Int'l Co	3-6-8-10-12
Winder Aircraft Corp of Fla	3-4-5-6-8-9-10-11-12-13-14
Wind Turbine Co	1
Worner Electronic Devices	6
WRL Electronics Inc	12

35—LIGHTING EQUIPMENT & ACCESSORIES

Accessories & supplies	1
Cold cathode	2
Consoles, control	3
Dimmers	4
Gobos	5
Lamps, infra-red	6
Lamps, inspection	7
Lighting, emergency	8
Lighting, preset panels	9
Lighting, tower	10
Lighting, TV	11
Lights, arc	12
Lights, black	13
Lights, dial	14
Lights, flood	15
Lights, fluorescent	16
Lights, glow	17
Lights, incandescent	18
Lights, neon test	19
Lights, signal	20
Lights, spot	21
Meters, light	22
Power supplies	23

PRODUCT MFRS

33—Insulators; 34—Kits; 35—Lighting Equip.

Scoops	24
Stroboscopes	25
Studio rigging	26
Acme Electric Corp	2
Advance Transformer Co	1
Aerolite Electronics Corp	20
Aerolux Light Corp	2-6-12-18-16-17-19-20-21-22-25
Aerotronic Associates Inc	25
Alden Products Co	14-20
Amco Eng Co	3
American Cystoscope Makers Inc	7
American Television & Radio Co	8-23
Anglo Corp	17-20
Amplifier Corp of America	23
Auto Test Inc (Chicago)	23-25
Avo Ltd	22
Berkshire Labs	25
Black Light Eastern Corp	7-18-16-18
Black Light Products Inc	18
Bogue Electric Mfg Co	8-23
Brunswick Instruments	19
Bundy Electronics Corp	8-23
Cable Electric Products	1-8-9-17-18-19-20-21
Canadian Research Institute	4-7-18-19-22-25
Carling Electric Inc	14
Cartriseal Corp	7
Century Lighting Inc	1-3-4-5-9-11-12-18-15-16-18-21-24-26
Chadwick-Helmuth Co	25
Champion Lamp Works	6-16-18-21
Compco Corp	10-15-16
Consolidated Diesel Electric Corp	15-23
Cook Co Frank R	23
Cutler-Hammer Inc	4
Davenport Mfg Co	23-25
Dazor Mfg Corp	7-16-18
Deltron Inc	23
Dialight Corp	14-17-18-19-20
Eagle Electric Mfg Co	1-6-7-16-18-19
Edgerton Germeshausen & Grier	25
Electric Cord Co	8-15
Electric Machinery Mfg Co	24
Electric Storage Battery Co/Exide Ind Div	8
Electron-Radar Products	4
Electronic Brazing Co	25
Electronics Corp	9
Electronics Corp of America	4
Englehard Industries Inc	6-13
Engineering Developments Inc	7
E-Z Way Towers Inc	10
Falstrom Co	3
Federal Instrument Corp	22
Fisher Pierce Co	8-10
Flexo International Corp	1-7-11-18-16-18
Florman & Babb Inc	1-4-5-15-18-21-23-24
Fostoria Pressed Steel Corp	6-16-18
Gates & Co Geo W	7-12-18
Gates Radio Co	10
General Electric Co/Dist Assemblies Dept	1-4-11
General Radio Co	4-25
General Railway Signal Co	20
General Scientific Equipment Co	8
Georator Corp	23
Gordon Enterprises	4-5-12-15-18-19-20-21-22-25
Great Western Div/Interlectric Corp	16-18
Green Rectifier Co	12-23
Gries Reproducer Corp	1
Guide Lamp Div	4-18-21
Herzog Miniature Lamp Wks	18
Hetherington Inc (El Segundo)	14-19-20
Hetherington Inc (Folcroft)	14-20
Hevi-Duty Electric Co	23
Hudson Lamp Co	17-18
Hughey & Phillips	10
Industrial Devices Inc	20
Javex Electronics	1
Johnson Co E F	7-9-14-17-18-20
Kahn & Co	23
Katolight Corp	8
Kemlite Labs Inc	2-6-8-11-13-20-25
Kent Lighting Corp	2-4-8-13-16-18
Kirkland Co H R	14-17-18-19
Kliegl Bros Universal Electric	3-4-5-9-11-12
Stage Lighting Co Inc	13-15-16-18-21-24-26
Kulka Elec Corp	1-4
Lawter Chemicals Inc	18
Leecraft Mfg Co Inc	17-18-20
Linde Co Div/Union Carbide & Carbon Co	12-15
Line Material Industries	15-16-18
Litton Industries Electronic Display Lab	7-15-16-20-21-25

Luxo Lamp Corp	7-11-16-18-21
Magnaflux Corp	13
Magnetic Amplifiers Inc	4-11-23
M-B Communication Co	26
Merix Chemical Co	1
Metal Products Inc/Div Mid West Conveyor Co Inc	8
Midwest Metal Products Inc	8
Mine Safety Appliances Co	8
Minneapolis Honeywell/Heiland Div	21
Miskella Infra-Red Co	6
Mole-Richardson Co	1-3-5-11-12-18-21
Nat'l Carbon Co/Div Union Carbide Corp	1-14-19-20-21
Nat'l Cine Equipment Inc	1
Nat'l Coil Co	22
Natural Lighting Corp	8-10-11
New York Mfg & Gen'l Supply Co	7-13-18
Nicad Div Gould Nat'l Batteries Inc	8
Norco Products Mfg Co	2-6-7-8-12-13-15-16-18-21
Northeast Electronics Corp	25
Nyt Electronics Inc	4
Opad Electric Co	19-23-25
Oxford Components Inc/Sub Oxford Electric Corp	14-17-18-19
Oxford Elec Corp	9-14
Par-Metal Products Corp	3
Peschel Electronics Inc	23
Photo-Crystals	4
Photo-Research Corp	22
Plasteck Inc	14
Power Supplies Inc	23
Precise Measurements Corp	6-23
Radiant Lamp Corp	6-15-18-21
Radio Corp of America/Commercial Electronic Prod	10-11-15-21-24-26
Radio Eng'g Co	25
Rodale Mfg Co	15-19
Rostan Corp	10
Sampson Chemical & Pigment Corp	2-7-13-16-19
Sel Rex Corp	23
Sequoia Wire & Cable Co/Div Mandrel Industries	3-21
Shannon Luminous Materials Co	7-13
Signalite Inc	17
S O S Cinema Supply Corp	1-4-5-8-11-12-15-18-21-22-23-24
Specialty Eng'g & Electronics Co	10
Standard Electric Time Co	8
Stewart & Stevenson Services Inc	8
Strat-o-Seal Mfg Co	7
Sunbank Electronics Inc	1
Superior Electric Co The	4-23
Sylvania Electric Products Inc (Williamsport)	16-18
Technical Apparatus Builders	23
Temco Aircraft Corp	13
Terado Co	8-16
Time Electronic Sales	14-19
Torwico Electronics Inc	4-23
Transval Electronics Corp	23
Tricraft Products Corp	1
Ucinite Co/Div United-Carr Fastener Corp	17-19
Ultra-Violet Products Inc	13
Universal Transistor Products Corp	23
U S Radium Corp	8-20
Varo Mfg Co	23
Verd-A-Ray Corp	1-2-6-7-15-16-18-21
Ward Leonard Electric Co	4
Westinghouse Electric Corp (Pittsburgh)	15-16-18
Weston Instrument/Div Daystrom Inc	22
White Co O C	7-16-21
Wincharger Corp	23
Wind Turbine Co	10
Winder Aircraft Corp of Fla	23

36—MAGNETICS

Alloys, high permeability	1
Amplifiers, magnetic	2
Clutches, magnetic	3
Ironoxides, magnetic	4
Magnesium	5
Magnetostriction	6
Magnets, electro	7
Magnets, permanent	8
Metals, powdered	9
Permeameters, high H	10
Permeameters, R-F	11
Steel, electric	12

CORES

Cores, c-type	27
Cores, ceramic	28

Cores, cut	29
Cores, e-type	30
Cores, ferrite	31
Cores, high permeability	32
Cores, laminated	33
Cores powdered	34
Cores, slug tuning	35
Cores, tape wound	36
Cores, toroidal	37
Cores, u-type	38
Ferric oxides	39
Ferrites	40

Acoustica Associates	6
Acromag	2
Actuator Prods Corp	3
Adler Electronics Inc	2
Advanced Technology Labs	2
Aerovox Corp (New Bedford)	8-9-31-35-37-38-40
Airpax Electronics Inc/Seminole Div	2
Aitron Inc/Div Litton Industries	2
Airtronics Inc	2
Alden Products Co	36-37
Allegheny Ludlum Steel Corp	1-12-32
Allied Control Co	7
American Electronics Inc	2-3
American Research & Mfg Co	2
American Silver Co	1-12
Anadex Instruments Inc	2
Annis Co	7
Arma Div/American Bosch Corp	2
Arco Steel Corp	1-12
Arnold Eng'g Co	1-8-27-29-30-32-33-34-36-37-38-39-40
Arnoux Corp	2
Arrow Tool Co Inc	8
Artisan Electronics Corp	7
Atlas Coil Corp	8
Atlas Eng Co	2
Autotronics Inc	3
Avion Div/ACF Industries Inc	36-37
Belmont Smelting & Refining Works	5-9
Bendix Aviation Corp/Pioneer-Central Div	6
Bendix Aviation Corp/Eclipse-Pioneer Div	2-3
Bethlehem Steel Co	2
Bogue Electric Mfg Co	2
Bram Metallurgical-Chemical Div	1-9
Brooks & Perkins Inc	5
Brush Beryllium Corp	28
Burroughs Corp (Detroit)	2-32-36
Bush Transformer Corp	2
California Magnetic Controls Corp	2
Calmag Div/Calif Magnetic Cont Corp	2
Cambridge Thermionic Corp	34-35
Cannon-Muskegon Corp	1
Carpenter Steel Co	1-12
Cedar Eng'g/Div Control Data Corp	2
City Chemical Corp	9
Clark Controller Co (Los Angeles)	2
Clevite Harris Prods Inc	4
Coils Electronics Co	7
Collins Radio Co (Cedar Rapids)	31-34-35-37
Columbian Carbon Co/Mapico Iron Oxides Unit	4
Communication Accessories Co	2
Crucible Steel Co of America	1-4-7-8-12
Cunningham Son & Co James	7
Cycle Transformer Corp	2
Dial Products Co	3-7
Diamonite Products Mfg Co	28
Dormeyer Industries	7
D & R Ltd	2
Du-Co Ceramics Inc	28
Duramic Products Inc	28
Dynacor Inc	32-36
Dynatronic Inc	2
Edison Industries Thomas A Instrument Div	7
Electrical Specialty Co	33
Electronic Production & Development	2
E M I Cossor Electronics	3
Engelhard Ind Inc/Amer Platinum & Silver Div	9
Engineered Magnetics/Div Gulston Industries Inc	2
FAE Instrument Corp	3
Fair-Rite Products Corp	40
Feedback Controls Inc	2
Ferranti Electric Inc	6
Ferroxcube Corp of America	27-30-31-32
Foot Mineral Co	4-9
Freed Transformer Co	2
Fuyle-Miller Labs Inc	7
Garret Corp/Airesearch Mfg Co Div	2
General Ceramics Corp	27-28-30-31-35-37-38-40
General Controls Co	2
General Electric Co/Metallurgical Prods Dept	8

General Electric Co/Apparatus Sales Div	2
General Electro-Mechanical Corp	3
General Magnetics Inc	2
Geotronic Labs Inc	2
Gibson Electric Co	4-8
Gilmore Industries Inc	6-14-22-26-35-37-39
G-L Electronics Co	23-32-36-37
Globe Industries Inc	3-9
Gulton Industries Inc	2
Hamilton Watch Co/Allied Products Div	1-8
Handy & Harman	1
Harvey-Wells Electronics Inc	2-7
Honeywell Controls Ltd	2
Hycron Mfg Co	2
Indiana Steel Products Co	8
Industrial Control Co	2
Insulating Fabricators Inc	33
Isolantite Mfg Corp	28
Johnson Electronics Inc	2
Jones & Laughlin Steel Corp	12
Kaiser Electronics Inc	2
Kalbfell Corp	2
Kearfott Co Inc (Pasadena)	2
Kearfott Co Inc (Clifton)	2-3-4-31-39-40
Kelsey-Hayes Co	1-12
Keystone Carbon Co	9
Keystone Products Co	2
Kidde & Co Walter	2
Kirchberger & Co N	23
Krystinel Corp	4-6-8-27-28-30-31-32-35-37-38-39-40
Kulite Tungsten Co	1-9
Langevin Div/W L Maxson Corp	2
Lapp Insulator Co/Radio Specialties Div	28
Leach Corp/Inet Div	2
Lear Inc (Santa Monica)	3
Lear Inc (Grand Rapids)	2-3
Leeds Co Gerard G	2-6
Leetronics Inc	7-8
Leland Airborne Products	2
Lestershire Spool Div/Nat'l Vulcanized Fibre Co	33
Lewyt Mfg Corp	2
Linlar Inc	2
Magnaflux Corp	10
Magnetic Circuit Elements Inc	2
Magnetic Core Corp	31-32-34-35-37
Magnavox Corp	2
Magnetic Metals Co	32-33-34-36
Magnetic Research Corp	2
Magnetic Shield Div/Perfection Mica Co	1-9-12
Magnetic Inc	2
Magnetics Corp	3
Magnetics Inc	1-32-34-35-36-37
Magnetics Research Co	2
Magtrol Inc	2-3
Martin-Merrill Inc	2-6
Maxson Corp W L	2
Meredith & Co Ltd C C	2
Minn-Honeywell/Boston Div	2
Minn-Honeywell Regulator Co/Aeronautical Div	33
Minn-Honeywell Regulator Co/Rubicon Instruments	10
Moloney Electric Co	27-29-30
Mullard Overseas Ltd	7-8-31-40
Nat'l Moldite Co	1-4-8-9-27-30-31-32-34-35-37-38-39-40
Nat'l U S Radiator Corp	4-9
Naylor Laboratories Inc E V	7
Networks Electronic Corp	2
Norton Co	28
Nyt Electronics Inc	2
Ortho Filter Corp	2
Peebles & Co Ltd Bruce	2-7
Penn-East Eng'g Corp	2
Permag Corp	8
Permoflux Products Co	2
PIC Design Corp	3
Piezo Products Co	2
Polymer Corp	9
Polyphase Instrument Co	2
Precision Paper Tube Co	33
Q O S Corp	32-34-35
Quality Components Inc	34-35
Radio Condenser Co	3
Radio Cores Inc	32-34-35-37
Radio Corp of America/Commercial Electronic Products	31-34
Radio Corp of America/Electron Tube Div	31
Rayco Electronic Mfg Co	2
Raytheon Co (Waltham)	2
Rea Co J B/Electronics Div	2
Reed & Reese-Retron Corp	2-3
Reeves Instrument Corp	3
Richardson Labs Kenneth	7
Risco	37
Sag Harbor Industries	7
Sangamo Electric Co	2-6-37

PRODUCT MFRS

Santa Barbara Div/Curtiss Wright	2-7
Scientific Eng'g Lab	7
Servomechanisms Inc	2-3
Shrader Co F W	8
Sigma Instruments Inc	2
Simplatrol Products Corp	3
Southwestern Industrial Electronics Co/Div	
Dresser Industries Inc	2
Stackpole Carbon Co	4-8-28-30-31-34-38
Standard Electromagnetics Inc (Frederick)	3
Standard Electromagnetics Inc (Walkerville)	8
Stearns Magneto Products	7-8
St Eloi Corp	1-4-8-9
Stevens Products Inc	33
Steward Mfg Co D M	4-8-27-28-30-31-32-37-38-40
Superior Steatite Ceramic Corp	28
Stone Paper Tube Co/Div Stone Straw Corp	33
Supperex Electronics Corp	31-32-40
Technical Apparatus Builders	2
Technical Development Co	7-8
Technical Oil Tool Corp	3
Telectro Industries Corp	2
Telegraph Construction & Maintenance Co Ltd (Cables Group)	1-6-9-12-27-29-30-32-33-36-37-38
Telemeter Magnetics Inc	\$1-40
Tempel Steel Co	33
Thermal Refractories Corp	28
Thomas & Skinner Inc	1-3-8-12-27-29-30-32-33-36-37
Thor Ceramics Inc	28
Topp Industries Inc	2
Torotel Inc	2
Torwico Electronics Inc	2
Transonic Inc	2
Transval Electronics Corp	2
Tresco Inc	2
United Transformer Corp	2
Universal Toroid Coil Winding Inc	2
Valor Electronics Co	31
Varian Associates	7
Vari-L Co	2
Varo Mfg Co	2
Vickers Inc/Electric Products Div	2
Waltham Screw Co	35
Warner Electric Brake & Clutch Co	3
Western Gold & Platinum Co	28
Westinghouse Electric Corp (Greenville)	27-29-30-32-36-37
Westinghouse Electric Corp (Pittsburgh)	1-2-7-8-9-27-29-30-32-33-36-37-38
Wickes Eng'g & Construction Co	2
Whitehead Metals Inc	1-6
Wiegand Mfg Co	2
Williams & Co C K (E St Louis)	4-9
Williams & Co C K (Easton)	4-9

Atmosphere Control Co	12
Bach-Simpson Ltd	1-2-3-4-5-6-7
Barker & Williamson Inc	4-10
Barnett Instruments Co	1-7
Beckman Inst Inc/Berkeley Div	7
Bendix Aviation Corp/Cincinnati Div	6
Bergen Labs	16
B & F Instruments Inc	7-9
B & H Instruments Co Inc	7-9-12-16
Biddle Co James G	6
Bliss Electronic Corp	7
Boonton Electronics Corp	1-5
Boonton Radio Corp	4-8-14
Bristol Co	1-2-3-4-5-6-7-9-12-16
Bruno New York Industries Corp	8-13
Brunswick Instruments	7-9
Calif Technical Industries/Div Textron Inc	10-18
Cal-Ohm Labs Inc	1-2-3-4-5-6-7-8-9-12-13-15-16
Cambridge Instrument Co	1-2-3-5-7-16
Canadian Marconi Co	1-4-5-7-8
Canadian Research Institute	1-2-3-4-6-7-12-13-15-16
Cardinal Instrumentation Corp	12
Chesapeake Instrument Corp	
Chicago Industrial Instrument Co	1-2-3-4-5-12-13
Clegg Labs/Div Clegg Inc	4-7-16
Clough-Brengle Co	1-4-5-7
Coast Coil Co	3
Consolidated Productions Inc	4
Cornell-Dubilier Electrical Corp	1-7
Cunningham Son & Co James	1-3-4-5-6-7-15-16
Curtiss-Wright Corp/Electronics Div	6-7-16
Datascan Inc	1-12
Daven Co	4-5-6-7-16-17
Davenport Mfg Co	2-3-6-7-12
Daystrom Pacific	9
Deltron Inc	1-7
Electro Impulse Lab Inc	13
Electro Instrument Inc	1-2-3-4-5-6-7-9-16
Electromatic Equipment Co	1-5-7
Electro-Measurements Inc	1-2-3-4-5-6-7-11-16
Electronic Applications Inc	1-7
Electronic Instrument Co Inc	1-7
Electronic Processes Corp of Calif	12-16
E M I Cossor Electronics	1-4-5-7-17-18
Eppley Lab Inc	12-16
Erdeco Eng'g Corp	1
Foxboro Co	12
Freed Transformer Co	1-3-5
General Communications Co	8-13
General Electric Co/Apparatus Sales Div	3-7
General Radio Co	1-2-3-4-5-6-7-8-14-16-17-19
Gertsch Products Inc	3-4
Gray Instrument Co	7-11-12-16
Gulton Industries Inc	1-2-3-4-5-6
Hagan Chemicals & Controls Inc	7-9-12-16
Heath Co	1-2-3-4-5-7-10-16
Hellige Inc	2
Hewlett-Packard Co	4-18
Holland Electronics	13
Honeywell Controls Ltd	1-4-5-7-16
Industrial Control Co	1
Industrial Deb Labs Inc	1-7-13
Industrial Instruments Inc	1-2-3-4-6-7-16
Industrial Test Equipment Co	1-3-4-5-7-11
Industrial Transformer Corp	5
International Telephone & Telegraph Corp/Industrial Products Div	1-3-4-5-6-7-8-16
Johnson Co E F	10
Jones Electronics Co Inc M C	8-10
Jones Electronics Co M C	8-10
Julie Research Labs	7-11-16
Kahn & Co	7-16
Kearfott Co Inc (Pasadena)	1-5-9-11
Kearfott Co Inc (Clifton)	1-3-4-5-6-7-11-12-16
Keystone Carbon Co	13
Kinetics Corp	7
Leeds Co Inc Gerard G	6-12-13
Leeds & Northrup Co	1-2-3-4-5-6-7-9-12-16
Lehigh Valley Electronics Eng'g & Mfg Co	4-12-13
Macleon & Hanapol	1
Magnavox Corp	1
Magnetic Instrument Co Inc	1
Marconi Instruments Ltd	1-2-4-5-6-7-8-14
Measurements Research Co/Div Prudential Indust	1-4-7-13
Measurements/Div McGraw-Edison	18
Metronix Inc	1-4-5-7
Millen Mfg Co James	4-8-10
Millitest Corp	7
Millivac Instruments Div/Cohu Electronics Inc	16
Minn-Honeywell Regulator Co/Brown Instruments Div	3-7-16
Minn-Honeywell Regulator Co/Rubicon Instruments	7-11-12-16

36—Magnetics; 37/38—Meas. & Test Equip.

Miratel Inc	8-17
Model Eng'g & Mfg Co Inc	1-3-4-5-8
Mosley Electronics Inc	10
Muirhead & Co Ltd	1-3-4-5-7-16-17
Muirhead Instruments Inc	1-3-4-5-7-11-16
Mullard Equipment Ltd	2
Narda Microwave Corp	4
Non-Linear Systems Inc	3-7-9-16
Northeast Electronics Corp	4-10
Northern Radio Mfg Co Ltd	
Polytechnic Research & Development Co	10-13
Polytronics Co	3-6-7-12-15-16
Precise Measurements Corp	6
Precision Apparatus Co	1
Pyrometer Instrument Co	12
Radar Measurements Corp	10-13-18
Radex Corp	4
Radio City Products Co	1-3-4-6-7-15-16
Rank Cintel Ltd	1-3-4-5-6-7-16
Rinco Inc	1-2-3-4-5-6-7-16
Rixon Electronics Inc	8-10
Royco Instruments Inc	12-13
Ruge Assoc Inc Arthur C	12
Shallcross Mfg Co	3-6-7-16
Southwestern Industrial Electronics Co/Div Dresser Industries Inc	1-2-4-5-6-7
Sperry Microwave Electronics Co/Div Sperry Rand	10-13-18
Sprague Electric Co	1
Sticht Co Herman H	6-16
Stratocor Corp/Geophysical Services Div	3-7-16
Sullivan Ltd H W	1-2-4-5-6-7-16
Tech Labs	1-3-4-5-6-7-16
Technical Oil Tool Corp	8
Technique Associates Inc	12
Telectro Industries Corp	1-3-4-5
Theta Instrument Corp	11
Telerad Mfg Corp	10
U S Dynamics Corp	3
Virginia Electronics Co	8-17
Vis-U-All Products Co	19
Veron & Co George	1-4-5-6-7-15-16
Wayne-Kerr Corp	1-2-3-4-5-6-7-8-9-14-17
West Coast Research Corp	12
West Instrument Corp	12
Westronics Inc	2-3-9-13
Winder Aircraft Corp of Fla	1-2-3-4-5-7-17-18
Winslow Co	1-3-4-7-16

37—MEASUREMENT & TEST EQUIPMENT—BRIDGES

Bridges, audio	17
Bridges, bolometer	18
Bridges, capacitance	1
Bridges, conductivity	2
Bridges, electrical	3
Bridges, impedance	4
Bridges, inductance	5
Bridges, megohm	6
Bridges, resistance	7
Bridges, R-F	8
Bridges, self balancing	9
Bridges, standing wave	10
Bridges, synchro	11
Bridges, temperature	12
Bridges, thermistor	13
Bridges, vacuum tube	19
Bridges, VHF	14
Bridges, wein	15
Bridges, whetstone	16

38—MEASUREMENT & TEST EQUIPMENT—COUNTERS

Counters, directional	14
Counters, electromagnetic	1
Counters, electronic	2
Counters, events-per-unit time	3
Counters, frequency	4
Counters, geiger	5
Counters, impulse	6
Counters, mechanical	7
Counters, photoelectric	8
Counters, preset	9
Counters, proportional	15
Counters, radiation	10
Counters, revolution	11
Counters, scintillation	12
Counters, time-measuring	13

Acme Model Eng Co	7-16
Acton Laboratories Inc	1-5
Advanced Instruments	12-13
Airborne Instrs Lav/Div Cutler Hammer Inc	8-13
Alford Mfg Co	10
Allegany Instruments Co	7-16
Alpha Instrument Co	1-2-4-5-6-7-15-16
Arnoux Corp	12-13
American Measurement & Control Inc	3-9
Associated Research Inc	3-6-7

Macleon & Hanapol	1
Magnavox Corp	1
Magnetic Instrument Co Inc	1
Marconi Instruments Ltd	1-2-4-5-6-7-8-14
Measurements Research Co/Div Prudential Indust	1-4-7-13
Measurements/Div McGraw-Edison	18
Metronix Inc	1-4-5-7
Millen Mfg Co James	4-8-10
Millitest Corp	7
Millivac Instruments Div/Cohu Electronics Inc	16
Minn-Honeywell Regulator Co/Brown Instruments Div	3-7-16
Minn-Honeywell Regulator Co/Rubicon Instruments	7-11-12-16

Ad-Yu Electronics Lab Inc	2-4-10
Aeromotive Eng'g Products Ltd	1-2-4-6-7-9-11
Aerotronic Associates Inc	2-3-4-13
Alexandria Div/American Machine & Foundry	4-11
American Electronics Inc	2-5-9-10-12
American Electronics Inc/Taller & Cooper Div	6-7
American Tradair Corp	5-10-12
Anton Electronic Labs	5-10
Arma Div/American Bosch Corp	2-3-4-9-11-13
Atomic Accessories Inc	5-10-12-15
Automatic Electric Co	1-6-9
Automatic Timing & Controls Inc	6-11
Automation Dynamics Corp	9
Baird-Atomic Inc	1-2-3-4-5-6-7-8-9-10-11-12-13-15

Barkley & Dexter Labs	1-8
Basic Controls Inc	1-2-3-7-8-9-11-13-15
Baskon Corp	1-6-9
Beckman Inst Inc/ Berkeley Div	2-3-4-6-8-9-11-13
Beckman Instruments Inc/ Systems Div	2-3-4-9-13
Beckman Inst Inc/Scientific & Process Inst Div	2-3-9-13
Bendix Aviation Corp/Cincinnati Div	2-9
B & H Instrument Co Inc	4-11
Biddle Co James G	4
Boesch Mfg Co	2-6-7
Briggs Associates	2
Bristol Co	3-11
Burroughs Corp (Detroit)	2
Burroughs Corp/Electronic Tube Div	2-3-6-9
Canadian Applied Research Ltd	2-13
Canadian Marconi Co	2-4
Canadian Research Institute	2-5-6-8-10-12
Central Scientific Co of Canada Ltd	6
Centronix Inc	2
Clark Controller Co (Cleveland)	8
Coast Coil Co	2
Compton Corp	2
Computer Control Co Inc	2
Computer Measurements Co/Div Pacific Industries Inc	2-3-4-9-13
Computing Devices of Canada Ltd	3-10
Cunningham Son & Co James	1-2-7
Datscan Inc	8
Davenport Mfg Co	2-3-8-13
DeJur-Amsco Corp	13
Di-An Controls Inc	2-9-14
Digital Equip Corp	2-9
Digitran Co	6-7-9-11
Divco-Wayne Electronics Div/ Divco-Wayne Corp	4
D & S Mfg Co	6
Durant Mfg Co (Melrose Park)	1-2-7-8-9-11
Durant Mfg Co (Milwaukee)	1-2-6-7-8-9-11-14
Dymec Inc	2-3-4-6-9-13
Dynamic Electronics Inc	6-7
Dynapar Corp	2-3-4-8-9-11-13-14
Dynatron Inc	2
Eagle Signal Corp	6-7-9-11-13
Eberline Instrument Corp	3-5-10-12
Elcor Inc	2
Electric Tachometer Corp	1-11
Electro Contacts Inc	7-13
Eldorado Electronics Co	10-13
Electrical & Physical Inst Corp	2-10
Electronic Computer Co	2-3-6
Electronics Corp of America (Cambridge)	2-8-9-13
Electronics Corp of America (Toronto)	8
Electronics Eng Co of Calif	2-4-9-13
Electro-Pulse Inc	2-3-4-9-13
Electro Vision Lab	13
E M I Cossor Electronics	12
Epsco Inc	4
Erie Pacific/Div Erie Resistor Corp	2-3-4-6-8-9-11-13
Erie Resistor Corp	2-3-4-6-9-11-13
Exact Eng'g & Mfg Inc	2-7-11-13
Federal Equipment Co	8
Fisher Research Lab Ltd	5-12
Franklin Electronics Inc	2
Freed Transformer Co	2-8-9-11
Gates Radio Co	2-4
General Controls Co	1-6-7-8-9-11
General Controls Co (Canadian) Ltd	1-6-7-8-9-11
General Devices Inc	2-7-13
General Electric Co/Apparatus Sales Div	8
General Electric Co/X Ray Dept	12
General Electro-Mechanical Corp	1-6
General Railway Signal Co	2
Gordon Enterprises	1-2-3-6-7-11-13
Guardian Electric Mfg Co	1-6
Haledy Electronics Co	2-3-8-9-13-14
Hamilton Watch Co/Allied Products Div	13
Hammer Electronics Co Inc	12
Haydon Co A W	1-6-13-15
Haydon Div/General Time Corp	13
Haydon Instrument Co	7-9-11-13
Heath Co (Benton Harbor)	5-10
Hewlett-Packard Co	2-3-4-6-8-10-11-13
Hoffman Electronics Corp	5-10
Honeywell Controls Ltd	2
I-L-S Instrument Div	2-3-4-13
Industrial Timer Corp	13
Instruments Inc	10
Isomet Corp	12
Isotopes Inc	2-5-10-12
Isotopes Specialties Co	5-10-12-15
Jordan Electronics/Div Victoreen	10
Kaiser Aircraft & Electronics Div (Oakland)	2-3-4-13
Kearfott Co Inc (Clifton)	1-7-14

Land-Air Inc	10
Landsverk Electrometer Co	5-10
Larson Instrument Co	2-3-4
Las-Lab Inc	1-7
Lavoie Labs Inc	4
Leeds Co Inc Gerard G	2-3-4-6-10-12-13
Librascope Inc (Glendale)	2-6-7
Magnetics Research Co	2-4
Magnuson Engineers Inc	2-7
Magtrol Inc	2-8-11
Martin-Merrill Inc	2-3-4
Mast Development Co Inc	1-3-6-7-9-11
Millen Mfg Co James	7
Mullard Equipment Ltd	10
National Instrument Laboratories Inc	8
Nat'l Radiac Inc	10-12
Norrman Laboratories Ernst	4-13
Northeastern Eng'g Inc	2-4-13
Nuclear-Chicago Corp	2-3-5-6-7-9-10-12-13-15
Nuclear Corp of America/Instrument & Research Div	1-5-10-12-15
Nuclear Development Lab	5-10
Nucleonic Corp of America	5-10-12
Orbitran Co Inc	2-18
Patterson Moos Div/Universal Winding Co	2-5-9-13
Peebles & Co Ltd Bruce	2-13
Philips Electronics Inc	5-10-12-15
Photobell Co	2-4-6-7-8-9-11
Photocon Research Products	1-6-7-9-11
PIC Automation Div/General Controls	1-2-6-7-8-9-11
Polytronics Co	8
Potter Instrument Co	2-3-4-9-11-13
Precision Radiation Instruments Inc	5-10-12
Quantametric Devices Inc	8
Radiation Counter Labs Inc	10-12
Radio City Products Co	5
Radio Corporation of America/Indust Automation Equip	2-6-8-9
Radiation Instrument Development Lab Inc	2-10-12-13-15
Ram Meter Inc	1-2-4-6-9-13
Rank Cintel Ltd	2-3-4-6-8-11-13
Ransom Research	2-3-4-8-9-13
Rayco Electronic Mfg Co Inc	2
Research Industrial Lab of Electronics	2
Reuter Stokes Electronic Components	5-10-15
Ripley Co	2-8
Rixon Electronics Inc	3
Robotron Corp	2
Royco Instruments Inc	3
Scantlin Electronics Inc	2-3-4-13
Scientific Eng'g Lab	2
Seaboard Electric Products Corp	6-7
Semi-Elements Inc	12
Sigma Instruments Inc	1-6-8
Simpson Electric Co (Chicago)	3-7-13
Skiatron Electronics & Tv Corp	1-2-3-4-6-8-9-11-13
Southwestern Industrial Electronics Co/ Div Dresser Industries Inc	11
Standard Electric Time Co	2-4
Standard Instrument Corp	2-3-8-9-13
Stanley Aviation Corp	10-12
Stewart Instrument Co	13
Sticht Co Herman H	13
Strandberg Eng'g Labs Inc	2-3-6-11
Streeter Amet	1-3-6-11
Stromberg-Carlson/Div Gen'l Dynamics Corp (Carlson Rd)	2-3-10
Syston Corp	2-3-4-5-6-9-10-11-12-13
Taffet Radio & TV Co	5-10
Taller & Cooper	1-6-7-11
Teca Corp	2-10-12
Technical Oil Tool Corp	7-11
Telecomputing Corp	2
Teletro Industries Corp	1-2-3-4-8
Telemeter Magnetics Inc	2
Textran Corp	2-4
Tracerlab Inc	5-10-12-15
Tri-Tronics Co	8
Trott Electronics Inc	2-6-8-10-13
Tullamore Electronics Lab	2-3-10-12-13
U S Components	4
U S Instrument Corp	1-6
Universal Transistor Products Corp	5-10-12
Valor Electronics Co	2
Veeder Root Inc	1-2-7-8-9-11-12
Venner Electronics Ltd	2-4-6-9-13
Victor Adding Machine Co	2
Victoreen Instrument Co	5-10-12
Waeline Inc	11-13
Walkirt Co	2-3-4-6-8-9-11-13
Wang Labs Inc	2-9
Webcor Inc	1-4
Weltronic Co	2
Western Radiation Lab	5-10-12
Wood Counter Lab N	5-10-12
Zenith Electric Co	13
Zernickow Co	7-13

39—MEASUREMENT & TEST EQUIPMENT—DECADE BOXES

Attenuators, decade	4
Decade boxes, capacitance	1
Decade boxes, inductance	2
Decade boxes, resistance	3

Aero Electronics Co	2
Aerovox Corp (New Bedford)	1-2-3
Audicon Electronics Inc	1-2-3
Barker & Williamson Inc	2
Burnell & Co Inc	2
Cal-Ohn Laboratories Inc	1-2-3-4
Cambridge Industrial Co	3
Canadian Research Institute	1-3
Central Scientific Co of Canada Ltd	3
Cinema Eng'g Div/Aerovox Corp	3
Clarostat Mfg Co	3
Computer Eng'g Associates Inc	2
Cornell-Dubilier Electrical Corp	1-3
Electro-Measurements Inc	1-3
Electronic Applications Inc	1
Electronic Instrument Co Inc	1-3
Electronic Measurements Co	3
Electronic Measurements Corp	1-3
Electronic Production & Development	1-2-3
E M I Cossor Electronics	1-2-3-4
Fidelity Amplifier Co	3
Freed Transformer Co	1-2
General Radio Co	1-2-3-4
General Resistance Inc	3
Gertsch Products Inc	4
Gray Instrument Co	3
Heath Co (Benton Harbor)	1-3
Hewlett-Packard Co	4
Honeywell Controls Ltd	1-2-3
Industrial Instruments Inc	1-3
International Resistance Co	2
ITT/Industrial Products Div	1-3
Julie Research Labs	3-4
Kurtz John O	3
Leeds & Northrup Co	1-2-3
Martin-Merrill Inc	3
Minn-Honeywell Regulator Co/Brown In- struments Div	3
Minn-Honeywell Regulator Co/Rubicon Instruments	3
Muirhead & Co Ltd	1-2-3-4
Muirhead Instruments Inc	1-2-3
New London Instrument Co Inc	3
Ohmite Mfg Co	3
Polytronics Co	3
Precise Development Corp	1-3
Scientific Wood Cabinet Co	1-2-3
Shallcross Mfg Co	3-4
Solartron Electronic Group Ltd	4
Sprague Electric Co	2
Sullivan Ltd H S	1-2-3-4
Tech Labs	1-2-3-4
Teletro Industries Corp	1
Telex	3
Telonic Industries Inc	3-4
Torocoil Co	2
Ultronix Inc	3
United Transformer Corp	2
Universal Mfg Co Inc	2
Valandy Electronics Corp	1-3
Wald Electronics	4
Waltham Electronics	3
Wayne-Kerr Corp	4
Winslow Co	1-3

40—MEASUREMENT & TEST EQUIPMENT— GENERATORS

Generators, A-F signal	1
Generators, color TV bar	2
Generators, color TV dot	3
Generators, color TV signal	4
Generators, F-M signal	5
Generators, harmonic	6
Generators, microwave signal	7
Generators, noise	8
Generators, phase modulation	7
Generators, picture signal	29
Generators, pulse	10
Generators, R-F signal	11
Generators, SHF	28
Generators, single-sideband	12
Generators, square wave	13

Generators, sweep	14
Generators, sync	15
Generators, sync. stretcher ...	16
Generators, sync. studio TV ...	17
Generators, timing marker	18
Generators, TV composite signal	19
Generators, TV signal	20
Generators, UHF	21
Generators, ultrasonic	22
Generators, VHF	23
Generators, video signal	24
Generators, waveform	25
Multipliers, frequency	26

Acoustica Associates	22
Adler Electronics Inc	1-5-6-10-11-12-20-21-23-24-25-26
Airborne Instrs Lab/Div Cutler Hammer Inc	8
Aircorn In (Winthrop)	6-7-8-10-11-14-21-23
Aircorn Inc (Roselle)	7
Aircraft Radio Corp	7-11-21-23
Alcar Instruments Inc	22
Alfred Electronics	7-14
Alpha Instrument Co	1-5-11
Amerac Inc (Beverly)	7-21-26
American Electronic Labs	10-13-18-25
American Electronic Labs Inc	10
American Electronics Inc	26
American Research & Mfg Co	26
Anadex Instruments Inc	18
Antlab Inc	13
Arenberg Ultrasonic Laboratory	22
A R F Products Inc (River Forest)	5-11-13-23
Atomic Accessories Inc	10
Audicon Electronics Inc	1-5-6-11-13-22
Avo Ltd	1-5
Bach Simpson Ltd	1-5-11
Barker & Williamson Inc	1-2-26
Beckman Inst Inc/Berkeley Div	10
Bergen Labs	21
Berkshire Labs	10-25
B J Electronics/Borg-Warner Corp	5-10-11-13-14-21-23-26
B & K Mfg	2-3-9-20-24-25
Blackstone Corp	22
Boonton Radio Corp	5-7-11-14
Bosco Electronics Inc Don	1-8-10-11
Branson Instruments Inc/Branson Ultrasonic Corp	22
Bruno New York Industries Corp	7-11-21
Bulova Watch Co/Electronics Div	1-5-6-10-13-18-23-26
Burr-Brown Research Corp	1-13
Burroughs Corp (Detroit)	10-13-18
Burroughs Corp/Electronic Tube Div	10
Calif Technical Industries Div/Telextron Inc	7
Canadian Marconi Co	1-5-7-8-10-11-13-14-17-19-21-23-28
Canadian Research Institute	1-10-11-13-22
Canoga Div/Underwood Corp	14
Cawkell Electrical Eng'g A E	10
Centronix Inc	11
Chesapeake Instrument Corp	8-22
Cirlo Ultrasonic Corp	22
Clegg Labs/Div Clegg Inc	7-10-12-21
Clough-Brengle Co	1-7-11-14-21-23
Collins Radio Co (Cedar Rapids)	12
Colorado Research Corp	19-20-24-26
Communication Measurements Labs	22
Conn Organ Corp	1
Continental Electronics Corp	1
Crosby Labs Inc	12
Daven Co	1-11
Dayton Aviation Radio & Equipment Corp	11-23
Demornay-Bonardi Corp	6-8-26
Designers for Industry	12-21-22-26
Diehl Mfg Co	14
Diveco-Wayne Electronics Div/Divo-Wayne Corp	1-5-11
Donner Scientific Co	1-13
Dymec Inc	1-7-14
Dyna-Empire Inc	8
Elcor Inc	10-13-25
Electric & Physical Inst Corp	10-13
Electronic Instrument Co Inc	1-11-13-14-20
Electronic Measurements Corp	1-3-20
Electronic Tube Corp	14-18
Electro-Pulse Inc	10
Elgenco	8
Elsin Electronics Corp	7
Fly Sales Co	1
F M I Cossor Electronics	5-8-10-13-14-18
Empire Devices Products Corp	8-10
Empire Product Sales Corp	8
Engineering Associates	7-8-10-11-13-21-22-23-26
Entron Inc	11

Federal Mfg & Eng'g Corp	10-11-21
Feiler Eng'g & Mfg Co	1-11
Franklin Electronics Inc	10
Freed Transformer Co	22
General Communications Co	5-7-10-11-13-14-15-18-24
General Electric Co/Technical Products Dept	4-9-15-17-19-20-24
General Radio Co	1-6-7-8-10-11-13-21-22-23-26
Gertsch Products Inc	26
Gordon Enterprises	18
Grem Eng'g Co	7
Gulton Industries Inc	22
Hazeltine Electronics Co/Div Hazeltine Corp	2-3-4-7-9-10-11-21-23
Heath Co (Benton Harbor)	1-2-3-6-11-13-14-19-23
Hewlett-Packard Co	1-7-8-10-11-13-14-21-23-24-25-28
Hickok Electrical Instrument Co	25
Hycorn Eastern Inc	18
Hycon Mfg Co	2-3-4-8-10-15
Industrial Test Equipment Co	1
ITT/Industrial Products Div	1-5-8-11-21-23
Jackson Electrical Instrument Co	1-2-14-20
Jerrold Electronics Corp	14-23
J-V-M Microwave Co	7-11-21-26
Kahn & Co	22
Kaiser Aircraft & Electronics Div/Kaiser Ind (Oakland)	7
Kay Electric Co	1-2-3-4-5-6-7-8-9-10-11-14-18-19-20-21-22-23-24
Kearfott Co Inc (Pasadena)	7
Kearfott Co Inc (Clifton)	7-8
Kearfott Co Inc/Microwave Div	7
Kennedy Labs Inc	10
Kintel	17-19-20
Kurtz John O	14
Lampkin Labs Inc/Technical Div	6-11
Lavoie Labs Inc	10-11-21-23
Leeds Co Inc Gerard G	7-10-11-14-21-22-23
Levinthal Electronic Products Inc	7-21
Ling Systems Inc	7
Maico Electronics Inc	24
Manson Laboratories Inc	6-7-10-11-12-21-23-26
Manufacturers Eng'g & Equip Corp	14
Marconi Instruments Ltd	2-5-7-8-11-14-21-23-24
Martin-Merrill Inc	7-10-11-14-21-22-23
Measurements McGraw Edison Inc	1-5-10-11-13-20-21-23-24
Measurements Research Co/Div Prudential Indust	8
Microlab	6
Microwave Associates Inc	7
Milgo Electronic Corp	18
Miratel Inc	1-5-7-11-17-19-24-25
Missouri Research Labs Inc	18-24
Mobile Electronics Mfg Co	1
Moore Corp John B	22
Muirhead & Co Ltd	1
Muirhead Instruments Inc	1-13
Mullard Equipment Ltd	10-18-22
Narda Ultrasonics Corp	22
National Ultrasonic Corp	22
Navigation Computer Corp	10
New London Instrument Co Inc	5-11-13-21-23
Nichols & Clark Inc	1
Norrman Labs Ernest	6-10-18
Northeast Scientific Corp	25
Northern Radio Mfg Co Ltd	18-26
Opto Engineering Co/Div Remanco Inc	7-10-11-24
Orbitran Co Inc	10-13-18
Packard Bell Electronics Corp	10
P C A Electronics Inc	10
Peebles & Co Ltd Bruce	8-22
Polared Electronics Corp	10-11-14-21-23
Philamon Laboratories Inc	13
Philbrick Researches Inc George A	1-13-14-18-25
Philco Corp/G & I Div	2-3-4-5-6-7-8-9-10-11-17-19-20-21-22-23-24-26-27-28
Phillips Mfg Co	22
Polytechnic Research & Development Co	7
Power Supplies Inc	22
Precise Development Corp	1-2-5-10-11-13
Precision Apparatus Co	1-2-3-5-11-13-14
Precision Hearing Aids	8
Probescope Co Inc	14
Pye Telecommunications Ltd	1-11-25
Radar Design Corp	7
Radar Measurements Corp	7
Radiation Counter Labs Inc	10
Radiation Instrument Development Lab Inc	10
Radio City Products Co	1-2-3-4-5-10-11-13-14-21-23
Radio Corp of America/Commercial Electronic Products	1-2-3-4-5-6-10-11-13-14-15-16-17-18-20-21-23-24-25-26

PRODUCT MFRS

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Radio Corp of America/Electron Tube Div	1-2-3-11-23
Rank Cintel Ltd	1-2-10-13-14-25
Reeves Instrument Corp	8
Research Industrial Lab of Electronics	10
Resdel Eng'g Corp	7-8-10-11-21-26-28
Rese Eng'g Inc	10-25
Rixon Electronics Inc	8-26
Riverbank Labs Eng'g Dept	1
RS Electronics Corp	8
Rutherford Electronics Co	10-18
Santa Barbara Div/Curtiss Wright	22
Scientific-Atlanta Inc	6-7-11-26
Scott Inc H H	8
Seaboard Electric Products Corp	10
Servo Corp of America	13-25
Sierra Electronic Corp	5-7-21-23-27
Simpson Electric Co	2-3-4-5-10-11-14-19-20-21-24
Solartron Electronic Group Ltd	1-10-11-13-14-25
Southwestern Industrial Electronics Co/Div Dresser Industries Inc	1-10-13-18-22-25-26
Specialty Eng'g & Electronics Co	1-10-11
Stelma Inc	10
Stoddard Aircraft Radio Co	10
Stromberg-Carlson/Div Gen'l Dynamics Corp	7-12
Taffet Radio & TV Co	1-5-6-11-13
Taro Electronics Inc	2-9-10-15-16-17-19-24
Technical Oil Tool Corp	7
Technitrol Eng'g Co	10
Tektronix Inc	10-13-18-25
Telechrome Mfg Corp	2-3-4-7-8-9-10-11-12-13-15-16-17-18-19-20-24-25
Telecontrol Corp	1-17
Telectro Industries Corp	1-7-10-11-21-24
Telemarine Communications Co	5-11-21-23
Telerad Mfg Corp	5-7-10-11
Teletronics Lab Inc	10
Tel-Instrument Electronics Corp	2-3-4-5-9-11-14-15-17-19-20-21-23-24
Telonic Industries Inc	6-10-11-14-21-23
Trad Electronics Corp	11
Transistor Devices Inc	1
Triplet Electrical Instrument Co	2-3-4-5-11-14-20-24
Tullamore Electronics Lab	10
Ultrasonic Eng'g Co	22
Underwood Corp/Canoga Div	7-11
Valandy Electronics Corp	1
Van Norman Industries Inc/Electronics Div	7-11-14-21-23
Varo Mfg Co	1-13-26
Victoreen Instrument Co	10
Voran & Co George	1
Waltham Electronics Corp	5-7-8-11-13-14-20-21-23-25-26
Wang Labs Inc	10-25
Waveforms Inc	1-22
Waveline Inc	7
Weinschel Eng'g	7-11-13
Wickes Eng'g & Construction Co	2-3-4
Winder Aircraft Corp of Fla	26
Winslow Co	1
Winston Electronics Inc	1-2-3

41—MEASUREMENT & TEST EQUIPMENT—MONITORS

Monitors, antennas phase	1
Monitors, audio	2
Monitors, frequency	3
Monitors, modulation	4
Monitors, phase angle	5
Monitors, power	6
Monitors, service	7
Monitors, video color	8
Monitors, video line	9
Monitors, video off-the-air	10
Monitors, VOR	11
Monitors, waveform	12

Acromag	3
Action Laboratories Inc	5
Adler Electronics Inc	12
Airborne Instrs Lab/Div Cutler Hammer Inc	6
Aircraft Radio Corp	11
Alexandria Div/American Machine & Foundry	3-6

Alto Scientific Co	3
Amelco Inc	3-6
American Machine & Foundry Co/Gen Eng Labs	3-6-12
Anadex Instruments Inc	3
Andrew Antenna Corp	1-5
A R F Products Inc (River Forest)	4
Arma Div/American Bosch Corp	3-5-6
Audocall Co	6
Beckman Inst Inc/Berkeley Div	3
Bergen Labs	5
Boonton Electronics Corp	12
Bosco Electronics Inc Don	2-7
Budelman Radio Corp	3-4
Bulova Watch Co/Electronics Div	3
Canadian Marconi Co	3-4-6
Central Electronics Inc	4-12
CGS Laboratories Inc	3
Chemalloy Electronics Corp	6
Chesapeake Instrument Corp	2
Collins Radio Co (Grand Rapids)	11
Conrac Inc	8-9-10
Crosby Labs Inc	4
Cunningham Son & Co James	8-9
Curtiss-Wright Corp/Electronics Div	7
Daven Co	2
Divco-Wayne Electronics Div/Divco-Wayne Corp	3
Dukane Corp	2
Dyna-Empire Inc	2
Dynapar Corp	3
Dynatronic Inc	6
Electro Impulse Lab Inc	3-6
Electronic Applications Inc	3
Empire Devices Products Corp	4
Empire Product Sales Corp	4
Engineering Associates	4
Gates Electronic Co	6
Gates Radio Co	2-3-4-9-12
General Radio Co	3-4
Gertsch Products Inc	4
Hathaway Instrument/Div Hamilton Watch Co	3
Hazeltine Electronics Div/Hazeltine Corp	8-11
Heath Co (Benton Harbor)	4
Hewlett-Packard Co	3
Industrial Test Equipment	6
Industrial TV Inc	8-9
Insul-8-Electronics	9
Kaiser Aircraft & Electronics Div/Kaiser Ind (Oakland)	8-9
Kings Electronics Co Inc	6
Kintel	9-10
Lampkin Labs Inc/Technical Div	3-4
Langevin Div/W L Maxson Corp	2
Magnetic Research Corp	3
Minn-Honeywell Regulator Co/Davies Labs Div	6
Miratel Inc	9-10-12
Multronics Inc	3-4-5
National Coil Co	6
New London Instrument Co Inc	3-4
Northeast Electronics Corp	6
Northern Radio Mfg Co Ltd	3
Olympic Radio & TV	1-6-7
Philco Corp/G & I Div	3-4-7-10
Polytechnic Research & Development Co	6
Radar Design Corp	6
Radio Corp of America/Commercial Electronics Products	1-8-4-8-10-12
Ram Meter Inc	6
Rank Cintel Ltd	2-3-8-9-10-11-12
Rixon Electronic Inc	6
Santa Barbara Div/Curtiss Wright	3-5
Sierra Electronic Corp	6-12
Skiatron Electronics & TV Corp	9-12
Southwestern Industrial Electronics Co/Div Dresser Industries Inc	4
Stromberg-Carlson/Div Gen'l Dynamics Corp (Carlson Rd)	11
Sullivan Ltd H W	3
Systron Corp	3-5
Taro Electronics Inc	5
Tektronix Inc	12
Teledyne Mfg Corp	3-5-7-8-9-10-12
Telectro Industries Corp	2-11
Tel-Instrument Electronics Corp	8
Theta Instrument Corp	5
Topp Industries Inc	1-5-6-11
Towaco Electronics	3
Varo Mfg Co	3
Virginia Electronics Co	2
Vokar Products Inc	2
Waltham Electronics	2-3-4
Waterman Products Co	4-5-12
Waugh Eng'g Co	3
Westinghouse Electric Corp (Pittsburgh)	3
Wickes Eng'g & Construction Co	8
Winder Aircraft Corp of Fla	1-2

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Oscillators, audio	1
Oscillators, cavity	2
Oscillators, code	3
Oscillators, crystal	4
Oscillators, grid dip	5
Oscillators, klystron	15
Oscillators, microwave	6
Oscillators, pulse	7
Oscillators, R-F	8
Oscillators, sweep	9
Oscillators, tuning fork	10
Oscillators, ultra low frequency	11
Oscillators, ultrasonic	12
Oscillators, video pattern	13
Oscillators, video range	14

Acoustica Associates	12
Adler Electronics Inc	1-2-7-8
Airborne Instrs Lab/Div Cutler Hammer Inc	6-8
Aircon Inc	2-6-8-9
Alfred Electronics	6-8-9
Alpha Instrument Co	1-7
Amerac Inc (Beverly)	2-6-7
American Electronics Labs	7
American Time Products Inc	10
Anderton Electronic Lab	1
Antlab Inc	10
Arenberg Ultrasonic Laboratory	7-12
A R F Products Inc (River Bank)	8-9
Audicon Electronics Inc	1-3-12
Bach-Simpson Ltd	1-5
Barker & Williamson Inc	1-5-8
Basic Controls Inc	3-6
Bendix Aviation Corp/Bendix Pacific Div	7
Biddle Co James G	10
Bogart Mfg Corp	6
Boonton Electronics Corp	5-8
Borg Equip Div/Amphenol-Borg Electronics Corp	4
Bosco Electronics Inc Don	1-7-8
Branson Instruments Inc/Branson Ultrasonic Corp	12
Bulova Watch Co/Electronics Div	1-4-11
Bunnell & Co J H	10
Burr-Brown Research Corp	1-12
Calif Technical Industries/Div Tectron Inc	6-15
Canadian Marconi Co	1
Canadian Research Institute	1-5-12
Centronix Inc	4-8-12
CGS Laboratories Inc	2-6
Clegg Laboratories/Div Clegg Inc	6-7-9
Clough-Brenkle Co	1-8-9
Community Eng'g Corp	8-9
Conn Organ Corp	1
Consolidated Electrodynamics Corp (Pasadena)	8
Continental Electronics Corp	1
Daven Co	1-8
Dayton Aviation Radio & Equipment Corp	4-8-9
Demornay-Bonardi Corp	6
Designers for Industry	4-11-12
Diamond Antenna & Microwave Corp	6-8
Donner Scientific Co	1-9-11-14
Dukane Corp	1
DuMont Laboratories Inc Allen B	1-7-8-9
Dymec Inc	1-6
Dynamic Electronics Inc	8
Dynatronic Inc	8
Edison Electronic Co	4
Elcor Inc	7
Electronic Instrument Co Inc	5
Electronic Measurements Corp	1
Electronics Int'l Co	1
Electronic Research Associates	1
Electro-Pulse Inc	7
E M I Cossor Electronics	1-7-9-12-15
Empire Product Sales Corp	6
Engineering Associates	6-8
Entron Inc	8
Erwood Inc	10
ESC Corp	7
Gates Radio Co	1-8
General Communication Co	2-6-8
General Devices Inc	3-6-7-8-9-11
General Radio Co	1-4-6-7-8-9-10-11-12-15
Genisco Inc	1-9
Gulton Industries Inc	6-12
Hammarlund Mfg Co	4-8
Hamilton Watch Co/Allied Products Div	10

Hazeltine Electronics Div/Hazeltine Corp	1-2-3-4-6-7-8-9
Heath Co (Benton Harbor)	1-5-8-9
Hewlett-Packard Co	1-6-8-9
Hill Electronics Inc	1-4-11
Holland Electronics	10
Hycon Eastern Inc	4
Industrial Test Equipment Co	1-10-11-12
Instrument Labs	1
Instruments for Industry Inc	9
ITT/Industrial Products Div	8
Jackson Electrical Instrument Co	1-9
Johnson Co E F	3
J-V-M Microwave Co	2-6-8
Kaiser Aircraft & Electronics Div/Kaiser Ind (Oakland)	9-13-14
Kay Electric Co	1-4-6-7-8-9-11-12-13-14
Krohn-Hite Corp	1-11-12
Lavoie Labs Inc	1
Leeds Co Inc Gerard G	6-8-9-12
Ling Electronics Inc	9
Ling Systems Inc	6
Magnaflux Corp	12
Manson Laboratories Inc	4-6-8
Marconi Instruments Ltd	4-11
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Millen Mfg Co James	5-8-9
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Mobile Electronics Mfg Co	1-4-12
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Muirhead & Co Ltd	1-10-11-12
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New London Instrument Co Inc	8
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Northern Radio Mfg Co Ltd	4
Packard Bell Electronics Corp	3
Peebles & Co Ltd Bruce	1
Philam Laboratories Inc	10
Philco Corp/G & I Div	6-8-11-12-13-14
Plectron Corp	1
Polarad Electronics Corp	2-6-7-8-9-15
Polytechnic Research & Development Co	6-15
Precision Apparatus Co	1-8
Premier Instrument Corp	6
Probescope Co Inc	9
Pulse Techniques Inc	1
Pye Telecommunications Ltd	8
Radar Design Corp	6
Radex Corp	1
Radio City Products Co	1-4-5-7-9
Radio Corp of America/Commercial Electronic Products	4-8-9
Radio Corp of America/Electron Tube Div	1-8-9
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Resdel Eng'g Corp	2-4-6-7-8
Research Industrial Lab of Electronics	7
Riverbank Labs Eng'g Dept	10-11-12
Rutherford Electronics Co	7
Saaborn Co	2-3
Santa Barbara Div/Curtiss Wright	7-12
Scala Radio Co	1
Scientific-Atlanta Inc	6
Scientific Radio Prods Inc	4-8-11
Sherman Industrial Electronics/Div Eng Design Inc	8
Short Brothers & Harland Ltd	11
Sierra Electronic Corp	2-6-8
Simpson Electric Co	4-8-9
Smith Inc Herman H	3
Solartron Electronic Group Ltd	1-6-9-11-14
Southwestern Industrial Electronics Co/Div Dresser Industries Inc	1-7-10-11-12
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Spectralab Inst Co	2-6-7-8-9
Spivey Inc James S	1-7
Stromberg-Carlson/Div General Dynamics Corp (Carlson Rd)	6-7-8-9-12
Sullivan Ltd H W	1-10
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Technical Material Corp	8
Technical Oil Tool Corp	2-6
Technitrol Eng'g Co	9-14
Teledyne Mfg Corp	13-14
Telectro Industries Corp	1-2-6-7-8
Telemarine Communications Co	9
Telerad Mfg Corp	2-6-7
Teletronics Lab Inc	1
Telonic Industries Inc	8-9
Textran Corp	4
Times Facsimile Corp	10
Topp Industries Inc	1-8
Transistor Devices Inc	1
Transonic Inc	1-4
Triplet Electrical Instrument Co	8-9
Ultrasonic Eng'g Co	12
Underwood Corp	6
Valandy Electronics Corp	1

Van Norman Industries Inc	2-6-8-9
Vari-L-Co	9
Varo Mfg Co	1-10-11
Venner Electronics Ltd	1-4
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Walkirt Co	4-10
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Wang Labs Inc	7
Waveforms Inc	1-11-12
Waveline Inc	6
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Transducers, sonar	48
Transducers, telemetering	78
Transducer, temperature	79
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VSWR measuring equipment	51

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Oscillographs, multi-element	4
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Allegany Instrument Co	1-3-8
American Electronic Labs	1-3-8
American Electronic Labs Inc	2
Applied Science Corp of Princeton	4
Bach-Simpson Ltd	1
Burroughs Corp (Detroit)	7
Cal-Ohm Labs Inc	3
Canadian Research Institute	1
Central Electronics Inc	1
Central Research Labs	1-3-7-8
Centronix Inc	2-3-4-5-7
Century Electronics & Instruments Inc	2-3-4-5-7
Consolidated Electrodynamics Corp	1-2-3-4-5-7
Divco-Wayne Electronics Div/Divco-Wayne Corp	1
Edgerton Gernsmaier & Grier	1
Edin Div/Eps Co Inc	2-3-5-7
Electro Instrument Inc	1-5
Electronic Instrument Co Inc	1
Electronic Measurements Corp	1
Electronic Tube Corp	1-3-5-7-8
Electro-Medical Lab Inc	2
Electro-Technical Labs	3-5-7
F M I Cossor Electronics	1-3-5-6-7
Engineering Associates	1
Feiler Eng'g & Mfg Co	1-5
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Geotechnical Corp	2-3-4-6-7-8
Gordon Enterprises	2-3-4-5-7-8
Hamilton Watch Co/Allied Products Div	1-2-3-4-5-6-7-8
Hathaway Instrument Div/Hamilton Watch	1-4-7
Heath Co (Benton Harbor)	1
Hewlett-Packard Co	1
Hickok Electrical Instrument Co	1-5
Hogan Labs Inc	2-3-4-7
Honeywell Controls Ltd	2-3-5-7
Hughes Products/Hughes Aircraft Sta	1-2-7-8
Hughes Products Group Hughes Aircraft Co	1-8
Industrial TV Inc	1
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Leeds Co Inc Gerard G	8
Levinthal Electronic Products Inc	3
Magnecord Div/Midwestern Instruments Inc	2-3-4-5-7
Massa Div/Cohu Electronics Inc	2-3-5-7-8
Meditronics Assoc	1-5
Midwestern Instruments	2-3-4-5-7
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Manson Labs Inc	2
Marconi Instruments Ltd	2
Marquardt Aircraft Co/Pomona Div	8
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Minn-Honeywell Regulator Co/Rubicon Instruments	5
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Sangamo Electric Co	1
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Anchor Wire Co	6-12-21-44
Armco Steel Corp	25-43-44
Arnold Eng'g Co	5
Associated Eng'g & Mfg Corp	10-20-33-46-48-50-51-54
Attleboro Refining Co	24-41
Barium & Chemicals Inc	9-29-45
Belmont Smelting & Refining Works	6-7-8-9-10-11-12-13-14-15-16-18-19-20-21-23-28-29-30-31-32-33-34-35-41-42-46-47-48-49-50-51-53-54-55-56-57-58
Beryllium Corp	10-21
Bethlehem Steel Co	44
Bishop & Co Platinum Works J	24-36-39-46
Bow Solder Products Co	7-15-28-49-55
Bram Metallurgical Chemical Div	1-2-5-7-8-9-10-11-12-13-14-15-16-17-18-19-20-21-23-24-27-28-29-30-31-32-33-34-35-36-39-41-42-44-46-48-49-50-51-53-54-55-56-57-58
Bridgeport Brass Co (Bridgeport)	44-47-49-50-52-53-54
Bridgeport Brass Co (Indianapolis)	6-12-13-14-50-52-54
Brooks & Perkins Inc	57-59
Brush Beryllium Corp	10
Brush Beryllium Co/Penrold Div	10-12-13-14-44
Butcher Co L H	12-13-15-24-28-34-35-36-39-41-49-58-56
Canadian Radium & Uranium Corp	37-38-51
Canon-Muskegon Corp	5-34-13-44

PRODUCT MFRS

45—Meas. Equip.; 46—Med. Electronics;
47—Materials

Carborundum Co/Gobar Plant	27
Carborundum Co/Latrobe Plant	27
Carborundum Metals Co/Div Carborundum Co	54
Carpenter Steel Co	44
Central Scientific Co of Canada Ltd	32
Cerro De Pasco Sales Corp	15-21-28-47-53-55-56
Channel Master Corp	6
Chase Brass & Copper Co	6-12-13-14-21-44
Chemical Commerce	56
Chromium Corp of America	18
City Chemical Corp	1-2-4-6-7-8-9-10-11-15-16-17-18-19-20-21-23-24-25-26-29-31-32-33-35-36-39-41-45-46-47-48-49-50-51-52-53-54-55-56-57-58
Columbian Carbon Co/Mapco Iron Oxides Unit	26
Compeco Corp	59
Consolidated Mining & Smelting Co of Canada Ltd/Metal Sls Div	7-15-28-41-42-49-53-55-56
Cooper & Sons Joseph B	24-36-39-41-42
Cross Co H	33-46-50-51-54
Crucible Steel Co of America	5-22-25-30-14-50
Davison Chemical Co	48-52
Division Lead Co	7-8-15-16-28-32-42-47-49-53
Dixon Crucible Co Joseph Drakenfeld & Co B F	4
Driver Co Wilbur B	27-34-35-44
Driver Harris Co	27-30-34-35-44
Du Pont de Nemours & Co E I	50-58
Eagle-Picher Co	15-23-58
Eastern Rolling Mills Inc	6-12-13-14-21
Eastern Smelting & Refining Corp	24-32-36-39-41-42
Eisler Eng'g Co	27-33-34-51
Electrical Specialty Co	2
Englehard Ind Inc/Amer Platinum & Silver Div	24-36-39-41-42
Englehard Industries Inc	24-36-39-41-42
English Electric Valve Co Ltd	23-58
Federated Metal Div/American Smelting & Refining Co (Los Angeles)	6-7-8-12-13-14-15-21-28-30-41-42-47-49-53-55-56-57
Federated Metal Div/American Smelting & Refining Co (Newark)	6-7-8-12-13-14-15-21-23-28-36-37-41-42-47-49-53-55-56-57
Felker Mfg Co	3
Ferroxcube Corp of America	22
Firth Sterling Inc	1-44-54
Flamemaster Chemical Inc	33
Foote Mineral Co	19-26-29-31-35-45-50-54-58
General Ceramics Corp	22
General Chemical Div/Allied Chemical & Dye Corp	7-8-9-15-19-20-21-22-23-26-28-31-35
General Electric Co/Lamp Metals & Components Dept	33-51
Gerrard & Co A J	43
Hamilton Watch Co/Allied Products Div	13-14-20-27-33-34-35-44-51
Handy & Harmon (El Monte) Handy & Harmon (New York)	41-42-24-25-36-39-41-42-56
Harshaw Chemical Co	12-39-40
Hill Co C R	32
Instruments Inc	17-19-38
International Nickel Co	19-34-35
Isolantite Mfg Corp	69
Isotopes Specialties Co	37-39
Johnson Mfg Co	7-15-28-49-53-55
Jones & Laughlin Steel Corp	25-44
Kahl Scientific Instrument Corp	32
Kearfott Co Inc (Clifton)	22
Kelsey-Hayes Co	1-5-6-7-8-11-12-13-17-18-19-20-21-23-25-27-30-36-44-55-56-57
Kennametal Inc	1-20-46-50-51
Kulite Tungsten Co	19-33-35-51
La Pointe Industries Inc	6
Linde Co Div/Union Carbide & Carbon Co	32
Mackay Research Labs	28
Makepeace Div/D E Englehard Industries Inc	24-36-41-42-55
Mallineroth Chemical Works	32-52-58
Mallory & Co Inc P R (Gray St)	10-13-14-21-33-36-41-42-44-46-50-51-54-57
Maykay Inc A D	1-2-4-5-6-7-8-9-10-11-12-13-14-15-16-17-18-19-20-21-23-24-25-26-27-28-29-31-32-33-34-35-36-37-38-39-41-42-44-45-46-47-48-49-50-51-52-53-54-55-56-57
Metal & Thermit Corp	18-49
Miller Dial & Nameplate Co	6

National Carbon Co/Div Union Carbide Corp	2-4
National Moldite Co	22-25-26
National Standard Co	43-44
National U S Radiator Corp	25-26-31-35-58
New Process Metals Inc	48
North American Philips Co	33-51
Norton Co	1
Nuclear Systems Div/Budd Co	19
Ohio Carbon Co	2-4
Pettinos Inc Charles	4
Phelps Dodge Refining Corp	12-13-21
Porter Co Inc/H K Riverside-Alloy Metal Div	10-12-13-14-21-34-35-44
Pyramid Screen Corp	21-35-44
Radium Chemical Co	38
Republic Steel Corp	25-43-44-50
Revere Copper & Brass Inc	6-12-13-14-21-28-49
Reynolds Metals Co	6
Ryerson & Son Joseph T	6-43-44
Santa Barbara Div/Curtiss Wright	22
Sel Rex Corp	15-21-24-35-36-39-41-42
Seymour Mfg Co	12-13-14-21-44
Somers Brass Co	12-13-14-21-27-34-35-44-46
Stackpole Carbon Co	2
St Eloi Corp	1-3-6-7-9-10-11-15-16-17-18-19-20-21-22-23-24-28-29-30-31-32-33-35-36-38-39-41-43-45-46-47-48-50-51-52-53-54-55-57
Steward Mfr Co D M	22
Sylvania Electric Products Inc/Chem & Metallurgical Div	22-23-58
Technic Inc	24-36-39-41
Telegraph Construction & Maintenance Co Ltd/Metals Group	10
Telegraph Construction & Maintenance Co Ltd/Cables Group	10-35
Texas Instruments/Semi-Conductor Components Div	58
Thomas & Skinner Inc	5-58
Titanium Alloy Mfg Div/Nat'l Lead Co	1-54
Titan Metal Mfg Co	12-13
Trancoa Chemical Corp	58
Trans-Sil Corp	58
Tricon Mfg Co	24-36-41-42
Union Carbide Metals Co/Div Union Carbide Corp	16-18-20-30-31-46-50-51-58
United Carbon Products Co	2-4
U S Steel Corp	43-44
Wallingford Steel Co	44
Warren Wire Co	21
Werner Co R D	6-44
Western Gold & Platinum Co	24-32-36-39-41-42
Westinghouse Electric Corp (Pittsburgh)	5-27
Wildberg Bros Smelting & Refining Co	24-32-36-39-41-42
Williams & Co C K	26
Wood Co Alan	25

47-A—MATERIALS, METAL METAL STOCK

Foil	55
Foil, aluminum	86
Foil, lead	87
Foil, tin	88
Porous bearing metal	56
Sheet	57
Spring contact	58
Stampings	59
Thermostatic metal	60

SOLDER

Aluminum	61
Indium	62
Lead-tin	63
Printed circuit	64
Silver	65
Solder Preform	89

TUBING

Aluminum	66
Asbestos	67
Brass	68
Ceramic	69
Copper	70
Glass fibre insulation	71
Glass precision	72
Metal alloy	73
Metal hose, flexible	74
Monel	75

Nickel	76
Paper	77
Phenolic	78
Plastic	79
Silver	80
Steel	81
Steel, stainless	82
Tungsten	83
Varnished or lacquered	84
Woven or knitted wire	85

Accurate Electronics Corp	59
Ace Plastic Co	78-79
Acme Mfg & Gasket Co	59
Acoustica Associates	61
Acro Tool & Die Works	59
Actioncraft Products	71-79
Aeromotive Eng'g Products Ltd	71-79
Allegheny Ludlum Steel Corp	57-59-73-81-82
Allegheny Plastics Inc	19-79
Allied Fabricating Corp	59
All-State Welding Alloys Co	61-65
Alpha Metals Inc	55-57-59-61-62-63-64-65
Alpha Wire Corp	71-79-84-85
Alprodo Inc	81
Aluminum Co of America	55-57-59-61-66-73-86
Amercoat Corp	79
American Aluminum Co	59
American Brass Co	55-57-58-59-66-68-70-73-74
American Lava Co	69
American Metal Climax Inc	63-64-65
American Silver Co	55-57-58-59-60-65-68-70-75-76-80-89
American Smelting & Refining Co/Federated Metals Div	61-62-63-64
Amplex Div/Chrysler Corp	56
Anaconda Co	55-57-58-86
Anchor Metal Co	55-58-61-62-63-64-65-89
Anchor Plastics Co	79
Anchor Wire Co	63
Appleton Co Inc Harry	79
Armco Steel Corp	55-57-81
Associated Eng & Mfg Corp	83
Atlantic Metal Hose Co	74
Auburn Mfg Co	59-67-78
Avon Tube Div/Higbie Mfg Co	81
Babcock & Wilcox Co/Tubular Products Div	73-81-82
Bache & Co Simon	72
Baldwin Products Corp	58-59
Belmont Smelting & Refining Works	55-57-61-62-63-64-65-87-88
Bemis Bros Bag Co	85
Bentley Harris Mfg Co	71-84
Bernard Franklin Co Inc	59-81
Bethlehem Steel Co	57-81
Bishop & Co Platinum Works J	55-57-60-73-75-76-83
Blaco Mfg Co	59
Borden Chemical Co/Resinite Dept	79
Bow Solder Products Co	61-63-64
Brand & Co William	71-79-84
Bram Metallurgical-Chemical Div	55-57-58-59-60-66-68-70-73-75-76-80-82-83-85
Braun Knecht Heimann Co/Glass Eng'g Dept	72
Breeze Corps	74
Bridgeport Brass Co	57-58-59-65-66-68-70-73-74-76-82
Brooks & Perkins Inc	57-59
Brush Beryllium Co/Penrold Div	55-57-58
Brush Beryllium Co	55-57-69
Bud Radio Inc	59
Carpenter Steel Co	82
Centralab Div/Globe Union Inc	69
Cerro De Pasco Sales Corp	62
Chace Co W M	60
Channel Master Corp	66
Chase Brass & Copper Co	57-63-65-66-68-70-73-82
Chemalloy Electronics Corp	61
Chicago Gasket	79
Chromium Corp of America	55
City Chemical Corp	55-57
Cleveland Container Co	77-78
Colonial Alloys Co	57
Columbia Products Co	79
Continental-Diamond Fibre Corp	78-79
Co-Operative Industries Inc	74
Corning Glass Works (Bradford)	72
Cortland Industries	77-78-79
Craft Mfg Co	59
Crane Packing Co	79

Cross Co H	55-57
Crucible Steel Co of America	57-73-75-81-82
Crystal-Westlake Corp	78-79
Demornay-Bonardi Corp	66-68-80
Diamonite Products Mfg Co	69
Dielectric Materials Co	79
Dixon Corp	79
Driver Harris Co	55
Du-Co Ceramics Co	69
Dunton Co M W	63-64
Duramic Products Inc	69
Eastern Rolling Mills Inc	68-70
Eastern Smelting & Refining Corp	65-80
Electrical Refractories Co	69
Electrical Specialty Co	55-61-63-64-65-71-77-78-79-84
Electronics Div/Metal Textile Corp	85
Elzee Metal Products Co	59
E M I Cossor Electronics	79
Emerson & Cuming Inc	79
Emerson Plastics Corp	71-78-79
Enfo Corp	79
Englehard Indus Inc/Amer Platinum & Silver Div	65-89
Englehard Industries Inc	60-65-73-80
Enthoven Solders Ltd	61-62-63-64-65-89
Erie Resistor Corp	69
Eutectic Welding Alloys Corp	61-63-65
Federated Metal Div/American Smelting & Refining Co (Los Angeles)	61-62-63
Federated Metals Div/American Smelting & Refining Co (Newark)	61-62-63-64
Fisher & Porter Co	72
Fisher Co Inc Oscar	82
Fish-Schurman Corp	72
Flexaust Co	66-67-74
Flexonics Corp	74-82
Fluorocarbon Products Inc/Div U S Gasket Co	79
Forbes & Wagner Inc	59
Formica Corp	64-78-79
Frenchtown Porcelain Co	69
Furane Plastics Inc	79
Garlock Packing Co	67-79
General Cement Mfg Co/Div Textron Inc	59-64-66-79-84
General Ceramics Corp	69
General Electric Co	71-77-78-79
General Scientific Equipment Co	79
Geotronic Labs Inc	17
Gibson Electric Co	58
Goodrich Aviation Products/Div B F Goodrich Co	79
Goodrich Industrial Products Co B F	79
Guide Lamp Div	59
Hallett Mfg Co	74
Hamilton Watch Co/Allied Products Div	55
Handy & Harmon (Calif)	65-80
Handy & Harmon (New York)	55-57-59-65-80
Haveg Industries Inc	67-71-78-79
Hi Grade Alloy Corp	61
H & H Machine Co Inc	59
Houghton Labs Inc	79
Hudson Tool & Die Co	59
Hysol Canada Ltd	79
Illumitronic Eng'g Co	78-79
Insulating Fabricators Inc	71-77-78-79
Insulation Mfrs Corp	67-71-77-78-79-84
International Nickel Co	53-73-75-76
Jodee Plastics Inc	78-79
Johns-Manville (New York)	67-71
Johnson Mfg Co	61-62-63-64
Johnston Foil Mfg Co	55-63-86-87-88
Jones & Laughlin Steel Corp	57-73-81
Keasbey & Mattison Co	67
Kelsey-Hayes Co	55-57-58-59-62
Kent Lighting Corp	59
Kester Solder Co	61-62-63-64-65-89
Kivchberger & Co M	69
Kling Metal Spinning & Stamping Co	59
Kulite Tungsten Co	55-57-83
Laminated Sheet Products Corp	71-78-79
La Moree C D	71-79-84
La Pointe Industries Inc	59-64-65-66
Lee Chemical Corp Walter	79
Leetronics Inc	58-59
Lenk Mfg Co	61-62-63-64-65
Lestershire Spool Div/Nat'l Vulcanized Fibre Co	78
London Chemical Co	63-64-65
Luminous Resins Inc	79
Luzerne Rubber Co	79
Mackay Inc A D	55-57-61-62-63-64-65-76-80
Magnetic Metals Co	59
Magnetic Shield Div/Perfection Mica Co	55-57-73
Makepeace Div/Englehard Industries Inc D E	65-66-68-70-76-80

Manostat Corp	72-79
Markel & Sons L Frank	71-79-84
Metal Products Inc/Div Mid West	
Conveyor Co Inc	59
Metpro Inc R I	66-68-70-73-76-81-82
Mica Insulator Co	78
Mica Insulator Div/Minn Mining & Mfg Co	78-79
Mico Instrument Co	63
Midwest Metal Products Inc	59
Miller Dial & Nameplate Co	59
Minn Mining & Mfg Co/	
Irvington Div	71-79-84
Minnesota Mining & Mfg Co	69-78-79-84
Minor Rubber Co	79
Mitronics Inc	69-72
Modern Adhesives & Electronics Inc	55
Morganite Inc	69
Multicores Sales Corp	63-64-65
Multicores Sales Corp/Div	
British Industries Corp	63-64-65
Natl Beryllia Corp (N Bergen)	69-72
National Standard Co	57-59-74-85
Nation Tel Tronics Corp	59-78-79
National Vulcanized Fibre Co (Wilmington)	71-78-79
Natvar Corp	79
Newark Wire Cloth Co	85
Newcomb Spring of Conn	58-59
Newcomb Spring of Conn Inc	58-59
New England Tape Co	79
Newman Corp M M	79
New York Solder Co	63
Niemand Bros Inc	77
Northern Metal Products Corp	57-59-61-63-65
Norton Co	69
NY-Glass Inc	71
Ohio Seamless Tube Div/Copperweld Steel Co	81
Paul FH & Stein Bros Inc	55-66-85-86
Peerless Products Industries	59
Pence Div/Alan Wood Steel Co	59
Penn Fibre & Specialty Co	77-78-79
Perfection Mica Co	55
Permacel	79
Phalo Plastics Corp	79
Phelps Dodge Refining Corp	68-70-73
Phila Scientific Glass Co	72
Pioneer Patents & Products Co	59
Pix Mfg Co	59
Polymer Corp (Santa Ana)	57
Polymer Corp (Reading)	79
Porcelain Products Co	69
Precision Paper Tube Co	71-78-84
Precision Tube Co	66-68-70-73-75-76-81-82
Q-Line Mfg Corp	59-66
Raybestos-Manhattan Inc/Plastic Products Div (Manheim)	67-79
Raybestos-Manhattan Inc (Passaic)	79
Republic Foil & Metal Mills Inc	86
Republic Steel Corp	81-82
Resistoflex	79
Revere Copper & Brass Inc	55-57-59-66-68-70-73-81-86-87-88
Reynolds Metals Co	55-57-59-66
Richard Co	78-79
Richardson Co	78-79
Rigidized Metals Corp	57
Rome Cable Corp	81
Rubber & Asbestos Corp	57-64
Ruby Chemical Co	63
Ryerson & Son Joseph T	57-66-73-79-81-82
Santa Barbara Div/Curtiss Wright	71-79
Schuyler Mfg Corp	85
Scientific Glass Apparatus Co	72
Seymour Mfg Co	57
Shambian & Co W S	79
Solar Mfg Corp	69
Somers Brass Co	55-64
Southern Plastics Co	79
Spaulding Fibre Co	71-78
Spaulding Fibre Co Inc	71-79
Star Porcelain Co	69
St Eloi Corp	55
Steward Mfg Co D M	69
Stone City Products Co	59
Stone Paper Tube Co/Div Stone Straw Corp	67-78-84
Suckle Electronics Co	59
Superior Steatite Ceramic Corp	69
Superior Tube Co (Ohio)	73-75-76-81-82
Superior Tube Co (Penna)	73-75-76-81-82
Suprenant Mfg Co	79
Swift Textile Metallizing & Luminating Corp	86
Sylvania Electric Products Inc/Parts Div (Warren)	59
Sylvania Electric Products Inc/Chem & Metallurgical Div	59

Sylvania Electric Products Inc (Williamsport)	59-83
Synthane Corp	71-78-79
Taffet Radio & TV Co	59
Taylor Fibre Co (La Verne)	71-78
Taylor Fibre Co (Norristown)	71-78
Technical Wire Products Inc	85
Telegraph Construction & Maintenance Co Ltd (Metals Grp)	59-79
Telegraph Construction & Maintenance Co Ltd (Cables Grp)	60
Templet Industries Inc	59
Thermal Refractories Corp	69
Thomas & Sons William	59
Thor Ceramics Inc	69
Titanium Alloy Mfg Div/Natl Lead Co	69
Titeflex Inc	74-79-82-85
Topper Mfg Co	78-79
Transformer Metal Prods Corp	59
Tricon Mfg Co	58-63-65-80
Tri-Ex Tower Corp	81
Uniform Tubes Inc	66-68-70-73-75-76-80-81-82
United Shoe Machinery Corp	59
U S Steel Corp	81-82
U S Stoneware Co/Alite Div	69-79
U S Stoneware Co (Tallmadge)	69-79
Utilities Service Co	59
United Wire & Supply Corp	66-68-70
Varflex Corp	79
Video Industries Co	66
Wallingford Steel Co	55-82
Walco Electronics Mfg Co	64-71-79
Waterbury Cos Inc	59
Werner Co R D	66-82
Western Gold & Platinum Co	55-57-59-62-65-69
Westinghouse Electric Corp/Micarta Div	71-78-79-84
Westlake Plastics Co	78-79
Whitehead Metals Inc	55-57-61-63-65-66-68-70-73-75-76-79-81-82
Wildberg Bros Smelting & Refining Co	55-57-65
Wilnington Fibre Specialty Co	78
Winzler Mfg & Tool Co	59
Wisconsin Porcelain Co	69
Wood Co Alan	57
Wood Steel Co Alan/Penco Div	59
Workman TV Inc	65
Zenith Optical Lab	72
Zenith Plastics Co	79
Zippertubing Co	74-79

48—METERS, AUDIO

Meters, audio	1
Meters, decibel	2
Meters, distortion	3
Meters, frequency	4
Meters, intermodulation	5
Meters, modulation	6
Meters, noise	7
Meters, output	8
Meters, phase angle	9
Meters, recording	10
Meters, sound level	11
Meters, wow & flutter	12

Ad-Yu Electronics Inc	9
Aeromotive Eng'g Products Ltd	1-2
Airpax Electronic Inc/Seminole Div	4-12
Airtron Inc/Div Litton Industries	4
Allison Labs Inc	2
American Machine & Foundry Co/Gen Eng Labs	4
Amplifier Corp of America	12
Anderton Electronic Lab	1-11
Anton Electronic Labs	1-2-6-8-11
Audio Instrument Co	5
Audiovox Inc	1
Aurex Corp	1
Automatic Timing & Controls Inc	10
Bach-Simpson Ltd	1-2-4-11
Barker & Williamson Inc	3-4-5-7
Beede Electrical Instrument Co	1-2
Berzen Labs	9
Biddle Co James G	4
Budelman Radio Corp	4
Burr-Brown Research Corp	1
Burton-Rogers Co	2-11
Canadian Marconi Co	3-4-5-8
Canadian Research Institute	1-2-3-4-7-8-11
Chesapeake Instrument Corp	2-7-11
Clough-Brengle Co	2
Conn Ltd C G	4
Conn Organ Corp	4
Cooper Electronics Inc	8

PRODUCT MFRS

47A—Materials, Metal; 48—Meters, Audio

Daven Co	1-2-3-4-7-8-11-12
Davenport Mfg Co	1-2
DeJur-Amsco Corp/Electronic Sales Div	11
Deltron Inc	9
Demornay-Bonardi Corp	4
Donner Scientific Co	4-12
Eastern Specialty Co	9
Electronic Applications Inc	3-4-12
Elk Electronics Labs Inc	3-4-6
Empire Devices Products Corp	3-6-7
Empire Product Sales Corp	3-5-6
Engineering Associates	4-6-7
Eric Pacific Div/Eric Resistor Corp	4
Erwood Inc	11
Freed Transformer Co	3
Gates Radio Co	2
General Electric Co/Apparatus Sales Div	4-10
General Radio Co	2-3-4-5-6-7-8-11
Hammarlund Mfg Co	4
Heath Co (Benton Harbor)	1-3-5-6-8-11
Hewlett-Packard Co	3-4-7
Hoyt Electrical Instrument Works	2-11
ITT Industrial Products Div	4-6
Jackson Electronics Co	2-4-7-9
Kay Electric Co	1-7-10-11-12
Magnetic Amplifiers Inc	9
Marion Instrument Div	2
Measurements McGraw Edison Inc	5
Mine Safety Appliances Co	1-2-7-11
Minn-Honeywell Regulator Co/Davies Labs Div	12
Motorola Communications & Electronics Inc	1-2
Muirhead & Co Ltd	9
Muirhead Instruments Inc	9
National Coil Co	2-4
Nichols & Clark Inc	1
North Atlantic Industries Inc	9
Northeast Electronics Corp	2-3-11
Northeastern Eng'g Inc	4
Northern Radio Mfg Co Ltd	4
Pace Electrical Instruments Co	2-8-11
Phaotron Instrument & Electronic Co	1-2-11
Precision Apparatus Co	2-8-11
Qualitone Co	1-2-7
Radio Corp of America/Commercial Electronic Products	4-6
Ram Meter Inc	4
Rich Electronics Inc	6
Roller-Smith Inc/Sub Federal Pacific Electric Co	1-2-3-8-9-12
Scott Inc H H	2-7-11
Simpson Electric Co (Chicago)	2-8-11
Solartron Electronic Group Ltd	2-8
S O S Cinema Supply Corp	12
Southwestern Industrial Electronics Co/Div Dresser Industries Inc	6-8
Sticht Co Herman H	4
Stoddard Aircraft Radio Co	7
Taffet Radio & TV Co	1-2-4
Teletro Industries Corp	9-10-12
Teletronics Lab Inc	4
Triplet Electrical Instrument Co	2-4-8-11
Varo Mfg Co	4
Voltron Products	4-6-9
Voron & Co George	1-2
Waeline Inc	1-2-4-7-8-11
Waugh Eng'g Co	4
Waveforms Inc	1
Wayne-Kerr Corp	7
Westinghouse Electric Corp (Pittsburgh)	2-4-9-10
Weston Instruments/Div Daystrom Inc	1-2-4-8-9-10-11
Winder Aircraft Corp of Fla	1-11-12
Winslow Co	4-9
Winston Electronics Inc	1-7

49—METERS, ELECTRICAL MEASUREMENT

Meters, ammeter	1
Meters, capacitance	2
Meters, conductance	3
Meters, d'arsonval	4
Meters, electrometer	5
Meters, flux	6
Meters, frequency	7
Meters, galvanometer	8

Meters, impedance	9
Meters, kilovolt	10
Meters, kilowatt	11
Meters, megohm	12
Meters, microampere	13
Meters, microfarad	14
Meters, microvolt	15
Meters, milliampere	16
Meters, millivolt	17
Meters, multimeter	18
Meters, multiplier	19
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Meters, ohm	21
Meters, output	22
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Meters, power factor	25
Meters, Q	26
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Meters, tension	28
Meters, vacuum tube volt	29
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Amelco Inc	7
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American Machine & Foundry Co	7
Analogue Controls	9-12-21
Anchor Products Co	29
Anton Electronic Labs	1-4-8-10-13-15-16-17-20-22-23-30
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Argonne Electronics Mfg Corp	18-22
Assembly Products Inc	1-4-8-10-11-13-16-17-23-30-31
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Keithley Instruments Inc	1-5-10-12-13-15-16-17-18-21-29-30-34
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Leeds & Northrup Co	4-8-12-15-17-21
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Parker Electronics Co	1-4-16-17-23-30
Peschel Electronics Inc	10
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Sensitive Research Instrument Corp	30
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Simpson Electric Co (Lac du Flambeau)	
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Southwestern Industrial Electronics Co/Div Dresser Industries Inc	1-2-9-12-13-15-16-17-18-19-21-22-29-30-33
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Meters, decibel	3
Meters, distortion	4
Meters, field strength	5
Meters, FM deviation	6
Meters, frequency	7
Meters, grid dip	8
Meters, microwave	9
Meters, noise	10
Meters, output	11
Meters, phase	12
Meters, R-F power	13
Meters, standing wave ratio	14
Meters, wave	15

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Amerac Inc (Beverly)	7
Amtron Co	13
A R F Products Inc (River Forest)	6
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Bach-Simpson Ltd	1-3-5-7-8
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Barker & Williamson Inc	4-7-8-10-11-13-14
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Bassett Inc Rex	7
Beckman Inst Inc/Berkeley Div	7-9
Beede Electrical Instrument Co	1
Bellaire Electronics Inc	5
Bergen Labs	12
Biddle Co James G	7
Bird Electronic Corp	13-14
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Bruno-New York Industries Corp	13
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Budelman Radio Corp	6
Calif Technical Industries/Div Textron Inc	9-14
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Caswell Electronics Corp	9
Chemalloy Electronics Corp	9-13
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Hoffman Electronics Corp	7
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Jerrold Electronics Corp	5
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Kings Electronics Co Inc	13-15
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Lavoie Labs Inc	7
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Radar Measurements Corp	9-13-14-15
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Telectro Industries Corp	5
Telerad Mfg Corp	7-9-11-15
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Meters, cable testing	6
Meters, counting rate	7
Meters, deflection	8
Meters, deviation	9
Meters, dosimeter	10
Meters, elapsed time	11
Meters, electronic micrometer	12
Meters, events-per-unit time	13
Meters, exposure for film	14
Meters, flutter	15
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Meters, goniometer	17
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 32-33-34-35-36-37-38-39-40-41-42
 Wayne-Kerr Corp 3
 Weinschel Eng'g 3-22-34
 Western Int'l Co 34-38-46
 Westinghouse Electric Corp
 (Pittsburgh) 2-11-27-28-34
 Zenith Plastics Co 1-24

Test units, acceleration 13
 Test units, vibration 14
 Transceivers, aviation 15
 Transceivers, lifeboat 16
 Transceivers, infrared 23
 Transceivers, portable 17
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Abalon Precision Mfg Corp 3
 Acromag 6
 Actuator Prods Corp 1
 Adler Electronics Inc 3-6-10-12
 Advanced Technology Labs 8
 Aero Electronics Co 8
 Aerona Mfg Corp 12
 Aerojet General Corp 12
 Aeromotive Eng'g Products Ltd 1-8
 Aeronutronic Systems Inc 12
 Aircom Inc 12
 Aircraft Radio Corp 8-10-15-17-18
 Aircsearch Mfg Co/Arizona Div/
 Garrett Corp 1-10
 Airpax Electronics Inc 6
 Airtron Inc 6
 Allegany Instrument Co 13
 All Products Communication Products 2
 Alto Scientific Co 10
 Amelco Inc 6-10-12-15-16-17-18
 American Electronic Labs Inc 2-12
 American Electronics Inc
 (Los Angeles) 1-10-12-15
 American Electronic Labs 2
 American Electronics Inc/Taller &
 Cooper Div 12
 American Machine & Foundry Co/
 Gen Eng Labs 1-4-5-6-10-13
 American Research & Mfg Co 6-10-14
 American Television & Radio Co 10
 Amp Inc/Capitron Div 10
 Anchor Specialty Mfg Co 13-14
 Andrew Antenna Corp 2
 Anso Div/Gen'l Aniline & Film Corp 1-8
 Applied Science Corp of Princeton 12
 Arenberg Ultrasonic Lab 14
 A R F Products Inc (Ill) 3-8-10-12
 A R F Products Inc (New Mex) 2-3-8-12
 Arizona Telemetering Corp 12
 Arma Div/American Bosch Corp 8
 Arnoux Corp 10-12
 A R & T Electronics Inc 12
 Artisan Electronic Corp 1
 Associated Research Inc 10
 Associated Testing Labs 13-18
 Atlas Precision Products Co 1-8-12
 Atmosphere Control Co 9
 Audio Equipment Co 10
 Audicon Electronics Inc 10
 Authentics Div/North American
 Aviation Inc 8
 Automatic Control Co 12
 Automation Dynamics Corp 12
 Auto Test Inc (Wisc) 6
 Auto Test Inc (Ill) 10
 Avco Mfg Corp/Crosley Div 8-12
 Baird-Atomic Inc 8-10-23
 Barber Coleman Co/Aircraft Controls Div 1
 Barker & Williamson Inc 2-5-6-7-10-11-12
 Beckman Instruments Inc/Systems Div 6
 Beckman Inst Inc/Berkeley Div 6
 Belock Instrument Corp 6
 Bemis Bro Bag Co 9
 Bendix Aviation Corp/Bendix-Pacific Div 12
 Bendix Aviation Corp/Eclipse-Pioneer Div 8
 B & H Instrument Co Inc 6
 B J Electronics/Borg Warner Corp 3-12
 Bogue Electric Mfg Co 10
 Borg Equip Div/Amphenol-Borg
 Electronics Corp 8
 Bowmar Instrument Corp 8
 Brach Mfg Corp/Div General Bronze Corp 2
 Brooks & Perkins Inc 3-4
 Bruno-New York Industries Corp 8
 Bunnell & Co J H 10
 Burton Mfg Co 5
 Canadian Applied Research Ltd 8-10
 Canadian Marconi Co 8-10-15
 Cardinal Instrumentation Corp 12
 Carol Electronics Corp 10
 Carter Motor Co 10
 Centronix Inc 10-12
 CGS Labs Inc 6
 Chatham Electronics Div/Tung-Sol
 Electric Inc 10
 Chesapeake Instrument Corp 14
 Christie Electric Corp 10
 Clark Controller Co (Los Angeles) 5
 Clegg Labs/Div Clegg Inc 10-15-16-17-18
 Cleveland Metal Specialties Co 12
 Collins Radio Co 15-18
 Columbia Research Labs 13-14

55—MILITARY EQUIPMENT

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 Antennas, all wave 2
 Cases, transit 3
 Coders, AOF 19
 Coders, beacon 20
 Coders, R-F 21
 Coders, transponder 22
 Containers, shipping 4
 Control center, portable 5
 Frequency measuring equipment 6
 Fungicide equipment 7
 Navigation equipment 8
 Packaging materials 9
 Power supplies 10
 Scramblers, speech 11
 Telemetering 12

Computing Devices of Canada Ltd	8	Hamilton Standard Electronics Dept	1-10
Condenser Products Div/New Haven		Hamilton Watch Co/Allied Products	
Clock & Watch Co	10	Div	5-8
Conray Corp	4	Haydon Co A W	1-12
Consolidated Electrodynamics		Hazeltine Electronics Div/Hazeltine	
Corp (Pasadena)	12-13-14	Corp	8-10-15-17-18
Convair (San Diego)/Div Gen		Heinz Mueller Eng'g Co	10
Dynamics Corp	6	Hewson Co Inc	10
Cook Co Frank R	10	Hoffman Electronics Corp	1-6-8-10-15-17-18
Corbin Corp	2-8-11-12	Hogan Labs Inc	12
Corrugated Paper Products	9	Homelite Div/Textron Inc	10
Craig Systems Inc	2-3-4-5-8	Honeywell Controls Ltd	1-8-10
Crown Engineering	12	Hoover Electric Co	1-10
Crown Industrial Products Co	7	Hoover Electronics Co	12
Cunningham Son & Co James	1	Hughes Aircraft/Ground Systems Div	2-5
Curtiss-Wright Corp/Electronics Div	10	Hycon Mfg Co	12
Custom Scientific Instruments Inc	13	Industrial Radio Corp	10-17-18
Cutler Metal Products Co	4	Industrial TV Inc	10
Dahlstrom Metallic Door Co	3	Infrared Industries Inc	23
Dalmotor Div/Yuba Consolidated	1	Inertia Switch Inc	13
Data-Control Systems Inc	12	Inland Electronics Corp	8
Davenport Mfg Co	10	Inso Co/Div Barry Controls	14
Dayton Aviation Radio & Equipment		Instrument Corp of Fla	12
Corp	8-10-15-18	Intl Equip Co	13
Defiance Eng'g & Microwave Co	2	Interstate Electronics Corp	12
Del Electronics Corp	10	I-T-E Circuit Breaker Co	2
Designers for Industry	3-10-15-17-18	ITT Federal Division/	
DeVilbus Co Metal Fabricators	4	ITT	8-12-15-18-20-21-22-23
Diamond Antenna & Microwave Corp	2	Jan Hardware Mfg Co Inc	13
Di-An Controls Inc	8	Jordan Electronics Div/Victoreen	6-10
Divco-Wayne Electronics Div/Divco-		Kahn & Co	5-10-13-14
Wayne Corp	6	Kaiser Aircraft & Electronics	
Dolin Metal Products Inc	3	Div/Kaiser Indus	8-10
Dymec Inc	6-12	Kauke & Co	12
Dynamic Electronics Inc	2-3-4-6-8-11-13-	Kay Electric Co	6-14
	14-15-16-17-18	Kearfott Co Inc (Clifton)	1-2-8-17-18
Dynapar Corp	6	Kearfott Co Inc (Calif)	2-8
Dynatronic Inc	8-10-12	Kelsey-Hayes Co	1-2-3-4
D & R Ltd	10	Kleinschmidt/Div Smith Corona	
Dynex Inc	1	Marchant Inc	12
Eastern Industries Inc	1	Koch & Sons H	4
Eastman Kodak Co	23	Kollman Case Corp	3
Eclipse-Pioneer Div/Bendix Aviation		Kollmorgen Optical Corp	8-10
Corp	1-8	Land-Air Inc	14
Eldico Electronics	10-15-16-17	La Pointe Industries Inc	2-8-12
Electric Regulator Corp	10	Lavoie Labs Inc	3-6
Electro Contacts Inc	12	Leach Corp/Inst Div	10
Electro Impulse Lab Inc	6	Lear Inc (Calif)	1-8-12
Electronic Communications Inc	1-8-10-11-18	Lear Inc (Mich)	1-8-15-18
Electronic Measurements Co	10	Leeds Co Inc Gerard G	10
Electronic Specialty Co	2-8	Lel Inc	12-15-16-17
Electronic Production & Development	10	Leland Airborne Products	10
Electronics Development Co	12	Lewyt Mfg Corp	6-8-10-12-15-16-17-18
Electronics Eng Co of Calif	12	Librascope Inc (Glendale)	8
Elsin Electronics Corp	10-12	Lindsay Structure/Div Intl Steel Co	4
Elzee Metal Products Co	3-4	Ling Systems Inc	12-14
Emerson Electric	2-10-12	Linlar Inc	10
E M I Cossor Electronics	6-17	Litton Industries of Maryland	2-8-10-12-20
Empire Devices Products Corp	10	Loral Electronics Corp	6-8
Engineering Associates	6-12	Lyndon Aircraft Inc	1
Epsco Inc	6-12	Magnasync Mfg Co	13
Erie Resistor Corp	6	Magnetic Research Corp	10-12
Fairchild Astrionics Div/Fairchild		Magnavox Co Research Labs (Calif)	12
Engine & Airplane Corp	4-12	Magnavox Corp	8-10-15-17-18
Fairchild Controls Corp	1	Magnetic Amplifiers Inc	8-10
Falstrom Co	3-4	Maico Electronics Inc	20-22
Federal Mfg & Eng'g Corp	1-10	Marquardt Aircraft Co/	
Federal Shockmount Corp/Div		Pomona Div	6-8-10-20-22
Korfund Co	3-4	Martin-Merrill Inc	10-13
Ford Instrument Co/Div Sperry		Maxson Corp W L	2-8-10
Rand Corp	8	MB Mfg Co/Div Textron Inc	14
General Electric Co/Low Voltage		Merz Engineering Inc	13
Switchgear Dept	10	Meterlog Corp/Sub Air Logistics Corp	10
Gabriel Electronics Div/Gabriel Co	2	Microwave Associates Inc	6
Garrett Corp/Airesearch Mfg Co Div	1-10	Microwave Eng'g Labs Inc	6
General Railway Signal Co	12	Millen Mfg Co James	6
Gates Electronic Co	10-13-14	Minn-Honeywell Regulator Co/	
Gates Radio Co	3-4-8-10	Aeronautical Div	1-8
General Communication Co	5-6-8-10-12-20-21-22	Minn-Honeywell Regulator Co/Mil	
General Controls Co (Glendale)	1	Prod Corp/Aeronautical &	
General Devices Inc	10-12-19-21	Ordnance Div	1-8-10
General Electric Co (Va)	18	Missileonics Inc	6-8-10-12
General Electric Co/Apparatus Sales		Model Eng'g & Mfg Co Inc	10-15-16-17-18
Div	12	Molded Insulation Co	3
General Electric Co/Light Military		Moran Instrument Corp	10
Electronics Dept	1-8-15-17	Mullard Equipment Ltd	15
General-Electro Mechanical Corp	1	Navigation Computer Corp	6
General Precision Lab Inc (Calif)	8	New London Instrument Co Inc	12
General Precision Lab Inc (Pleasantville)	8	NJE Corp	10
Genisco Inc	13-14	Norden Div/United Aircraft Corp	8
Georator Corp	10	North Electric Co	12
Geotechnical Corp	12-13-14	Northeastern Eng'g Inc	6-19
Globe Industries Inc	1	Northrop Aircraft Inc/Nortronics Div	4-5-8
Goodrich Sponge Products B F/Div		Nyt Electronics Inc	10
B F Goodrich Co	9	Olympic Plastics Co	3
Gordon Enterprises	3-4-8	Olympic Radio & TV	8
Gray Mfg Co	1-6-20-21-26	Opad Electric Co	10
Green Rectifier Co	10	Orbitran Co Inc	20
Gulton Industries Inc	2-10-12-13-14	Packard Bell Electronics Corp	8-10-12
Hallamore Electronics Co	12-20-22	Parameters Inc	1
Haller Raymond & Brown	2-8	Parsons Co Ralph M/Elect-Ronics Div	12

Patterson Moos Div/Universal		Winding Co	1-10-13-14
Peerless Products Industries	2	Permoflux Products Co	10
Peschel Electronics Inc	10	Pescho Electronics Inc	10
Pesco Products Div/Borg Warner Corp	1-10	Philamon Labs Inc	10
Philbrick Researches Inc George A	10	Philco Corp	1-2-3-4-5-6-8-10-12-15-17-18
Philco Corp		G & I Div	15-16-17-18-19-20-21-22
Plastic Capacitors Inc	10	Polarad Electronics Corp	6-8-12
Polytronic Research Inc	2-10	Power Supplies Inc	10
Premax Products/Div Chisholm-Ryder Co	2	Premco Inc	15
Pye Telecommunications Ltd	8-12-16-17-18	Radiation Eng'g Labs	2
Radio City Products Co	6-8-15-17-18	Radio Corp of America/West Coast	
Missile & Surface	9	Radio Receptor Co Inc	2-8-12-15-17-18-19-20-22
Ram Meter Inc	10	Rank Cintel Ltd	6-12
Rauland-Borg Corp	10-15-18	Raytheon Co	8
Rea Co J B/Electronics Division	8-10-12	Reed & Reese-Retron Corp	1-10
Reeves Instrument Corp	2	Reflectone Corp	10-11
Rheem Mfg Co/Electronics Div	12	Rich Electronics Inc	18
Robinson Technical Products Inc	3-4	Sanders Associates	8
Santa Barbara Div/Curtiss Wright	10-12	Schauer Mfg Corp	10
Scientific-Atlanta Inc	2	Seiscor Mfg Co/Div Seismograph	
Service Corp	8	Sequoia Wire & Cable Co/Div Mandrel	
Industries	10-12	Servo Corp of America	8-12
Servomechanisms Inc	8	Servo-Tek Products Co	1
Sierra Electronic Corp	12	Skiastron Electronics & TV Corp	8-10-11-12
Southwestern Industrial Electronics Co/		Div Dresser Indus Inc	10-11-14
Spectra Electronics Corp	12	Spectralab Inst Co	12
Sperry Farragut Co/Div Sperry		Rand Corp	8-12
Sperry Microwave Electronics Co/		Div Sperry Rand	6
Spivey Inc James S	10-12-15	Springer Aircraft Radio Corp	15-18
Standard Electronics/Div Radio		Eng'g Labs	10
Stanley Aviation Corp	10	Statham Instruments Inc	10-13-14
Stavid Eng'g Inc	2-12-15	Stoddart Aircraft Radio Co	3-6-12
Stratocor Corp/Geophysical Services Div	12	Stromberg-Carlson/Div General	
Dynamics (Carlson Rd)	8-11-15	Dynamics (N Goodman St)	2-6-8-10-11-12-15-16-17-18
Sullivan Ltd H W	6	Superior Electric Co	10
Syston Corp	6	Szekely Eng & Mfg Inc	1-5-8
Taffet Radio & TV Co	2-3-6	Taller & Cooper	12
TA Mfg Corp	3	Ta-Mar Inc	2
Tapco Group/Thompson Ramo		Wooldridge Inc	1
Technical Apparatus Builders	10	Technical Appliance Corp	2
Technical Material Corp	2-3-6-12	Technical Oil Tool Corp	1-2-10
Telectro Industries Corp	3-5-6-7-8-10-12-15-16-17-18	Telemetering Corp of America	12
Telephone Corp	15-17-18	Telerad Mfg Corp	6-10-12
Temco Aircraft Corp	2-8-12	Thermador Electrical Mfg Co	10
Topp Industries Inc	10-15-18	Torwico Electronics Inc	10
Trans Electronics Inc	10		

Transonic Inc	1-10	A R F Products Inc (Ranton)	2-7-11-13	Empire Devices Products Corp	2
Trans-Sil Corp	10	Arizona Telemetering Corp	7	Epsco Inc	4-5-7
Transval Electronics Corp	10	Arma Div/American Bosch Corp	3-5-6-9-10-13	Ereo Radio Labs Inc	2
TV Utilities Corp	10	Armour Research Foundation	7-11-12-14	Fairchild Astrionics/Fairchild Engine & Airplane Corp	13
Ultradyn Inc	12	Arnoux Corp	1-4-7	Federal Mfg & Eng'g Corp	11-12
United Aircraft Products Inc	1-3	A R & T Electronics Inc	7	Feedback Controls Inc	6-8-9-11
United Control Corp	1	Atlas Precision Products Co	2-3-6-7-8-9-10-11-14	Feiler Eng'g & Mfg Co	1-2
United Electrodynamic	12	Audicon Electronics Inc	2	Fischer & Porter Co	4-5
United Mfg Co/Div Maxson Corp W L	10	Audio Equipment Co	2	Flight Research Inc	4
Universal Transistor Products Corp	10	Auerbach Electronics Corp	4-5-7-8-11	Ford Instrument Co/Div Sperry Rand Corp	6-7-8-9-13-14
Univox Corp (Calif)	8	Automatic Control Co	1-7	G S Electronics Corp	13-14
Univox Corp (New York)	8	Automation Dynamics Corp	7	Gaertner Scientific Corp	5
U S Testing Co	2	Avco Mfg Corp/Crosley Div	2-6-7-8-11-13-14	Gai-Tronics Corp	1-2
Utilities Service Co	2	Avion Div/ACF Industries Inc	3-10-14	Garrett Corp/Airesearch Mfg Co Div	5-6
Varo Mfg Co	6-10	Baird-Atomic Inc	4-10-12-13-14	Gates Radio Co	2-4-8
Vickers Inc/Electric Products Div	10	Ballamore Electronics Co	2-4-5-8	General Communication Co	3-7-14
Video Instruments Co Inc	10	Barker & Williamson Inc	2-3	General Controls Co (Glendale)	5-6-8
Virginia Electronics Co	8-10-17	Basic Controls Inc	1-3-10-13	General Devices Inc	2-4-5-7
Voltron Products	6	Bausch & Lomb Optical Co	10-13	General Electric Co/Apparatus Sales Div	7
Waeline Inc	6	Beckman Instruments Inc/Systems Div	4-5-7	General Electric Co/MSVD	3-10
Waldorf Electronics/Div F C Huyck & Sons	8-10	Beckman Inst Inc/Scientific & Process Inst Div	1-4-5	General Electric Co/Communication Products Dept	1-2-7
Waltham Electronics	12	Belock Instrument Corp	4-5-6-9	General Electric Co/Computer Dept	4-5
Warren Mfg Co	12	Bendix Aviation Corp/Bendix-Pacific Div	1-4-5-7-11-14	General Electric Co/DSD	8-9
Waugh Eng'g Co	6	Bendix Aviation Co	4-5	General Electric Co/Light Military Electronics Dept	2-3-4-5-6-8-9-10-11-13-14
Webeor Inc	20	Bendix Aviation Corp/Eclipse-Pioneer Div	8-9-11	General Electric Co/Technical Products Dept	2
Western Gear Corp/Electro Products Div	1-10	Benson-Lehner Corp	4-5	General Electric Co/LMED	3
Westinghouse Electric Co/Air Arm Div	1-23	B J Electronics/Borg-Warner Corp	4-5-7	General Instrument Corp	2
Westinghouse Electric Corp (Pittsburgh)	8-10	Bliss Electronic Corp	2	General Kinetics Inc	2-4
Westrex Corp	11	Bogue Electric Mfg Co	6-8	General Mills Inc/Mechanical Div	3-6-7-8-9-10-11-12-13-14
White Dental Mfg Co/S S Industrial Div	1	Bomac Labs Inc	14	General Precision Lab Inc	4-9-10-11-12
Wiancko Eng'g Co	12	Bosch Inc M Ten	9	General Railway Signal Co	7
Wickes Eng'g & Construction Co	5-10	Briggs Associates	1-4-5-7-12	Geotechnical Corp	4-5-7
Wincharger Corp	10	Brooks & Perkins Inc	6-13	Giannini & Co G M	4-5-6-7-8
Winder Aircraft Corp of Fla	2-3-10	Burroughs Corp (Detroit)	5-6-8	Gordon Enterprises	3-4-5-6
Winslow Co	6	Cable Electric Products	6	Gray Mfg Co	2-6-13-14
Zero Mfg Co	3-4	Calif Technical Industries/Div Tectron Inc	2-6-10-11-13-14	Gulton Industries Inc	2-4-5-7-8-10-11-12-14
Z & W Mfg Corp	2	Cameraflex Corp	4	Haller Raymond & Brown	2-3-4-5-6-7-8-10-11-13-14

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Alarm systems	1
Communications	2
Counter measures	3
Data recording systems	4
Data reduction systems	5
Fire control	6
Infra Red	13
Radar	14
Telemetering	7

GUIDANCE CONTROL SYSTEMS

Command control, navigation	8
Inertial navigation	9
Infra-red, navigation	10
Radar beam navigation	11
Stellar navigation	12

Adler Electronics Inc	2-7	Camerascope Corp	4	Hamilton Standard Electronics Dept	6-8
Advanced Technology Laboratories	10-13	Canadian Applied Research Ltd	13	Hammerlund Mfg Co	1-2-7
Aero Electronics Co	1-3-6-7-13	Canoga Div/Underwood Corp	6-11	Hanson-Gorrill Brian	4
Aerojet-General Corp (Azusa)	6-13	Cardinal Instrumentation Corp	1-7	Harvey-Wells Electronics Inc	5
Aerojet-General Corp (Frederick)	3-7	Cedar Eng'g/Div Control Data Corp	4	Hazeltine Electronics Div/Hazeltine Corp	2-6-7-8-11-13-14
Aeromotive Eng'g Products Ltd	1-4-5-8-9-11-12	Centronix Inc	1-2-4-5-7-8-11	Hewson Co Inc	1
Aeronca Mfg Corp	4-5-7-14	CGS Laboratories Inc	2-3	Hoffman Electronics Corp	2-3-6-8-10-11-13-14
Aeronutronic Systems Inc	2-4-5-6-7-8-10-13-14	Clegg Laboratories/Div Clegg Inc	2-3	Hogan Labs Inc	2-3-4-7
Aircrom Inc	7	Collins Radio Co	2-8-12	Honeywell Controls Ltd	6-8-9-10-14
Aircraft Armaments Inc	3-4-7	Colorado Research Corp	2-5	Hoover Electronics Co	5-7
Airesearch Mfg Co/Arizona Div/Garrett Corp	6	Computer Control Co Inc	4-5	Hughes Aircraft Co-Ground Systems Div	2-7-14
Airtronics Int'l	4	Computer Control Co	5	Hughes Aircraft Co/El Segundo	6-8-13
Airtronics Inc	4-5	Computing Devices of Canada Ltd	2-4-5-7	Hughes Aircraft Co/Electronics Mfg Div	6-8-11-14
All Products Communication Products	2	Consolidated Electrodynamic Corp (Pasadena)	4-5-7	Hycon Mfg Co	2-3-7-14
Alto Scientific Co	1-2-7	Consolidated Productions Inc	26	Hycon Eastern Inc	2-4-5
Amelco Inc	2-3-4-7-8	Control Data Corp	4-5-8-9	Inertia Switch Inc	9
American Electronics Inc/Taller & Cooper Div	1-4-5-7	Convair (Pomona)/Div Gen Dynamics Corp	7-11-13	Inland Electronics Corp	1
American Electronic Labs Inc	1-2-3-7	Convair (San Diego)/Div Gen Dynamics Corp	4-5-6-8-11-13-14	Instrument Corp of Fla	2-5-7-13
American Electronic Labs	1-2-3	Corbin Corp	2-3-6-7-8-9-10-11-13-14	Instrument Development Labs Inc	9
American Electronics Inc	4-5-7	Craig Systems Inc	2-6-8	Instruments for Industry	2-3
American Machine & Foundry Co/Gen Eng'g Labs	3-7-13	Cunningham Son & Co James	4-5	Interstate Electronics Corp	1-2-3-4-5-7-13
American Research & Mfg Co	1	Deco Instrument Co	6	Ireo Corp	14
Anadex Instruments Inc	4-5	Dale Products Inc	7	Itak Corp	4
Analogue Controls Inc	8-9-10-11-12	Data-Control Systems Inc	7	I-T-E Circuit Breaker Co	13
Andromeda Inc	4-5	Datex Corp	4-5	ITT Federal Div/International Telephone Telegraph Corp	2-3-4-7-13
Anso Div/Gen'l Amline & Film Corp	4	Daystrom Instrument	3-4-5-6-8	ITT Laboratories/Div ITT	1-2-3-4-5-6-7-8-9-10-11-12-13-14
Applied Science Corp of Princeton	4-5-7	Daystrom Pacific	6-8-9	Kaiser Aircraft & Electronics/Div Kaiser Industries Corp-Toledo Electronics Plant	14
A R F Products Inc (River Forest)	2-7	Dayton Aviation Radio & Equipment Corp	2-3	Kaiser Aircraft & Electronics Div (Oakland)	2-4-13
		Daytronic Corp	4	Kauke & Co	4-7
		Designers for Industry	2-3-4-5-8-9-11-13	Kearfott Co Inc (Clifton)	4-5-6-8-9-10-12-14
		Di-An Controls Inc	4-5	Kearfott Co. Inc (Pasadena)	9
		Digitronics Corp	4-5	Kintel	4-5
		Donner Scientific Co	9	Kirkland Co H R	1
		Du Mont Laboratories Inc		Kleinschmidt/Div Smith Corona Marchant Inc	2-7
		Allen B	1-2-3-5-6-7-11	Land-Air Inc	2-3-4-5-7
		Dymec Inc	4-7	La Pointe Industries Inc	9-11-12
		Dynamic Electronics Inc	2-3-4-5-6-8-11-13-14	Las-Lab Inc	14
		Dynatronic Inc	4-5-7	Lavoie Labs Inc	2-8-14
		Eastman Kodak Co	10-13	Leach Corp/Inlet Div	1-4
		Eclipse-Pioneer Div	8-9-11	Lear Inc (Santa Monica)	2-7-8
		Edison Industries Thomas A Instrument Div/McGraw-Edison Co	1	Lear Inc (Grand Rapids)	6-8-9
		Edmund Scientific Co	6-13	Lel Inc	7
		Eldico Electronics	2	Lenkurt Electric Co	2
		Electro Instrument Inc	4-5	Lewyt Mfg Corp	2-3-4-5-6-7-8-10-13-14
		Electronic Communications Inc	2-3-4-13-14	Librascope Inc (Glendale)	1-3-4-5-6-8-9-10-11-12-13-14
		Electronic Specialty Co	1-2-3-4-6-11		
		Electronic Systems Development Corp	3-4-5-8-9		
		Electronics Corp	6		
		Electronics Corp of America	1-6-10-14		
		Electronics Eng Co of Calif	4-5-7		
		Ellison Draft Gage Co	1		
		Emerson Electric	3-4-5-6-7-9-10-11-13-14		
		E M I Cossor Electronics	1-2-3-4-11-13-14		

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Ling Systems Inc	2-7
Link Aviation Inc	4-5
Litton Industries of Calif	7-9
Litton Industries of Md	2-3-7-14
Loral Electronics Corp	2-9-13
Magnavox Corp	2-4-5-6-7-8-11-13
Magnavox Corp/Research Labs	4-5
Magnetic Amplifiers Inc	6-8
Magnetic Instrument Co Inc	4
Magnetic Research Corp	1-7
Maico Electronics Inc	2-4-5-7
Manson Laboratories Inc	2
Marquardt Aircraft Co/Pomona Div	4-5
Mast Development Co Inc	4-5-6
Maxson Corp W L	3-6-8-11-14
Melpar Inc	1-2-4-5-8
Microwave Eng'g Labs Inc	3-11-13-14
Microwave Service Inc	1-2-3-4-5-6-7-13-14
Mid-Continent Mfg Co	4
Midwestern Instruments	4-5
Milgo Electronic Corp	4-5-6
Minn-Honeywell Regulator Co/Davies Lab Div	4-5
Minn-Honeywell Boston Div	6-9
Minn-Honeywell Regulator Co/Mil Prod Gp/Aeronautical & Ordnance Div	2-6-8-9-10-14
Minn-Honeywell Regulator Co/Aeronautical Div	6-8-9-10-13-14
Miskella Infra-Red Co	14
Missileonics Inc	2-5-7-13
Missouri Research Labs Inc	1-6
Moran Instrument Corp	4
Motorola Inc	2
Mullard Equipment Ltd	2
Nat'l Co Inc	2-7
National Radio Co	2
Nat'l Scientific Labs Inc	2-3
Non-Linear Systems Inc	4-5
Norden Div/United Aircraft Corp	4-5-6-8-9-10-13-14
North Electric Co	2
Northrop Aircraft Inc/Northrop Div	1-3-4-5-6-8-9-10-12-13
Nuclear Products-Ereco/Div ACF Industries	3
Olympic Radio & TV	2-3-4-5-14
Optron Corp	8-10-12
Orbitran Co Inc	4
Otis Elevator Co/Electronic Div	13
Packard Bell Electronics Corp	1-2-3-4-5-6-7-9-10-11-12-13
Par Products Corp	4
Parsons Co Ralph M Elect-Ronics Div	4-5-7
Patterson Moos Div/Universal Winding Co	1-2-3-6-7-10-14
Perkins-Elmer Corp	6-10-13
Phila Scientific Glass Co	1
Philco Corp	2-3-4-6-7-9-10-11-12-13-14
Philco Corp/G & I Div	1-2-3-4-5-6-7-8-9-10-11-12-13-14
Photobell Co	1-3-6-14
Piezo Products Co	1
Polarad Electronics Corp	2-3-4-5-7-8-10-13-14
Potter Instrument Co	4-5
Pye Telecommunications Ltd	2-7
Pyramid Screen Corp	10-13
Q O S Corp	10-13
Radio City Products Co	1-2-3-6-13
Radio Eng'g Labs	2
Radioplane Div/Northrop Aircraft Inc	11
Radio Eng'g Products	2
Radio Receptor Co Inc	2-3-7-14
Rauland-Borg Corp	2
Raytheon Co/Missile Systems Div	14
Raytheon Co (Waltham)	13
Rea Co J B/Electronics Div	4-5-7
Reeves Instrument Corp	6-7-9-11-13
Reflectone Corp	3
Republic Aviation	3-7
Resdel Eng'g Corp	2-7-14
Rheem Mfg Co/Electronics Div	2-3-7
Rixon Electronics Inc	2
Sanders Associates	3-6-13
Santa Barbara Div/Curtiss Wright	4-7-8-9
Scatter-Communications Inc	2
Seaboard Electric Products Corp	1-3-6
Sesquia Wire & Cable Co/Div Mandrel Industries	7
Servo Corp of America	10-13
Servomechanisms Inc	4-6-8-9-10-11-14
Short Brothers & Harland Ltd	8-11
Sierra Electronic Corp	7
Skiatron Electronics & T V Corp	1-2-3-4-5-6-7-8-10-11-13-14
Solartron Electronic Group Ltd	5
Southwestern Industrial Electronics Co	4
Specialty Eng'g & Electronics Co	2-7
Spectra Electronics Corp	1-2-3-6-7-10-14

Sperry Farragut Co/Div Sperry Rand Corp	6-8-9-11
Sperry Gyroscope Co/Sunnyvale Dev Center	6-9-14
Sperry Gyroscope Co/Surface Armament Div	6-9-11-13-14
Sperry Gyroscope Co/Air Arm Div	2-3-6-9-10-11-12-13-14
Spivey Inc James S	7
Stainless Inc	7
Standard Electronics/Div Radio Eng'g Labs	2
Stanley Aviation Corp	1
Statham Instruments Inc	7
Stavid Eng'g Inc	3-6-7-8-11-13
Stratocor Corp/Geophysical Services Div	7
Stromberg-Carlson Company/Div Gen'l Dynamics (San Diego)	4
Stromberg-Carlson/Div Gen'l Dynamics (Goodman St)	2-4
Stromberg-Carlson/Div Gen'l Dynamics (Carlson Rd)	2-3-4-5-8-13-14
Syston Corp	1-4-5-7
Taag Designs Inc	7
Taller & Cooper	1-4-5-6-7
Ta-Mar Inc	2-3-7-14
Tapco Group/Thompson Ramo Wooldridge Inc	3-14
Tarc Electronics Inc	2
Technical Materiel Corp	2-7-8
Technical Oil Tool Corp	3-6-7-8-9-11-13
Telechrome Mfg Corp	7
Telemetering Corp	2-3-5-11-13
Teletro Industries Corp	1-2-3-4-6-7-8-11-13
Telemeter Magnetics Inc	5
Telemetering Corp of America	7
Telephonics Corp	2-3-14
Telerad Mfg Corp	8-11
Temco Aircraft Corp	3-4-7-8-9-10-11-14
Temco Aircraft Corp/Greenville Plant	2-4
Textran Corp	3-11
Times Facsimile Corp	4
Top Industries Inc	1-2-6
TV Utilities Corp	2
Ultradyn Inc	7
United Electric Controls Co	1
United Electrodynamics	4-7
U S Time Corp (New York)	9
U S Time Corp (Palos Verdes Estates)	9
Univox Corp	2-8-10-13
Vickers Inc/Electric Products Div	6
Victor Adding Machine Co	4-5
Virginia Electronic Co	2
Voron & Co George	1-2
Waldorf Electronics/Div F C Huyek & Sons	4-5-6-8-9-10-11-12
Warwick Mfg Corp	4-5
Webeor Inc	2-3-4-11-13-14
Wells-Gardiner & Co	2
Westinghouse Electric Co/Div Air Arm	3-4-5-6-8-10-11-12-13-14
Westinghouse Electric Corp (Pittsburgh)	1-2-3-4-6-10-11-13-14
Westrex Corp	2-4-7
Westronics Inc	1-4
Wiancko Eng'g Co	4-7
Wickes Eng'g & Construction Co	2
Wind Turbine Co	2
Winder Aircraft Corp of Fla	2-4-5-7-8-11-14

57—MISSILES

Coders, AOF	12
Coders, beacon	13
Coders, R-F	14
Coders, transponder	15
Frequency controls	1
Frequency regulators	2
Fuses, electronic	3
Ground check-out equipment	4
Ground handling equipment	5
Guidance equipment	6
Gyros	7
Inverters, missile	16
Power supplies	8
Seals	9
Telemetry	10
Telescopes, radio	17
Tracking systems	18
Transponders	11

Adler Electronics Inc	1-2-4-8
Advanced Technology Laboratories	6
Aero Electronics Co	3
Aeroflex Labs	7
Aerojet-General Corp/(Azusa)	1-2-4-5-6-8-16
Aerojet General Corp (Frederick)	10
Aeromotive Engineering Products Ltd	4-5-8-16
Aeronca Mfg Corp	4-5-10
Aeronutronic Systems Inc	6-10
Aircrom Inc (Winthrop)	10
Aircraft Armaments Inc	4-5
Airesearch Mfg Co/Airzone Div/Garrett Corp	5-8
Airpax Electronics Inc/Seminole Div	1-2
Airtron Inc/Div Litton Industries	6
Allegany Instrument Co	4
All Products Communication Products	18
Alto Scientific Co	4-8-16
Amelco Inc	4-8-16
American Electronics Inc	2-4-5-7-8-16
American Electronics Inc/Taller & Cooper Div	16
American Machine & Foundry Co/Gen Eng Labs	4-5-10-18
American Measurement & Control Inc	6-8
American Research & Mfg Co	4-5-8
American Television & Radio Co	8-16
American Time Products Inc	1-2-8
Anadex Instruments Inc	1-14
Analogue Controls	4-6
Andrew Calif Corp	10
Andrew Corp	10
Anton Electronic Labs	9
Applied Science Corp of Princeton	16
A R F Products Inc (River Forest)	4-8-10-11
A R F Products Inc (Ranton)	10
Arizona Telemetering Corp	10
Arma Div/American Bosch Corp	4-6-7
Arnoux Corp	8-10
A R T Electronics Inc	3-10
Associated Research Inc	8
Atlas Precision Products Co	4-5-6-16-18
Auerbach Electronics Corp	4-6-10
Autoatics Div/North American Aviation Inc	4-6-7
Automation Dynamics Corp	10
Avco Mfg Corp/Crosley Div.	3-10-11
Avion Div/ACF Industries Inc	6-11
Axler Associates Inc	8
Baird-Atomic Inc	6-18
Baldwin-Lima-Hamilton Corp/Electronics & Instrumentation Div	4-5
Barrett Electronics Corp	6
Beckman Instruments Inc/Systems Div	4-10-18
Beckman Inst Inc/Berkeley Div	4
Beckman & Whitley	16
Belock Instrument Corp	6-7
Bendix Aviation Corp/Bendix-Pacific Div	6-10-11-16
Bendix Aviation Corp/Bendix Radio Div	6
Bendix Aviation Corp/Red Bank Div	1-2-4-8-16
Bendix Aviation Corp/Eclipse-Pioneer Div	4-6-7
Bendix Products Div/Missiles	1-2-3-4-5-6-7-8-9-10-11
Berneco Eng'g Corp	4
B & H Instrument Co Inc	4
B J Electronics/Borg-Warner Corp	4-5
Blaw-Knox Co/Blaw-Knox Equip Div	17-18
Bogue Electric Mfg Co	1-2-4-5-8
Bone Eng'g Corp	4-5-8
Bosch Inc M Ten	7
Bowmar Instrument Corp	6
Briggs Associates	6-10
Brooks & Perkins Inc	5
Bulova Watch Co/Electronics Div	1-2
Burroughs Corp (Detroit)	4-6
Burton Mfg Co	6
Cable Electric Products	3-8
Calbest Electronics Co	4-5
Calif Technical Industries/Div Textron Inc	4
Canoga Div/Underwood Corp	11-13-18
Cardinal Instrumentation Corp	10
Cedar Eng'g/Div Control Data Corp	7
Centronix Inc	4-6-8-10
Chatham Electronics Div/Tung-Sol Electric Inc	8
Christie Electric Corp	4-8
Cleveland Metal Specialties Co	3-16
Communication Accessories Co	2-6-8
Computer Eng'g Associates Inc	8

Condenser Products Div/New Haven		Greer Hydraulics Inc	4-5-8	Nuclear Products-Erco/Div ACF	
Clock & Watch Co	8	Gulton Industries Inc	6-8-10	Industries	4-5
Conray Corp	5	Hallamore Electronics Co	1-2-4-10-11-15-16-18	Nyt Electronics Inc	8
Consolidated Diesel Electric Corp	4-5-8	Haller Raymond & Brown	4-6-10	Ohio Carbon Co	9
Consolidated Electrodynamics		Hamilton Standard Electronics		Opad Electric Co	8
Corp (Pasadena)	4-10	Dept	1-2-4-5-6-8	Opto Engineering Co/Div Remanco Inc	4-11
Control Data Corp	6-7	Hanson-Gorrill Brian	4	Orbitran Co Inc	13
Convair (Pomona)/Div Gen'l Dynamics		Hazeltine Electronics Div/Hazeltine		Otis Elevator Co/Electronic Div	4-5-6-8-10
Corp	4-5-6	Corp	3-4-5-6-10-11-18	Pacific Scientific Co	6-7
Convair (San Diego)/Div Gen Dynamics		Highside Chemicals Inc	9	Pacific Technical Co	4
Corp	4-5-11-18	Hill Electronics Inc	1	Packard Bell Electronics Corp	4-5-6-8-10-11
Cook Co Frank R	8	Hoffman Electronics Corp	4-5-6-7-8	Parsons Co Ralph M Elect-onics Div	4-10-11
Corbin Corp	6	Hogan Labs Inc	10	Patterson Moos Div/Universal Winding	
Craig Systems Inc	4-5	Holland Electronics	1-2-8	Co	3-4
Crescent Eng'g & Research Co	4-5-6-8-10	Honeywell Controls Ltd	4-5-6-7-8	Peebles Bruce & Co Ltd	11
Curtiss-Wright Corp/Electronics Div	8	Hoover Electric Co (Los Angeles)	5-6	Perkin-Elmer Corp	6
Daco Instrument Co	4-6-7-18	Hoover Electronics Co	4-10-11	Perkin Eng'g Corp	4-8
Dale Products Inc	5-10	Houston Fearless Corp	5	Permotux Products Co	7
Data-Control Systems Inc	10	Hughes Aircraft Co	4-5-6	Peschel Electronics Inc	8
Datex Corp	4	Hycan Mfg Co	4	Pesco Products Div/Borg-Warner Corp	8-16
Davenport Mfg Co	8	Inertia Switch Inc	6	Phila Scientific Glass Co	9
Daystrom Instrument	4-5-6	Interstate Electronics Corp	4-10-11	Philco Corp/G & I Div	1-2-3-4-5-6-7-8-16-18
Daystrom Pacific	4-7	Instrument Development Labs Inc	10	Philco Corp	3-4-6
Designers for Industry	1-2-4-5-6-8-10-11	ITT Federal Div/ITT	4-5-6-10-11-13-15-18	Photographic Analysis Inc	4-6-18
Di-An Controls Inc	4	ITT Industrial Products Div	4-5-8	Plastic Capacitors Inc	8
Dit-MCO Inc/Electronics Div	4	Jackson Electronics Co	1-3-8	Polarad Electronics Corp	1-4-5-6-10-11
Donner Scientific Co	6-7	Joelin Mfg Co	9	Power Supplies Inc	2-4-8-16
Dynamic Electronics Inc	1-5-8	Jordan Electronics/Div Victoreen	1-2-4-8-16	Producers Sales Corp	6
Dynatron Inc	6-8-10	Kaiser Aircraft & Electronics Div/Kaiser		Radar Measurements Corp	4
Dynex Inc	4	Ind (Oakland)	4-8-11	Radiophone Co	4-13-16-18
Eastern Industries Inc	1	Kaiser Electronics Inc	8	Radio City Products Co	1-3-4
Eastman Kodak Co	3-4	Kaiser Aircraft & Electronics/Div Kaiser		Radio Corp of America/West Coast Missile	
Eclipse-Pioneer Dib/Bendix Aviation Corp	6-7	Ind/Toledo Electronics Plant	4-8-11-16	& Surface	1-2
Edison Industries/Thomas A Instrument		Kauke & Co Inc	10	Radionic's Inc	5-8
Div	6	Kearfott Co Inc (Pasadena)	4-5-6-7	Radioplane Div/Northrop Aircraft	
Electric Regulator Corp	1-2-8	Kearfott Co Inc (Clifton)	4-6-7	Inc	4-5-6-18
Electro Contacts Inc	16	Kelsey-Hayes Co	5	Radio Receptor Co Inc	8-12-13-14-15
Electro Instrument Inc	4	Kepeco Inc	8	Rahm Instruments/Div American Machine	
Electronic Assembly Co	8	Keystone Products Co	8	& Metals Inc	7
Electronic Communications Inc	3-6	Kidde & Co Walter	4-5-8-16	Ram Meter Inc	4-8
Electronic Measurements Co	8	Land-Air Inc	4-10	Raytheon Co/Missile Systems Div	5
Electronic Production & Development	4-8	Langevin Div/W L Maxson Corp	8	Rea Co J B/Electronics Div	1-4-8-10
Electronic Research Associates	2-8	LaPointe Industries Inc	4-6-7-9	Reed & Reese-Retron Corp	7-8
Electronics Corp	4	Larson Electronic Glass	9	Reeves Instrument Corp	6-7
Electronics Development Co	10	Lavoie Labs Inc	1	Remler Co	4
Electronics Eng Co of Calif	4-5	Leach Corp/Inet Div	1-2-4-5-8	Resdel Eng'g Corp	1-4-10-11
Electronic Specialty Co	1-2-3-4-6-8	Lear Inc (Santa Monica)	4-6-7-8	Revere Corp of America	4-5
Electronic Systems Development Corp	6-8	Lear Inc (Grand Rapids)	4-6-7	Rhem Mfg Co/Electronics Div	4-8-10
Elsin Electronics Corp	8-10	Leeds Co Inc Gerard G	1-2-4-8-10	Riverbank Labs Eng'g Dept	1
Emerson Electric	3-4-5-6-8-10-18	Leland Airborne Products	8	Rogers Corp	9
Emerson Plastics Corp	9	Lewyt Mfg Corp	1-4-5-6-8-10-11	Rome Cable Corp	8-10
EMI Cossor Electronics	11	Librascope Inc (Glendale)	6	Sanders Associates	6-7
Engineered Magnetics/Div Gulton		Ling Systems Inc	4-10	Santa Barbara Div/Curtiss-	
Industries Inc	8	Link Aviation Inc	4	Wright	1-2-4-5-6-8-10-11
Engis Equipment Co	4	Link-Belt Co/Dept EI	5-6-9	Schaffer Air Industries	4-5
Epsco Inc	4-10	Linlar Inc	8	Scientific Radio Prods Inc	1-2
Erco Radio Labs Inc	10	Litton Industries Calif	6-7-8	Sequoia Wire & Cable Co/Div Mandrel	
Fairchild Astrionics/Fairchild Engine &		Litton Industries Md	8-10	Industries	4-8-10
Airplane Corp	4-5-6-10	Lockheed/Missile & Space Div	4-5-6-8-11	Servo Corp of America	4-16-18
Fairchild Controls Corp	7	McCormick Selph Associates	8	Servomechanisms Inc	4-6-8
Fairchild Controls Corp/Components Div	7	Magnavox Corp	6-10	Short Brothers & Harland Ltd	5-6-7
Federal Mfg & Eng'g Corp	4-6-8	Magnetic Amplifiers Inc	6-8	Solartron Electronic Group Ltd	4-8-10
Feedback Controls Inc	4-6	Magnetic Circuit Elements Inc	1-2-4-8-10	Specialties Inc	4
Ford Instrument Co/Div Sperry Rand		Magnetic Research Corp	2-4-8-10	Specialty Eng'g & Electronics Co	2-4
Corp	1-2-4-6-7-8-10	Magnetics Research Corp	6	Spectralab Inst Co	10
Frenchtown Porcelain Co	9	Magtrol Inc	6	Sperry Farragut Co/Div Sperry Rand	
Garlock Packing Co	9	Maico Electronics Inc	8-10-12-13-14-15-16	Corp	6-7-8-16
Garrett Corp/Airesearch Mfg Co Div	4-5-6-8	Makepeace Div/D E Englehard Industries		Sperry Gyroscope Co/Sunnyvale Dev	
Gates Radio Co	6	Inc	6	Center	6-7
General Communications Co	10-11-13-14-15-16	Marquardt Aircraft Co/Pomona Div	4-5	Sperry Gyroscope Co/Air Arm Div	4-6-7
General Controls Co (Glendale)	5-6	Martin-Merrill Inc	1-2-4-8-10	Sperry Gyroscope Co/Surface Armament	
General Devices Inc	1-2-6-8-10-12-14-16	Mast Development Co Inc	5	Div	5-6-7-18
General Electric Co/Computer Dept	4	Maxson Corp W L	1-2-3-4-5-6-7-8-11	Spivey Inc James S	10
General Electric Co/Apparatus Sales Div	2-7	Meterlog Corp/Sub Air Logistics Corp	4-8-16	Stackpole Carbon Co	9
General Electric Co/DSD	6	Mid-Century Instrumatic Corp	18	Stanley Aviation Corp	4-5-8-18
General Electric Co/Light Military		Milgo Electronic Corp	4-18	Statham Instruments Inc	10
Electronics Dept	2-4-5-6-7	Millipore Filter Corp	4	Stavid Eng'g Inc	4-6-10-11
General Electric Co/		Minn-Honeywell Regulator Co/Davies Labs		Stratocron Corp/Geophysical Services Div	10
MSVD	1-2-3-4-5-6-7-8-9-10	Div	4	Stromberg-Carlson/Div Gen'l Dynamics	
General Electric Co/Low Voltage		Minn-Honeywell/Boston Div	6-7	(Goodman St)	4
Switchgear Dept	8	Minn-Honeywell Regulator Co/Aeronauti-		Stromberg-Carlson/Div Gen'l Dynamics	
General Electric Co/Industry Control		cal Div	4-6-7	Corp (Carlson)	1-4-5-6-10
Dept	4-5-8	Minn-Honeywell Regulator Co/Mil Prod		Systron Corp	4-10
General Electric Co/Specialty Control		Gp/Aeronautical & Ordnance Div	3-4-6-7-8	Szekely Eng'g & Mfg Inc	5
Dept	5-8	Missileonics Inc	6-10	Taft Radio & TV Co	8
General Electric Co/Missile Production		Model Eng'g & Mfg Co Inc	11	Ta-Mar Inc	4
Sec	3-4-5	Moran Instrument Corp	4-8	Tapco Group/Thompson Ramo Wooldrige	
General Mills Inc/Mechanical Div	4-6	Nat'l Co Inc	4-6	Inc	1-4
General Precision Lab Inc (Pasadena)	6	National Radio Co	4	Tarc Electronics Inc	8
General Precision Lab Inc (Pleasantville)	6	New London Instrument Co Inc	10	Technical Apparatus Builders	8-16
Geotechnical Corp	10	Newton Co	6	Technical Oil Tool Corp	4-6
Giannini & Co G M	1-6-7-11	NJE Corp	8	Teledrome Mfg Corp	8-10
Gilmore Industries Inc	4	Norden Div/United Aircraft Corp	8	Telecomputing Corp	4-7
Gisholt Machine Co	7	Norrman Laboratories Ernst	1-2	Telectro Industries Corp	1-3-4-6-8-10
Globe Industries Inc	6	North Atlantic Industries Inc	4	Telemetering Corp of America	10
Goodrich Aviation Products/B F Goodrich Co	9	Northeastern Eng'g Inc	8-12	Telex	3-8
Gordon Enterprises	4	North Electric Co	4	Tel-Instrument Electronics Corp	8
Graphite Metallizing Corp	9	North Hills Electric Co Inc	8	Tempco Aircraft Corp	4-5-6-10-11
Gray Mfg Co	6	Northrop Aircraft Inc/Nortronics Div	4-5-6	Tempo Instrument Inc	3
Green Rectifier Co	8			Telephonics Corp	6-8-11

Terlad Mfg Corp	6-8-10-11
Tempo Instrument Inc/Commercial St	3
Topp Industries Inc	2-4-8-11-16
Torwico Electronics Inc	8
Trans Electronics Inc	8
Trans-Sil Corp	8
Transval Electronics Corp	2-4-5-8-16
Ultradyne Inc	6-10
Underwood Corp/Canoga Div	8
United Aircraft Products Inc	4-5-8-9
United Electrodynamics	4-5-8-10-11
United Mfg Co/Div W L Maxson Corp	4-8
United States Time Corp	7
Universal Transistor Products Corp	8
U S Time Corp (Palos Verdes Estates)	6-7
U S Time Corp (New York)	6-7-10
Van Norman Industries Inc/Electronics Div	6-10
Varo Mfg Co	1-2-4-5-6-8-16
Vectrol Eng'g Inc	1-2-8
Vickers Inc/Electric Products Div	1-2-4-6-8
Video Instruments Co Inc	8
Virginia Electronics Co	1-4-8
Waldorf Electronics/Div F C Huyck & Sons	4-6-8-18
Waltham Electronics	1-10
Wang Labs Inc	1-10
Warren Components/Div El Tronics Inc	9
Waugh Eng'g Co	1
Weboor Inc	1-4-6-13
West Coast Research Corp	5-8
Western Gear Corp/Electro Products Div	5-8
Westinghouse Electric Co/Air Arm Div	3-6-7-8
Westinghouse Electric Corp	5-6-7-8
Westrex Corp	4
Wickes Eng'g & Construction Co	2-4-5-8
Wincharger Corp	8
Winder Aircraft Corp of Fla	6-8

58—MOBILE COMMUNICATIONS EQUIPMENT

Citizens radio	1
Handsets	2
Intercommunicating systems	3
Pack sets	4
Pickup units, mobile TV	5
Receivers, fixed	6
Receivers, mobile	7
Telephones, portable field	8
Transceivers, aviation	9
Transceivers, infrared	16
Transceivers, lifeboat	10
Transceivers, portable	11
Transceivers, UHF	12
Transceivers, VHF	13
Transmitters	14
Walkie-talkies	15

Adler Electronics Inc	14
Aeronautical Electronics Inc	6-7-11-13-14
Aircraft Radio Corp	9-12-13
Amelco Inc	4-6-7-9-12-13-14
American Electronics Inc Instrument	9
American Electronics Inc	9-13
American Machine & Foundry Co	
Gen Eng Labs	1
Applied Electronics Co	6-7-14
A R F Products Inc (River Forest Ill)	6-7-14
Audicon Electronics Inc	3-6-7
Audio Equipment Co	3
Audiosears Corp	2
Aveo Corp Crosley Div	6-7-14
Barker & Williamson Inc	14
Barrett Electronics Corp	7-14
Basic Controls Inc	14
Bendix Aviation Corp	2-4-6-7-12-13-14-15
Bergen Labs	13
Bliss Electronics Corp	8
Bogen-Presto Co	3
Bulova Watch Co	5
Canadian Marconi Co	5-6-7-12-13-14
Centronix Inc	1-6-7-14-15
Collins Radio Co	6-9-12-13-14
Communications Co	6-7-9-13-14
Comptometer Corp	11
Continental Manufacturing Inc	1
Corbin Corp	6-14
Craig Systems Inc	7
Daven Co	11-15
Dayton Aviation Radio & Equipment Corp	7-13
Designers for Industry	1-3-4-6-7-9-11-13
Developmental Electronics Corp	6-10-15

Drake Co R L	6-7
DuMont Laboratories Inc Allen B	1-2-3-4-5-6-11-12
Dynamic Electronics Inc	3-6-7-9-10-11-12-13-14
Eldico Electronics	6-7-9-10-11-13-14
Electronic Communications Inc	7-12-13-14
Electronics Design Co	1-2-6-7-11-12-13-14-15
Electronics Development Co	14
E M I Cossor Electronics	3-4-5-11-15
Erco Radio Labs Inc	3-6-7-12-14
Fanon Electric Co	2-3-8
Feiler Eng'g & Mfg Co	1-3-11-15
Gates Radio Co	3-14
General Communications Co	7-9-14-15
General Electric Co/Communications Prods Dept	1-5-7-11-12-13-14-15
General Railway Signal Co	7
Gordon Enterprises	15
Haller Raymond & Brown	3-4-6-7-9
Hazeltine Electronics Div/Hazeltine Corp	6-7-11-12-13-14
Heath Co	1-6-14
Hoffman Electronics Corp	4-6-7-9-11-12-13-14-15
Hughes Aircraft Co-Ground Systems Div	7-14
Industrial Development Eng'g Assoc	6-7
Industrial Radio Corp	4-6-7-11-12-13-14-15
Infrared Industries Inc	16
I T T Industrial Products Div	1-6-7-14
Johnson Co E F	14
Kaar Eng'g Corp	1-2-4-6-7-11-12-13-14
Kearfott Co Inc (Clifton)	10
Kuhn Electronics Inc	1-6-7
Land-Air Inc	3-4-6-7-14
Land-Air Inc Instrument & Electronic Div	7
Lavoie Lab Inc	3
Lear Inc (Calif)	9-13
Lear Inc (Mich)	9-13
Lel Inc	6-15
Lenkurt Electric Co	6-7
Ling Systems Inc	5
Linlar Inc	2
Mackay Radio & Telegraph Co/Marine Div	10-13
Magnavox Corp	7-9-12-13
Magnetic Amplifiers Inc	2
Mallory & Co Inc P R (Gray St)	12-13
Microwave Eng'g Labs Inc	6-7-12-13
Milgo Electronic Corp	2-3-13
Miratel Inc	1-3-12-13
Mitchell Industries Inc	9
Model Eng'g & Mfg Inc	3-4-6-7-10-11-12-13-14-15-19
Morrow Radio Mfg Co	4-7-14
Motorola Communications & Electronics Inc	1-4-6-7-15
Mullard Equipment Co	6-7-9-12-14
Multi-Products Co	6-7-14-15
National Radio Company Inc	6
Northeast Electronics Corp	6-14
North Electric Co	3-8
Pearce Simpson Inc	1-7-14
Permoflux Products Co	2
P & H Electronics	6-7-14
Philco Corp/G & I Div	3-4-5-6-7-8-10-11-12-13-14-15
Philco Corp	4-5-6-7-11-12-13-14
Pratt Albert	6-7-14
Pye Corp of America	6-7-9-11-12-13-14-15
Pye Telecommunications Ltd	1-3-4-6-7-10-11-13-14-15
Radio City Products Co	9-10
Radio Corp of America	1-2-6-7-11-12-13-14
Radio Eng'g Labs	6-14
Radio Mfg Engineers Inc	1-15
Radio Receptor Co Inc	6-7-9-11-12-13-14
Radio Specialty Mfg Co	2-4-15
Rauland-Borg Corp	3
Remler Co	2
Rich Electronics Inc	1-13
Roanwell Corp	2
Royal Communications Systems	1-3-6-7
Seeley Electronics	6-7
Seg Electronics Co Inc	6
Servo Corp of America	6
Simpson Mfg Co Mark	3
Sorensen Industrial Electronic Co	1-3-7
Spartan Electronics Div	9-10-11-12-13-15
Spivey Inc James S	13
Springer Aircraft Radio Corp	9-13
Springfield Enterprises	11-13-15
Stromberg-Carlson/Div Gen Dynamics Corp (Carlson Rd)	2-3-4-6-7-9-10-11-12-13-14
Tarc Electronics Inc	15
Telechrome Mfg Corp	5
Telectro Industries Corp	3-6-7
Tele-Dynamics Inc	1-3-5-6-7

PRODUCT MFRS

58/59—Mobile Comm. Equip. & Accessories

Telemarine Communications Co	1-2-6-7-9-11-13-14-15
Telephonics Corp	2-3-4-6-7-8-9-12-13-14-15
Topp Industries Inc	6-7-9-13-14
Trimm Inc	2
Virginia Electronics Co	3-6-7-11-14
Vocaline Co of America	1-3-11-12
Westrex Corp	4-6-15
Winder Aircraft Corp of Fla	7
Young Spring & Wire Co	6-7-9-11-12-13-14

59—MOBILE COMMUNICATIONS ACCESSORIES

Antennas	1
Antenna bases	2
Auto alarms	3
Control equipment	4
Crystals	5
Microphones	6
Power supplies	7
Power supplies, emergency	8
Recorders, film	9
Recorders, magnetic	10
Selective calling devices	12
Vibration mountings	11

Acme Electric Corp	7
Aeronautical Electronics Inc	1-4-7-11-12
Aircraft Radio Corp	1-7
All Products Communications Products	1-2
American Brass Co	1
American Concertone Div/American Electronics Inc	10
American Electronics Inc	4-7-10
American Machine & Foundry Co Gen Enr Labs	1-2
American Research & Mfg Co	7
American Television & Radio Co	7-8
Amnlixox Ltd	6
Andrew Antenna Corp	1
Andrew California Corp	1
Andrew Corp	1
Anso Div/Gen'l Aniline & Film Corp	9
Antenna Specialists Co	1-2
Applied Electronics Co	6
A R F Products Inc (River Forest)	1-7
Astatic Corp	5-6
Atlas Precision Products Co	4
Audiosears Corp	6
Automation Dynamics Corp	1
Barker & Williamson Inc	4-7
Barrett Electronics Corp	1-12
Bassett Inc Rex	1-2-5
Bendix Aviation Corp/Bendix Radio Div	4-5-7
Bendix Aviation Corp/Red Bank Div	7-8
Bergen Labs	10
Biddle Co James G	12
Birtcher Co	11
Blaine Electronics Inc	1
Buggie Inc H H	1-2
Bogue Electric Mfg Co	4-7-8
Bundy Electronics Corp	7-8
Cable Electric Products	7
Carter Motor Co	7
Christie Electric Corp	7
Clegg Labs/Div Clegg Inc	7
Communications Accessories Co	3-12
Comptometer Corp	10
Computer Eng'g Assocs Inc	7
Consolidated Diesel Electric Corp	7-8
Cook Co Frank R	7-8
Craig Systems Inc	1-2-4
Daven Co	7
Davenport Mfg Co	7
Diamond Antenna & Microwave Corp	1
Dynamic Electronics Inc	1-7
Eldico Electronics	7-8
Electric Regulator Corp	7-8
Electronic Measurements Co	7
Electronic Research Associates	7
Electronic Specialty Co	1
Electro-Voice Inc	6
E M I Cossor Electronics	1-6-10
Engineered Magnetics	7
E-Z Way Towers Inc	2
Fanon Electric Co	12
Federal Shockmount Corp/Div Korfund Co	11
Fen-Tone Corp	6-10
Ferrotran Electronics Co Inc	7
Finn & Co T R	11

Gabriel Electronics/Div Gabriel Co	1
Garrett Corp/Airesearch Mfg Co Div	7-8
Gates Electronic Co	7-8
General Electric Co/Low Voltage Switch- gear Dept	7-8
General Electric Co/Communication Products Dept	4-5-6-7-12
General Instrument Corp	7
Geotechnical Corp	9
Gordon Enterprises	9-10
Green Rectifier Co	7
Gulton Industries Inc	1-2-7-8-12
Haller Raymond & Brown	1-12
Heath Co	3
Heinz Mueller Eng'g Co	7
Hoffman Electronics Corp	1-4
Houston Fearless Corp	1-2
Hughes Aircraft Co/Ground Systems Div	1-4
Hycon Mfg Co	7
Illumitronic Eng'g Co	1
Industrial Development Eng'g Assoc	1-5-12
Industrial Radio Corp	7
Isolantite Mfg Corp	1
I-T-E Circuit Breaker Co	1-2
I-T-T Industrial Products Div	1-7
Kaiser Aircraft & Electronics (Toledo)	7
Kaiser Electronics Inc (N J)	7-9
Kelsey-Hayes Co	1-2
Kennedy & Co D S	1
Kenyon Transformer Co	7
Kepeco Inc	7-8
Kling Metal Spinning & Stamping Co	2
Knights Co James	5
K-W Eng'g Works	1
La Pointe Industries Inc	1-2
Leland Airborne Products	7-8
Lewyt Mfg Corp	7-12
Linlar Inc	6-7-8
Lord Mfg Co	11
McCoy Electronics Co	5
Magnasync Mfg Co	9-10
Magnecord Div/Midwestern Instruments Inc	10
Magnetic Amplifiers Inc	7
Magnetic Research Corp	7-8
Mallory & Co Inc P R (S Gray St)	7
Master Mobile Mounts Inc	1-2-5
Meterlog Corp/Sub	7
Midwestern Instruments	10
Miratel Inc	7
Minn-Honeywell Regulator Co/Davies Labs Div	10
Mobile Electronics Mfg Co	12
Morrow Radio Mfg Co	7
Mosely Electronics Inc	1
Multi-Products Co	4-7-12
NJE Corp	7
North Hills Electric Co Inc	7
NYT Electronics Inc	7
Onan & Sons D W	8
Opad Electric Co	7
Pacific Universal Products Corp	42
Pearce Simpson Inc	6
Perkin Eng'g Corp	7-8
Permotlux Products Co	6-7-8
Peschel Electronics Inc	8
P & H Electronics	7
Philco Corp/G & I Div	1-2-3-4-5-7-8-12
Philco Corp	1-4-7-8
Plastic Capacitors Inc	7
Power Supplies Inc	7-8
Premax Products/Div Chisholm-Ryder Co	1-2
Prodelin Inc	1-4-5-15-18-24-33-35-38
Pye Telecommunications Ltd	1-2-4-5-7-8
Radio City Products Co	3
Radio Corp of America/Communications Products Dept	1-2-4-5-6-7-8-11-12
Radio Receptor Co Inc	1
Rich Electronics Inc	1-2
Roanwell Corp	6
Robinson Technical Products Inc	11
Roflan Co	6
Rowe Industries	1
Santa Barbara Div/Curtiss Wright	4-7-10
Scantlin Electronics Inc	12
Scientific-Atlanta Inc	1-9-15-52
Scientific Radio Prods Inc	5
Scientific Radio Service	5
Secode Corp	4
Shure Bros	6
Snyder Mfg Co	1-2
S O S Cinema Supply Corp	6-7-8-9-10
Southwestern Industrial Electronics Co	7-10
Spectrol Electronic Corp	7
Spivey Inc James S	8
Stainless Inc	1
Stancil-Hoffman Corp	10
Stewart & Stevenson Services Inc	8
Stromberg-Carlson/Div Gen Dynamics Corp (Carlson Rd)	1-12

Ta-Mar Inc	1
Tapco Group	7
Tarc Electronics Inc	7
Technical Apparatus Builders	7-8
Technical Appliance Corp	1-2
Telectro Industries Corp	7-8-10
Tele-Dynamics Inc	1-2-4-6-7-8-12
Telephonics Corp	6
Telex	6
Tenna Mfg Co	1-2
Tenatronics Ltd	1-2
Times Facsimile Corp	9
Torwico Electronics Inc	7
Transonic Inc	7
Transval Electronics Corporation	7-8
Tri-Ex Tower Corp	1
Ultradyme Inc	21
Universal Transistor Products Corp	7-8
U S Testing Co	1
Varo Mfg Co	7-8
Virginia Electronics Co	1-4-7
Warwick Mfg Corp	10
Wincharger Corp	7-8
Winder Aircraft Corp of Fla	1-7-8
Young Spring & Wire Co Conset Div	4-7-12

60—MOTION PICTURE EQUIPMENT

Cameras, 8MM	1
Cameras, 16MM	2
Cameras, 35MM	3
Kinescope recording apparatus	4
Projectors, 8MM	5
Projectors, 16MM	6
Projectors, 35MM	7
Projectors, rear	8
Projectors, theatre TV	9
Sound readers	10
Tape, synchronized magnetic	11

Ace Electric Mfg Co	10
American Electronics Inc	11
Baskon Corp	1-2-3-5
Beckman & Whitley	2-3
Belock Instrument Corp	2-3
Benson-Lehner Corp	2-3
Boode Screen & Projector Co	8
Bolsey Research & Development Corp	1-2-3-6-7-8-11
Cameraflex Corp	2-3
Canadian Applied Research Ltd	3
Canadian Marconi Co	4
Century Projector Corp	7-8
Chadwick-Helmuth Co	2
Cinematic Developments	2-3-6-7-10-11
DeJur-Amsco Corp/Electronic Sales Div	1-5
Eastman Kodak Co	1-2-5-6-9
E M I Cossor Electronics	6
Fairchild Camera and Instrument Corp	2
Flight Research Inc	2-3
Federal Mfg & Eng'g Corp	6
Florman & Barb	10-11
General Precision Lab Inc (Pasadena)	9
General Precision Lab Inc (Pleasantville)	4-6-7-9
Gordon Enterprises	2-3-4-6-7-8-9-10-11
Harwald Co Inc	6-8
Houston Fearless Corp	2-3-4
ITT/Industrial Products Div	9
Kalart Co Inc	5-6-7-10
Las-Lab Inc	2-3
Mast Development Co Inc	7-8
Magnasync Mfg Co	11
Motiograph Inc	7
National Cine Equipment Inc	2-3-4-10
Neumade Products Corp	10
Pampa Electronics Corp	11
Par Products Corp	2
Pembrex Theatre Supply Corp	7-8-11
Photographic Analysis Inc	2-3
Producers Sales Corp	1-2-3-4-5-6-7
Radio Corp of America/Commercial Electronic Products	6
Rangertone Inc	11
Rank Cintel Ltd	9
Reeves Soundcraft Corp	11
Shrader Sound Inc	11
S O S Cinema Supply Corp	2-3-4-6-7-8-9-10-11
Southwestern Industrial Electronics Co/Div Dresser Industrial Inc	11
Tarc Electronics Inc	6-7-8
Taylorreel Corp	11
Television Specialty Co Inc	2-4-8
Trad Electronics Corp	9
Trans Lux Corp	8

Vought Co	1-2-3-4
Westrex Corp	10-11
Wollensack Optical Co	1-2-3-5-6

61—MOTION PICTURE EQUIPMENT ACCESSORIES

Animation equipment	1
Chemical developers	2
Cue markers	3
Editing equipment	4
Film cans	5
Film scrapers	6
Lenses	7
Magnetic filmheads	8
Optical apparatus	9
Printing equipment	10
Processing equipment	11
Projection lamps	12
Projector carbon	13
Projector stands	14
Range finders	15
Rapid development equipment	16
Reels, continuous projection	17
Rewinds, auto	18
Screens, background	19
Screens, projection	20
Special effects equipment	21
Splicing equipment	22
Tape-to-film sound transfer equip	23
Titling equipment	24
View finders	25
Zoom lenses	26

Ace Electric Mfg Co	3-6-22
Acme Industrial Co	9
American Molded Products Co	5-17
American Optical	9
Anso Div/Gen'l Aniline & Film Corp	2-16-17
Applied Magnetics Corp	8
Ashland Electric Products Inc	41-43
Axler Associates Inc	9
Bache & Co Semon	7
Bausch & Lomb Optical Co	7-9
Bar-Ray Products Inc	11
Belock Instrument Corp	10-11
Bodde Screen & Projector Co	14-19-20-21
Burke & James Inc	9
Cameraflex Corp	17
Canadian Applied Research Ltd	2-11-16
Century Projector Corp	8-9-14
Cinematic Developments	4-9
City Chemical Corp	2
Compco Corp	4-5-17-18-22
Craft Mfg Co	5
Da-Lite Screen Co	20
Du Pont de Nemours & Co E I	2
Eastman Kodak Co	2-4-5-7-12-17-20-22-23
Electric Eye Equipment Co	4-9-10
Electro Products Labs Inc	11
Engineering Developments Inc	7-9
Engis Equipment Co	9
Equipto Div/Aurora Equipment Co	14
Exakta Camera Co	7
Fairchild Camera & Instrument Corp	11-16
Federal Mfg & Eng'g Corp	11-63
Fen-Tone Corp	8
Fisher Co Inc Oscar	11
Fish-Schurman Corp	10
Florman & Barb	1-3-4-5-6-7-8-9-21-22-24-25
General Kinetics Inc	11
General Transistor Western Corp	8
Gordon Enterprises	1-2-3-4-5-7-8-9-10-11-12- 14-15-16-18-19-20-21-22-23-24-25-26
Griswold Machine Works	22
Hacker & Co Wm J	9
Harwald Co Inc	4-5-12-14-17-18-20-22
Hi-Speed Equipment Inc	11
Houston Fearless Corp	10-11-16-25-26
Kalart Co Inc	4-5-6-7-8-9-10-12-13- 14-15-18-20-22-23-24-25
Kelsey-Hays Co	5
Kollmorgan Optical Corp	7
Leedal Inc	10-11
Las-Lab Inc (Baltimore)	9-11-16
Las Lab Inc (Stykesville)	16
Lipps Co Edwin A	8
Logetronics Inc	10
Magnasync Mfg Co	8-23
Mast Development Co Inc	9-11-21-24
Merix Chemical Co	2
Metal Fabricators Corp	11-16

60/61/62—Motion Picture Equip.; 63—Motors

Morse Instrument Co	11-16
Motiograph Inc	12-14
National Carbon Co/Div Union Carbide Corp	13
National Cine Equipment Inc	1-4-7-9-10-21-24-25-26
Neumad Products Corp	3-4-5-6-14-18-22
Norton Associates Inc	8
Optical Gaging Products Inc	9
Pacific Optical Corp	7-9-15-25-26
Pacific Universal Products Corp	7
Pampa Electronics Corp	8
Par Products Corp	1-7-9-10-15-25
Perkin-Elmer Corp	7-26
Permacel	3
Photobell Co	18
Producers Sales Corp	1-9-10-21-24
Rangertone Inc	4
Raven Screen Corp	19-20-21
Reed & Reese-Retron Corp	8
Robins Industries Corp	5-22
Rolab Photo-Science Labs	4-21
Rosco Labs Inc	1-4-22
Shepard Labs Inc	22
Simpson Optical Mfg Co	7-9
S O S Cinema Supply Corp	1-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17-18-19-20-21-22-23-24-25-26
Southwest Products Inc	2
Stancil-Hoffman Corp	23
Swedlow Plastics Co	19-20
Taylorco Corp	5-17-23
Technikote Corp	20
Telectro Industries Corp	23
Television Specialty Co Inc	19-20-21
Trans Lux Corp	1-7-9-11-12-14-19-20-21
Uhlerr Cine Machine Co	10
Vought Co	9-25
Wallin Assoc W	7-9-25-26
Westrex Corp	4-8-23
Wollensack Optical Co	7-9-26
Zenith Optical Lab	7-9

62—MOTION PICTURE FILM

Film, magnetic stripe	1
Film, raw stock	2
Film, storage	3

Auburn Mfg Co	2
Bolsey Research & Development Corp	2
Du Pont de Nemours & Co E I	2
Eastman Kodak Co	1-2
Harwald Co Inc	3
Gordon Enterprises	1-2-3
Livingston Audio Products Corp	1
Neumad Products Corp	3
Paragon Electric Co	21-22
Reeves Soundcraft Corp	1
S O S Cinema Supply Corp	1-3

63—MOTORS & GENERATORS & BLOWERS

Alternators	1
Autosyns	40
Blowers	2
Blowers, centrifugal	41
Blowers, radial wheel	42
Blowers, vaneaxial	43
Brush holders	3
Brushes, motor	4
Clutches	5
Commutators	6
Contacts, motor & generator	7
Controls	8
Converters, rotary	9
Couplings, flexible	10
Couplings, rigid	11
Discs, magnetic	44
Drives & drive mechanisms	45
Dynamotors	12
Engines, diesel	13
Engines, gas	14
Fans	15
Generators, AC	16
Generators, DC	17
Generators, hand-crank	18
Generators, high freq. power	19
Motors, AC	20
Motors, clock	21
Motors, control	22

Motors, DC	23
Motors, fractional hp	24
Motors, hysteresis	25
Motors, miniature	26
Motors, phonograph	27
Motors, servo	28
Motors, synchronous	29
Motors, timing	30
Motors, turntable	31
Motors, universal	32
Power plants	33
Rotors	34
Servos	35
Starters	36
Stators	37
Synchros	38
Wedges, woodslot	39

Accurate Electronics Corp	3
Actuator Prods Corp	5-45
Advanced Products	5-20-21-24-25-26-29-30
Aeromotive Eng'g Products Ltd	1-2-16-17-19-20-22-23-24-25-26-28-29-33-35-38-41-42-43
Airborne Accessories Corp	9-20-23-24-28-35
Air Controls Inc	2-15-41
Aircraft Radio Corp	12
Airflyte Electronics Co	3-6-7
Airesearch Mfg Co/Arizona Div Garrett Corp	1-8-16-17-20-23-24-36
Air Marine Motors	2-15-20-22-24-25-26-29-34-37-41-43
Air-Marine Motors Inc	2-15-20-24-25-26-28-29-41-43
Allard Instrument Corp	20-23-26
Allen-Bradley Co	8-22-36
Amco Eng Co	2
American Brass Co	3
American Electronics Inc/Instrument Div	28-35-38
American Electronics Inc	1-2-5-8-9-10-15-16-17-19-20-22-23-24-25-26-28-29-35-38-41-43-45
American Electronics Inc/Electro-Mechanical Div	1-2-4-5-9-15-17-20-22-23-24-25-26-28-29-34-37-41-42-43-44
American Measurement & Control Inc	28-35
Amlo Corp	21-23-26-30
Amplex Div/Chrysler Corp	5-6-11
Applied Technology Corp	8
Arma Div/American Bosch Corp	1-8-17-20-23-32-36
Ashland Electric Products Inc	1-2-15-20-24-25-26-29-31
Atlas Precision Products Co	35
Autotronics Inc	5
Barber-Colman Co	20-23-29-41
Barber Coleman Co/Small Motor Div	2-16-20-22-24-27-28-29
Barber Coleman Co/Elec Comp Div	2-17-20-22-23-24-26-28
Baskon Corp	30
Beck Co Harold	22
Bendix Aviation Corp/Red Bank Div	1-9-12-16-17-19-20-23-24-33
Bendix Aviation Corp/Eclipse-Pioneer Div	22-26-28-35-38
Bodine Electric Co	20-22-23-24-25-26-27-28-29-30-31-32
Bogue Electric Mfg Co	8-9-12-16-17-18-19-20-22-23-28-29-33-35
Borg Equip Div/Amphenol-Borg Electronics Corp	24-29-23-26-30
Brailsford & Co	8
Branson Corp	8
Brevet Products Corp	20-24-26-31
Butcher Co L H	2-17-41
Carter Motor Co	1-9-12-16-20-24-26-32
Caterpillar Tractor Co	13-33
Cedar Eng'g/Div Control Data Corp	23-25-26-28-29-2-15
Clarage Fan Co	2-15
Clark Controller Co (Los Angeles)	8-22-36
Clifton Precision Products Co Inc	23-28-35-38
Collectron Corp	3-6
Columbia Electric Mfg Co	16-17
Consolidated Diesel Electric Corp	1-16-17-20-23-24-33-36
Controls Co of America (Crystal)	20-23-24
Controls Co of America (Schiller Park)	2-8-15-24-29-30-31-43
Curtiss-Wright Corp/Electronics Div	35
Consumer Industrial Products	24-32
Continental Electric Co	1-12-16-17-19-20-23-29-33
Cramer Controls Corp	20-21-23-26-29-30
Curtiss-Wright Corp (W Caldwell)	22
Cutler-Hammer Inc	5-8
Dalmotor/Yuba Consolidated	1-2-3-9-12-16-17-20-23-24-25-26-28-29-30-34-37

Dale Products Inc (Columbus)	25
Delco Appliance Div GMC	23-24-26-28-34-35-37-38
Dial Products Co	5-10
Dictaphone Corp	20-23-24-25-26-29-32
Diehl Mfg Co	20-22-23-24-26-28
Digitronics Corp	5
D & R Ltd	1-9-16-19
Dwyer Mfg Co F W	8
Dynatomic Div/Eaton Mfg Co	5
Dynamic Air Eng'g Inc	2-15-20-23-24-32
Eclipse Fuel Eng'g Co	2-41
Edison Industries Thomas A/Instrument Div McGraw-Edison Co	28-35-38
Electrical Specialty Co	4
Electric Auto-Lite Co (Toledo)	17-23-24-32
Electro Contacts Inc	4-7
Electric Indicator Co	1-2-4-16-17-20-22-23-24-25-28-29-32-38
Electric Machinery Mfg Co	1-3-4-8-16-17-19-20-29-33-36-37
Electric Motors & Specialties	1-20-24
Electric Products Co	1-3-4-6-16-17-19-20-23-29
Electric Tachometer Corp	17
Electro-Development Co	3
Electronic Specialty Co	9-12
El Products Corp	30
Electro-Products/Div Western Gear Corp	1-2-9-15-16-17-18-19-20-28-29-30-32-35-38-40-41-42-43
El Ray Motor Co Inc	2-20-23-24-26-28-29
Emerson Electric	20-23-24-25-26
Emerson Plastics Corp	3
Engineering Associates	9
E T A Products Co of America	22
Fairbanks Morse & Co	1-13-14-16-17-20-23-24-29-33
Fasco Industries Inc	2-15-20-24-27
Feedback Controls Inc	35
Fen-Tone Corp	20-24-27-29-32
Five Star Co	37
Ford Instrument Co/Div Sperry Rand Corp	10-26-28-29-30-35-38
Garrett Corp/Airesearch Mfg Co Div	1-2-8-14-15-16-17-20-23-24-25-26-28-29-33-35-41-43
General Controls Co (Glendale)	2-8-20-23-24-26-35
General Controls Co (Canadian) Ltd	22
General Electric Co/Apparatus Sales Div	9-12-16-17-24-28-29
General Electric Co/Industry Control Dept	8-36
General Electric Co/Specialty Control Dept	22
General Devices Inc	34
General Radio Co	8
Georator Corp	1-9-16-17-19-33
Gibson Electric Co	7
Globe Industries Inc	1-2-5-8-15-16-17-18-20-22-23-24-25-26-28-29-30-35-37-43
Gordon Enterprises	4-9-24-25-26-28-29-30-38
Graphite Metallizing Corp	3-4-5-6-7
Great Lakes Electric Mfg Co	9-12-16-17
Green Rectifier Co	8
Hallamore Electronics Co	1-8
Hansen Mfg Co	21-23-26-29-30
Hanson-Van Winkle-Munning Co	3-17-29
Harowe Precision Inc	20-26-28-29-34-35-37-38-40
Haydon Co A W	20-21-22-23-25-26-29-30
Haydon Div/General Time Corp	20-21-22-23-25-26-29-30
Haydon Instrument Co	23-26
Hays Mfg Co	3
Heinze Elec Co/Div Consolidated Elec Lamp	2-20-23-24-26-32
Heinz Mueller Eng'g Co	1-2-3-4-9-12-15-16-17-18-20-23-26-32-34-41-42-43
Helipot Div/Beckman Instruments Inc (Fullerton)	28-35-38
Helipot Div/Beckman Instruments Inc (Toronto)	35-38
Henrite Products Corp	4
Hevi-Duty Electric Co	41
Hill & Co E Vernon	26
Holtzer Cabot/Div Nat'l Pneumatic Co	20-22-23-24-25-26-28-29-30-34-37
Homelite Div/Textron Inc	14-16-17-33
Honeywell Controls Ltd	8-20-22-28-29-35
Hoover Electric Co	1-2-3-5-9-11-12-15-16-17-18-19-20-22-23-24-25-26-28-29-30-32-34-35-36-37-38
Horlicke Co Wm I	1-9-16-17-19
Howell Electric Motors Co	20-24
Hunter Spring Co	3

Ideal Electric & Mfg Co	1-3-6-8-16-17-19-20-22-23-29-34-36-37	Reliance Electric & Eng'g Co	1-8-9-16-17-20-22-23-24-28-34-35-37-45	Shoran	12
ILG Electric Ventilating Co	2-16-41	Reliance Electric & Eng'g (Canada) Ltd	17-20-23-33-45	Sofar	13
Induction Motors Corp	1-2-12-16-17-20-22-23-24-25-26-27-28-29-30-31-35-38-41-42-43	Reynolds Electric Co	15-24	Sonar	14
Induction Motors of Calif/Div Induction Motors NY	28-38	Ripley Co	2-15-41-42	Transponders	15
Ingersoll-Rand Co	13	Robbins & Myers Inc	1-2-15-16-17-20-23-24-32-41-42-43	Tacan (& other similar systems)	18
Instrument Development Labs Inc	6-9	Robertshaw-Fulton Co/Acro Div	24	Aerojet-General Corp (Azusa)	17
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Nutron Mfg Co Inc	1-3-6-11-13	Solartron Electronic Group Ltd	2-3-5-6-11-12-13-15-24	Westinghouse Electric Corp (Pittsburgh)	1-3-10-11-12-13-16-17-19-20-22-23-24
Nyt Electronics Inc	2-3-4-6-8-9-10-11-12-13-17-20-22-24-26	Sorensen & Co	3-4	Westrex Corp	22
Oak Mfg Co	15-22-25	Southwestern Industrial Electronics Co	8-9-11-12-13-14-15-16-17-19-20-21-22	Wickes Eng'g & Construction Co	3-9-11-12-14-15-16-19-23-24
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Oltronic Co	3-4-6-11-12-13	Specialty Eng'g & Electronics Co	2-24	Winder Aircraft Corp of Fla	1-2-3-4-5-6-7-10-14-28
Opad Electric Co	1-2-3-4-5-6-8-9-11-12-13-14-16-19-24	Specific Electronics	3-4-6-8		
Oregon Electronics Mfg Co	3-11-12-13	Specific Products Co	3		
Ortho Filter Corp	1-2-3-6-8-9-11-12-13	Servo Corp of America	12		
Owen Labs Inc	3-6-11-12-13-23-24	Spectrol Electronics Corp	1-2-3-6-8-9-11-12-13-17-19-20-22-30		
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Pacific Technical Co	1-12	Sperry Microwave Electronics Co	5		
Packard Bell Electronics Corp	1-2-3-8-11-12-13-15-24	Spivey Inc James S	1-4-6		
Parsons Co/Ralph M Elec-Ronics Div	3-11	Stancil-Hoffman Corp	11		
Patterson Moos Div	6-9-12-13-27	Standard Electric Time Co	19		
Peebles & Co Ltd Bruce	1-2-3-4-6-8-11-12-13-15-23-24-28	Standard Electronics/Div Radio Eng'g Labs	1-3-4-5-6-11-12-16-24		
Peerless Electric Products	4-8-13	Stanley Aviation Corp	3-11		
Perkins Eng'g Corp	1-2-3-4-5-6-7-8-9-10-11-12-13-14-16-17-19-20-21-22-23-24-28	Statham Instruments Inc	6-11-12		
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Permoflux Products Co	1-3-4-6-8-9-10-11-12-17-20	Stewart & Stevenson Services Inc	1-3-9		
Peschel Electronics Inc	1-2-3-4-5-6-7-8-9-10-11-12-13	Superior Electric Co The	1-3-16-24		
Pesco Products Div	1-14-19-22-24	Sutton Electronic Co Inc	11-12-13-22		
P & H Electronics	1-3-4-6-9-11-12-13	Systems Development Inc	4-11-12		
Philbrick Researches Inc George A	2-3-11-16-24	Systron Corp	17-19-20		
Philco Corp/G & I Div	1-2-3-4-5-6-7-8-9-10-11-12-13-14-23-24	Taffet Radio & TV Co	1-3-4-6-11-12		
Plastic Capacitors Inc	1-2-3-4-5-8-10-11-12-13	Tapeco Group	1-3-9-16		
Polarad Electronics Corp	4-5-7-12	Tarc Electronics Inc	11		
Polytron Eng'g Inc	8-13	Tarzan Inc Sarkes	1-5-7-11		
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Polytronic Research Inc	11-13	Technical Material Corp	3		
Polytronics Co	24	Technical Oil Tool Corp	1-3-4-7		
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Power Supplies Inc	1-2-3-4-5-6-7-8-9-11-12-13-14-22-23-24	Telephonics Corp	1-3-8-11-12		
Pratt Albert	9	Telerad Mfg Corp	5-7-10-13		
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Q O S Corp	4-8-13	Telker Inc	1-3-6-8-11-13-17-19-22-25-29		
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Circuits, plated	5
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Circuits, stamped	8
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Networks, matching	14
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PRODUCT MFRS

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Aeronutronic Systems Inc	7	Epsco Inc	15-16	Northern Plastics Corp	4-5-6-7-11-12
Airflyte Electronics Co	5-6-16-25	Equip-A-Matic Eng'g Corp	20	Nyt Electronics Inc	6-10-14-15-16-25
Amelco Inc	4-5-7-16-25	Ercona Corp	9-19	Ohmite Mfg Co	1-21
American Brass Co	11	Erie Resistor Corp	1-2-7-16-21	Onondiga Pottery Co	1-7-16-21
American Electronics Inc	18	ESC Corp	10-15	Orbitran Co Inc	10
Amphenol Connector Div	9-17	Fairchild Astrionics	4	Packard Bell Electronics Corp	3-4-5-6-7-8-10-15-22
Amp Inc Capitor Div	15	Fairchild Controls Corp	18-21	Panellit Inc	4-7-8-19-22
Ansley Mfg Co Arthur	4-5-6-7-16-25	Farley & Loetscher Mfg Co	11	Paul F H & Stein Bros Inc	22
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Applied Technology Corp	7	Ferrottran Electronics Co Inc	16	Philco Corp	5-6-7-10
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Arvey Corp	11	Filmohm Corp	11-12	Plastic Capacitors Inc	1-15
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Automatic Metal Products Corp	9	Formica	11	Plastics & Electronics Corp	5-6-7-10-15-16
Avco Mfg Corp Crosley Div	7	Fugle-Miller Labs Inc	10	Polytronics Research Inc	3-4-5-7-25
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Avionics Ltd	4-5-6-7-22	Gardner Lab Inc	19	Porter Co Inc H H/Delta-Star Electric Div	11
Balco Research Labs Capacitor Div	1	Gates Radio Co	4-5-6-7-12-16-19	Precision Inc	21
Baldwin Piano Co	3-4-5-6	Gavitt Wire & Cable Co	3-4-5-6-7-16-22-25	Precision Line Inc	18
Bart Mfg Corp (Belleville)	5	General Devices Inc	19	Printed Electronics Corp	4-5-7-19-22
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Basic Controls Inc	16-25	General Research & Supply Co	22	Radio Industries Inc (Chicago)	1-3-5-7-16-21
Becks Inc	3-4-7-8-16-25	Glass Products Co	5-7	Radio Industries Inc (Des Plaines)	1-7-16
Bel Fuse Inc	10-22	Globe Electrical Mfg Co	4-5-7-16-22	Radio Receptor Company Inc	7-24
Bigelow Metallizing Chemicals Co	12	Good Electronics Corp	3-4-5-6-7-8-9-16-17	Rank Cintel Ltd	4
B J Electronics	4-7-16-22	Graphik Circuits	3-4-5-6-7-8-9-16	Ransom Research	4-16-24-25
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Brew & Co Richard D	10	Hamilton Standard Electronics Dept	4-5-6-7-16-25	Remington Rand	7
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Burke & James Inc	19-22	Hoover Electronics Co	4-6-7-22	Rese Eng'g Inc	16
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Cal-Ohm Labs Inc	4-5-6-7-8-11-12-18-19-21-22	Insulating Fabricators Inc	4-7-8-11-19	Richardson Co	11-12
Cambridge Thermionic Corp	1-2-9-17	International Resistance Co	18-21	Rimak Inc	22
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Carni Co	1	James Plating Works Inc	5	Ross Metals Co Milton	6-9-17-23
Centralab Div Globe-Union Inc	1-2-3-4-6-7-16-18-21-29	Jeffers Electronics Div Speer Carbon Co	16	Rubber & Asbestos Corp	4-5-11-19
Centronix Inc	6-7-16	JFD Electronic Corp	2-10	Sibley Co	4-5-6-7-16
Chicago Telephone of Calif	18	Johnson Co E F	2-9-13-14-17-23	Sampson Chemical & Pigment Corp	4-7-22
Chicago Telephone Supply Corp	18-21	Kaiser Aircraft & Electronics Div (Oakland)	16	Sanders Associates	4-11-20
Cinch Mfg Corp	4-7-9-22-23	Keil Eng'g Products Co	4-5-7-11-22	Sangamo Electric Co	1
Circon Components Corp	7-16-23	Keuffel & Esser Co	19	Santa Barbara Division/Curtiss Wright	9-16
Cleveland Metal Specialties Co	1-4-5-6-7-9-16-23-25	Kulka Elec Corp	9	Scantlin Electronics Inc	16
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Conductorlab Inc	4-5-6-7-16-22	Lestershire Spool Div	11-12	Slip Ring Co of America	5
Connector Corp	23	Librascope Inc (Glendale)	4-5-6-7-10-16	Sclar Mfg Corp	1-2
Conray Corp	19	Link Aviation Inc	4-7-10-16-18-22-25	Spaulding Fibre Co Inc	11-12
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Cornell-Dubilier Electrical Corp	1	Luminous Processes Inc	4-7-22	Sprague Electric Co	1-6-7-15-16-21-25
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Corson Electric Mfg Corp	15	Mahler Research Foundation	4-5-7-22	Sta-Warm Electric Co	20
Cortland Industries	7-8-11-22	Maico Electronics Inc	16	Stelma Inc	4-7-22
Croname Inc	4-5-7-22	Malco Mfg Co	9	Stromberg-Carlson/Dynamics (Carlson Rd)	7
Crown Engineering	4	Mandex Mfg Co Inc	4-5-7-8-23	Superox Electronics Corp	16-25
Cummins-Chicago Corp	19	Mallory & Co Inc P R (Gray St)	1-16-18-19-21	Sutton Electronic Co Inc	4
Curtiss-Wright Corp (W Caldwell)	10	Mallory & Co Inc P R (Washington St)	1-18	Swedlow Plastics Co	11-12
Dale Products Inc (Columbus)	3-4-5-6-7-8-16-18-21	Mansol Ceramics Co	4-5-7-8-23	Sylvania Electric Products Inc (Warren)	9-23
Dee Electric Co	20	Mech-Tronic Equipment Co	19-22	Synthane Corp	11-12
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DeJur-Amsco Corp	9	Methode Mfg Corp	4-5-7-8-9-17-22-23	Ta-Mar Inc	7
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Donner Scientific Co	6	Minshall Organ Inc	4-5-7	Telecomputing Corp	6-7-10
Doty Acoustical Electronic Labs	4-6-16-19-25	Mitronics Inc	7-10	Telegraph Condenser Co	1-3-4-5-6-7-8-9-10-13-14-15-16-20-22
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Chambers, temperature & humidity	6
Chambers, test	7
Cleaners, ultrasonic	8
Compressed air production tools	9
Conveyors	10
Crystal growing equipment	11
Crystal refining equipment	12
Dehumidifiers	13
Dehydrators	14
Demagnetizers	15
Drill presses	16
Dust enclosures	17
Electromagnetics	58
Furnaces, electric	18
Furnaces, gas fired	19
Lathes, bench	20
Machines, abrasive cutting	21
Machines, automatic assembly	59
Machines, balancing	22
Machines, blueprint	23
Machines, capacitor mfg	24
Machines, coil winding	25
Machines, coil winding, toroidal	26
Machines, counting	27
Machines, crystal mfg. & finishing	28
Machines, die casting	29
Machines, electron tube mfg.	30
Machines, engraving	31
Machines, glass blowing & working	32
Machines, hermetic sealing	33
Machines, impregnating	34
Machines, lamination stacking	35
Machines, marking & numbering	36
Machines, metal forming	37
Machines, plastic press	38
Machines, riveting	39
Machines, shock testing	40
Machines, soldering	41
Machines, weighing	42
Machines, wirestripping	43
Magnetizers	44
Material handling equipment	45
Ovens, temperature controlled	47
Pots & tanks, heating	48
Pressurization units	49
Pumps, high vacuum	57
Pumps, metering	50
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Lincoln Electric Co	56
Lindberg Eng'g Co	11-12-18-19
Link-Belt Co	10
Litton Eng'g Labs	18-30-32-47-56-57
L & R Mfg Co	8-15
MacDonald & Co	8
Magnaflux Corp	15-44
Magnetics Corp	39
Manostat Corp	5-6-7-18-19-32-47-57
Markem Machine Co	36
Martindale Electric Co.	15
Martin-Merrill Inc	8
Mast Development Co Inc	7
Matthews & Co Jas	36-53
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Measurements Research Co/Div	
Prudential Indust	3-59
Mech-Tronic Equipment Co	18-47
Merz Engineering Inc	2-3-59
Metal Fabricators Corp	54
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Metal & Thermit Corp	56
M-H Standard Corp	10-45
Micromech Mfg Co	4-21-28
Milford Rivet & Machine Co	39
Midwest Metal Products Inc	10-17-45-52
Miller Dial & Nameplate Co	36
Millers Falls Co	4-16
Minister Machine Co	37-51
Miskella Infra-Bed Co	18-47
Modern Laboratory Equip Co	5-6-7-18
Murphy & Miller	5-6-7-13-14-47
Mullard Equipment Ltd	8-55
Narda Ultrasonics Corp	8
Nat'l Ultrasonic Corp	8
Nat'l Vulcanized Fibre Co (Wilmington)	45
Nelson Vacuum Pump Co Geo F	57
Newage Industries Inc	36
Newbury Industries Inc	38
New Hermes Engraving Machine Corp	16-31
New Rochelle Tool Corp	37-56
Niagara Machine & Tool Wks	37-51
Nichols & Clark Inc	38
Norton Co	4
NRC Equipment Corp	5-7-11-12-14
Nuclear Products-Erco	18-28-34-57
Nyt Electronics Inc	37-39-45
Oakite Products Inc	8
Oneil-Irwin Mfg Co	37-38-45-51
Pacific Scientific Co	18-19-47
Peck Stow & Wilcox Co	37
Peer Inc	56
Pegasus Labs Inc	40
Penci Div	45
Pereny Equipment Co	18-47
Phillips Electronics Inc	5
Phillips Mfg Co	8
PIC Automation Division of General Controls	27
Pioneer Broach Co	37
Pittsburgh Electrodryer Div	13-14
Polytronics Co	15-18-47
Precise Measurements Corp	25
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Radio Frequency Labs Inc	15-44
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Rayco Electronic Mfg Co Inc	26-27
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Red Point Corp	34-57
Reed & Reese-Retron Corp	1-2-3-6-8-10-12-28
Reeve Electronics Inc	11-12
Research Inst Co Inc	3-11-12-18-33-59
Research Industrial Lab of Electronics	4
Richardson Labs Kenneth	15
Rico Instrument Co	16-26-31
Robinson Inc	48-50
Ronan Kunzel	45
Rotron Mfg Co	1
Sangamo Electric Co	14
Schaffer Air Industries	40
Scientific Eng'g Lab	5
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Selas Corporation of America	14-19-41-47
Shrader Co F W	44-45
Sherman Industrial Electronics	33-38-41-56
Southwest Products Inc	42
South Bend Lathe Works	16-20
Specialty Eng'g & Electronics Co	1
Spectra Electronics Corp	3
Stackbin Corp	45
Standard Electric Mfg Co	50
Standard Tool & Mfg Co.	2-3-18-19
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Statham Instruments Inc	5-6-7
Sta-Warm Electric Co	18-48
Steel & Alloy Tank Co	7-48-49-54
Stokes Corp F J	5-7-12-18-24
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Stempel Instrument Corp	3
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Surface Combustion Corp	1-13-19-47
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Thomas Electronics Inc	30
Thomas Instrument Co	43
Tiptronic Inc	38
Toledo Scale Co	42
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Universal Mfg Co Inc	26
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U S Testing Co	5-6-7
Utica Drop Forge & Tool	56
Vacuum Equip Div/N Y Air Brake Co	49-54
Vacuum Specialties Co	57
Vacuum Tube Products/Div Hughes Aircraft Co	56
Veeco Vacuum Corp	57
Victory Eng'g Co	6
Vickers Inc	56
Viking Pump Co	50
Virginia Electronics Co	41
Vulcan Electric Co	48
Wabash Metal Products Co	38
Wales-Strippit Inc	51
Warren Components Div El Tronics Inc	38
Warren Corp	6-34
Webber Manufacturing Co Inc	5-6-7
Weldmatic Div	56
Westinghouse Electric Corp (Pittsburgh)	1
Westlake Plastics Co	38
Wheelabrator Corp	17
White Dental Mfg Co	21
Whitney Metal Tool Co	37-51
Wiedemann Machine Co	51
Windsor Electronics Inc	30-32
Wood Steel Co Alan	45
Wyle Mfg Corp	5-6-7-40
Wyzenbeek & Staff Inc	4
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Abrams Instrument Corp	12
Acme Model Eng Co	22
Aeronutronic Systems Inc	2-3
Airborne Instrs Lab/Div Cutler Hammer Inc	1-3-4-6-7-11-13-14
Aircorn Inc (Roselle)	3-11-14
Aircraft Armaments Inc	22
Airtronics Int'l	15-16-18
Airtron Inc/Div Litton Industries	3-11-14
Amelco Inc	11
American Electronic Labs	3-6-7-9
American Machine & Foundry Co/Gen Eng Labs	2-3-11-14
American Machine & Foundry Co (New York)	3
Amp Inc	16-18-19-20
Andrew California Corp	3
Andrew Corp	3
Anso Div/Gen'l Aniline & Film Corp	4-12
Applied Technology Corp	20-22
Arma Div/American Bosch Corp	3
Artted Co Inc	16-19
Atlas Precision Products Co	1-3-4-22
A R F Products Inc (Ranton)	1
Audicon Electronics Inc	11
Autoentics Div/North American Aviation Inc	1
Avco Mfg Corp/Crosley Div	1-3-11-14
Avco Mfg Co/Nashville Div	2-3-4-12-35
Avion Div/ACF Industries Inc	11-14
Bart Mfg Corp (Newark)	3-10
Bel Fuse Inc	16-17-18-21
Bendix Aviation Corp/Bendix-Pacific Div	2-11-14
Bendix Aviation Corp/Bendix Radio Div	1
Bendix Aviation Corp/Eclipse-Pioneer Div	3
Benson-Lehner Corp	12
Birdair Structures Inc	3-10
Blaine Electronics Inc	3
Brach Mfg Corp/Div General Bronze Corp	3
Brew & Co Richard D	15-16-17-18-19-20-21
Brooks & Perkins Inc	3-4
Budd Stanley Co	3
Cameraflex Corp	12
Canadian Applied Research Ltd	2-12
Canadian Marconi Co	3
Canoga Div/Underwood Corp	3-7-11-14
Caswell Electronics Corp	3
Coaxial Connector Co Inc	3
Conrad & Moser	3
Consolidated Electrodynamics Corp (Pasadena)	9
Convair (San Diego)/Div Gen Dynamics Corp	1-2-3-6-10-22
Coors Porcelain Co	10
Corning Glass Works (Bradford)	10
Corbin Corp	1-3-11-14
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Designers for Industry	4-7-11-14
Diamond Antenna & Microwave Corp	3-10
D & S Mfg Co	3
DuMont Labs Inc Allen B	9
Dymec Inc	22
Dynamic Electronics Inc	3
Electronic Communications Inc	2-8-11-14
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Emerson & Cuming Inc	10
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Emerson Plastics Corp	4-10
E M I Cossor Electronics	1-9-12-16-17-20
ESC Corp	15-16-17-18-19-20
Fairchild Astrionics/Fairchild Engine & Airplane Corp	10
Fairchild Camera and Instrument Corp	12
Ferroxcube Corp of America	29
Filtcon Co	16-18
Flight Research Inc	12
Ford Instrument Co/Div Sperry Rand Corp	4
Gabriel Electronics/Div Gabriel Co	3-10
General Bronze Corp	3
General Communication Co	5-11-14
General Electric Co/Light Military Electronics Dept	22
General Mills Inc/Mechanical Div	3
Geotechnical Corp	9-12
Gordon Enterprises	12
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Grem Eng'g Co	11-14
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Gulton Industries Inc	3-5-10
Haller Raymond & Brown	3-22
Hazeltine Electronics Div/Hazeltine Corp	1-2-3-4-6-7-11-14-16-18-22
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Aircraft landing control	1
Altimeters	2
Antennas	3
Boards, plotting	4
Calibrators	5
Delay lines, cable type	15
Delay lines, distributed constant fixed	16
Delay lines, distributed constant variable	17
Delay lines, lumped constant fixed	18
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Indicators, plan position	7
Indicators, proximity	8
Oscillographs	9
Radar simulators	22
Radomes	10
Receivers	11
Recording cameras	12
Repeaters	13
Transmitters	14

Corbin Corp	1-3-4-5-11
Crosby Labs Inc	11
Daystrom-Western Industries	3
Dayton Aviation Radio & Equipment Corp	1-2-3-4-9
Designers for Industry	11-12
Edo Corp	6
Electronic Communications Inc	1-2-3-5
	6-7-9-11
Elk Electronics Labs Inc	3-6-8
Ellison Draft Gage Co	2-10
Emerson Electric	5
General Communication Co	6-12
Gray Mfg Co	1
Gulton Industries Inc	8
Hallamore Electronics Co	3
Hammarlund Mfg Co	7
Heller Raymond & Brown	3-5-12
Hazeltine Electronics Div/Hazeltine Corp	2-3-9
Heath Co	7
Hoffman Electronics Corp	1-2-4-5
Hogan Labs Inc	11
Industrial TV Inc	3-6
Infrared Industries Inc	5
Instrument Corp of Fla	1
ITT Federal Div/ITT	1-2-4-5-6-7-9
Jefferson Inc Ray	1
Kaar Eng'g Corp	1-10
Kearfott Inc (Clifton)	1
Land-Air Inc Instrument & Electronic Div	3
Lane Electronics Mfg Corp	7
Lear Inc (Santa Monica)	1-4-9
Lear Inc (Grand Rapids)	1-4-7-9
Lewyt Mfg Corp	1-2-3-5
Litton Industries of Maryland	2
Mackay Radio & Telegraph Co/Marine Div	1-6-8-10
Magnavox Corp	1
Microwave Eng'g Labs Inc	1-6-12
Mitchell Industries Inc	9
Muirhead Instruments Inc	11
Munston Mfg & Service Inc	7
Mullard Equipment Ltd	7
National Aeronautical Corp	9-5
Northern Radio Mfg Co Ltd	11
Northrop Aircraft Inc	5
Olympic Radio & TV	1
Pacific Semiconductors Inc	18
Packard Bell Electronics Corp	1-2-8
Phileo Corp	6-9
Phileo Corp/G & I Div	1-2-3-6-7-8-9-10-11
Photobell Co	10
Polarad Electronics Corp	1-2-3-6-12
Pye Telecommunications Ltd	1-3-7
Q O S Corp	5
Radio City Products Co	1-2-3-4-6-7-10
Radio Receptor Co Inc	1-3-6
Raytheon Co	1
Resdel Eng'g Corp	3
RS Electronics Corp	3
Setchell-Carlson Inc	13
Seeley Electronics	3-8-10
Seisor Mfg Co	2-3
Servo Corp of America	1-2
Specific Electronics	3
Sperry Gyroscope Co/Air Arm Div	1-6
Springer Aircraft Radio Corp	9
Stromberg-Carlson/Div Gen Dynamics Corp (Carlson Rd)	1-2-3-8-9
Technical Material Corp	3-7-10-11
Telectro Industries Corp	1-2-3-4-7-9-10
Telemarine Communications Co	1-3-6
Temco Aircraft Corp	1-2
Times Facimile Corp	11
Topp Industries Inc	1-9
Secode Corp	7-8
Sequoia Wire & Cable Co	3
Spectra Electronics Corp	2
Veron & Co George	6-9
Virginia Electronics Co	3-7
Westinghouse Electric Co/Air Arm Div	5
Westinghouse Electric Corp (Pittsburgh)	3
Westrex Corp	3-7-11
Winder Aircraft Corp of Fla	1
Zenith Radio Corp	1

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Duplicators, magnetic tape	1
Recorders, binaural tape	2
Recorders, dictation	3
Recorders, disc	4
Recorders, magnetic disc	5

Recorders, magnetic film stripe	6
Recorders, magnetic tape	7
Recorders, magnetic wire	8
Recorders, miniature tape/wire	9
Recorders, photographic film sound track	10
Recorders, portable	11
Recorders, sound	12
Recorders, studio	13
Recorders, synchronized film-tape	14
Recorders, tape loop	15
Recorders, telephone	16

Alto Fonic Music Systems Inc	7-12-15
American Concertone Div/American Electronics Inc	1-2-7-11-12-13
American Electronics Inc	2-7-11-14
American Elite Inc	5-7-11-13
American Geloso Electronics Inc	3-7-9-11-12-14-16
Ampex Corp (Redwood City)	1-2-7-11-12-13-15
Ampex Audio (Sunnyvale)	7-11-13
Amplifier Corp of America	2-7-11-15
Applied Magnetics Corp	9
Audio Instrument Co	15
Audio-Master Corp	2-7-11-15-16
Aurex Corp	8-9
Avionics Ltd	7
Basic Controls Inc	15
Bell Sound Div/Thompson Ramo Wooldridge Inc	2-7-11
Bergen Labs	5
B J Electronics	7-9
Bogen-Presto Co	1-4-7-11-12-13
Bolsey Research & Development Corp	6-7
Broadcast Equipment Specialties Corp	7-11-12
Cleveland Electronics Inc	2-7-11-12
Components Corp	4
Comptometer Corp	3-9-11
Consolidated Electrodynamics Corp	7-9-15
Cousino Inc	1-7-14-15
Cross County Audio Exchange	1-2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17
Delmonico International Div/Thompson-Starrett Co Inc	7
Designers for Industry	7-9
Dictaphone Corp	3-7-9-11-12-16
Doty Acoustical Electronic Labs	9
Electronic Applications Inc	2-7-9-11
Electro Vision Lab	2-14-15
Elk Electronics Labs Inc	7
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Ercona Corp	2-7-15
Fairchild Recording Equipment Co	4-5-7-11-12-13-14
Federal Mfg & Eng'g Corp	6-7
Fen-Tone Corp	1-2-7-10-12-14
Gates Radio Co	7
General Radio Co	12
Gordon Enterprises	7-10-11-12-13-14
Gotham Audio Development Corp	4-13
Gray Mfg Co	3-4-11-12-17
Gulton Industries Inc	7-15
Heath Co	2-7
International Radio & Electronics Corp	7
La Belle Industries Inc	2-7-14
Lane Electronics Mfg Corp	2-7
Leach Corp/Inent Div	7-9
Litton Industries of Calif	5-6-7-10-11-12-13
Magnecord Div/Midwestern Instr Inc	1-2-7-9-11-12-13-15
Magnasynce Mfg Co	6-7-11-12-13-14
Magnetic Recorders Co	1-2-5-6-7-8-9-11-12-15
Medcraft Electronic Corp	7
Midwestern Instruments	1-2-7-9-11-12-13-15
Miles Reproducer Co	3-9-11-12-13-14-15-16
Mincom Div/Minn Mining & Mfg Co	7
Minn-Honeywell Regulator Co/Davies Labs Div	7-15
Newcomb Audio Products Co	2-7-11
Olympic Radio & TV	7
Packard Bell Electronics Corp	7-9-15
Pampa Electronics Corp	6
Peirce Dictation Systems	3-7-8-9-11-16
Pentron Corp	2-7-11-12-13-15
Polytronics Inc	1-2-3-7-11-12-13-15
Printed Electronic Research Inc	11
Pye Telecommunications Ltd	16
Rangertone Inc	6-11-13-14-15
Roberts Electronics Inc	2-7-11
Robinson Recording Labs	4
Rowe Industries	1
Shrader Sound Inc	14
Smith Assoc Inc Rawdon	1
Sorensen Industrial Electronic Co	7
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Southwestern Industrial Electronics Co/Div Dresser Industries Inc	1-2-3-7-11-12-13-15

Stancil-Hoffman Corp	1-2-6-7-9-11-12-13-14
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Telectro Industries Corp	1-2-3-7-8-9-11-12-13-14-16-16
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US Recording Co	1-7-11-12-13
Viking of Minn	1-2-7-11
V-M Corp	2-7-11
Warwick Mfg Corp	2-7-11-12-15
Waters Conley Co Inc	4-11-12-13
Webeor Inc (Bloomington Ave)	7-11
Webeor Inc (Kedzie)	1-6-7-8-9-15
Webster Electric Company	2-7-11
Westinghouse Electric Corp (Pittsburgh)	11
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Wilcox Gay Corp	7-11

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Recorders, data	3
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Recorders, film thickness	6
Recorders, frequency	7
Recorders, material thickness, electronic	8
Recorders, oscillograph	9
Recorders, polar	10
Recorders, ph	11
Recorders, portable	12
Recorders, power level	13
Recorders, pressure, electronic	14
Recorders, self-balancing	15
Recorders, smoke & combustion	16
Recorders, strain	17
Recorders, telemetering	18
Recorders, teletype	19
Recorders, temperature	20
Recorders, timing	21
Recorders, torque	22
Recorders, transient	23
Recorders, vacuum	24
Recorders, vibration	25
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Allerhany Instrument Co	9-14-17-21-22-23-25
Amelco Inc	3-21
American Concertone Div/American Electronics Inc	3-18
American Electronics Inc	3-12-18-26
American Electronics Inc/Taller & Cooper Div	3-29
American Optical Co/Instrument Div	11
American Tradair Corp	1
Ampex Corp	3-4-12-18-19-23-25-26
Anso Corp/Genl Aniline & Film Corp	5
Antlab Inc	1-11-13-28
Applied Science Corp of Princeton	18
Arkay Co	2
Atomic Accessories Inc	30
Automatic Timing & Controls Inc	6-8-14-15-17-22-27-28
Autoentics Div/North American Aviation Inc	3
Automation Management Inc	3-4
Bailey Meter Co	10-16-18-20
Baird-Atomic Inc	3-17
Baldwin-Lima-Hamilton Corp	14-17-22-25-27
Barber-Colman Co	10-14-15-16-17-20
Basic Controls Inc	16
Beattie-Coleman Inc	29
Beckman Instruments Inc/Systems Div	3
Beckman Instruments Inc/Scientific & Process Instr Div	10
Beckman Inst Inc/Berkeley Div	3-7-21
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B & F Instruments Inc	17-22
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California Computer Products	3-28
Calif Technical Industries/Div Calif Technical Ind	1
Cambridge Instrument Co	10-25
Canadian Applied Research Ltd	3-5-9
Centronix Inc	3-7-8-9-12-18-21
Century Electronics & Instruments Inc	9-12-17-25
Consolidated Electrodynamics Corp (Pasadena)	3-9-12-14-17-18-24-25-30
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Curtiss-Wright Corp/Electronics Div	3-6-8
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Designers for Industry	4-26
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Electro Instrument Inc	3-28
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Electro-Technical Labs	9
Ellis Associates	17
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Ercona Corp	5
Esterline-Angus Co	12-21-24-30
Fairchild Camera and Instrument Corp	29
Fen-Tone Corp	26
Fisher & Porter Co	3-14-18-20-24
Flight Research Inc	3-5-29
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General Devices Inc	18
General Electric Co/Apparatus Sales Div	7-10-13-14-16-17-18-20-21-25
General Kinetics Inc	3
General Precision Lab Inc (Pleasantville)	6
General Radio Co	13-25
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Geotechnical Corp	3-9-18-22-25
Gilmore Industries Inc	3-14-15-17-20-21-22-27-28
Good Electronics Corp	17-20
Gordon Enterprises	5-9
Green Instruments Inc H J	20
Gulton Industries Inc	2-3-14-18-20-25
Hagan Chemicals & Controls Inc	3-10-14-15-16-18-20-24
Hanson-Gorrill Brian	3
Hastings-Raydist Inc	14-24
Hathaway Instrument Div/Hamilton Watch	9-17
Haydon Co A W	21
Hays Corp	10-14-16-20
Healy-Ruff Co	18
Hewlett-Packard Co	3
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Honeywell Controls Ltd	3-7-8-9-10-12-14-15-16-17-18-20-22-24-27-28
Hughes Products	9
Hull-Standard Corp	24
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Industrial Electronic Engineers Inc	27
Industrial Timer Corp	21
Inso Co/Div Barry Controls	25
Instrumentation Associates	9-10-20
Jackson Electronics	3
Kahl Scientific Instrument Corp	20
Kay Electric Co	2-3-7-18-23-25
Kleinschmidt Div/Smith-Corona Marchant Co	6-12
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Leach Corp-Inst Div	3-12-18
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Lewyt Mfg Corp	3-28
Librascope Inc/Commercial Div	28
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Litton Industries of Calif	4-5-29
Livingston Audio Products Corp	16
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Magnavox Research Labs	29
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Magnetic Instrument Co Inc	3-9-15-17-18-20-27
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Moeller-Instrument Co	20-21
Muirhead Instruments Inc	4
Non-Linear Systems Inc	17-20
Northeastern Eng'g Inc	7
NRC Equipment Corp	24
Nuclear-Chicago Corp	15-21
Ohmart Corp	6
Oltronix Co	3
Optron Corp	25
Packard Bell Electronics Corp	18
Par Products Corp	3-29
Partlow Corp	20
Perkin-Elmer Corp	29
Photographic Analysis Inc	29
Photomation Inc	8-16
Photon Instrument Co	9-12-17
Potter Instrument Co	2-3-7-19
Prescott TV Co	26
Pryometer Instrument Co	20
Ram Meter Inc	21
Rea Co J B	3-18-21
Reeves Soundcraft Corp	3
Ruge Assoc Inc Arthur C	20
Sanborn Co	3-7-9-12-13-14-17-28-30
Santa Barbara Div/Curtiss-Wright	3-18-23
Scientific-Atlanta Inc	1-11
Scientific Glass Apparatus Co	20
Serdex Inc	20
Servomechanisms Inc	3
Shand & Jurs Co	3-18
Solartron Electronic Group Ltd	6
Soroban Eng'g Inc	3
Southwestern Industrial Electronics Co/Div Dresser Indus Inc	9-12
Southwest Products Inc	27
Stancil-Hoffman Corp	5-12
Standard Instrument Corp	3-7-16-21
Stoelting Co C H	9-15-29
Strandberg Eng'g Labs Inc	3-18
Streeter Amet	3-15-18-21-27
Stromberg-Carlson Co/Div Gen Dynamics (San Diego)	3-4-5-28-29
Systron Corp	3-7-17-18-21-23
Taller & Cooper	3-27
Technical Products Co/Instrument Div	12-15
Technitrol Eng'g Co	3-4-21
Telechrome Mfg Corp	5
Telectro Industries Corp	3-18-26
Tele-Dynamics Inc	18
Television Specialty Co Inc	5
Temco Aircraft Corp	18-26
Thermo Electric Co	20
Thwing Instrument Co Albert	17-20-28
Times Facsimile Corp	4
Toledo Scale Co	27
Tri-R Instruments	20
United Electrodynamics	18-28
U S Taximeter Corp	3
Vacuum Tube Products/Div Hughes Aircraft Co	24
Varian Associates	12-15
Veeder Root Inc	8
Victor Adding Machine Co	3
Vought Co	3-29
Waldorf Electronics/Div F C Huyck & Sons	3-28
Wang Labs Inc	2-3
Warren Mfg Co	2
Warwick Mfg Corp	3-12
Waugh Eng'g Co	7
Webcor Inc	3
Weksler Instruments Corp	20-24
Westinghouse Electric Corp (Pittsburgh)	7-12-18
West Instrument Corp	14-20
Weston Instruments	10-12-14-15-20-21
Westrex Corp	5-12-26
Westronics Inc	1-3-7-10-12-14-15-16-17-20-22

76—RECORDING ACCESSORIES

Discs, blank	1
Drivers	2
Equalizers	3
Footage counters	4
Heads, cutting	5
Heads, recording	6
Needles, cutting	7
Paper, facsimile recording	8

PRODUCT MFRS

74-75-76—Recorders & Recording Access.

Pickups, transcription & phonograph	9
Record molding compounds	10
Record preforms	11
Reels	12
Screw feeds	13
Stylus, rotary	14
Tape magazines, continuous	15
Tape, magnetic	16
Tape splicers	17
Tape, splicing	18
Tape threaders	19
Turntables	20
Wire, magnetic	21

Aerovox Corp (New Bedford)	3
Alfax Paper & Eng Co	1-8
Allied Radio Corp	1-16-21
Allied Recording Products Co	1-16
Alonge Products Inc	17
American Concertone Div/American Electronics Inc	6
American Geloso Electronics Inc	9-12-16
American Molded Products Co	12-15
Ampex Corp (Redwood City)	12-16-17
Amplifier Corp of America	15
Argonne Electronics Mfg Corp	9-17
Arnold Eng'g Co/Repach Pacific Div	16
Applied Magnetics Corp	6
Astatic Corp	5-6-9-12-16
Audio Devices Inc	1-7-12-16
Audio-Master Corp	16
Audiotex Mfg Co	17-18-19
Bogen-Presto Co	1-3-5-6-7-9-20
Bolsey Research & Development Corp	16
Bram Metallurgical-Chemical Div	21
Burnell & Co Inc	3-18
Canadian Astatic Ltd	5-9
Centronix Inc	2-8-9
Cinematic Developments	4
Clevite Harris Prods Inc	1-10
Commercial Radio Sound Corp	20
Components Corp	5-11-20
Cousino Inc	15-16-17-18
Durant Mfg Co	4
Dynamu Magnetics Corp	6
Electronic Applications, Inc	9-12-20
Electro-Sonic Labs	9
E M I Cossor Electronic	4-16-17
English Electric Valve Co Ltd	5-6-12
Ercona Corp	9-17-20
Ernie Resistor Corp	9
Fairchild Recording Equipment Co	3-5-6-7-9-20
Fen-Tone Corp	6
Ferro Dynamics Corp	16
Fideltone Inc	7-16-21
Florman & Barb	16-17
General Cement Mfg Co	21
General Electric Co/Audio Components Product Sec	9
General Electric Co/Apparatus Sales Div	8
General Transistor Western Corp	6-7
Gordon Enterprises	4-12-16-17
Gotham Audio Development Corp	5-6-20
Gray Mfg Co	1-20
Greg	6
Harwald Co Inc	16
Hogan Labs Inc	8
Jensen Industries Inc	7
Kling Metal Spinning & Stamping Co	20
Knowlton Brothers	8
Librascope Inc/Commercial Div	6
Litton Industries of Calif	5-6
Magnasync Mfg Co	3-4-6
Magnecord Div/Midwestern Instruments Inc	6
Magnelectronics	16-17
Maico Electronics Inc	6
Michigan Magnetics Inc	6
Midwestern Instruments	6
Miller Mfg Co M A	7
Minn-Honeywell Regulator Co/Davies Labs Div	6-12
Minnesota Mining & Mfg Co	12-16-18
Minn Mining & Mfg Co/Electrical Products Div	12-16-18
Muirhead Instruments Inc	8
National Cine Equipment Inc	4
National Standard Co	21
Neumade Products Corp	4-12-17

Norton Associates Inc	6
Nortronics Co Inc	6
Orradio Industries Inc	12-16-17-18
Packard Bell Electronics Corp	15
Pampa Electronics Corp	6
Penron Corp	6
Permacel	18
Permo Inc	7-16-21
PIC Design Corporation	1
Pickering & Co Inc	3-9
Potter Instrument Co	6
Precision Radiation Instruments Inc	1-11
Pro-Tex Reel Band Company	12
Pulse Techniques Inc	3
Radio Corp of America/Commercial Electronic Products	3-4-9-12-15-16-20
Rea Co J B/Electronics Div	6
Recoton Corp	1-7-16
Reeves Soundcraft Corp (Danbury)	16-18
Reeves Soundcraft Corp (Springdale)	1-15-16
Robins Industries Corp	12-17-18-19
Robinson Recording Labs	20
Rockbar Corp	6
Ronette Acoustical Corp	9
Rosco Labs Inc	17-18
Saxton Products Inc	15
Shure Bros	6-9
Smith Assoc Inc Rawdon	6
Sonotone Corp	6
Southwestern Industrial Electronics Co	2-6-16
Stancil-Hoffman Corp	3-4-6
Talking Devices Co	5-6
Tapedcode	16
Taylorcoil Corp	12
Technical Oil Tool Corp	13
Telectro Industries Corp	6
Times Facsimile Corp	8
United Transformer Corp	3
U S Rubber Co	18
Veeder Root Inc	4
Waldo Electronic	3
Walsco Electronics Mfg Co	2
Webcor Inc (Bloomingdale Ave)	12-16-21
Webcor Ltd (Kedzie)	15
Webster Electric Co	6
Westrex Corp	2-3-5-6-9-15-16

77—RECTIFIERS

Amplifiers, thyatron	14
Battery eliminators	1
Inverters	2
Rectifier power units	3
Rectifiers, copper oxide	4
Rectifiers, electronic tube	5
Rectifiers, germanium	6
Rectifiers, mercury or	7
Rectifiers, metal oxide	8
Rectifiers, metal sulphide	9
Rectifiers, metallic stack	10
Rectifiers, selenium	11
Rectifiers, silicon	12
Rectifiers, titanium	13

Accurate Electronics Co	3-5-7-10-11
Adler Electronics Inc	2-3
American Electronics Lab	1
American Electronics Inc	2
American Geloso Electronics Inc	2
Amp Inc/Capitron Div	3
American Television & Radio Co	1-2-3
Arnoux Corp	2-3
Audicon Electronics Inc	3-5
Audio Devices Inc	12
Audio Devices Inc/Rectifier Div	12
Automatic Mfg Co	12
Auto Test Inc (Chicago)	1-3
Barry Electronics Corp	11-12
Bradley Semiconductor Corp	4-11-12
Bogue Electric Mfg Co	2-3-6-10-11-12
Bradley Semiconductor Corp	3-4-8-10-11-12
Bristol Co	2
Bundy Electronics Corp	3
Butcher Co L H	3-4-6-8-9-10-11-12
Chatham Electronics/Div Tung-Sol Electric Inc	1-2-3-5-10-11-12
Christie Electronic Corp	1-3
Clark Electronic Labs	3-5-6-7-11-12
Conant Labs	4-11
Continental Device Corp	12
Control Circuits Inc	3-11-12
Davenport Mfg Co	1
Dresser Electric Co	11
Eitel-McCullough Inc	5
Electric Storage Battery Co/Exide Ind Div	4-11-12

Electronic Devices Inc	11
Elk Electronics Labs Inc	3
Farmer Electric Products Co	8-20
Fox Products Co	1-3-10-12
Gahagan Inc	6
Gates Electronic Co	1-2-3-4-5-6-7-8- 9-10-11-12-13
General Electric Co/Apparatus Sales Div	4-5-6-10-11-12
General Electric Co/Power Tube Dept	2-5-7
General Electric Co/Low Voltage Switchgear Dept	1-2-3-4-6-7-10-11-12
General Instrument Corp	6-11-12
General Railway Signal Co	3-4
Great Eastern Mfg Co	11-12-13
Green Rectifier Co	1-3-6-10-11-12
Hanson-Van Winkle-Munning Co	3-6-11-12
Heath Co	1-2
Hewson Co Inc	3-5
Hoffman Electronics Corp	12
Hoffman Electronics Corp/Semiconductor Div	12
Hughes Products Group/Hughes Aircraft Co	12
International Rectifier Corp	6-10-11-12-13
International Resistance Co (Phila)	11
Int'l Resistance Co (Boone)	11
ITT Components Division	1-5-10-11-12-14
Jordan Electronics/Div Victoreen	2
Kaiser Electronics Inc	1-2-8
Kemtron Electron Products Inc	6-12
Kepeco Inc	1-2-3
Kinetics Corp	2
Kuthe Labs	5
LaMarch Mfg Co	11
Leach Corp-Inet Div	2-3
Leland Airborne Products	2
Leland Inc G H	11
Meterlog Corp/Sub Air Logistics Corp	1-2-3
Mallory & Co Inc P R (Gray St)	4-9-12
Mallory & Co Inc P R (E Washington St)	9-12
Microwave Associates Inc	12
Model Rectifier Corp	1-3-10
Motigraph Inc	11
Motorola Inc/Semiconductor Products Div	12
Mullard Overseas Ltd	5-6-12
NJE Corp	1-3
Opad Electric Co	1-3-4-5-6-7-8-9-10-11-12-13
Pacific Semiconductors Inc	12
Perkin Eng'g Corp	1-2-3-6-10-11-12
Peschel Electronics Inc	1-3
Plastic Capacitors Inc	3
Power Supplies Inc	3
Precise Measurements Corp	3
Radio Corp of America/Electron Tube Div	12
Radio Industries Inc	11
Radio Receptor Co Inc	10-11
Rapid Electric Co	3
Raytheon Co/Semiconductor Div	12
Raytheon Co/Distributor Products Div	5-6-12-14
Raytheon Co (Waltham)	1-12
Rectico Inc	4-7-8-9-10-11-12
Rectifier Corp	11
Reliance Electric & Eng'g Co	3-5-7
St Eloi Corp	13
Sanford Miller Co	1-3-10-11-12
Santa Barbara Div/Curtiss Wright	11-12-13
Schauer Mfg Corp	1-3-4-8
Schrack Electrical Sales Corp	3-11
Sel Rex Corp	1-3-4-5-6-8-9-10-11-12
Semicon Inc	12
Shrader Co F W	3
Slaughter Co	3
Southwestern Industrial Electronics Co/Div Dresser Ind Inc	1-2-3-4-5-6-12
Syntron Co	3-11-12
Tarzian Inc Sarkes	11-12
Technic Inc	6-11
Technical Apparatus Builders	1-2-3-4-5-6-7-8- 9-10-11-12-13-14
Telker Inc	1-2-3
Thermosen Inc	12
Transitron Electronic Corp	6-12
Trans-Sil Corp	3-10-12
Transval Electronics Corp	2-3
Union Switch & Signal Div	4-8
Universal Transistor Products Corp	2-3
U S Dynamics Corp	1-2-3-6-12
U S Semiconductor Products	12
Varo Mfg Co	2
Vacuum Tube Products Div/Hughes Aircraft Co	21-22-25-27-30-33-34-38
Vectrol Eng'g Inc	5-14
Vickers Inc/Electric Products Div	3-10-11
Veron & Co George	1
Weltronic Co	5
Westinghouse Electric Corp (Pittsburgh)	3-4-5-6-8-10-11-12

Westinghouse Electric Corp/ Semiconductor Dept	12
Weston Instruments/Div Daystrom Inc	4
Westrex Corp	3
Winder Aircraft Corp of Fla	1-2-3

78—RELAYS

Relays, audio operated	1
Relays, capacitance	2
Relays, coaxial	3
Relays, contact	4
Relays, crossbar	5
Relays, d'arsonval	6
Relays, differential	7
Relays, electronic	8
Relays, frequency selective	9
Relays, hermetically sealed	10
Relays, high voltage	11
Relays, impulse	12
Relays, keying	13
Relays, latching	14
Relays, mercury	15
Relays, meter	16
Relays, overfrequency	17
Relays, overload	18
Relays, overvoltage	19
Relays, photoelectric	20
Relays, plate circuit	21
Relays, polarized	22
Relays, power	23
Relays, R-F	24
Relays, rotary	25
Relays, sequence	26
Relays, stepping	27
Relays, subminiature	28
Relays, telephone	29
Relays, thermal	30
Relays, thermostatic delay	31
Relays, three position	32
Relays, time-delay	33
Relays, tuned audio	34
Relays, underfrequency	35
Relays, undervoltage	36
Relays, vacuum contact	37
Relays, vibrating reed type	38
Relays, video switching	39
Solenoids	40

Abrams Instrument Corp	33
Ace Electronics Associates	10-28
Acme Model Eng Co	8-10-30-31-33
Adams & Westlake Co	15-33
Advanced Products	26-28-33
Advance Relay Co	10-25-27-28
Advance Relays/Electronics Div	3-4-5-8-10-11-13- 14-18-21-23-25-27-28-29-30-31-32-33-40
Ad-Yu Electronics Inc	4-10
Aerolite Electronics Corp	21-28-40
Aeromotive Engineering Products Ltd	5-6-7-8-10-12- 13-14-16-17-18-19-21-22-23- 26-27-28-29-33-35-36-39-40
A G A Div Elastic Stop Nut Corp	33
Allard Instrument Corp	1-14
Allen-Bradley Co	4-5-8-18-33-36-40
Allied Control Co Inc	3-7-10-11-12-13-14-15- 18-19-21-22-23-24-25-28-29-32-33-36-37-39
Alto Scientific Co	8-27-33
American Electronics Co	4-10-11-12-13-14- 21-23-24-28-29-33 8-23-33
American Instrument Co Gen Eng Labs	1-4-8-12-27-28-29-40
American Television & Radio Co	38
Amperite Company Inc	7-31-33
Anadex Instruments Inc	8-9-17-19-33-35-36
Anderson Controls Inc	40
Argonne Electronics Mfg Corp	21-28
Arrow-Hart & Hegeman Electric Co	18-23-30-33
Artisan Electronics Corp	4-7-8-10-11-12-13-14- 18-19-20-21-22-23-24-25-26-27-29-32-36-40
Assembly Products Inc	4-6-7-9-10-14-16- 17-18-19-22-35-36
Atlas Electric Products Co	10
Audocall Co	14-15-25
Automatic Electric Co	10-12-13-14-15-22- 25-26-27-29-33-39-40
Automatic Metal Products Corp	3-24
Automatic Timing & Controls Inc	8-10-12-33
Autotron Inc	20

PRODUCT MFRS

77—Rectifiers; 78—Relays

<p>Avionics Ltd 14-15-18-20-24-28-29-33-40 Babcock Relays Inc 4-7-8-10-12-13-14-15-18-19-21-22-23-25-28-29-32-36-39 Barber-Colman Co 10-22 Barber-Coleman Co/Elec Comp Div 9-14-22 Baskon Corp 5-7-8-9-10-13-14-17-21-22-23-25-26-27-28-33-35-36-40 Baso Inc 8-10-28-33 Bassett Inc Rex 8-10-18-19-21-28-30-33 Beck Co Harold 7-8 Bendix Aviation Corp/Red Bank Div 17-19-23-36 Bergen Labs 8-26-27 Bernco Eng'g Corp 15 Biddle Co James G 9-38 Branson Corp 4-10-12-18-19-21-22-23-25-28-31-33-36 Bristol Co 7-8-10-12-22-28-37-38 B/W Controller Corp 40 Cable Electric Products 30 Calbest Electronics Co 1 Cal-Ohm Labs Inc 40 Caltron Products Co 40 Canadian Research Institute 6-8-16-20-33 Cannon Electric Co 40 Cannon Electric Canada Ltd 1-3-4-10-11-12-13-14-18-19-21-23-24-25-28-29-30-31-33-39-40 Clare & Co C P 10-13-14-15-21-22-23-27-28-29-33-37-39 Clark Controller Co (Los Angeles) 8-14-18-23-26-27-30-33-36 Clark Controller Co (Cleveland) 4-8-11-14-18-19-20-22-23-30-33-36 Comar Electric Co 8-10-12-13-14-21-23-28-29-33 Commercial Radio Sound Corp 1 Communication Accessories Co 34 Continental Electronics Corp 3-25-33-40 Controls Co of America (Schiller Park) 40 Couch Ordnance Inc 25 Cramer Controls Corp 10-33 Cunningham Son & Co James 5-39-40 Curtiss-Wright Corp/Electronics Div 40 Cutler-Hammer Inc 4-8-10-11-18-23-26-33 Danbury Knudsen/Div Amphenol Borg Electronics Corp 3 Datascan Inc 8-20 Davis Electric Co 14-28-29 Deitz Co S J 8-20-33 Denrad Mfg Co Inc 1-20 Dormeyer Industries 40 Dow-Key Co Inc 3-8-23-39 Dura Kool Inc 15-33 Eagle Signal Corp 10-14-26-33 Ebert Electronics Corp 8-10-14-15-23-30-37 Edison Industries Thomas A/Instrument Div 6-7-10-16-22-30-31-33 Electric Regulator Corp 9-17-19-35-36 Electro-Mechanical Instrument Co 28 Electro-Mechanical Specialties Co 4-7-8-10-12-18-19-21-23-25-28-29-33-35-36 Electric Computer Co 3-10-38 Electronic Control Corp 8-18-20-33 Electronics Div/Elgin Nat'l Watch Co 3-4-8-10-11-13-14-17-18-19-23-24-26-27-28-29-30-31-32-33-35-36-39 Electron-Radar Products 10-15-20-23-33 Electro-Switch & Controls Inc 10-12-14-22-23-28-29-33 Electro Tec Corp 10-23-40 Ely Sales Co 20 E M I Cossor Electronics 28 Energy Controls Inc 15-20 Ercona Corp 30 Essex Wire Corp 2-4-5-10-11-18-23-29-40 Filters Inc 7-10-14-18-19-21-23-25-28-36 Fisher Pierce Co 20-23 Five Star Co 4-23-26-40 Gates Radio Co 21-23-24 General Automatic Corp 4-7-8-9-10-12-13-14-18-19-21-23-28-29-30-33-35-36 General Communication Co 3-24 General Controls Co 4-40 General Electric Co/Apparatus Sales Div 7-8-9-11-14-18-19-20-22-23-26-28-33-36-40 General Electric Co/Industry Control Dept 18-19-30-33-36-40 General Electric Co/Specialty Control Dept 8-10-20-28-33 General Electric Co Ltd of England (Charles St) 14-25-27-29 General Electric Co Ltd of England c/o Intra Corp (University Rd) 14-27-29 General Railway Signal Co 9-18-19-27-30-32-33 Glass-Tite Industries Inc 10 Globe Electrical Mfg Co 3-4-10-11-13-14-21-25-29-33-40 Gordos Corp 10-15-37-38 Guardian Electric Mfg Co 4-8-10-11-12-13-14-18-21-23-25-26-27-28-29-32-33-36-40</p>	<p>Gulton Industries Inc 1-2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17-18-19-20-21-22-23-24-25-26-27-28-29-30-31-32-33-34-35-36-37-38-39-40 G-V Controls Inc 8-10-17-18-19-30-33-35-36 Hamlin Inc 10-15-24-30-31-36 Hartman Electrical Mfg Co 4-9-10-14-17-18-19-22-23-26-33-35-36 Hart Mfg Co 2-4-8-10-18-22-23-26-28-33 Haydon Co A W 8-10-26-28-33 Haydon Div/General Time Corp 33 H-B Instrument Co 8-11-15-37 Heath Co 1 Heinemann Electric Co 18-33 Hi-G Inc 10-21-23-25-28 Hillburn Electronic Products Co 4-5-10-12-13-14-18-19-20-21-23-27-28-29-33-39-40 Honeywell Controls Ltd 4-8-14-15 Hufco Industries 10-21-23-28-29 Hughes Products/Hughes Aircraft Sta 30 Industrial Products/Amphenol-Borg Electronics Corp 3-24 Int'l Instruments Inc 16 Iron Fireman Mfg Co/Electronics Div 10-14-25-28 Jaidering Mfg Co 10-12-14-18-19-21-23-26-28-33-38 James Vibrapowr Co 1-3-13-23-40 Jennings Radio Mfg Corp 37 Johnson Co E F 8 Jordan Electronics Div Victoreen 8-9-10-12-13-14-17-18-19-26-27-28-33-35-36 J-V-M Microwave Co 3-24 Kellogg Switchboard & Supply 5-9-12-29 Kidde & Co Walter 8-14-23 Kinetics Corp 4-10-23-36 Kurman Electric Co/Div Norbut Corp 3-4-8-10-11-12-13-14-18-19-20-21-22-23-24-28-29-33-39 Land-Air Inc (Chicago) 40 Larson Instrument Co 4-6-7-8-13-14-16-18-19-20-22-23-36 Leach Corp/Leach Relay Div 4-7-8-9-10-11-12-13-14-17-18-19-21-22-23-24-25-26-27-28-29-31-32-33-35-36-40 Leach Corp/Inet Div 7-8-9-10-11-12-13-14-17-18-19-21-22-23-24-25-26-27-28-29-31-32-33-35-36-40 Leetronics Inc 40 Lektra Labs Inc 33 Leland Inc G H 10-25-27-40 Life Instrument Co 1-4-7-10-18-19-21-23-30-33-36 Linlar Inc 40 Line Electric Co 4-14-21-30-33 Lisk Co G W 40 Livingston Electronic Corp 30-33 Logeman Co C W 8 Luther Mfg Co 7-10-22-28 Magnecraft Electric Co 3-4-5-7-10-11-12-13-14-18-19-23-28-29-33-36 Magnetic Devices Inc 3-14-22-25 Magnetic Research Corp 8 Magnetics Corp 38-40 Magnuson Engineers Inc 25 Makepeace Div 4-5-25 Mallory & Co Inc P R (S Gray St) 28 Mallory & Co Inc P R (E Washington St) 10-21 Maynadyne Corp 4-7-10-13-20-21-22-24-28-33-36-39 Marion Instrument Div 3-6-10 Mason Electric Corp 10-14-27-40 Miratel Inc 1-33 Mobile Electronics Mfg Co 1 Modelectric Products Corp 40 Molex Products Co 23 Muirhead Instruments Inc 7 Muirhead & Co Ltd 7 Mullenbach Div/Electric Machinery Mfg Co 8 Naybar Laboratories Inc E V 10-18-19-21-23-25-28-33-36-40 Networks Electronic Corp 10-30 North Electric Co 26-27-28-29-33-36-38 Northern Radio Mfg Co Ltd 8 Oak Mfg Co 40 Ohmite Mfg Co 4-10-14-18-19-21-23-29-33-36 OK Electronics Corp 4-7-8-9-10-11-19-21-23-30-33-36-37 Opad Electric Co 8-11-17-18-19-33-35-36 Pacific Scientific Co 28 Paragon Electric Co 33 Peebles & Co Bruce, Ltd 8-14-20 Pendar Inc 8-14-33 Penta Laboratories Inc 37 Permoflux Products Co 40 Peschel Electronics Inc 8-11 Phastron Instrument & Electronics Co 4-10-21-23-25 Phila Scientific Glass Co 4-8-10-15-23-37</p>	<p>Philco Corp/G & I Div 8-24-26-27-28-29-33-34-39 Phillips Control Corp 4-8-10-11-12-13-14-21-23-24-28-29-33-39-40 Photobell Co 2-20 Photo-Crystals 10-15-20-23-33 Photomation Inc 20 Pollak Corp Joseph 3-4-5-7-10-11-20-28-29-33-36-40 Potter & Brumfield Inc 1-2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17-18-19-20-21-22-23-24-25-26-27-28-29-30-31-32-33-34-35-36-37-38-39 Precision Scientific Co 8 Precision Thermometer & Instrument Co 8-28 Price Electric Corp 3-4-10-11-13-18-19-21-23-24-25-27-28-29-33-36 P S P Eng'g Co 40 Radar Relay Inc 10-13 Radio Corp of America/Commercial Electronic Products 8-10-24-25-28 Radio Eng'g Products 13 Radionic's Inc 40 Ramco Products 10-15-31 Randall Inc Douglas 10-23-28-40 R-B-M Div Essex Wire Corp 2-4-5-8-10-11-18-20-21-23-24-29-30-31-40 Relay Sales Inc 3-4-7-8-10-11-12-13-14-15-18 Renfrew Electric Co Ltd 3-7-8-9-10-11-14-15-18-19-23-26-27-28-29-30-33 Research Industrial Lab of Electronics 8 Revere Corp of America 10-38 Rhodes Inc M H 33 Ripley Co 8-20 Riverbank Labs Eng'g Dept 9 Rixon Electronics Inc 8-24 Robertshaw-Fulton Co 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Welwyn Electrical Labs	8
Western Felt Works	1-2-3-11
Westinghouse Electric Corp (Pittsburgh)	10
Westlake Plastics Co	1
Zell Products Corp	8-10
Zohpar Mills Inc	9

81—SEMI-CONDUCTORS

Cells, silicon solar	16
Closures, diode	17
Closures, transistor	18
Diodes, germanium	2
Diodes, photosensitive	12
Diodes, silicon	3
Diodes, selenium	13
Diodes, zener	19
Transistors, diffused base	20
Transistors, junction	4
Transistors, photo	5
Transistors, point contact	6
Transistors, power	7
Transistors, germanium	14
Transistors, silicon	15
Transistors, surface-barrier	9
Transistors, switching	10
Transistors, tetrode	11

American Lava Co	17
Amperex Electronics Corp	1-2-3-4-5-7-10-12-14
Automatic Mfg Co	2-3-19
Bendix Aviation Corp/Red Bank	
Div	1-3-4-7-10-14-20
Bendix Aviation Corp/Red Bank	
Div Semiconductor Dept	3-4-7-10-14
Bogue Electric Mfg Co	14-15-20

80—SEALS

O-Rings	1
Rings, oil sealing	2
Rings, retaining	3
Rings, slip	4
Rings, slip & brush assemblies	5
Sealers, protective	6
Seals, carbon	7
Seals, hermetic	8
Seals, insulating	9
Seals, metal-to-glass	10
Seals, oil	11
Seals, shaft	12
Seals, switch	13

Bomac Labs Inc	3
Bradley Semiconductor Corp (Hamden)	3-13
Bradley Semiconductor Corp (New Haven)	3-13
Clevite Transistor Products	1-2-3-7-10-14
CBS-Hytron Div (Danvers) Columbia Broadcasting System	2-3-4-6-7-10-14
CBS Hytron (Newburyport)	2-7-10-14
Continental Device Corp	3-19
Delco Radio Div OMC	7-11-14
Electrical Industries	17-18
Electronic Devices Inc	13
English Electric Valve Co Ltd	2-3
Fairchild Semiconductor Corp	4-7-10-15-20
Finney Co	2-3
Gahagan Inc	2
General Electric Co Ltd of England	2-3-13-19
General Instrument Corp	2-3
General Transistor Corp	2-4-5-10-14-15
Glass-Tite Industries Inc	17-18
Green Rectifier Co	3-12-13
Gulton Industries Inc	4-5-6-7-9-10-11-14-15-20
Hermetite Corp	17-18
Hoffman Electronics Corp	3-10-12-15-16
Hoffman Electronics Corp/Semiconductor Div	3-16-19
Honeywell Controls Ltd	2-4-7-11-14-15
Hughes Products Group/Hughes Aircraft Co	2-3-14-15-19
Industro Transistor Corp	4-11-14
International Rectifier Corp	2-3-4-5-6-7-9-10-11-12-13-14-15-16-17-18-19-20
International Resistance Co (Phila)	13
Int'l Resistance Co (Boone)	13
ITT Components Division	3-13-19
Microwave Associates Inc	1-3
Minn-Honeywell Regulator Co/Mil Prod Co/Aeronautical & Ordnance Div	7-11-14
Minn-Honeywell Regulator Co/Semiconductor Products Div	4-7-10-11-14
Mitronics Inc	17
Motorola Inc/Semiconductor Products Div	3-4-7-10-14-15-19-20
Mullard Overseas Ltd	2-3-4-5-7-10-14-15-19
Nucleonic Products Co	2-12-14
Ohmite Mfg Co	2
Pacific Semiconductors Inc	2-3-7-10-15-19-20
Philco Corp/Lansdale Tube Co Div	2-3-4-7-9-10-14-15-17-18-20
Philco Corp	1-2-4-7-9-10-14-15
Radio Corp of America/Electron Tube Div	4-7-10-14-15-20
Rauland Corp	4-10-14
Raytheon Co/Semiconductor Div	2-3-4-10-14-15
Raytheon Co/Distributor Products Div	1-2-3-4-6-7-9-10-12-14-15-19
Raytheon Co (Waltham)	2-3-10-14-15
Research Inst Co Inc	17-18
Renfrew Electric Co Ltd	13
Rheem Semiconductor Corp	3-14-15
Ross Metals Co Milton	17
Semicon Inc	3-12
Semi-Elements Inc	2-3-13
Solid State Products Inc	7-10-15
Sperry Semiconductor Div/Sperry Rand Corp	3-4-10-15
Sprague Electric Co	9-10-14-20
Sylvania/Semiconductor Div	10
Sylvania Electric Products Inc (New York)	19-68
Sylvania Electric Products Inc (Williamsport)	1-2-3-14-15
Syntroon Co	3-13
Tarzian Inc Sarkes	3-13
Technical Apparatus Builders	2-3-13
Texas Instruments/Semiconductor Components Div	3-4-5-7-10-11-12-14-15-16-19-20
Topp Industries Inc	4-7-15-16-19-20
Transitron Electronic Corp (Melrose)	2-3
Transitron Electronic Corp (Wakefield)	2-3-4-7-10-11-14-15-16-19
Tung-Sol Electric Co	14
U S Dynamics Corp	1-2-3
U S Semiconductor Products Inc	19
Vickers Inc	13
Warren Components Div/El Tronics Inc	1
Westinghouse Electric Corp (Pittsburgh)	2-3-4-7-8-13-14-15
Westinghouse Electric Corp/Semiconductor Dept	2-3-4-7-10-14-15
Workman TV Inc	7-14

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AM program packages	1
Audio design & service	2
Film, editing & titling	3
Film, magnetic stripe	4

Film processing	5
Film studios	6
Film, TV	7
Frequency measuring	8
Kinescoping	9
Libraries, film	10
Libraries, magnetic tape	11
Libraries, record	12
News services	13
Optical repairs	14
Recording services	15
Sound dubbing	16
Sound effects	17
Sound studios	18
Stylus resharpening	19
Tower erection & maintenance	20
TV program packages	21
TV props & scenery	22
TV special effects	23
TV slides	24
Transcriptions	25

Acme Industrial Co	14
All Products Communications Products	20
Apple Frequency Measuring Service H L	8
Becker Productions V S	1-7-21-25
Bogen-Presto Co/Div Siegler Corp	19
Bldg Recording Studio	15-16-17-18-25
Bray Studios Inc	3-6-24
Burnett Radio Law W W L	8
Burke & James Inc	5-14
Columbia Records Div/Columbia Broadcasting Systems	15-18-25
Commercial Radio Sound Corp	2
Commercial Telecast Networks Inc Components Corp	7-21 15-16-17-25
Cross County Audio Exchange	2
Doty Acoustical Electronic Labs	2
Dresser-Ideco Co	20
Edison Electronic Co	8
Engineering Associates	8
Eprad Co	1-2-8-18
E-Z Way Towers Inc	20
Fairchild Recording Equipment Co	2-19
Felthousen Audio Service	2
Film Arts Productions	3-4-5-6-7-12-15-16-17-18-24-25
Film Associates	3-5-6-7-9-12-15-16-17-18-25
Florman & Barb	14
Frederick Recording Co	15-16-17-18-25
Gates Radio Co	2-20
Gordon Enterprises	3-4-5-6-7-14-15
Handel Film Corp	3-7-10-21
Haskey Richard R	15
Holland Electronics	2
Houston Fearless Corp	5
Loucks & Norling	7-9-24
Magnetic Amplifiers Inc	23
Neumade Products Corp	10-11-12
Northern Eng'g Labs	8
Oberline Inc/Ultraaudio Div	1-2
Packaged Programs Inc	1-3-5-6-7-13-15-16-17-18-21-22-24-25
Pacific Universal Products Corp	14
P & H Electronics	2-8
Precision Hearing Aids	2
Public Information Programs Inc	1-3-7-13-21-24
Recorded Publications Labs	1-15-16-17-18-25
Reeves Soundcraft Corp (Danbury)	4-19
Shrader Sound Inc	2
Smith Assoc Inc Rawdon	15-16-18
Talking Devices Co	15-16-17-18
Telechrome Mfg Corp	9
Telectro Industries Corp	15
Telemated Motion Pictures	3-6-23
Telepix Corp	3-6-7-15-16-17-18-24-25
Television Specialty Co Inc	9-23-24
Tower Construction Co	20
Trans Lux Corp	7-10-13-14-23
U S Recording Co	3-15-16-17-18
Wald Electronics	2-5-15
Westrex Corp	2-6-15-16-18
Williams Recording Service Ash	1-15-16-25
Wind Turbine Co	20

83—SERVICES, INDUSTRIAL

Aerial surveys	1
Aircraft maintenance	2
Assembly	3
Brazing	4
Carrier current maintenance	5
Computer service	6
Construction	7

Electrical testing	8
Electronic equipment repairs	9
Encapsulation	10
Engraving & pantographing	36
Engraving & profiling	11
Fabrication, metal parts	12
Fabrication, non-metal parts	13
Frequency calibration	14
Heat treating	15
Hermetic sealing	16
Inspection	17
Marine maintenance	18
Marking	19
Metal finishing	20
Microwave calibrating	21
Microwave relay maintenance	22
Military systems engineering	23
Optical repairs	24
Packaging	25
Plating, metal on plastic	26
Plating, precious metal	27
Police, fire, municipal maintenance	28
Qualification testing	29
Soldering	30
Test equipment repairs	31
Testing	32
Tinning, hot dipped	33
Treating, fungus & moisture proof	34
Welding	35

A-1 Precision Products	27
Abalon Precision Mfg Corp	12-13-35
Acme Industrial Co	3-12-13-17-23-24-31
Acme Mfg & Gasket Co	12-13
Acromark Co	11-19-36
Actioncraft Products	19
Acton Laboratories Inc	32
Aeroflex Labs	1-23-29-32
Aerohm Corp	8-9-29-31-32
Aerolite Electronics Corp	3-10-12-13-15-20-23-27-35
Aeromotive Eng'g Products Ltd	9
Aerotest Laboratories	3-8-17-29-32
Airborne Accessories Corp	23
Aircon Inc (Roselle)	3-4-12-21-30-35
Airflyte Electronics Co	3-4
Airtronics Inc	10
Airtronics Int'l	10
Airtron Inc/Div Litton Industries	21
Allied Fabricating Corp	12-34
All Products Communications Products	23
All-Tronics Inc	10-16-32
Alto Fonic Music Systems Inc	3-8-23-37
Amaton Electronic Hardware Co Inc	3
Amelco Inc	7-38
American Aluminum Co	12-20
American Electrical Heater Co	30
American Electronic Labs	8-29
American Electronic Labs Inc	29
American Electronics Inc	8-11-29-32
American Electronics Inc/Taller & Cooper Div	3-8-12
American Lava Co	13
American Machine & Foundry Co/Gen Eng Labs	3-12-23
American Research & Mfg Co	23
American Silver Co	12-27
Anchor Metal Co	4-27-30-33
Anchor Specialty Mfg Co	3-12-31
Anco Eng'g Co	12
Andromeda Inc	23
Anso Div/Gen'l Aniline & Film Corp	3-12-20-23-24
Ansley Mfg Co Arthur	3-10-27-34
Apple Frequency Measuring Service H L	14
Arcan Eastern Ltd	12-35
Arch Instrument Co	3
A R F Products Inc (River Forest)	23
Aries Labs Inc	10-25-34
Arizona Telemetering Corp	3-8-9-10-30-32
Arnoux Corp	23
Arrow Tool Co Inc	12-13
Art Decorating Co	19
Artted Co Inc	10
A R & T Electronics Inc	7
Artisan Metal Works Co	12-35
Associated Research Inc	8-32
Associated Testing Labs	8-17-29-32
Atlas Precision Products Co	3-4-8-11-12-13-17-20-27-32-36
Atmosphere Control Co	31-32-33
Audicon Electronics Inc	8-9-10-17-29-31-32-34
Auto Test Inc (Chicago)	3-12-13

Aveo Mfg Corp/Crosley Div 23
 Avion Div/ACF Industries Inc 6-10
 Avionics Ltd 25-26-27-30-31
 Bache & Co Semon 15
 Bacon Industries 10-13
 Baldwin Products Corp 20-27
 Barker & Williamson Inc 9-10-14-23-29-32
 Barlowe Electronics 9-31
 Barnett Instrument Co 9-31
 Bart Mfg Corp (Belleville) 26-27
 Bemis Bro Bag Co 25
 Bernard Franklin Co Inc 12
 Berkshire Labs 8
 Bernco Eng'g Corp 3-4-10-12-30-35
 Bigelow Metallizing Chemicals Co 26
 Bjorksten Research Labs for Industry 26
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 Booth Co Arthur E 8
 Bram Metallurgical-Chemical Div 12-27
 Braun Knecht Heimann Co Glass Eng'g Dept 13
 Briggs Associates 8-9
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 Brooks & Perkins Inc 3-12-20-27-35
 Bud Radio Inc 12-20
 Bruke & James Inc 24
 Burnett Radio Lab W W L 8-9-14-31
 Burroughs Corp (Detroit) 6
 Calbest Electronics Co 23
 Calif Technical Industries Div Textron Inc 3-23
 Cal-Ohm Labs Inc 3-1-6-9-10-11-12-13-17-23-31-32-35
 Canadian Applied Research Ltd 9-12-17-23-29-36
 Canadian Research Institute 7-8-9-11-14-17-19-31-32
 Cardinal Instrumentation Corp 23
 Carroll Pressed Metal Inc 12
 Centronix 3-9-10-12-13-23-25
 Century Plating Co 20-27
 Ceramatronics Inc 4-10-13-16
 Chicago Industrial Instrument Co 3-7-8-9-11-12-13-17-19-20-25-26-30-31-32-34-35
 Chicago Screw Co/Div Standard Screw 3-4-5-20-25
 Chromium Corp of America 20-27
 City Marking Devices Corp 11-19-36
 Clegg Labs/Div Clegg Inc 7-8-23-31
 Cohan Epner Co 20-26-27
 Coils Electronics Co 3-8-17-29-30-32
 Collectron Corp 12-35
 Colorado Research Corp 6
 Columbia Records Div/Columbia Broadcasting Systems 26-27
 Compco Corp 12-20
 Computer Eng'g Associates Inc 6
 Computing Devices of Canada Ltd 6-9-12-23
 Conn Marine Instrument Co 18-28
 Conrad & Moser 3-4-12-35
 Conray Corp 2-3-8-9-12-13-31-32
 Consolidated Electrodynamics Corp/Rochester Div 26
 Continental Can Co Inc 25
 Control Circuits Inc 3-10-23
 Control Data Corp 6
 Controls for Radiation Inc 32
 Cook Research Labs 12-19-35
 Corbin Corp 7-23
 Cortland Industries 11-13-19
 Craftint Mfg Co 19
 Craft Mfg Co 12-35
 Croname Inc 3-12-20-26-30-35
 Crown Engineering 7
 Crystal-Westlake Corp 25
 Daco Instrument Co 12-23
 Dale Products Inc (Columbus) 3-8-10-12-13-16-20-23-27-29-32
 Data Processing Corp 6
 Daystrom-Weston Industries Div Daystrom Inc 3-10-12-16
 DIT-MCO Inc/Electronics Div 8-23-29-32
 Demornay-Bonardi Corp 21
 Denrad Mfg Co Inc 31
 DeWitt Development Co 1
 Dietzen Co Eugene 19
 Donner Scientific Co 6
 Doty Acoustical Electronic Labs 3-7-10
 Dynatron Inc 23
 Dynex Inc 12
 Earle Signal Corp 3-12-29
 Eidson Electronic Co 9-28
 Eisler Eng'g Co 4-30-35
 Electrical Testing Labs Inc 8-14-17-21-29-32
 Electro-Etch Circuits Inc 12
 Electro-Mechanical Eng'g Co Inc 32
 Enflo Corp 13
 Electronic Assembly Co 3-7-25-30
 Electronic Brazing Co 4-30
 Electronic Craftsmen 3
 Electronic Production & Development 12-13-19-30-31

Electronics Eng Co of Calif 23
 Elzee Metal Products Co 3-4-11-12-13-35
 Emerson Electric 23-29-32
 Emerson Plastics Corp 10-13
 E M I Cossor Electronics 6
 Empire Electronics Co 3
 Engineering Associates 7-8-9-14-21-31-32
 Eng'g Mfg Corp of Texas 12
 Epoxy Products Div/Jos Waldman & Sons 10-13-25
 Eprad Co 3-6-8-9-12-13-14-23
 Epsco Inc 29
 Equipment and Service Co 6-9-31
 Ercona Corp 24
 Erie Resistor Corp 25-26
 ESC Corp 10
 Eugene Eng'g Co 11-12-35-36
 Ewald Instruments 35
 E-Z Way Towers Inc 12
 Fairchild Camera and Instrument Corp 1
 Farrelloy Co 30
 Fastex Div/III Tool Works 12-13
 Federal Electric Corp 7-8-9-22-23-28-31-32
 Federal Machine Co 12-13-35
 Feiler Eng'g & Mfg Co 3-5-8-23
 Fidelity Amplifier Co 3
 Five Star Co 10-21-22
 Fluorocarbon Products Inc/Div U S Gasket Co 3-10
 Foote Bros Gear & Machine Corp 12
 Formica Metal Products Co 3-4-12-13-30-35
 Frenchtown Porcelain Co 3-4-16
 Garrett Corp/Airesearch Mfg Co Div 2
 Gates Electronic Co 2-3-5-8-9-10-11-14-15-16-18-22-23-24-25-26-27-28-29-30
 Gates Radio Co 9-12-13-14-17-30-34-35
 G B Electronics Corp 12
 General Bronze Corp 3-8-12-20-21-23-35
 General Communication Co 23
 General Electric Co/Computer Dept 6
 General Kinetics Inc 6
 General Metal Products Co 12-13-25
 General Mills Inc/Mechanical Div 3-12-13-23
 General Precision Lab Inc (Pasadena) 3-9-23-31
 Geotechnical Corp 9-12-23
 Giannini & Co G M 23
 Globe Electrical Mfg Co 11
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 Good Electronics Corp 9-26-27
 Gordon Enterprises 9-11-12-13-17-24-31-32
 Gray Mfg Co 9-12-15-29-35
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 Haller Raymond & Brown 23
 Hallett Mfg Co 3-4-10-30
 Hallamore Electronics Company 23
 Hamilton Watch Co/Allied Products Div 3-11-12-15-20-23-27
 Handy & Harmon (El Monte) 4-12
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 Haveg Industries Inc 13
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 Hermes Plastics Inc 11-14
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 H & H Machine Co Inc 12
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 Interference Measurement Lab Inc 29-32
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 James Plating Works Inc 20-27
 Jan Hardware Mfg Co Inc 3-8-15-29-32
 Janitrol Aircraft Div/Surface Combustion Corp 12-23-29
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 Johnson Mfg Co 30
 Kahle Engineering Co 10
 Kaiser Aircraft & Electronics/Div Kaiser Ind (Oakland) 12
 Kaiser Aircraft & Electronics/Div Kaiser Ind (Toledo) 29
 KayTownes Antenna Co 12
 Kees Mfg Co F D 12-15-20-35
 Kelsey-Hayes Co 3-4-10-12-13-15-20-25-30-33
 Kent Lighting Corp 12
 Keystone Electronics Corp 12-13
 Kinetics Corp 15
 Kling Metal Spinning & Stamping Co 12-30
 Koch & Sons H 25
 Kollmorgen Optical Corp 23
 Kulite Tungsten Co 4-16
 Kurz-Kasch Inc 13
 Kuss Industries Inc 3-4-12-35
 K-W Eng'g Works 3-12
 Labelon Tape Co 19
 La Moree C D 12-21-22
 Land-Air Inc (Chicago) 2-3-5-6-8-9-12-13-17-22-23-24-27-28-29-31
 LaPointe Industries Inc 3-9-10-12-13-15-16-20-23-26-27-30-31-32-33-34
 Las-Lab Inc 24-32
 Lear Inc (Grand Rapids) 23
 Lee Chemical Corp Walter 13
 Lehigh Valley Electronics Eng'g & Mfg Co 3-12-30-36
 Lenkurt Electric Co 5-22-23
 Lestershire Spool Div/Nat'l Vulcanized Fibre Co 13
 Levey Labs Harold A 32
 Librascope Inc (Glendale) 6
 Lindberg Eng'g Co 12
 Lorain County Radio Corp 18
 Lorentzen Inc H K 3-12-35
 Lyon Metal Products Inc 12
 Lytle Eng'g & Mfg Co 12-20-23
 Mackay Radio & Telegraph Co/Marine Div 9-18
 Magnaflex Corp 17-32
 Magnesium Products of Milwaukee Inc 35
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 Marquardt Aircraft Co/Pomona Div 12-23-25-29-32-36
 Masonite Corp 13
 Mathis Co G E 7-12-35
 Matthews & Co Jas 19
 Merit Plating Co 27
 Merz Engineering Inc 12-13
 Metal Fabricators Corp 3-4-12-35
 Metal Products Inc/Div Mid West Conveyor Co Inc 3-4-7-12-13-20-35
 Metaplast Corp 10
 Microwave Services Inc 21-23-29
 Mid-Century Instrumental Corp 6
 Midwest Metal Products Inc 3-4-7-12-13-20-35
 Milgo Electronic Corp 23
 Miller Dial & Nameplate Co 11-19
 Milwaukee Stamping Co 3-4-20-35
 Minn-Honeywell Regulator Co/Aeronautical Div 9-23
 Minn-Honeywell Regulator Co/Mil Prod Gp/Aeronautical & Ordnance Div 9-23
 Missleonics Inc 3-23-25
 Mitchell Industries Inc 30
 Mitronics Inc 4-10-16
 Modelectric Products Corp 3-30
 Mohawk Mfg Co 12
 Molded Insulation Co 10-13
 Motiograph Inc 3-12
 Mountain Associates 6
 Mytron Mfg Co 9-25
 Nat'l Cine Equipment Inc 24
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 Nat'l Scientific Labs Inc 22-23-32
 Nat'l Vacuum Platers Inc 20-26
 Nat'l Vulcanized Fibre Co (Newark) 13
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 New York Cell Co 3-10
 New York Testing Laboratories Inc 8-9-14-17-29-32
 Nichols Products Co 12-13-30
 Nilsson Electrical Laboratory Inc 9-31-32
 Nichols & Clark Inc 3-4-7-8-12-13-25-30-35
 Nopco Chemical Co 10
 Northeast Electronics Corp 8
 North Electric Co 3
 Northern Eng'g Labs 9-14
 Northern Plastics Corp 13-15-19-26-27
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Needles, sapphires	8
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Phonographs, hand-wound	11
Phonographs, radio combinations	12
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Pickups, capacities	15
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Pickups, magnetic	19
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Argonne Electronics Mfg Corp	8-13-17
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Audicon Electronics Inc	10-12
Audio Devices Inc	7-8-9-32
Audiogersh Corp	17-19-23-27-28-38
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Bennett & Co Paul	6-7-8-9-13-14-16-17-19-26
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Cinema Eng'g Div/Aerovox Corp	3-4
Columbia Records Div/Columbia Broadcasting Systems	1-2-6-8-24-29-31-33-34-35-37
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Diamond Tool Eng'g Co	6-8
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Emerson Radio & Phonograph Corp	10-12-27
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Erie Resistor Corp	16
Fairchild Recording Equipment Co	4-6-10-13-14-19-25-27-28-38
Fanon Electric Co	10-12-26-27-28
Fedtro Inc/Federal Electronics Sales Div	14
Fen-Tone Corp	6-7-10-11-12-14-15-16-17-18-19
Fidelitone Inc	1-2-6-7-8-9
Frederick Recording Co	33-35-36
Garrard Sales Corp	13-23-27-28-38
Gates Radio Co	25-38
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NY-Glass Inc	13
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Parameters Inc	8-17-23-29-32
Par Products Corp	11-12
Parsons Co Ralph M/Elect-onics Div	23-25
Patent Button Co	20
Peebles & Co Ltd Bruce	9-31
Peerless Products Industries	3-11-12-13-19
Penco Div/Alan Wood Steel Co	12
Penn-East Eng'g Corp	12
Perkin-Elmer Corp	23
Peschel Electronics Inc	8-9-32
Peter Partition Corp	25
P & H Electronics	9-14-28
Philco Corp	22
Philco Corp/G & I Div	1-6-7-9-22-23
Pioneer Industries Inc	12-13-35
Planet Plating Co Inc	20-26-27
Plastic Accessories Inc	13
Polymer Corp	20
Polytronics Inc	3-8-12-19-20-25
Porter Co Inc H K/Delta-Star Electric Div	20-33-34
Precise Measurements Corp	8
Precision Electroplating Co	27
Printloid Corp Dept E	13
Prodelin Inc	30
Pye Telecommunications Ltd	18-22-28
Q O S Corp	3-12-13
Quality Control	17-31
Radar Measurements Corp	21
Radar Relay Inc	23
Radio City Products Co	23
Radio Eng'g Co	3-6-7-8-9-14-17-29-31-32
Radioplane/Div Northrop Aircraft Inc	23
Raybestos-Manhattan Inc (Manheim)	13
Rayco Electronic Mfg Co Inc	10
Red Point Corp	10-34
Remler Co	12-13
Research Development Mfg Inc	12-13
Research Industrial Lab of Electronics	9
Research Inst Co Inc	12
Reynolds Metals Co	12-20-35
Richard Co	13
Richardson Co	13
Rich Electronics Inc	8-9-18-31
Ridgeway Div/Gravelly Furn Co	20-27
Riester & Thesmacher Co	12-35
Rimak Inc	3-12-15-17-19-20-34-35
Riverbank Labs Eng'g Dept	14
Rockwell Eng'g Co	8
Rogers Corp	13
Rohn Mfg Co	12
Rondo of America Inc	25
Ross Metals Co Milton	3-10-11-12-20
Rototest Labs Inc	8-29-32
Rowe Industries	3
Saginaw Steering Gear/Div GMC	3
Saine Equipment Lab Harry T	9
St Eloi Corp	8-11-26-27-32-34-35
St John X-Ray Lab	17-29-32
Sampson Chemical & Pigment Corp	19-20
Santa Barbara Div/Curtiss-Wright	9-12-13-23-31
Schaffer Air Industries	3-12-31
Sealectric Switch & Relay Corp	16
Seiscor Mfg Co/Div Seismograph Service Corp	3-6-8-9-12-13-17-23-24-25-32
Shambian & Co W S	13
Sheltered Workshops	3-8-12-13-16-17-19-25-30-32-33
Sherman Industrial Electronics/Div Eng Design Inc	15-16-30-35
Sinclair Mfg Co	3-4-12-13-30-33
Sibley Co	27
Sightmaster Corp	3
Skiatron Electronics & TV Corp	23
Slaughter Co	3
Smith-Meeker Eng'g Co	2-9
Sorensen Industrial Electronic Co	3-7-12
Soroban Eng'g Inc	6
Southern Plastics Co	13
Southwestern Industrial Electronics Co/Div Dresser Industries Inc	9-10-12-16-17-23-25-30-31-32
Sparta Mfg Co	13
Spaulding Fibre Co Inc	12-13
Specialty Automatic Machine Corp	3-12
Sperry-Gyroscope Co/Sunnyvale Dev Center	23
Spincraft Inc	12
Standard Electromagnetics Inc	16
Standard Electronics Research Corp	14-29
Standard Screw Co	3-4-15-20-25
Standard Tool & Mfg Co	12
Stanley Aviation Corp	3-6-10-12-13-15-20-23-32
Staver Co	12
Steel Protection & Chemical Co	20-27-33
Strandberg Eng'g Labs Inc	9
Stratocon Corp/Geophysical Services Div	10-23
Stromberg-Carlson/Div Gen'l Dynamics Corp (Carlson Rd)	23
Suffolk Products Corp	3-4-11-12-20-35
Sutton Electronic Co Inc	10-16
Swedlow Plastics Co	13
Swenson Co	13
Sylvania Electric Products Inc/Parts Div	3-12-13
Synthane Corp	13
Tatnall Measuring Systems Co	3
Taylor Fibre Co (LaVerne)	13
Taylor Fibre Co (Norristown)	13
Techline Div/Wheelabrator Corp	20
Technical Information Corp	3-32
Technical Material Corp	23
Technical Oil Tool Corp	21-31-32
Technicraft Co	10-13-16-34
Techniques Inc	11-12-19
Teleshrome Mfg Corp	10
Telectro Industries Corp	10-16-31
Telegraph Construction & Maintenance Co Ltd (Metals Group)	20-25-35
Telex	3-10-29
Templet Industries Inc	12-13
Thermal Refractories Corp	13
Thomas & Son William	12
Tickle Eng'g Works Arthur	12-18-35
Titan Metal Mfg Co	12
Topper Mfg Co Inc	10
Torrington Co	12
Torwico Electronics Inc	10-16
Tower Construction Co	22
Transformer Metal Prods Corp	12
Transistor Electronics Co	3-10-30-33
Transmit Inc	13
Transval Electronics Corp	3-9-12-23-25
Tricon Mfg Co	4-12-30-35
Tricraft Products Corp	3-4-12-13-25-30-33-34-35
Tri-Dex Electronics	3-7-9-13-28
Triplet & Barton	8-32
Tronex Inc	16-27-30-35
Ultra Electroforming & Mfg Co	12
Ultra-Violet Products Inc	12-13
Unimatic Mfg Corp	12
United Aircraft Products Inc	3-4-12-23-35
United Shoe Machinery Corp	12-25
United States Gasket	13
Universal Industrial Equipment Corp	4-12-35
Universal Mfg Co Inc	3-12-13
U S Dynamics Corp	4-10
U S Plastic Molding Corp	10
U S Radium Corp	10-19
U S Recording Co	9-23
U S Rubber Co	26
U S Testing Co	8-12-13-17-29-32
Vach & Co	15
Vacuum Specialties Co	3-7-9-12-13-17-26-31-35
Vacuum Tube Products/Div Hughes Aircraft Co	35
Vermaline Products Co	11-36
Victor RF & Microwave Co	3-4-30
Viking Industries Inc	10
Virginia Electronics Co	3-10-12-13-20-23-30-32
Vulcan Electric Co	30
Walkirt Co	3-10
Waltham Screw Co	10-12
Walworth Co/Electronics Div	4-12
Warren Components/Div El Tronics Inc	16-33
Warren Corp	12
Watson Mfg Co	12
Waveline Inc	4-21
Weinschel Eng'g	21
Western Felt Works	13
Western Instrument Co	8-9-14-29-31-32
Westgate Lab Inc	23
Westinghouse Electric Co/Div Air Arm	23-29
Westinghouse Electric Corp (Pittsburgh)	21-22
Westlake Plastics Co	26
Westline Products Div Western Lithograph Co	19
Wildberg Bros Smelting & Refining Co	12-27
Wilmington Fibre Specialty Co	13
Wireco Electronics Inc	10-30
Wood Steel Co Alan/Penco Div	12
Wright Equip Corp	32
Wright Metalcoaters Inc	30-33
Wyle Laboratories	8-29-32
Zenith Optical Lab	11-12-24
Zenith Plastics Co	8-13-29-32

PRODUCT MFRS

84-85-86—Sound Reproducers & Systems

Gray Mfg Co	4-13-27-28-32-38
Greene Co L Charlton	10-27
Gulton Industries Inc	15-16-22
Hamilton Electronics Corp	10
Infrared Industries Inc	20
Jensen Industries Inc	2-6-7-8-9-17
Kandy Tapes & Records Corp	33
Kay Electric Co	34
K-G Electronics Corp	29
Leak Div/British Industries Corp	18
Linlar Inc	10-27
Major Electronics Corp	27-28
Manufacturers Lab	13
Merix Chemical Co	2
Miles Reproducer Co	6-8
Miller Co J W	5
Miller Mfg Co M A	1-6-7-8-9
MP Engineering Co	10-12-27-28
Neumade Products Corp	29
Newcomb Audio Products Co	10-27-28
Panatron Dev Div	4-5-33-34-35-36-37
Permo Inc	1-2-6-7-8-9
Permoflux Products Co	10-27
Pfanstiehl Chemical Corp	6-7-8-9
Pickering & Co Inc	3-4-6-8-13-19-38
Pilot Radio Corp	12
Poinsettia Co	30
Pulse Techniques Inc	3-4
Radio Corp of America/Commercial	
Electronic Products	13
Radio Music Corp	4-5-13-19-21-28-38
Raven Electronics Mfg Co	10
Recoton Corp	1-2-6-7-8-9-13-19-21-32
Reeves Soundcraft Corp	8-32
Robins Industries Corp	1-2-25-29-37
Robinson Recording Labs	38
Rockbar Corp	10-23-27-38
Ronette Acoustical Corp	6-8-13-14-17
Rowe Industries	19
Scott Inc H H	19-21-28-38
Seeburg Corp	10-23-26
Setchell-Carlson Inc	27
Shure Bros	13-16-17-18-19
Smith Assoc Inc Rawdon	33
Sonotone Corp	16
Spx Co	29
Stromberg-Carlson/Gen Dynamics	
Corp (Carlson Rd)	10-12-27
Superscope Inc	27
Swiss Jewel Co	6-8
Symphony Electronics Corp	13
Talking Devices Co	10-11
Tele-Tone Co of America	10-12-27
Telex Co	6-8
Tetrad Co	6
Thomas Organ Co	12
Thorens Co	10-11-13-17-27-28-38
Toman & Co E	11
Turner Co	17
United Audio Products Inc	6-8-10-16-17-23-27
United Transformer Corp	4-5
U S Recording Co	10-27-28
Valco Mfg Co	19
Vallorbs Jewel Co	8
Vanity Fair Electronics	10
V-M Corp	10
Walsco Electronics Mfg Co	25-37
Warwick Mfg Corp	10-12-23-27
Weacor Inc	10-12-23-27
Webster Electric Company	13-14-16-17
Wells-Gardner & Co	27
Westrex Corp	14-18-19-34-37
Whitley Electronics Inc	12-23-27
Wurlitzer Co	10-12-26-27

Ampex Corp (Redwood City)	3-8-10
Amplifier Corp of America	5
Applied Magnetics Corp	2-3
Astatic Corp	3-8
Audio Devices Inc	8
Audio-Master Corp	5-8-9
Audiomation Labs	5
Audiotex Mfg Co	7-10
Bell Sound Div	5
Bogen-Presto Co	5
Bram Metallurgical-Chemical Div	11
Columbia Records Div/Columbia Broad-	
casting Systems	9
Cousino Inc	5-8
Edison Industries Thomas A/Instrument	
Div	2-3-4
Electronic Applications Inc	5
EMC Recordings Corp	9
E M I Cossor Electronics	3-5-8
Fairchild Recording Equipment Co	3
Fen-Tone Corp	2-3-5
Fidelitone Inc	8-11
Florman & Barb	1-8
Fort Wayne Metals Inc	11
Frederick Recording Co	9
Frederick Tool & Eng'g Corp	5
Gates Electronic Co	10
General Cement Mfg Co/Div Textron	
Inc	11
General Transistor Western Corp	2-3-4
Greg	2-3
Grove Enterprises	9-10
Heath Co	5
International Radio & Electronics Corp	5
Kandy Tapes & Records Corp	9
LaBelle Industries Inc	5
Labelon Tape Co	7-8
Linlar Inc	5
Lipps Co Edwin A	2-3
Litton Industries of Calif	3
Magnasyn Mfg Co	2-3
Magnetics Corp	3
Maico Electronics Inc	2-3
Magnecord Div/Midwestern Instruments	
Inc	3-4-5-9
Mincow Div/Minn Mining & Mfg Co	8
Minn-Honeywell Regulator Co/Davies	
Labs Div	3
Minnesota Mining & Mfg Co	8
Moviola Mfg Co	1
Nat'l Standard Co	11
Neumade Products Corp	1-7
Norton Associates Inc	2-3-4
Nortronics Co Inc	3
Orradio Industries Inc	8
Packard Bell Electronics Corp	5
Pampa Electronics Corp	2-3
Pentron Corp	3-5
Permoflux Products Co	8
Permo Inc	8-11
Polytronics Inc	5
Radio Corp of America/Electron Tube Div	8
Rangertone Inc	8
Rea Co J B Electronics Div	2-3
Recoton Corp	8
Reeves Soundcraft Corp (Danbury)	8
Reeves Soundcraft Corp (Springdale)	8
Reigner Recording Library	9
Remington Rand Div/Sperry Rand Corp	8
Robins Industries Corp	1
Rockbar Corp	2
Seeburg Corp	5
Shore Bros	3-4
Smith Assoc Inc Rawdon	9-10
Sonotone Corp	8
Southwestern Industrial Electronics	
Co/Div Dresser Industries Inc	3-5-8-9-10
Stencil-Hoffman Corp	2-3
Telectro Industries Corp	2-3-4-5-6-8-9-10
Telegraph Construction & Maintenance	
Co Ltd (Cables Group)	8-11
Viking of Minn	5
Warwick Mfg Corp	5
Weacor Inc (Bloomingdale Ave)	5-8
Weacor Inc (N Kedzie)	3-5
Webster Electric Company	3-4
Westrex Corp	2-3-5

Carillons, electronic	23
Carrier current systems	4
Consoles, studio	5
Controllers, remote	6
Dictating machines	7
Equalizers	8
Hearing aids	9
Home sound systems	10
Intercommunicators	11
Megaphones, electronic	12
Musical equipment, electronic	13
Musical instruments, electronic	14
Paging systems	15
Preamplifiers	16
Public address systems	17
Speaker systems, marine	18
Telephone systems	19
Telephones, sound powered	20
Theater sound systems	21

Aerovox Corp (New Bedford)	2-5-8-16
Airtones Int'l	8
Allied Radio Corp	1-2-10-15-16-17
Altec Lansing Corp	2-5-10-15-16-17-18-21
Amco Eng'g Co	5
Amerac Inc	15-17
American Electronics Inc	1-16
American Geloso Electronics Inc	7
American Microphone Mfg Co/Div	
General Cement Mfg Co	20
Amplivox Ltd Abbey Mfg Est Mt Plant	9
Amplivox Ltd	9-22
Ardent Acoustic Labs Ltd	9
Argonne Electronics Mfg Corp	6
Atlas Sound Corp	12
Audicon Electronics Inc	1-2-10-11-15-16-17
Audio Equipment Co	1-2-9-11-12-13-17-22
Audio-Master Corp	10-17
Audiosears Corp	20
Audiovox Inc	9
Audocall Co	3-15
Auth Electric Co	3-15-19
Automatic Electric Co	19
Avionics Ltd	17
Barrett Electronics Corp	36-54-63
Bell Sound Division/Thompson Ramo	
Wooldridge Inc	10-17
Beltone Hearing Aid Co	9
Bennett Labs Inc	4-11
Bliss Electronic Corp	2-11-15-19
Blonder-Tongue Labs	8
Bogen-Presto Co/Div Siegler	
Corp	1-2-5-10-11-12-15-16-17-19-20
Budelman Radio Corp	2-15-17
Bundy Electronics Corp	11
Cable Electric Products	3
Calbest Electronics Co	10-11
Canadian Research Institute	2-5
Channel Master Corp	10
Central Electronics Inc	9
Cinema Eng'g Div Aerovox Corp	8-16
Clark Controller Co (Los Angeles)	6
Coils Electronics Co	11
Commercial Radio Sound Corp	5-10-15-17-19
Communication Measurements Labs	2
Conn Ltd C G	13-14
Consolidated Productions Inc	1-2
Continental Electronics Corp	11-19-20
Continental Manufacturing Inc	10-11-15
Crown Engineering	4
Daystrom-Weston Industries	2
Dictaphone Corporation	7
Doty Acoustical Electronic Labs	9-22
Dukane Corp	2-11-15-16-17-19
Dyna Co	2-16
Electronic Equipment Supply Co	11-19
Electronics Design Co	1
Electronic Systems Eng'g Co	2-16-17
E M I Cossor Electronics	2-7-11-15-17
Eprad Co	11-21
Ercona Corp	1-2-5-7-9-10-11
Fairchild Recording Equipment Co	2-8-10-16
Falstrom Co	5
Fanon Electric Co	1-3-4-10-11-12-13-14-15-16-17-18-19-20-21
Fedtro Inc Federal Electronics Sales Div	7-9
Feiler Eng'g & Mfg Co	2-4-7-10-11-15-17
Femco Inc	2-4-15-17
Fen-Tone Corp	15-16
Fidelity Amplifier Co	2-21
Fisher Berkley Corp	2-8-4-11-15-19

85—SOUND REPRODUCING EQUIPMENT, MAGNETIC

Editing blocks	1
Heads, magnetic film stripe	2
Heads, magnetic tape playback	3
Heads, magnetic wire playback	4
Players, magnetic tape	5
Players, magnetic wire	6
Tape indexes	7
Tape, magnetic	8
Tape, prerecorded	9
Tapes, test	10
Wire, magnetic	11

86—SOUND SYSTEMS, INTER-COMMUNICATORS & HEARING AIDS

Amplifiers, hearing Aid	22
Amplifiers, mobile	1
Amplifiers, power	2
Bells & buzzers	3

Alto Fonic Music Systems Inc	5-8-9
Alwac Computer Division/El-Tronics Inc	3
American Concertone Div/American	
Electronics Inc	3-5
American Electronics Inc	5
American Geloso Electronics Inc	5-8
American Molded Products Co	8-11

Flush Wall Radio Co	10-15
Frederick Tool & Eng'g Corp	6
Gai-Tronics Corp	2-11-15-16-17
Gates Radio Co	5-6-8-16
General Electric Co Audio Components	
Product Section	16
Godfrey Mfg Co	11
Good Electronics Corp	1-2-16-17
Gray Mfg Co	7-8-16
Hallamore Electronics Co	19
Hamilton Electronics Corp	1-2-9-12-15-16-17
Heath Co	10-16
Holland Electronics	1-2-16
Industrial Development Eng'g Assoc	16
Johnson Co E F	3
Kaiser Aircraft & Electronics Div (Oakland)	1
Kuss Industries Inc	5-11
Lake Mfg Co	3-10-11-17
Land-Air Inc (Chicago)	17
Langevin Div/The W L Maxson Corp	1-2-15-16-17
Leak Div/British Industries Corp	2-16
Lehigh Valley Electronics Eng'g & Mfg Co	2-6-15-17-20
Lenkurt Electric Co	4
Linlar Inc	1-2-10-12-16-17-18
Loxe Sound Engrs J M	12-17
Lorain County Radio Corp	18
Madison Fielding Corp	10-16
Magnasync Mfg Co	5-8-21
Magnecord Div/Midwestern Instruments Inc	13-15
Magnetic Amplifiers Inc	2-17
Melody Master Mfg Co	9-10-17
Metal Products Inc/Div Mid West Conveyor Co Inc	5
Midwestern Instruments	13-15
Midwest Metal Products Inc	5
Miles Reproducer Co	7-19-20
Motigraph Inc	11-15-21
MP Engineering Co	10-17-21
Myers & Sons Inc E A	9
Newcomb Audio Products Co	1-2-10-11-15-16-17
Nichols & Clark Inc	9-15
North Electric Co	2-3-4-6-11-19
Oberline Inc/Ultra Audio Div	2-15-16-17
Otarion Listener Corp	9
Panatron Dev Div Delta Broadcasting Sys	2-5-8-10-16
Patrick & Wilkins Co	3
Peebles & Co Ltd Bruce	2-6
Pierce Dictation Systems	7
Permoflux Products Co	1-2-10-12-16-17-18
Philco Corp	5-9-15
Philco Corp/G & I Div	1-2-5-6-9-15-16-22
Pilot Radio Corp	2-16-22
Polytronics Inc	2-7-11-15-16-17
Pratt Albert	1
Precision Hearing Aids	2-9
Pye Corp of America	12
Pye Telecommunications Ltd	1-2-6-11-12-17-18-19
Qualitone Co	9-22
Radio Corp of America Commercial Electronic Products	8-10-15-16-17-19-21
Radio Merchandise Sales Inc	11
Rauland-Borg Corp	1-2-3-5-6-8-10-11-15-16-17
Raven Electronics Mfg Co	17
Rea Co J B/Electronics Div	2-11-15-17
Remler Co	2-4-9-12-18-19-22
Roesch Communications Douglas	2-15-17-19
Roflan Co	9-20
Rowe Industries	14
Ryan Co S C	9
Rye Sound Corp	9-22
Scott Inc H H	2-10-16
Seg Electronics Co Inc	10-15-17
Schindlers	11
Schirmer National Alarm Co	6-11
Schrack Electrical Sales Corp	10-18-19
Schulmerich Electronics Inc	14-16
Science-Electronics Inc	6-11
Scientific Wood Cabinet Co	5
Seaboard Electric Products Corp	3
Shrader Sound Inc	5-10-15-17-19-21
Sherwood Electronic Labs Inc	10
Simpson Mfg Co	
Mark	1-4-10-11-13-14-15-16-17-21
Smith-Meeker Eng'g Co	15-17
Sonotone Corp	9
Sorenson Industrial Electronic Co	11
Spivey Inc James S	11
Spox Co	10
Stancil-Hoffman Corp	16-21
Stephens Tru-Sonic Inc	5-10-21
Stromberg-Carlson/Div Gen Dynamics Corp (Carlson Rd)	1-2-4-5-10-11-15-16-17-19
Taffet Radio & TV Co	17
Tech-Master Corp	8-16

Telectro Industries Corp	1-2-4-5-7-11-17-19-21
Telemarine Communications Co	1-2-12-17
Telephonics Corp	17-19-20
Telex	9-16-22
Thomas Organ Co	14
Transelectric Mfg Co	11-19
United Transformer Corp	8
U S Instrument Corp	3-10-11-15-19-20
U S Recording Co	4-12-17
Valandy Electronics Corp	9-17
Valco Mfg Co	14
Veron & Co George	1-2-18-11-15-17-19
Virginia Electronics Co	1-2-10-11-15-16-18
Vocaline Co of America	4-11-17
Wald Electronics	8-10-15-16-17
Webster Electric Company	1-2-4-10-15-16-17-19
Wells-Gardner & Co	10-13-14-76
Westlab Electronics Inc	2-10-11-15-17-18-19-21
Westrex Corp	5-15-17-21
Wheeler Electronic Corp	20
Wheelock Signals Inc	15
Whitley Electronics Inc	10-16-17
Worner Electronic Devices	11
Wurlitzer Co	10-13-14

87—SPEAKERS

Horns	1
Speakers, ceramic	2
Speakers, crystal	3
Speakers, electrodynamic	4
Speakers, electrostatic	5
Speakers, explosion-proof	6
Speakers, high-fidelity	7
Speakers, ionic	12
Speakers, magnetic	8
Speakers, PM dynamic	9
Speakers, weatherproof	13
Tweeters	10
Woofers	11

Allied Radio Corp	7
Altec Lansing Corp	1-5-7-8-9-10-11-13
Arnhold Ceramics Inc	1-5-7-9-10-11
Atlas Sound Corp	1-4-6-10-13
Audiogersh Corp	1-7-10-11
Audiotax Mfg Co	7
Bozak Sales Co R I	7
Blonder-Tongue Labs	7
Carbonneau Industries Inc	9-10-11-13
Channel Master Corp	7
Cletron Inc	4-7-9-10-11-13
Cleveland Electronics Inc	7-8-9-10-11-13
Cross County Audio Exchange	1-2-3-4-5-6-7-8-9-10-11-12-13
Dynamic Electronics Inc	7
Electronic Applications Inc	7
Electronic Instrument Co Inc	7
Electro-Voice Inc	1-7-9-10-11-12-13
E M I Cossor Electronics	7-10-11
Eprad Inc	9-13
Fedtro Inc Federal Electronics Sales Div	5-7-9
Fen-Tone Corp	1
General Coil Products Corp	4-8-9
General Electric Co/Audio Components Product Sec	7-10-11
Hammarlund Mfg Co	4
Happner Mfg Co	7-9-10-11-13
Hartley Products Co	7-9
Heath Co	7-9-10-11
Jensen Mfg Co	1-4-7-9-10-11-13
Knowles Electronics Inc	8
Linlar Inc	4-6-7-9-10-11-13
McGregor Electronic Industries Inc	9-10-11
Magnavox Corp	4-7-9-10-11-13
Molded Fiber Glass Co	1-7-13
Oxford Components Inc/Sub Oxford Electric Corp	7-8-9-10-11-13
Oxford Elec Corp	4-7-8-9-10-11-13
Pampa Electronics Corp	5-7-10
Permoflux Products Co	4-6-7-9-10-11-13
Pickering & Co Inc	5
Pye Telecommunications Ltd	1-13
Quam Nichols Co	4-7-9-10-11-13
Radio Corp of America/Commercial Electronic Products	1-6-7-8-9-12
Radio Shack Corp	29-49-86-88
Renfrew Electric Co Ltd	1-4-7-8-9-10-11-13
Rockbar Corp	1-7-9-10-11
Roflan Co	4-5-8
Rolo Company	4-7-8-9-10-11-13
Simpson Mfg Co Mark	9-13
Sonotone Corp	7-10-11
Stephens Tru-Sonic Inc	1-7-10-11
Stromberg-Carlson Div Gen Dynamics Corp (Carlson Rd)	7-9-10-11

Symphony Electronics Corp	4
Televex Co	12
United Audio Products Inc	7-9-10-11-13
University Loudspeakers Inc	1-6-7-9-10-11-13
U S Instrument Corp	1
Utah Radio Corp	4-6-7-8-9-10-11-13
Wharfedale Div/British Industries Corp	7-10-11
Whitley Electronics Inc	7-10-11
Wilcox Gay Corp	7
Wright Zimmerman Inc	7-9-10-11

88—SPEAKER ACCESSORIES

Baffles	1
Cabinets	2
Chambers, acoustic	3
Cloths, grill	4
Coils, crossover	5
Coils, fixed	6
Cones	7
Drivers, PM	8
Exciters, field	9
Grills	10
Materials, acoustic	11
Materials, sound absorbent	12
Mountings, car top	13
Networks, crossover	14
Shims, adjusting	15
Stands	16
Suspensions (for cones)	17

Abalon Precision Mfg Corp	2-10
Aerolite Electronics Corp	5-6-14
Allied Radio Corp	1-2
Altec Lansing Corp	1-2-3-8-14
Argos Products Co	1-2
Atlas Sound Corp	1-8-16
Auburn Mfg Co	15
Audiotax Mfg Co	12
Bemis Bro Bag Co	12
Bestcraft Products Co	1-4-10
Bogen-Presto Co	1
Bozak Sales Co R L	2-14
Brooks Radio & TV Corp	1-2-4
Bud Radio Inc	1-2
Calbest Electronics Co	2-14
Cambridge Pattern Works	2
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Hughes Aircraft Co	12
Hunter Spring Co	11
Hunter Tools	5-8
Hyeon Mfg Co	3-12-18-21
Ideal Industries Inc	5-8
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Industrial Instruments Inc	2
Industrial Test Equipment Co	2-3-5-6-11-13-19
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Jackson Electrical Instrument Co	2-3-5-22
Janco Corp	2
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Kaiser Aircraft & Electronics Div/Kaiser Ind (Oakland)	2-12-14-18
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Kay Electric Co	5-21-24
Kearfott Co Inc (Clifton)	7-8-12-14-19
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Keystone Electronics Corp	5-8
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Ling Systems Inc	14
Link Aviation Inc	2
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Magnaflux Corp	20
Magnavox Corp	18
Magnetic Amplifiers Inc	21
Manco Mfg Co	6
Manostat Corp/Div Emil Greeene Co	1
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Marine View Electronics Inc	5-6-8-18
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Testers, coil	6
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Testers, crystal	9
Testers, diode	10
Testers, distortion	11
Testers, guided missile	12
Testers, insulation	13
Testers, magnetron	27
Testers, microwave	14
Testers, motor	15
Testers, multimeter	16
Testers, radar	17
Testers, relay	18
Testers, synchro error	19
Testers, thickness, ultrasonic	20
Testers, transistor	21
Testers, tube, automatic	22
Testers, tube socket	23
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Adler Electronics Inc	12
Aero Electronics Co	19
Aeroflex Labs	24
Aerolite Electronics Corp	18
Aeromotive Eng'g Products Ltd	12-21
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Affiliated Television Labs Inc	22
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Aircraft Armaments Inc	17-26
Airesearch Mfg Co/Ariz Div Garrett Corp	7
Airtron Inc/Div Litton Industries	14-17
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Alcar Instruments Inc	20
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Allegany Instrument Co Inc	5-8-12
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Alto Scientific Co	18
Amelec Inc	1-12
Amerac Inc	14
American Elite Inc	21
American Machine & Foundry Co/Gen Eng Labs	17
Amp Inc	25
Analogue Controls	19
Anchor Products Co	4
Anchor Specialty Mfg Co	1-2-5-8-12- 13-18-21-24
Anko Mfg Co	22
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Applied Science Corp of Princeton	24
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Argonne Electronics Mfg Corp	16
Arma Div/American Bosch Corp	2-5-7-8-9-10-11-12- 13-15-18-19-20-21-22
Associated Research Inc	2-3-5-6-8-13-16
Atlas Precision Products Co	5-8-12-17-21-22
Atronic Products Inc	21
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Audio Accessories	2

Canoga Div/Underwood Corp	12
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Carol Electronics Corp	4-16-23
Caswell Electronics Corp	14-17
Central Electronics Inc	4
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CGS Laboratories Inc	12-26
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Chatillon & Sons John	15
Chemalloy Electronics Corp	14
Chesapeake Instrument Corp	24
Chicago Industrial Instrument Co	1-2-3-4-5-6-8- 10-15-16-21-23
Christie Electric Corp	1
Circo Equipment Co	20
Clifton Precision Products Co Inc	19
Columbia Research Labs	24
Computer Control Co	7
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Donner Scientific Co	5
Du Mont Laboratories Inc Allen B	4-17-19
Dymec Inc	14
Eagle Electric Mfg Co	6
Eastern Specialty Co	13-18
Electric Storage Battery Co/Exide Ind Div	1
Electro Instrument Inc	3
Electromatic Equipment Co	6
Electro-Measurements Inc	19
Electronic Brazing Co	13
Electro Impulse Lab Inc	7-14
Electronic Instrument Co Inc	1-3-4-6-8-16- 21-22-23
Electronic Measurements Corp	16-21-22-24
Electronic Production & Development	2-5-8
Electronic Research Associates	21
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Elsin Electronics Corp	21
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Nat'l Instrument Labs Inc	5
Nat'l Pneumatic Co Inc	13
Naybor Laboratories Inc E V	18
New London Instrument Co Inc	22
Nichols & Clark Inc	21
Norden Div/United Aircraft Corp	7-12-17-19-21
Non-Linear Systems Inc	16
North Atlantic Industries Inc	15
Northeast Electronics Corp	14-17
North Hills Electric Co Inc	6-10-21
Oberline Inc/UntröAudio Div	5
Opad Electric Co	1-2-5-8-13-18
Optimized Devices Inc	2-3-5-7-8-13-18-21-24
Opto Eng'g Co/Div Remanco Inc	17
Optron Corp	24
Owen Labs Inc	21
Pacific Semiconductors Inc	10
Pacific Technical Co	15
Parsons Co Ralph M Electronics Div	12
Pesehel Electronics Inc	2-3-5-8-13
Phaestron Instrument & Electronic Co	5-8-16
Phico Corp	5-12-14
Philco Corp/G & I Div	5-7-12-14-17-21-26
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Polard Electronics Corp	12-14-17
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l'precis Measurements Corp	2-5-6-13-15
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Radio Corp of America/Commercial Electronic Products	22-23
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Rese Eng'g Inc	7
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Rodale Mfg Co	5
Schaffer Air Industries	5-8-12
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Sel Rex Corp	18
Servomechanisms Inc	12
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Shalleross Mfg Co	2
Shepard Labs Inc	22
Shurite Meters	1
Sierra Electronic Corp	14-21
Sigma Instruments Inc	18
Simpson Electric Co	1-3-5-8-16
Sittler Corp	5-8
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Slaughter Co	2-3-5-6-8-13-15-18
Solutron Electronic Group Ltd	4-12-19
Sorensen Industrial Electronic Co	5-6-8-13-15-22
Southwestern Industrial Electronics Co/Div Dresser Industries Inc	16-24
Specialty Eng'g & Electronics Co	2-12-16-17
Spectra Electronics Corp	14
Sperry Microwave Electronics Co Div Sperry Rand	12-14-17-26-27
Sperry Products Inc	20
Sprague Electric Co	3
Stanley Aviation Corp	21
Sticht Co Herman H	5-13
Stratocoon Corp/Geophysical Services Div	2-10-21
Stromberg-Carlson/Div Gen'l Dynamics Corp (Carlson Rd)	3-8-10-12-21

Stromberg-Carlson/Div Gen'l Dynamics (San Diego)	21-22
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Takk Corp	13
Tarc Electronics Inc	11
Tatnall Measuring Systems Co	24
Technical Apparatus Builders	1-10-13-21
Technical Oil Tool Corp	7-12-14-17
Technitrol Eng'g Co	10
Telectro Industries Corp	2-3-5-7-12-17
Telerad Mfg Corp	12-14-17
Teletronics Lab Inc	10
Temco Aircraft Corp	12
Theta Instrument Corp	12-19
Thomas Electronics Inc	4-22
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Topp Industries Inc	7-12
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Transdyne Corp	12
Trans Electronics Inc	10-21
Transistor Devices Inc	10
Transistor Electronics Co	21
Triplett Electrical Instrument Co	4-16-21-22
United Electrodynamics	12
United Mfg Co/Div W L Maxson Corp	12-15-18
Unit Process Assemblies Inc	20
Univox Corp	2-5
U S Plastic Molding Corp	2
Valandy Electronics Corp	1-8-10-21
Valor Electronics Co	21
Van Norman Industries Inc/Electronics Div	13
Varo Mfg Co	12
Virginia Electronics Co	2-5
Vis U All Corp (Chicago)	1-4-22
Vis-U-All Products Co (Grand Rapids)	4-22
Waldorf Electronics/Div F C Huyck & Sons	7-17
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Warren Mfg Co	11
Waveline Inc	14
Wayne-Kerr Corp	21
Westinghouse Electric Co/Div Air Arm	2-5-7-12-17
Weston Instruments/Div Daystrom Inc	3-5-8-13-16
Winkler Labs	24
Winslow Co	2-3-7-13
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Wyle Mfg Corp/Mantec Div	24
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Acme Industrial Co	15-17-18
Acromark Co	10-16
Artos Eng Co	40
Acro Tool & Die Works	13-16
American Electrical Heater Co	30-31-32
American Optical	15
American Optical Co/Instrument Div	17
Amphenol Connector Div/Amphenol-Borg Electronics Corp	1
Anchor Products Co	32
Annis Co	10
Arrow Fastener Co Inc	34
Armstrong Bros Tool Co	21-41
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Bausch & Lomb Optical Co	15-18
Benchmaster Mfg Co	39
Black & Decker Mfg Co	3-6-7-8-12-23-41
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Carpenter Manufacturing Co Inc	32-40
Champion De Arment Tool Co	5-12-19
Chase Brass & Copper Co	32
Clauss Cutlery Co	25-27-38
Contact Inc	29-31
Cook Research Labs	5
Croname Inc	21
Crown Industrial Products Co	10
Dazor-Mfg Corp	15
Dee Electric Co	28
Dietzen Co Eugene	24
Doall Co	2-8-23
Doeden Tool Corp	6
Eisler Eng'g Co	28-29
Electrical Specialty Co	28
Electric Soldering Iron Co	28-29-31-32
Electronic Applications Inc	40
Engineering Developments Inc	15-18
Engis Equipment Co	1-15-18-24
Enthoven Solders Ltd	32
Erca Tool Die & Stamping Co	19-20
Ercona Corp	15-17-36-37
Erikson Specialized Tool Co	1-5-19-21-29 30-31-32-41
Eyelet Tool Co	19-20-35
E-Z-Way Templates	24
Fedtro Inc/Federal Electronics Sales Div	31-32
Foredom Electric Co Inc	6
Gardner-Denver Co	7-21-22-26-41
General Cement Mfg Co/Div Textron Inc	1-13-14-15-18-20-26-35-36-37-38-40
General Electric Co/Apparatus Sales Div	28-32
General Machine & Instrument Co	1-20
General Scientific Equipment Co	16-28-38
Goodrich Aviation Products Div/B F Goodrich Co	22
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Greenlee Tool Co	3-20-26
Hexacon Electric Co	29-30-31-32
High Speed Hammer Co	12-20-22
Hi-Shear Rivet Tool Co	22-26
Holub Industries Inc	40
Hunter Tools	1-2-19-23-26-27-37-38-39-40-41
Ideal Industries Inc	10-19-32-40
Ingersoll-Rand Co	26
Kelsey-Hayes Co	19-26-27-33-41
Keystone Electronics Corp	1-22-35
Klein & Sons Mathias	5-19-25-41
Lenk Mfg Co	32
Linde Co Div/Union Carbide & Carbon Co	32
Litton Industries/U S Engineering Co Div	35
Lufkin Rule Co	17-20-24-26-39
Mngnetics Corp	20-22-35
Martindale Electric Co	10-11
Mathews & Co Jas	16
Mico Instrument Co	3
Millers Falls Co	2-3-6-7-8-12-17-19- 20-21-23-26-39-41
Mitchell Industries Inc	30-31-32
Moody Machine Products Co	7-26-41
Morris Co J I	8-19
Niagara Machine & Tool Wks	12-20-22-27
Orbit Industries	38
Oryx Co	31-32
Oster Mfg Co John/Cummins Portable Tool Div	6-23
Owatonna Tool Co	4-5-12-19-20-21-26-41
Pacific Universal Products Corp	18
Peck Stow & Wilcox	12-27
PIC Design Corp	12-15-18

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Cutters, slide	4
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Drills, hand	7
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Drivers, staple	9
Etchers, electric	10
Files	11
Hammers	12
Holders, chassis	13
Knob pullers	14
Lenses, inspection	15
Marking stamps	16
Micrometers	17
Mirrors, inspection	18
Pliers	19
Punches	20
Ratchet wrenches	21
Rivet tools	22
Saws	23
Scales & tapes	24
Scissors	25
Screwdrivers	26
Snips	27
Salder pots	28
Soldering guns	29
Soldering iron stands	30
Soldering iron tips	31
Soldering irons	32
Splicing tools	33
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Terminal lug swaggers	35
Tube pin straighteners	36
Tube pullers	37
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Porter-Cable Machine Co	6-23	A C Transformer Corp	2-3-4-7-9-10-13-16-29-30-31	Chicago Telephone of Calif	2-18-19-31
Porter Co Inc H K/Delta-Star Electric Div	25	Aerolite Electronics Corp	24	Cinema Eng'g Div/Aerovox Corp	25
Porter Inc H K	5	Aerovox Corp (New Bedford)	2-25	Clippard Instrument Lab	24
Precise Measurements Corp	3	Aircom Inc (Roselle)	14	Coast Coil Co	2-9-20-22-25
Radial Cutter Mfg Corp	3	Airdesign Corp	2-3-4-5-6-7-9-10-12-13-15-16-17-18-19-20-23-26-27-28-31-32	Coil Co of America	1-2-3-4-5-6-7-9-10-11-12-13-15-16-17-18-19-22-25-28-29
Renfrew Electric Co Ltd	7	AirPax Electronics Inc	2-3-4-5-6-7-9-10-11-12-13-15-16-17-19-23-26-28	Coilcraft Inc	1-23-24-25-26
Richmont Inc	26-41	Aladdin Electronics/Div Aladdin Industries	23-24-25-26	Coils Electronics Co	24
Ross Metals Co Milton	36	Alford Mfg Co	14	Coil Eng'g & Mfg Co	2-4-7-13-16-18-28-29-31
Sexton Products Inc	1-5-11-19-26-27	Allegheny Ludlum Steel Corp	30	Coil Winders Inc	1-2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-18-19-20
Shakeproof Div/Illinois Tool Works	26	All-Tronics Inc	24	Colin Campbell Co Inc	2-3-4-5-6-7-9-10-11-12-13-15-16-17-18-19-20-22-23-25-26-27-29
Simonds Saw & Steel Co	2-11-23	Amelco Inc	2-3-4-5-6-7-9-10-11-13-15-16-18-19	Columbus Process Co	2-4-6-7-13-15-16-18-19-21-26-28
Smith Inc Herman H	1-36-37-40-41	American Electronics Co	2-3-5-6-9-10-11-12-16-17-18-19-20-23-26-28-30-31	Communication Accessories Co	2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17-18-19-20-21-22-23-24-25-26-27-28-29-30-31-32
Snap-On Tools Corp	2-3-5-6-11-12-18-19-20-21-23-26-27-29-31-32-39-41	American Machine & Foundry Co/Gen Eng Labs	10-14-23-25	Computer Eng'g Assocs Inc (Monrovia)	13
Star Expansion Products	36	American Research & Mfg Co	25	Computer Eng'g Associates Inc (Pasadena)	20
Sta-Warm Electric Co	28	American Transformer/Div Standard Electronics	1-2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17-18-19-20-21-22-23-24-25-26-27-28-29	Coto-Coil Co	31
Sturtevant Co P A	41	Amp Inc/Capitron Div	4-7-9-10-16-23-31	Cross County Audio Exchange	2
Technical Devices Co	13-40	Amplifier Corp of America	2-4-7-16-29	Cycle Transformer Corp	2-3-4-5-6-7-9-10-11-12-13-15-16-18-19-20-22-23-26-27-28-29-31
Technicraft Co	3-23-32	Annis Co	11	Developmental Electronics Corp	23-26
Telegraph Constructo & Maintenance Co Ltd (Metals Grp)	2-5-12-19-20-23-25-26-27-38-41	Antennavision Inc	1	Davenport Mfg Co	6
Temperature Eng'g Corp	28	Applied Radiation Co	23	Del Electronics Corp	4-6-7-9-10-11-12-13-16-22
Tipco Mfg Co	26-41	Ardente Acoustic Labs Ltd	2-4-26	Demornay-Bonardi Corp	14
Torrington Co	20	Aries Labs Inc	12	Developmental Electronic Corp	23-26
Turner Brass Works	28-32	Argonne Electronics Mfg Corp	2-24-26	Dietz Design & Mfg Co	2-4-7-9-16-17-18-19-20-25-31
Ungar Electric Tools Inc	30-31-32	Arnold Eng'g/Repath Pacific Div	30	Dinion Coil Co	2-4-7-9-10-13-15-16-17-18-19-20-23-24-25-26-28-31
United Shoe Machinery Corp	22-26	Arnold Magnetics Corp	8-25-26	Dormeyer Industries	2-3-4-6-7-9-10-11-12-17-18-19-24-28-29-30-31
Universal Drafting Machine Corp	24	Arttd Co Inc	1-23-24-25	Dorne & Margolin	1
Utica Drop Forge & Tool/Div Kelsey-Hayes Co	5-19-26-27-41	Associated Research Inc	11	Douglas Microwave Co	14
Vaco Products Co	5-12-19-26-35	Atlantic Transformer Corp	2-3-4-5-6-7-9-10-13-15-16-17-18-19-23-25-26-27-28-31	Drake Co R L	1-24
Vulcan Electric Co	28-30-31-32	Atlas Coil Corp	3-4-6-7-9-10-11-13-14-15-16-18-19-20-22-23-27-28-31-32	D & R Ltd	25
Wall Mfg Co P	29-30-31-32	Atlas Eng Co	1-2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17-18-19-20-21-22-23-24-25-26-27-28-29-30-31-32	DuCo Ceramics Co	12
Walsco Electronics Mfg Co	1-3-8-18-20-23-26-29-32-36-37-38-40	Audio Development Co	25-26-27	DuMont Labs Inc Allen B	21-23-25
Waltham Screw Co	1-20-36	Automatic Coil Co Inc	24-31	Dyna Co	2-18
Wasco Electric Products Corp	10-29-31-32	Automatic Timing & Controls Inc	11-20	Eastern Specialty Co	4
Weller Electric Corp	23-29-31-32	Auto Test Inc (Chicago)	2-4-7-11-13-16-18-19-28-31	Edko Electronics Eng'g Co	2-3-4-5-6-7-9-10-11-12-13-15-16-17-18-19-20-26-27-28-31
WEN Products Inc	6-23-29	Auto Test Inc (Neillsville Wisc)	4-16-28	Eisler Eng'g Co	4-6-9-10-23-29
White Dental Mfg Co SS Industrial Div	18	Avion Div/ACF Industries Inc	9-14-23-25	Elcor Inc	5-7-9-11-13-26
Whitney Metal Tool Co	20-21-22	Ballatran Corp	2-3-4-5-6-7-9-10-12-13-15-16-17-18-19-20-23-25-26-31	Electran Mfg Co	2-4-5-6-7-9-10-11-12-13-15-16-25-26-28-31
Wildner Mfg Co	30	Barker & Williamson Inc	1-23-24-25	Electrical Windings Inc	2-3-4-6-7-9-11-12-13-15-16-26-28-31
Workman TV Inc	1-36	Barwood Electronics Inc	2-3-4-5-6-7-9-11-26	Electro Assemblies Inc	24
Wyzenbeek & Staff Inc	3-23	Bellaire Electronics Inc	24	Electro Eng'g Works	2-4-6-7-9-10-11-12-13-15-16-17-18
Xcelite Inc	19-26-41	Berkshire Labs	17-23	Electronic Components	1-2-3-4-6-7-9-13-15-16-17-18

94—TRANSFORMERS

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Transformers, audio	2
Transformers, audio, very low frequency	3
Transformers, autotransformer	4
Transformers, bias	5
Transformers, current	6
Transformers, filament	7
Transformers, flyback	8
Transformers, 400 cycle	9
Transformers, HV	10
Transformers, instrument	11
Transformers, insulation	12
Transformers, isolation	13
Transformers, microwave	14
Transformers, modulation	15
Transformers, plate	16
Transformers, plug-in	17
Transformers, power receiving	18
Transformers, power transmitting	19
Transformers, precision matched	20
Transformers, precision TV deflection	21
Transformers, precision voltage dividing	22
Transformers, pulse	23
Transformers, RF-IF	24
Transformers, toroidal	25
Transformers, transistor	26
Transformers, ultrasonic	27
Transformers, vibrator	28
Transformers, voltage, regulating	29
Transformer laminations	30
Transformer, velocity	32
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Ace Coil & Electronics Co	23-24
Aeme Electric Corp	4-7-9-10-11-12-13-16-17-18-19-20-21-22-23-25-27-29
Acorn Electronics/Div James Vibrapowr Co	2-4-6-7-9-10-11-13-15-16-17-18-19-20-28-29-31
Acromag	20-22-25

Aerolite Electronics Corp	24
Aerovox Corp (New Bedford)	2-25
Aircom Inc (Roselle)	14
Airdesign Corp	2-3-4-5-6-7-9-10-12-13-15-16-17-18-19-20-23-26-27-28-31-32
AirPax Electronics Inc	2-3-4-5-6-7-9-10-11-12-13-15-16-17-19-23-26-28
Aladdin Electronics/Div Aladdin Industries	23-24-25-26
Alford Mfg Co	14
Allegheny Ludlum Steel Corp	30
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Sage Labs Inc	6
Sargent-Raymont Co	2
Scott Inc H H	2-4
Sherwood Electronic Labs Inc	2-4
Sickles F W Div Gie	1-2-3-4-7-8-9
Sierra Electronic Corp	6
Simpson Mfg Co Mark	2-4
Spartan Electronics Div	4-9-10
Specialty Eng'g & Electronics Co	9
Sperry Gyroscope Co/Electronic Tube Div	5
Sperry Microwave Electronics Co/Div	
Sperry Rand	6
Standard Coil Products Co	4-7-8-9-10
Standard Electronics Div Radio Eng'g Labs	4-9
Stromberg-Carlson Div/Gen Dynamics Co (Carlson Rd)	1-2-3-4-5-6-7-9
Taffet Radio & TV Co	1-2-4
Tech-Master Corp	1-2-8
Technical Oil Tool Corp	6-10
Telectro Industries Corp	3-6-10
Telerad Mfg Corp	5-6
Victor RF & Microwave Co	5-6
Virginia Electronics Co	1-10
Wald Electronics	1-2-4
Warren Mfg Co	6
Webeor Inc	6
Weinschel Eng'g	6
Wells-Gardner & Co	1-2-4
Westinghouse Electric Corp (Pittsburgh)	6
Whitley Electronics Inc	2
Young Spring & Wire Co	1-4-9

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Gauges, ultrasonic, thickness ..	7

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Machining Equipment	6
Metal-Joining Equipment	5
Transducers	1

Acoustics Associates	1-2-3-4-5-6
Alcar Instruments Inc	1-2-3-4-5
American Time Products Inc	4
Arma Div/American Bosch Corp	2-3-6
Atlantic Research Corp	1
Atomic Accessories Inc	4
Arenberg Ultrasonic Laboratory	2-3
Audicon Electronics Inc	3-4
Bendix Aviation Corp/Bendix-Pacific Div	1-4
Bendix Aviation Corp/Pioneer-Central Div	1-2-3-4-9
Birtcher Co	1-2-4
Birtcher Corp/Industrial Div	1-2-4
Blackstone Corp	1-2-3-4
Bliley Electric Co	1
Bogue Electric Mfg Co	2
Branson Instruments Inc/Branson Ultrasonic Corp	1-2-1-7
Burr-Brown Research Corp	3
Butcher Co L H	1-2-4
Circo Equipment Co	1-2-3-4-5-7
Chesapeake Instrument Corp	1-2-3
Communication Measurements Labs	3
Crescent Eng'g & Research Co	1
Designers for Industry	1-2-3
D & R Ltd	2
Dukane Corp	1-2-3
Dyna-Empire Inc	1
Electro-Ceramics Inc	1-3-4-7
E M I Cossor Electronics	1
Erie Resistor Corp	1
General Kinetics Inc	4
General Ultrasonics Co	1-2-3-4-5-6
Good Electronics Corp	2
Gulton Industries Inc	1-2-3-4-5-6-7
Instrumentation Associates	1-4
Kidde & Co Walter	1
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Langevin Div/The W L Maxson Corp	3
Martin-Merrill Inc	1-2-4
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Medcraft Electronic Corp	1-2
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Moore Corp John B	1-2-4
Mullard Ltd	1-2-4-5-6
Mullenbach Div/Electric Machinery Mfg Co	1
Narda Ultrasonic Corp	1-2-4-5-6
National Ultrasonic Corp	1-2-3-4-7
Northern Eng'g Labs	1
Phillips Mfg Co	1-2-4
Piezo Crystal Co	1
Piezo Products Co	2-1
Power Supplies Inc	2-3
Raytheon Co (Waltham)	2-6-4
Rea Co J B	1-3
Santa Barbara Division/Curtiss-Wright	1-3-4
Scott Inc H H	3
Sethco Mfg Co	4
Sheffield Corp	6
Sherman Industrial Electronics/Div Eng Design Inc	2-5
Solar Mfg Corp	1
Sperry Products Inc	7
Sprague Electrical Co	1
Statham Instruments Inc	1
Stromberg-Carlson/Div General Dynamics Co (Carlson Rd)	1-2-3
Telectro Industries Corp	2-3
Telephonics Corp	1-2-3-4
Topper Mfg Co Inc	1-2-3-4-5-6
Ultrasonic Eng'g Co	2-4
Virginia Electronics Co	3
Waveforms Inc	2
Wells-Gardner & Co	2

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Cable, antenna transmission, receiving	2
Cable, antenna transmission, transmitting	3
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Cable, coaxial	5
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Cable, ignition	8
Cable, insulated	9
Cable, low capacitance	10
Cable, microphone	11
Cable, shielded	12
Cable, solid dielectric	13
Cable, telephone	14
Cable, UHF	15
Clamps, cable	16
Code & tab markers	65
Cords, attachment	17
Cords, resistance	18
Forms, wire	66
Test Leads	19
Transmission line	20
Wire, aluminum	21
Wire, asbestos insulated	22
Wire, beryllium copper	23
Wire, cat whiskers for transistors	24
Wire, ceramic insulated	25
Wire cloth	26
Wire, copper, bare	27
Wire, copper clad	28
Wire, copper, insulated	29
Wire, cut & stripped	30
Wire, enameled	31
Wire filament	32
Wire, forms	33
Wire, glass insulated	34
Wire, gold plated	35
Wire, guy	36
Wire, harnesses	37
Wire, high voltage	38
Wire, hookup	39
Wire, litz	40
Wire, magnet	41
Wire, magnetic recording	42
Wire, marking	43
Wire, metal plated	44
Wire, metal shielded	45
Wire, molybdenum	46
Wire, monel	47
Wire, nickel-clad copper	48
Wire, phosphor bronze	49
Wire, plastic insulated	50
Wire, platinum	51
Wire reels	52
Wire, resistance	53
Wire, shielded	54
Wire, silicon bronze	55
Wire, silver plated	56
Wire, stainless steel	57
Wire, steel	58
Wire, tantalum	59
Wire, teflon insulated	60
Wire, thermocouple	61
Wire, titanium	62
Wire, tungsten	63
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Ackerman-Gould Co	43
Acme Wire Co	29-31-34-41
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Actioncraft Products	30-37-43-65
Aerolite Electronics Corp	4-16-19
Aeromotive Eng'g Products Ltd	4-5-7-9-10-11-12-13-29-30-31
Aero Research Instrument Co	25-61
Airtron Inc	2-3-4-5-8-9-12
A-K Mfg Co Inc	1-4-5-7-9-10-11-12-17-18-19-29-30-34-37-38-39-45-50-54
Alden Products Co	4-17-19-30-37-45
Allegheny Ludlum Steel Co	57-58
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Alphaduct Wire & Cable Co	29-39-50
Alpha Wire Corp	1-2-3-4-5-7-9-10-11-12-14-15-19-20-27-29-30-31-37-38-39-41-43-45-50-54-55-56-60
All-Tronics Inc	4
Alpha Metals Inc	33
Aluminum Co of America	1-9-16-20-21-41
American Brass Co	1-27-49-55
American Electric Cable Co	2-3-4-5-7-8-9-10-11-12-14-15-18-19-20-27-28-29-30-34-37-38-39-50-54-56-60-61
American Silver Co	51
American Super-Temperatures Wires Inc	5-8-9-10-12-13-15-17-19-29-30-31-34-37-38-39-41-50-54-60-61

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Andrew California Corp	2-3-4-5-13-15-16-20
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Armco Steel Co	57
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Asco Wire & Cable Co	29-31-41
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Belden Mfg Co	1-2-3-4-5-7-8-9-10-11-12-13-14-17-19-20-21-22-27-29-30-31-34-37-38-39-40-41
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Bendix Aviation Corp Cincinnati Div	4
Bergen Wire Rope Co	4-63
Bernco Eng'g Corp	4
Bishop & Co Platinum Works J	24-26-28-32-45-48-51-53-61
Blaco Mfg Co	16
Bliss Electronic Corp	4-37
B & M Electric Corp	17-29-30
Boston Insulated Wire & Cable Co	3-4-5-7-8-9-10-12-13-22-29-32-34-39-50-54-55-56-60-61
Bram Metallurgical-Chemical Div	1-23-27-28-29-31-32-34-35-40-41-44-45-46-47-48-49-51-53-55-56-57-59-62-63-64
Brand & Co William	2-3-4-5-9-10-11-12-13-15-20-29-30-34-37-38-39-43-45-50-54-65
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Bridgeport Brass Co (Indianapolis)	27-49-55
Bristol Co	61
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Cannon Electric Co	4
Carborundum Metals Co	61
Carol Cable Div Crescent Co Inc	5-8-9-11-12-17-29-30
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Channel Master Corp	2-15-20-36
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Cleveland Wire Cloth & Manufacturing Co	26
Coaxial Connector Co Inc	4
Cohn Corp Sigmund	21-24-29-31-32-35-51-61
Coils Electronics Co	4-19
Coleman Cable & Wire Co	2-3-5-8-9-10-11-12-14-15-21
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Component Mfg Service Inc	4-17-19-37
Consolidated Wire & Associated Cos	1-2-3-4-5-7-8-9-10-11-12-13
Continental Wire Sales Corp	5-8-9-10-11-12-13-22-29-30-34-38-39-45-50-54-60
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Cornish Wire Co	2-4-9-11-12-15-17-29-30-34-37-39-50-54
Crescent Insulated Wire & Cable Co	9-12-21-29-45-50
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Dale Products Inc (Columbus)	4
Dielectric Materials Co	5-9-10-11-12-13-29-38-39-43
Doty Acoustical Electronic Labs	4
Driver Co Wilbur B	18-23-31-32-34-47-53-56-57-61
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Dumont Airplane & Marine Instrument Inc	4
Eagle Electric Mfg Co	29-39-50

Eagle Signal Corp	4
Eastern Smelting & Refining Corp	35-51-56
Eisler Eng'g Co	46-63
Electric & Physical Inst Corp	5-6
Electrical Specialty Co	9-22-29-31-34-39-41-43-47-48-53
Electric Auto-Lite Co (Port Huron)	8-9-12-21-25-27-29-30-31-34-37-38-39-41-50-54-56-60
Electric Auto-Lite Co (Toledo)	4-8-12-27-28-29-30-31-34-37-39-41-50-52-54-60
Electro-Etch Circuits Inc	35-44
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Electronic Production & Development Electronics Inc	4-19-30-37
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Frederick Tool & Eng'g Corp	4
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Gavitt Wire & Cable Co (Brookfield)	4-5-7-9-10-11-12-14-15-17-18-19-29-37-39-45-50-54-60-61
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General Electric Co Lamp Metals & Components Dept	24-32-44-63
General Insulated Wire Works	4-5-9-12-14-17-22-30-39-50
General Precision Lab Inc (Pasadena)	4
General Radio Co	5
Gordon Co Claude S	22-27-31-34-51-60-61
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Graphik Circuits Div	37
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Gulton Industries Inc	5-12
Hackensack Cable Corp	2-3-36-49-55
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Halogen Insulator & Seal Corp	60
Hamilton Standard Electronics Dept	4
Handy & Harmon (El Monte)	32-33
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Hansen Co Wm	37
Haveg Industries Inc	5-9-12-29-30-39-45-50-54-60
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Hitemp Wires Inc	5-7-9-12-13-25-29-31-34-37-39-41-42-45-50-54-56-60
Holub Industries Inc	16
Holyoke Wire & Cable Corp	2-3-4-5-7-9-10-11-12-13-14-15-17-18-20-29-30-34-37-38-39-50-53-61-60
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Jefferson Electronic Products Corp	4-8-9-10-12-19-20-37
Jefferson Wire and Cable Corp	2-3-5-9-10-11-12-13-14-15-20-29-34-38-39-50-59
Jelliff Mfg Corp C O	47-53
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Kaiser Aircraft & Electronics Div (Oakland)	4
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Kings Electronics Co Inc	4-17-19
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 Lehigh Valley Electronics Eng'g & Mfg Co 4
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 Ling Systems Inc 4-19-20-37-43
 McHugh & Son Raymond F 61
 Mackay Inc A D 21-23-24-26-27-32-35-44-46-47-49-51-56-57-59-61-62-63-64
 Macleon & Hanopol 4
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 Markel & Sons L Frank 39-50-60
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 Mercury Eng'g Corp 4-30-37
 Meridan Metalcraft Inc 20
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 Minn-Honeywell Regulator Co Brown Instruments Div 61
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 Nesor Alloy Products Co 21-23-24-27-28-35-37-46-47-48-49-51-53-55-56-57-58-59-63-64
 Newark Wire Cloth Co 26
 Newcomb Spring of Conn Inc 33
 New England Electrical Works Inc 1-7-27-29-31-39-40-41
 Newman Corp M M 37
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 Porter Co Inc Alloy Metal-Div 23-27-28-47-48-49-57-58
 Precision Tube Co 5-12-15-20-54
 Prodelin Inc 3-4-5-15-20
 Progress Electronics Co 2-4-5-9-14-15-16-39-54-60
 Radio Corp of America/Commercial Electronic Products 2-3-5-6-11-12-15-16-17-20
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 Tenna Mfg Co 2-3-4-5-12-15
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1959 ELECTRONIC INDUSTRIES DIRECTORY

Brand & Trade Name Index

The brand names of the products, equipment, and instruments in the electronic and related industries are listed alphabetically, with the name of the manufacturer.

The address of the manufacturer whose brand or trade name is listed here may be obtained by referring to the Alphabetical Listing of Manufacturers.

A

Abalon—Abalon Precision Mfg Corp
 Abbeon—Abbeon Supply Co
 Absolute—Cambridge Filter Corp
 Absorb-A-Shock—Federal Shock Mount Corp
 Accuvac—Green Rectifier Co
 Ace—Mallory & Co Inc P R
 AccuRay—Industrial Nuclonics Corp
 Accutron—Sheffield Corp
 AC-DC—Power Sources Inc
 ACDC—ACDC-Electronics Inc
 Ace—Ace Plastic Co
 Acemho—Ace Electronics Assoc
 Aceohm—Ace Electronics Assoc
 Acepot—Ace Electronics Assoc
 Acetec—Ace Electronics Assoc
 Acetrim—Ace Electronics Assoc
 Acme—Acme Battery Corp
 Acme—Producers Sales Corp
 Acme Electric—Acme Electric Corp
 Acme-Mold—Acme Wire Co
 Acra-Stop—Joslyn-Hudson Inc
 Acro—Acro Tool Die Works
 Acro—Acro Div/Robertshaw-Fulton Controls Co
 Acromag—Acromag Inc
 Acrylex—Essex Wire Corp
 Actioncraft—Actioncraft Products
 Actrac—Seiscor Mfg Co/Div Seismograph Service Corp
 Ada-Its—Workman TV Inc
 Adalloy—Adalet Mfg Co
 Ad-A-Switch—Clarostat Mfg Co Inc
 ADC—Audio Development Co
 Adcaster—Audiomation Labs
 Addaplug—Associated Engineering Corp
 Add-A-Unit—Blonder Tongue Labs Inc
 Adello—Advance Electronics Co
 Adit—Weston Instruments Div/Daystrom Inc
 Adjust-Angle—Weksler Instruments Corp
 Adjustohm—Ward Leonard Electric Co
 Adjustoroids—Burnell & Co Inc
 Adlake—Adams & Westlake Co
 Admiral—Admiral Corp
 Advance—Acme Battery Corp
 Advanced—Advanced Instruments Inc
 Adventurer—Johnson Co E F
 AE Co Prods—American Electric Cable Co
 Aeralloy—Engelhard Industries Inc/H A Wilson Div
 Aerial Tower—Aerial Tower Mfg Co
 Aerocom—Aeronautical Communications Equip Inc
 Aeroflex—Anchor Plastics Co Inc
 Aerolux—Aerolux Light Corp
 Aeropak—Aero Research Instrument Co Inc
 Aeropot—Aero Electronics Corp
 Aerosolve—Cambridge Filter Corp
 Aertape—Packard Bell Electronics Corp
 A E 16—Bow Solder Products Co Inc
 A G F—American GAS Furnace Co
 Adrac—Mid-Century Instrumental Corp
 Air Dux®—Alumitronic Eng Co
 Airflex—Lemert Engineering Co Inc
 Air-O-Kay—Mine Safety Appliances Co
 Airpak—Conoflow Corp
 Air-Vac—Frederick Tool & Eng'g Corp

Airman—Firth Sterling Inc
 Ajax—United Screw & Bolt Corp
 Alcoa—Aluminum Co of America
 Alcoa—Whitehead Metals Inc
 Alcuplate—Metals & Controls Corp
 Alert-Call—Seeley Electronics
 Algeo—Auburn Mfg Co
 Align-O-Pot®—Bourns Labs Inc
 Alkenex—General Electric Co/Wire & Cable Dept
 All American—All American Tool & Mfg Co
 All Angl—Barry Controls Inc
 Allegheny—Allegheny Ludlum Steel Corp
 Allen Head—Allen Mfg Co
 Alliance—Alliance Mfg Co Inc
 All Metl—Barry Controls Inc
 Almanox 4462—Frenchtown Porcelain Co
 Almarco—Alliance Mfg Co Inc
 Alnisi—Engelhard Industries Inc/E Makepeace Div
 Almet—Porter Co Inc H K
 Alnico 5Cb—Thomas & Skinner Inc
 Alodine—Amchem Prod Inc
 Alox—Nat'l Beryllia Corp
 Altimatic—Air Marine Motors Inc
 Alu-Flex—Auburn Mfg Co
 Alumatic—General Electric Co-Capacitor Dept
 Alum-A-Stix—Mechanical Steel Tubing Div/Haydon Corp
 Alumel—Hoskins Mfg Co
 Alundum—Norton Co
 Amatuer Tower—Universal Products Eng'g Co
 Amberyl—Vaco Products Co
 Ambroid—Ambroid Co
 AMC-4—Arnold Magnetics Corp
 Amco—American Solder & Flux Co
 Amco—Applied Magnetics Corp
 Ameco—Antennavision Inc
 Ameco—American Electronics Co
 Amercoat—Amercoat Corp
 American Beauty—American Electrical Heater Co
 American Phillips—American Screw Co
 Amerite—American Tower Co
 Amer Plate—Amercoat Corp
 Amerisil—Engelhard Industries Inc/Amerisil Quartz Div
 Amertran—Standard Electronics Div/Radio Eng'g Lab
 Amerweld—Standard Electronics Div/Radio Eng'g Labs
 Ametron—Streeter Amet Co
 AMF—American Machine & Foundry Co
 AMFlite—American Machine & Foundry Co
 Amglo—Amglo Corp
 Aminco—American Inst Co Inc
 AMP—AMP Inc
 Amperite—Amperite Co Inc
 Amphos—American Metal Climax Inc
 Amplicall—Raul & Borg Corp
 Amplifilm—AMP Inc/Capitron Div
 Amplisorter—Technical Measurement Corp
 Ampli-Speed—Electrical Machinery Mfg Co
 Amplitran—Ferrotran Electronics Co
 Amzirc—American Metal Climax Inc
 Anaconda—American Brass Co
 Anaconda—Whitehead Metals Inc
 Ancor—Anchor Specialty Mfg Co
 Ancorene—Anchor Plastics Co Inc

Anderson—Micrometrical Mfg Co
 Anderox—Anderson Controls Inc
 Anderton—Anderton Electronic Lab
 ANELgear—Airborne Accessories Corp
 Annis—Annis Co R B
 Anoflex—Feay Co Neal
 Another Abalon Product—Abalon Precision Mfg Corp
 Ansley PLUS—Ansley Mfg Co Arthur
 Antennavision—Antennavision Inc
 Aquaflex—Engelhard Industries Inc/Wilson Div H A
 Aqualigner—Control Circuits Inc
 Arbeit D V A—Industrial Development Labs
 Archer—Radio Shack Corp
 Argonne—Argonne Electronics Mfg Corp
 Aristaloy—Engelhard Industries Inc/Baker Dental Div
 Aritemp—Aries Labs Inc
 Arnicor—Arnicor Stl Corp
 Armcorp—American Research & Mfg Corp
 Arra Line—Antenna & Radome Research Associates
 Arra Vamp—Antenna & Radome Research Associates
 Arrow—Arrow Radio Co
 Arrow Hart—Arrow Hart & Hegeman Elec Co
 Artisan—Artisan Electronics Corp
 Artos—Artos Engineering Co
 Arulab—Arenberg Ultrasonic Lab Inc
 Asarco—American Smelting & Refining Co
 Asarco Lo—American Smelting & Refining Co
 Ascor—American Speedlight Corp
 Ascorlight—American Speedlight Corp
 Ascorlux—American Speedlight Corp
 Asenco—Associated Eng'g & Mfg Corp
 Astatic—Astatic Corp
 Astatic—Canadian Astatic Ltd
 A-321—Wayne Kerr Corp
 Atkomatic—Aktomatic Valve Co Inc
 Atlas—Atlas Sound Corp
 Atlee—Atlee E-E Corp
 Atomcounter—Jarrell Ash Co
 Atomex—Engelhard Industries Inc/Chemical Div
 Atomic Accessories—Atomic Accessories Inc
 ATR—American Television & Radio Co
 Attenu-Duct—Filtrol Co Inc
 Audicon—Audicon Electronics Inc
 Audio-Aide—Greene Co L. Charlton
 Audio Baton—Blonder Tongue Labs Inc
 Audioidiscs—Audio Devices Inc
 Audiofilm—Audio Devices Inc
 Audiolator—Kay Electric Co
 Audio-Line—Audio Accessories
 Audio Master—Audio Master Corp
 Audiotone—Audio Master Corp
 Audiotape—Audio Master Corp
 Audiotran—Ferrotran Electronics Co
 Audivox—Audivox Inc
 Audiograph 5A—Gray Mfg Co
 Aurosal—Engelhard Industries Inc/Chemical Div
 Auto-Bender—Electro-Machinery/Div Design Tool Corp
 Auto-Bridge—Industrial Instruments Inc

Autoflex-TM—Engelhard Industries Inc/Wilson Div H A
 Auto-Former—Electro-Machinery Div/Design Tool Corp
 Autograf—Moseley Co F L
 Autonouncer—Audiomation Labs
 Autollizer—North Electric Co
 Automatic—Automatic Radio Mfg Co Inc
 Automatic—Trion Inc
 Auto Ref—Thermo Electric Co Inc
 Autotest Master—Stromberg Time Corp
 Auto-Solder—Electro-Machinery/Div Design Tool Corp
 Autospan—Universal Drafting Machine Corp
 Autosperser—Audiomation Labs
 Auto-Straightener—Electro-Machinery/Div Design Tool Corp
 Autosyn—Bendix/Eclipse-Pioneer Div
 Auto-Test—Auto-Test Inc
 Auto-Tong—Auto-Test Inc
 Auto-Vox—Kay Electric Co
 Axiohm—Ward Leonard Electric Co

B

Babcock—Babcock Relays Inc
 BAI—Briggs Associates Inc
 Baker 75—Engelhard Industries Inc/Baker Dental Div
 Baldwin Encopers—Baldwin Piano Co
 Bandolug—Burdny Corp/Omaton Div
 Banner Line—Jersey Specialty Co Inc
 Bantam—Small Motors Inc
 Bantam-Ware—Kontes Glass Co
 BA101—Minneapolis-Honeywell Regulator Co/Boston Div
 Barco—Barium & Chemicals Corp
 Barohm—Ward Leonard Electric Co
 Barry—Inscor Co/Div Barry Controls
 Barrymount—Barry Controls Inc
 Baso—Baso Inc
 Bass-Capps & Co Inc
 Bassett—Bassett Rex Inc
 Battery Scope—Christie Electric Corp
 Bay Shore—Munston Mfg & Service Inc
 B-Beads—Pilot Chemicals Inc
 BD—Beede Electrical Instrument Co
 Beach-Russ—Beach-Russ Co
 Beamatron—Hinh Vacuum Equipment Corp
 Beamed Power Arrays—Telrex Labs
 Beckerloy—Torsion Balance Co
 Belimiters—Workman T V Inc
 Bemac—Electrical Machinery Mfg Co
 Bemisorb—Bemis Bros Bag Co
 Bemistape—Bemis Bros Bag Co
 Benchmaster—Benchmaster Mfg Co Inc
 Bendix Amber—Bendix Aviation Corp
 Bendix Time of Flight—Bendix Aviation Corp
 Bendix Transcope—Bendix Aviation Corp
 Bendix Ultra Viscoson—Bendix Aviation Corp
 Benelux—Masonite Corp
 Benflex—Scintilla Div/Bendix Aviation Corp
 Bennett—Fisher Berkley Corp
 Benseal—Scintilla Div/Bendix Aviation Corp

B-801—Wayne Kerr Corp
 Berlox—National Beryllia Corp
 Bermalastic—Sterling Varnish Co
 Berylico—Beryllium Corp
 Beyer—Gotham Audio Development Corp
 B-521—Wayne Kerr Corp
 B G—Library—Audio Master Corp
 B & H—LaMore C D
 B H F—Bright Star Industries Inc
 Bi-Flux—Shure Brothers Inc
 Biluxor—PAR Products Corp
 Bios Brand—Bios Labs
 Blaco—Blaco Mfg Co
 Blastcorder—Geotechnical Corp
 Blast #1—Narda Ultrasonics Corp
 Blast #2—Narda Ultrasonics Corp
 Blast #3—Narda Ultrasonics Corp
 Blast #4—Narda Ultrasonics Corp
 Blue Chip—Firth Sterling Inc
 Blue-Point—Snap-on Tools Corp
 Blum—Laminations Co
 Blu Ohm—Bradford Components Inc
 Blu-Red—Associated American Trading Winding Machinery
 Boardmaster—Universal Drafting Machine Corp
 Bodine—Bodine Electric Co
 Bodnar—Bodnar Industries Inc
 Bogen—Bogen Presto Co
 Bolesey—Bolsley Research & Development Corp
 Bolsley Delmonico—Bolsley Research & Development Corp
 Bondex—Permacel
 Bondmaster—Rubber & Asbestos Corp
 Bondstrand—Amercoat Corp
 Bopad—Sterling Varnish Co
 Bore Master—Size Control Co
 Borescopes—Lenox Instrument Co
 Bore O Scope—Size Control Co
 Bowers—Bowers Battery & Spark Plug Co
 B P W Series—Bradford Components Inc
 Braloy—Brainin & Co C S
 Brandes—Cannon Co C F
 Brasslyfe—Bee Chemical Co/Logo Div
 Brassply—National Standard Co
 Bray Studios—Bray Studios Inc
 Brazaloy—All State Welding Alloys Co Inc
 Brice Phoenix—Phoenix Precision Instr Co Inc
 Bridgeport—Bridgeport Brass Co
 Bridger—Audio Instrument Co Inc
 Bright Star—Bright Star Ind
 Bristol's—Bristol Co
 Broadband—Topatron Inc
 Brown—Minneapolis Honeywell Reg Co/Industrial Div
 Bryant—Bryant Computer Products Div
 Bryllitite—Engelhard Industries Inc
 B-221—Wayne Kerr Corp
 B-601—Wayne Kerr Corp
 B-721—Wayne Kerr Corp
 B-731A—Wayne Kerr Corp
 Builders-Providence—B-I-F Industries Inc
 Bulova—Bulova Watch Co
 Bunell—Bunell & Co J H
 Burcap—Burdny Corp/Omaton Div
 Burgess—Burgess Battery Co/Div Servel Limited
 Burndy—Burdny Corp/Omaton Div

Burnley—Burnle Batter & Mfg Co
 Burr Corp—Aerial Tower Mfg Co
 Burroughs E101—Burroughs Corp/ElectroData Div
 Burroughs 205—Burroughs Corp/ElectroData Div
 Burroughs 220—Burroughs Corp/ElectroData Div
 Butoba—Audio Master Corp
 Button Mic—Erie Resistor of Canada Ltd
 B & W Croloy—Babcock & Wilcox Co/Tubular Products Div
 B & W Nicloy—Babcock & Wilcox Co/Tubular Products Div
 By-Buk Universal—By-Buk Co

C

Cadet—Linemaster Switch Corp
 Cad-Pak—American Electronics Co
 Cageable—Minneapolis-Honeywell Regulator Co/Boston Div
 Caisan—Magnecessories
 Calmag—California Magnetic Control Corp/Calmag Div
 Calstone—Technicraft Co
 CAL-30—Richmont Inc
 Caltron—Caltron Products Co
 Caltron—Caltron Products Co
 Cambion—Cambridge Thermionic Corp
 Cameraflex—Cameraflex Corp
 Camtrol—Lemert Engineering Co Inc
 Candle-Flame—North American Electric Lamp Co
 Candohms—Workman T V Inc
 Candybeme—North American Electric Lamp Co
 Canex—Canadian Research Institute
 Cannon-Ball—Cannon Co C F
 Cannon Plugs—Cannon Electric Co
 Capac—Engelhard Industries Chas Inc
 Capacitors—Barber-Colman Co/Wheelco Instruments Div
 Capadyme—Mullenbach Div/Electric Machinery Mfg Co
 Capaswitch—Mullenbach Div/Electric Machinery Mfg Co
 Capitron—A M P Inc/Capitron Div
 Capps—Capps & Co Inc
 Caps—Metal & Thermit Corp
 Captain TV—Medal Mfg Co
 CarCall—Seeley Electronics
 Cardatron—Burroughs Corp/ElectroData Div
 Cardioec—PAR Products Corp
 Carpenter Iron A—Carpenter Steel Co
 Carpenter Iron B—Carpenter Steel Co
 Carpenter Iron C—Carpenter Steel Co
 Carpenter No. 1-JR—Carpenter Steel Co
 Carpenter 27—Carpenter Steel Co
 Carpenter 30—Carpenter Steel Co
 Carpenter 32—Carpenter Steel Co
 Carpenter 36—Carpenter Steel Co
 Carpenter 42—Carpenter Steel Co
 Carpenter 49—Carpenter Steel Co
 Carpenter 52—Carpenter Steel Co
 Carpenter 80—Carpenter Steel Co
 Carpenter 400—Carpenter Steel Co
 Carpenter 426—Carpenter Steel Co
 Carpenter Stainless No. 3—Carpenter Steel Co
 Carpenter Stainless No. 5-F—Carpenter Steel Co
 Carpenter 800—Carpenter Steel Co
 Carpenter Stainless No. 446—Carpenter Steel Co
 Carpenter Stainless No. 6-F—Carpenter Steel Co
 Cary—Applied Physics Corp
 Casceder—Jerrold Electronics Corp
 Castaloy—Fisher Scientific Co
 Cast-On—Engelhard Industries Inc/Baker Dental Div
 Cathaloy—Superior Tube Co
 Cathedral Series—Cletron Inc

CBS—CBS-Hytron
 CDC 1604—Control Data Corp
 Cecospit—Community Eng'g Corp
 Cecoprint—Community Eng'g Corp
 Celab—Clark Electronic Labs
 Cement-O-Film—Harwald Co
 Cenco—Central Scientific Co
 Centilator—Kay Electric Co
 Centi-Low Range—Barnett Instrument Co
 Centrex—Century Projector Corp
 Cen Tri—Alpha Metals Co
 Century—Century Projector Corp
 Ceracast—Engelhard Industries Inc/Baker Dental Div
 Ceramag—Stackpole Carbon Co
 Ceramagnet—Stackpole Carbon Co
 Ceramatemp—Hitemp Wires Inc
 Ceramics—Erie Resistor of Canada Ltd
 Ceramo—Thermo Electric Co Inc
 Cer Ohm—Bradford Components Inc
 Certified—Certified Radio Labs
 Cetron—Continental Elec Co
 Challenger—Bogen Presto Co
 Challenger—Dreier Bros Inc
 Challenger—Johnson Co E F
 Channel Master—Channel Master Corp
 Characteron—Stromberg-Carlson Div/General Dynamics Corp
 Charjall—Lamarck Mfg Co
 Chase—Chase Brass & Copper Co
 Checkmate—CGS Labs Inc
 Chemalloy Fluxless Solders—Chemalloy Electronics Corp
 Chemalloy—Kahl—Chemalloy Electronics Corp
 Chemark—Gray Pantograph Engraving Co
 Chemark II—Gray Pantograph Engraving Co
 Chemelec—Fluorocarbon Products Inc/Div U S Gasket Co
 Chemiflex—Technicraft Co
 Chemiglas—Technicraft Co
 Chicago—Chicago Standard Transformer Corp
 Chicago Binding—United Screw & Bolt Co
 Chobert—Aviation Developments Inc
 CHQ—Firth Sterling Inc
 Christian Becker—Torsion Balance Co
 Chromabar—Kay Electric Co
 Chromadot—Key Electric Co
 Chromomax—Leeds & Northrup Co
 Chromel—Hoskins Mfg Co
 Chromel—Hoskins Alloys of Canada
 Chronistor—Bergen Labs Inc
 Chrono Log—Chrono Log Corp
 Chronotrols—Barber-Colman Co
 Cinch—Cinch Mfg Co
 Cinema—Cinema Engineering Circle C—Firth Sterling Inc
 Circon—Universal Circuit Controls
 Cirsosonic—Circo Ultrasonic Corp
 Circuitester—UltraAudio Products/Div Oberline Inc
 Circuitmaster—Fordham Mfg Co
 Cirflex-TM—Engelhard Industries Inc/Wilson Div H A
 Citi Fone—Multi Products Co
 Clamps—Peerless Electronics Inc
 Clare—Clare & Co C P
 Clairex—Clairex Corp
 Clark—Clark Controller Co
 Clarkstan—Pacific Transducer Corp
 Claro—Clarostat Mfg Co Inc
 Clarostat—Clarostat Mfg Co Inc
 Clary—Clary Corp
 Cletron—Cleveland Electronics Inc
 Cletron—Cletron Inc
 Clevite—Clevite Corp Texas Div
 C Line—Clarostat Mfg Co Inc
 Clinigraph—Weksler Instruments Corp
 Clipper—Linemaster Switch Corp
 Clipper—Sage Electronics Corp
 Clutch Head—United Screw & Bolt Co
 Coaxial Cable—Western International Co
 Coaxial Connector—Western International Co
 Coaxial Connectors—Coaxial Connector Co Inc
 Cobehn—Cobehn Inc

C O C—Hammarlund Mfg Co Inc
 Coffex-TM—Engelhard Industries Inc/Wilson Div H A
 Cohrastic—Connecticut Hard Rubber Co
 Coil Cradles—Benchmaster Mfg Co
 Coldite 70—Stackpole Carbon Co
 Color-Eye—Instrument Development Labs Inc
 Colorite—Trio Mfg Co
 Color Royal—Trio Mfg Comp
 Columbia—Columbia Electric Mfg Co
 Columbia—Standard Pressed Steel Co
 Columbia CD—CBS-Hytron
 Comco—Communications Co
 Commando—Dreier Bros Inc
 Compact—Linemaster Switch Corp
 Compass—Dreier Bros Inc
 Comptograph—Comptometer Corp
 Comptopak—Comptometer Corp
 Compu-tran—Int'l Resistance Co
 Conalert—Kaar Eng'g Corp
 Concertcaster—Audiomation Labs
 Concentrikrit—Int'l Resistance Co
 C-100—Mincom Div/Minnesota Mining & Mfg Co
 Conn—C G Conn Ltd
 Connecticut—Stueck Inc W Whitney
 Connex—Joslyn-Hudson Inc
 Conolite—Continental Can Co
 Conolite—LaMaree C D
 Conolon—Narmco Resins & Coatings Co
 Conrac—Conrac Inc
 Conrad Inc—Conrad Inc
 Consecutor—Audiomation Labs
 Constavac—Green Rectiler Co
 Constavolt—LaMarche Mfg Co
 Constavolt Marine—LaMarche Mfg Co
 Continental—Utah Radio & Electronic Corp
 Control-A-Matic—Rockwell Engineering Co
 Controlarc—Vickers Inc/Electric Products Div
 Conturo—Engelhard Industries Inc/Baker Dental Div
 Copad—Sterling Varnish Co
 Copel—Hoskins Mfg Co
 Copel—Hoskins Alloys of Canada Ltd
 Copperply—National Standard Co
 Corbeq—Sealectro Corp
 Corbrid—Sage Labs Inc
 Cormag—Weston Instruments Div/Daystrom Inc
 Corona—Corona Eng'g Service
 Cottonite—Acme Wire Co
 Coulter Counter—Coulter Electronics Inc
 Courier—Johnson Co E F
 Cox—Revere Corp of America
 Cq Fuse—Bergen Labs Inc
 Crablock—Burdry Corp-Omaton Div
 Craftscope—Waterman Products Co Inc
 Cramolin—Caig Labs
 CRB—Gertsch Products Inc
 Crestcent—Waldes Kohinor Inc
 Crestbrite—Crest Transformer Corp
 Crestmag—Crest Transformer Corp
 Crestrol—Crest Transformer Corp
 Criterion—Canadian Research Institute
 Crodon—Chromium Corp of America
 Cromovan—Firth Sterling
 Crosspatch—Photocircuits Corp
 Crown—International Radio & Electronics Corp
 CRT—Gertsch Products Inc
 CRT—Authorized Mfg Service Co
 Crucible—Whitehead Metals, Inc
 Crucible Alnico—Crucible Steel Co of America
 Crystolon—Norton Co
 CST—Custom Scientific Instruments Inc
 CTS CCM—Meredith & Co Ltd C C
 Cuemaster—Califone Corp
 Cunife—Indiana Steel Products Co
 Cuplat—Western Gold & Platinum Co
 Cuprothal—Kanthal Corp
 Current Governor—North Hills Electric Co Inc
 Cusil—Western Gold & Platinum Co
 Custom Dynetic—Shure Brothers Inc

Customized—Grant Gear Works Inc
 Customixer—Ultraudio Products/Div Oberline Inc
 C V-100—Mincom Div Minnesota Mining & Mfg Co
 CY-AN-IN—Indium Corp of America
 Cycle Electronic—Cycle Transformer Corp
 Cyclemag—Acromag Inc
 Cycle-Set—Controls Co of America

D

DACO—Daco Instrument Co
 Daglas—Acme Wire Co
 Dalmotron—Dalmotron Co
 Dalohm—Dale Products Inc
 Damp Chaser—Damp Chaser Co
 D A P—Semiconductor Products Red. Bank Div/Bendix Aviation Corp
 DART—Navigation Devices Inc
 Datafile—Burroughs Corp/Electro Data Div
 DATA-GAGE—Texas Instruments Inc
 Datarok—Airtronics Inc/Sub Scovill Mfg Co
 Datallites—Dialight Corp
 DATA-MAC—Texas Instruments Inc
 Data Matrix—Dialight Corp
 Data Strip—Dialight Corp
 Data-Tran—General Railway Signal Co
 Datedex—Datex Corp
 Davey—Vibrascope Co
 Dazic—Winterburn Mfg Co
 DB—Beede Electrical Instrument Co Inc
 De Armond—Rowe Industries
 Decasol—Decimeter Products Co
 Decorm—Davis Elect Co
 Deep-Kut—Krengel Mfg Co
 Delco—Delco Appliance Div/General Motors Corp
 Delta-Tenna—Western Gear Corp/Electro Products Div
 Deluxe Secretarial—Linemaster Switch Corp
 Den El—Electric Cord Co
 Defiance—All Star Prod Inc
 Dehydrators—Selas Corp of America
 Dejur—Dejur Amsco Corp
 Dekagot/r—Electro-Measurements Inc
 Dekavidet/r—Electro-Measurements Inc
 Delay Flats—Columbia Technical Corp
 Delco—Delco Radio Div Gen Motors Corp
 Deltabeston—General Elec Co/Wire & Cable Dept
 Deltaply—Dearborn Electronic Labs Inc
 Denrad—Denrad Mfg Co Inc
 Deoxo—Engelhard Industries Inc/Baker Dental Div
 Deoxo—Engelhard Industries Inc/Chemical Div
 Deoxo Flux—Engelhard Industries Inc/American Platinum and Silver Div
 Depolaray—Saine Equipment Lab Harry T
 Depolatherm—Saine Equipment Lab Harry T
 Derbylite—Luminous Resins Inc
 Dermitron—Unit Process Assemblies Inc
 Desco—Dietz Design & Mfg Co
 Desk-Topper—Universal Drafting Machine Corp
 Desmond—Desmond Stepha Mfg Co
 Desolv—Ram Chemicals Inc
 Detecto-Lite—Eagle Electric Mfg Co Inc
 Deutsch—Deutsch Co
 Develco—Developmental Electronics Corp
 Develocorder—Geotechnical Corp
 Deviometer—Radio Specialty Mfg Co
 De Wald—De Wald Radio Div of U S Labs Inc
 DF-I—Designers for Industry Inc
 Diagnostor—Engelhard Industries Inc/National Elec Instrument Div
 Dialco—Dialight Corp
 Diall—Mesa Plastics Co
 Dial Saw—Erwood Inc
 Diamond—Eagle Elec Mfg Co Inc

Diamond Truss—Pioneer Industries Inc
 Dico—Diamond Antenna & Microwave Corp
 Dictabelt—Dictaphone Corp
 Dictachron—Dictaphone Corp
 Dictacord—Dictaphone Corp
 Dictalog—Dictaphone Corp
 Dictaphone—Dictaphone Corp
 Dictatape—Dictaphone Corp
 Dietet—Dictaphone Corp
 Dietet A-9—Dietet Inc
 Dietz—Dietz Co Inc Henry G
 Digicon—Digitran Co
 Digidac—Aeronca Mfg Corp/Baltimore Div
 Digidac—Aeronca Mfg Corp
 Digidial/R—Helipot Div/Beckman Instruments Inc
 Digimatic—Stromberg-Carlson Div/General Dynamics Corp
 Digipot—Digitran Co
 Digiscan—Quantametric Devices Inc
 Digistepper—Digitran Co
 Digiswitch—Digitran Co
 Digisyn—Wayne George Corp Adcon Div
 Digitally—Digitran Co
 Digitizer—Coleman Eng'g Inc
 Digit-Matic—Victor Adding Machine Co
 Digitometers—Electro Met Labs Inc
 Digitote—Digitran Co
 Dilectron—Dilectron Div/Beckman Corp
 Dimco—Dimco Gray Co
 Dimetecote—Aercoast Corp
 Diploite—Dialelectric Materials Co
 Dip Pak—Fidelity Chemical Prod Corp
 Di-Profiler—Engis Equipment Co
 Directron—Sanford Miller Co
 Dirigo—Dirigo Compass & Instrument Co
 Diron—Peerless Products Industries
 Disc-Cap Cutter—Electro-Machinery/Div Design Tool Corp
 Discomb—Ward Leonard Elec Co
 Divco—Division Lead Co
 DK—Industrial Products/Div Amphenol Borg Electronics Corp
 DM—Dorne and Margolin Inc
 DogBone—Engelhard Industries Inc
 Dollar—Robert Dollar Co/Communications Equip Div
 Donner—Donner Scientific Co
 Dot—Cinch Mfg Co
 Double Diamond Brand—H-B Instrument Co
 Dow-Key—Dow-Key Co Inc
 Dowtran—Ferrotron Electronics Inc
 DR—Weston Instruments Div/Daystrom Inc
 Dresser-Ideco—Dresser-Ideco Co
 Dritherm—North American Electric Lamp Co
 Dri-TRAN—Lamp-Air Inc
 Drygalv—American Solder & Flux Co
 DS-200—Newton Co
 D T T—Milgo Electronic Corp
 Dual United Audio Products Inc
 Dualex—Bell & Gossett Co
 DualPultrator—Packard Bell Electronics Corp
 Dub-L-Plug—Superior Electric Co
 Du Kane—DuKane Corp
 Dumet—Sylvania Electric Products Inc/Parts Div
 Dumont—Dumont-Airplane & Marine Instruments Inc
 Du Mont—DuMont Laboratories Inc Allen B
 Duodial/R—Helipot Div/Beckman Instruments Inc
 Duo Diamond—Duotone Co Inc
 Duo Disc—Duotone Co Inc
 Duo Tape—Duotone Co Inc
 Duotone Sapphire—Duotone Co Inc
 Duplex—Bridgeport Brass Co.
 Duplex—Linemaster Switch Corp
 Duplican—Canadian Radium & Uranium Corp
 Duplicate—Canrad Precision Industries
 Durable Products—Seager Standard Carbon Co
 Durac—H-B Instrument Co
 Durach—Selas Corp of America
 Duraflex-TM—Engelhard Industries Inc/H Wilson Div
 Duraline—Universal Drafting Machine Corp
 Duraslew—General Plastics Corp

BRAND & TRADE NAMES

Duratrak—General Radio Co
 Durez—Durez Plastics Div/
 Hooker Chemical Corp
 Duro—Duro Specialty Co Inc
 Durpoint—Duotone Co Inc
 Dust Bugs—Electro-Sonic
 Laboratories
 Dustfoe—Mine Safety Appliances
 Co
 Dustronic—Radex Corp
 Dutch Brand—Johns Manville/
 Dutch Brand Div
 Dynaco—Dynaco Inc
 Dynaco—Dynamic Gear Co Inc
 Dynacounter—Dynapar Corp
 Dynagage—Photocon Research
 Products
 Dynakit—Dynaco Inc
 Dynalite—Meredith & Co Ltd
 C C
 Dynamic—Jackson Electrical
 Instrument Co
 Dyna-Q—K-W Engineering Works
 Dynaset—Dynapar Corp
 Dynatrol—Meredith & Co Ltd
 C C
 Dynaural—Scott Inc H H
 Dynistor—Westinghouse Elec Corp
 Dynox—Patterson Moos/Div
 Universal Winding Co Inc
 DY-2510—Dymec Inc
 DY-2500—Dymec Inc
 DY-2504A—Dymec Inc
 DY-2507—Dymec Inc
 DY-2512—Dymec Inc
 DY-2513—Dymec Inc
 DY-2530—Dymec Inc
 DY-2533—Dymec Inc
 DY-2538—Dymec Inc
 DY-2540—Dymec Inc
 DZUS—Dzus Fastener Co Inc

E

Eagaline—Eagle Electric Mfg Co
 Inc
 Eagalok—Eagle Electric Mfg Co
 Inc
 Eagle Brand—Felters Co
 Eagle Interchange—Eagle Electric
 Mfg Co Inc
 Eagle OK—Eagle Electric Mfg
 Co Inc
 Eagle Slo-Iag—Eagle Electric
 Mfg Co Inc
 Ease—Beckman Instruments Inc/
 Berkeley Div
 Easy-Flo—Handy & Harman
 Easy Vision—Hoffman Electric
 Corp/Consumer Products Div
 Ebert—Jarrell Ash Co
 EBG-Mev 1—X-Ray Dept/Gen-
 eral Electric Co
 EBG-MEV 2—X-Ray Dept/Gen-
 eral Electric Co
 E Case—Epoxy Prod Inc
 Echo-Vox—Kay Electric Co
 Econ-O-Tape—Engelhard Indus-
 tries Inc/D E Makepeace Div
 Econo Watt—Redmond Co Inc
 Edo—Electronics Design Co
 Edgeohm—Ward Leonard Electric
 Co
 Edo—Edo Corp
 Edo-Fishscope—Edo Corp
 Edo UQN—Edo Corp
 EECO—Engineered Electronics Co
 Evalast—Bache & Co Semon
 Efccon—Efccon
 E Form—Epoxy Prod Inc
 Ekotape—Webster Electric Co
 Ektacom—Fisher Berkley Corp
 Elasco—Electronic Assembly Co
 Inc
 Electone—Electron Enterprises
 Inc
 Electron—Electran Manufacturing
 Co
 Electrorator—Engelhard Indus-
 tries Inc/National Electric In-
 strument Div
 Electro-Electro Products Labs
 Inc
 Electrocraft—Electrocraft Inc
 Electrocut—Black & Webster Inc
 Electro-Dry—Republic Foil Inc
 Electrofilm—Electrofilm Inc
 Electrofilm—Shannon Luminous
 Materials Co
 Electrojet—Sheffield Corp
 Electromagnetic Counters—
 Photocon Research Prod
 Electromax—Leeds & Northrup
 Co
 Electromesh—Electrofilm Inc
 Electron—Electron Products Co/
 Div of Preso Inc
 Electronic Controls—Autotron Inc
 Electronic Indicator—Electro-
 Physics Co
 Electronic Master—Stromberg
 Time Corp

Electronik—Minneapolis Honey-
 well Reg Co/Industrial Div
 Electro Probe—Everwood Inc
 Electropunch—Black & Webster
 Inc
 Electroseal—Electro Engineering
 Works
 Electroset—Black & Webster Inc
 Electro-Span—Bendix-Pacific
 Div/Bendix Aviation Corp
 Electrostate—Black & Webster
 Inc
 Electrotable—Black & Webster
 Inc
 Electro-Voice—Electro-Voice Inc
 Electro Wipe—Duotone Co Inc
 Electrowriter—Comptometer Corp
 Elephant Brand—Seymour Mfg
 Co
 ii-TV—General Precision Lab Inc
 Elin—Electronics Internat'l Co
 Elix—El Products Corp
 Elkayol—Mallory & Co Inc P R
 Elkoni—Mallory & Co Inc P R
 Elkoniom—Mallory & Co Inc P R
 Elmec—Electro Mechanical En-
 gineering Co Inc
 Elmenco—Electro Motive Mfg Co
 Inc
 Elmet—Elmet Div, North
 American Philips Co
 Elphco—Electro-Physics Co
 Emi—Laminations Co
 Empower—Empire Products Sales
 Corp
 Emt—Electronic Applications Inc
 Enamelite—Acme Wire Co
 Encapsulet—Rue Products
 Enflon—Enflor Corp
 Ep—Electric Products Co
 E Pak—Epoxy Prod Inc
 Epco—Epoxy Products Inc
 Epinate—American Printed Cir-
 cuits Co
 Epocap—Hardman Co Inc H V
 Epotest—Hardman Co Inc H V
 Erotue—Reichhold Chemicals Inc
 Epoweld—Hardman Co Inc H V
 Epoxy-Clad—Rue Products
 Epsal—Electro Engineering
 Works
 Eput—Beckman Instruments Inc/
 Berkeley Div
 Equa-Therm—Temperature En-
 gineering Corp
 Era—Solartron Electronic Group
 Ltd
 Erectohm—Workman T V Inc
 Ericofon—North Electric Co
 Erma—General Electric Co/Com-
 puter Dept
 Esco—Electro Switch Corp
 Esco—Electric Steel Foundry Co
 Escom—Modern Industries Inc
 Est—Electro-Sonic Labs Inc
 Es-141—Newton Co
 Essex—Essex Electronics of Can-
 ada Ltd
 Esthetgold—Engelhard Industries
 Inc/Baker Dental Div
 Eto—Electric Terminal Corp
 Etho-Loc—Weckesser Co
 Eureka—Eureka X-Ray Tube
 Corp
 Evabrite—Bache & Co Semon
 Everdur—American Brass Co
 Everspring—Engelhard Industries
 Inc/Baker Dental Div
 EVI—Electro-Voice Inc
 Ewald—Ewald Instruments
 Exactohm—Workman T V Inc
 Exact Weight®—Exact Weight
 Scale Co
 Exakta Cameras—Exakta Camera
 Co
 Executive—Linemaster Switch
 Corp
 Exide—Electric Storage Battery
 Co
 Exide—Exide Ind Div
 Exide Ironclad—Exide Industrial
 Div
 Exide Manhex—Exide Ind Div
 Exide Powerclad—Exide Ind Div
 Exide Tyltex—Exide Industrial
 Div
 Explorer—Texas Instruments Inc
 Eye—Intelligent Machine Re-
 search Corp
 E-Z Code—Westline Products
 Div Western Lithograph Co
 E-Z Hook Clip—E-Z Hook Test
 Prods
 E-Z Hook Custom Probe—E-Z-
 Hook Test Prods
 E-Z Hook Sub—E-Z Hook Test
 Prods
 E-Z Hook Tip—E-Z Hook Test
 Products

F

Fafnir—Fafnir Bearing Co
 Faraday—Sperti-Faraday Inc
 Farlite—Plastics Div/Farley &
 Loetscher Mfg Co
 Fastee—Entron Inc
 Faximite—Hogan Laboratories Inc
 Faxkote—Hogan Laboratories Inc
 Faxpaper—Hogan Laboratories
 Inc
 Faxwriter—Times Facsimile Corp
 Faze-Box—American Measurement
 & Control Inc
 F-C-I—Film Capacitors Inc
 Featherweight—Barnett
 Instrument Co
 Federal—Federal Equipment Co
 Federated—American Smelting &
 Refining Co/Federated Metals
 Fellows—Fellows Gear Shaper Co
 Ferrac—Aiprax Electronics Inc
 Ferri-Choke—Superex Electronics
 Corp
 Ferrimag—Crucible Steel Co of
 America
 Fiberglass-Evercoat—Fibre Glass-
 Evercoat Co Inc
 Fidelitytend—Electrend Products
 Corp
 Fil-Cap—Filtron Co Inc
 FilmPot—Fairchild Controls
 Co p-Components Div
 Filterpoint—Duotone Co Inc
 Fil-Therm—Filtron Co Inc
 Filtron—Kenneth Richardson
 Labs
 Finco—Finco Corp
 Fine—Grant Gear Works Inc
 Fingrip—Burdig Corp-Omaton
 Div
 Fireye—Electronics Corp of
 America (Canada Ltd)
 Firezone—Rockbestos Products
 Corp
 Firthaloy—Firth Sterling Inc
 Firwhite—Firth Sterling Inc
 Fisher—Fisher Scientific Co
 Fischer Turned—Fischer Specialty
 Mfg Co
 Fiske—Advanced Instruments Inc
 Fitgo—Beckman Systems Div/
 Beckman Instruments Inc
 Fits-All—Eagle Electric Mfg Co
 Inc
 Five-Hundred—Johnson Co E F
 500-2500—Rixon Electronics Inc
 Fixtome—Claroat Mfg Co Inc
 Flame—Photo-Crystals
 Flamenol—General Electric Co/
 Wire & Cable Dept
 Flame-trols—Barber-Colman Co
 Flash-Flo—Ewald Instruments
 Fleetwood—Conrac Inc
 Flexator—Hunter Spring Co
 Flexiformer—Superior Electric Co
 Flexipipe—Bemis Bros Bag Co
 Flexipone—Du Kane
 Flexloc—Standard Pressed Steel
 Co
 Flexograin—Porter Co Inc H K
 Flexohm—Claroat Mfg Co
 Flexolon—Tensolite Insulated
 Wire Co Inc
 Flexoprene—Standard Wire &
 Cable Co
 Flexprint/T—Sanders Associates
 Inc
 Flextooth—Jeffrey Mfg Co
 Flipped over Foils—Modern
 Adhesives & Electronics Inc
 Flip-Seal—Rodale Mfg Co Inc
 Flip-Top—DuKane Corp
 Flowrator—Fischer & Porter Co
 Fluorocell—Joelin Mfg Co
 Fluoroflex-C—Resistoflex Corp
 Fluoroflex-T—Resistoflex Corp
 Fluorlastic Seals—Joelin Mfg Co
 Fluorolin—Joelin Mfg Co
 Fluoropoly—Int'l Resistance Co
 Fluxvalve—Pickering & Co Inc
 FM-3—Gertsch Products Inc
 FM-6—Gertsch Products Inc
 FM-7—Gertsch Products Inc
 Foamline—Plastoid Corp
 Foamtube—Plastoid Corp
 Foalite—Miller Dial & Name
 Plate Co
 Fontar—Engelhard Industries
 Inc/National Electric
 Instrument Division
 Formbond—Acme Wire Co
 Formex—General Electric Co/
 Wire & Cable Dept
 Formsprag—Formsprag Co
 Formvar—Acme Wire Co
 Formvar—Rome Cable Corp
 Forter—Forter Teichmann Co
 Forter Teichmann—Forter
 Teichmann Co

40/60—Ruby Chemical Co
 Fotoducer—Clark Electronic Labs
 Fotofoil—Miller Dial & Name
 Plate Co
 Fotopot—Clark Electronic Labs
 48 Alloy—Magnetics Inc
 Fotolux—American Speedlight
 Corp
 Four-Bander—American Gelo
 Electronics Inc
 400-CPS—Advanced Products Co
 4 PDT—Filters Inc
 Foxboro—Foxboro Co
 Frahm—Biddle Co James G
 Frenelens—Bolsley Research &
 Development Corp
 Furnas—Furnas Electric Co
 Futura—Canadian Astatic Ltd
 Fuzohm—Claroat Mfg Co Inc
 Fyberoid—Wilmington Fibre Spec
 Co
 Frye Freeze—Kidde & Co Inc
 Walter

G

GAC—General Automatic Corp
 GACOR—Eagle Electric Mfg Co
 Inc
 Gahagan—Gahagan Inc
 Gain-Set—Kay Electric Co
 Galv-O-Mast—Mechanical Steel
 Tubing Div/Haydon Corp
 Garcaau—Electro Medical Labs
 Inc
 Gardiner—American Smelting &
 Refining Co/Federated Metals
 Gardsman—West Instrument Corp
 Gardrol—Shand — Jurs Co
 Garox—Garalease
 Gas-Pointer—Johnson-Williams
 Inc
 G & B—Geier & Bluhm Inc
 G C Cts—G C Electronics Mfg
 Co
 G C Stackpole—G C Electronics
 Mfg Co
 G C Wuerth—G C Electronics
 Mfg Co
 Gearmotors—Motorsearch Co
 GE—General Electric Company/
 Laminated Products Dept
 GE—General Electric Co
 Gelo—American Gelo
 Electronics Inc
 GEM—Mallory & Co Inc P R
 Gemco—Great Eastern Mfg Co
 Genalex—Imtra Corp
 Genamid—General Mills Inc/
 Chemical Div
 Genco—General Photo Prod Co
 Inc
 Gencote—General Plastics Corp
 General Silk Screen Press—Gen
 Research & Supply Co
 Genie—Alliance Mfg Co Inc
 Gentape—General Plastics Corp
 Geformers—Triad Transformer
 Corp
 Geohmeter—Georator Corp
 Geotech—Geotechnical Corp
 Gertsch Box—Gertsch Products
 Inc
 G-15—Bendix Computer Div/
 Bendix Aviation Corp
 Giantview—Giantview Television
 Network Div/Meilink Steel
 Safe Co
 Glastic—Glastic Corp
 Gibsily—Gibson Electric Co
 Gibson—Robins Industries Corp
 Gilbargo—Gilbert & Barker Mfg
 Co
 Glasohm—Claroat Mfg Co Inc
 Glass To Metal Seals—Hermaseal
 Co Inc
 Glaswitch—Revere Corp of
 America
 Glo-Coil—Eagle Electric Mfg Co
 Inc
 Glo Drop—Workman TV Inc
 Glo-Escnt Lighting—Miller Dial
 & Name Plate Co
 Glo Panel—Technicraft Co
 G-M—G-M Labs Inc
 Gnat Rate—Minneapolis-Honey-
 well Regulator Co/Boston Div
 Godfrey—Godfrey Mfg Co
 Golden Co—Golden Co
 Golden Wand—Peerless Products
 Industries
 Golv-Line—American Gelo
 Electronics Inc
 Goniometer—Electro Mec Labs
 Inc
 Gonset—Gonset Div/Young
 Spring & Wire Corp
 Gotham—Grampian—Gotham Audio
 Development Corp

Gradiation—Selas Corp of
 America
 Grain-Oriented—Vicker Inc/
 Electric Products Div
 Gra Lab—Dimco Gray Co
 Grandin—Amchem Prod Inc
 Graphallo Products—Graphite
 Metallizing Corp
 Graphilm—Pettinos Inc Charles
 Graphlon—Graphite Metallizing
 Corp
 Gray—Gray Radio Co Inc
 GRC—Gries Reproducer Corp
 H J Green—Green Instruments
 Inc Henry J
 Greenbill—Equipment & Service
 Co
 Greene—Greene Co L Charlton
 Greenohm—Claroat Mfg Co Inc
 Greenohm Jr—Claroat Mfg Co
 Inc
 Greenohm V—Claroat Mfg Co
 Inc
 Greg—Greg
 Gremer—Gremer Mfg Co
 Grid Yagi—Technical Appliance
 Corp
 Grimaco—Reeves Soundcraft Corp
 Grip Waste—Size Control Co
 Groov-Pin—Groov-Pin Corp
 GS—Seventy-Seven—Glaser-Steers
 Corp
 Guardian Mark-II—Electronic
 Systems
 Gude Glass—Gudebrod Bros Silk
 Co Inc
 Gude Glass R—Gudebrod Bros
 Silk Co Inc
 Gude Glass S—Gudebrod Bros
 Silk Co Inc
 Gude Glass T—Gudebrod Bros
 Silk Co Inc
 Gudelace H—Gudebrod Bros Silk
 Co Inc
 Gudelace—Gudebrod Bros Silk
 Co Inc
 Gude Nylace—Gudebrod Bros
 Silk Co Inc
 Gymlastic—Sterling Varnish Co
 Gyn-A-Lite—Engelhard Industries
 Inc/Na't'l Electric Instrument
 Div
 Gyraline—Cascade Research Div
 of Monogram Precision Ind
 Gyro—Eclipse Pioneer Div/
 Bendix
 Gyro Flux Gate—Bendix-Eclipse
 Pioneer Div
 Gyromechanisms—Kety Dept-
 Norden Div/United Aircraft
 Corp
 Gyrospool—Pickering & Co Inc

H

Hallen—Hallen Div Schoen
 Products Co
 Halfwell—Standard Pressed
 Steel Co
 Hamill S A—Hamilton Watch
 Co/Industrial Div
 Hamilton—Hamilton Watch Co
 Ham-R-Press—Chase Mfg Co
 Ham Tenna TM—Alumitronic
 Eng Co
 Handivolt—Nutron Mfg Co Inc
 Handley—Handley Inc
 Handy-Pak—Int'l Resistance Co
 Harder—Harder Co Donald C
 Harmonic—Mectron Co
 Harper—Harper Electric
 Furnace Corp
 Hartline—Rowe Industries
 Hawley—Hawley Products Co
 Hawlits—Hawley Prod Co
 Haysite—LeMowee C D
 Hasite—Hays Mfg Co
 HC-4 Alloy—Sylvania Electric
 Products Inc/Parts Div
 Heatron—Heatron Inc
 Heatzone—Rockbestos Products
 Corp
 Heavy Duty Rotator—Telrex Labs
 Heimco—Heli Electronics Inc
 Heinz Mueller—Heinz Mueller
 Rng'g Co Inc
 Helecon—United States Radium
 Corp
 Heliax—Andrew Corp
 Helicoil—Heli Coil Corp
 Helicorder—Geotechnical Corp
 Helidel®—Helipot Div/Beckman
 Instruments Inc
 Helipot®—Helipot Division/
 Beckman Instruments Inc
 Heli-Tube—Newman Corp M M
 Herasil—Engelhard Industries
 Inc/Amersil Quartz Div
 Hercules—Linemaster Switch
 Corp

Hercules—Bache & Co Semon
Hewlett-Packard—Hewlett-Packard Co
Hexacon—Hexacon Electric Co
Hexalad—Hexacon Electric Co
Hex Ohm—Bradford Components Inc
Hi-Brite—Shannon Luminous Materials Co
Hi-D—United Aircraft Products Inc
Hi-Damp—Barry Controls Inc
Hide A Mark—Krylon Corp
Hide-A-Way—Peerless Products Industries
Hi Fi—Reeves Soundcraft Corp
Hi Fi 50—Reeves Soundcraft Corp
Hi Fi Kits—Gray Mfg Co
Hi G—Hi G Inc
High-Fidelity—Pesco Products Div/Borg-Warner Corp
Highflex 45-TM—Engelhard Industries Inc/H A Wilson Div
Highflex-TM—Engelhard Industries Inc/H A Wilson Div
Highheat-47-TM—Engelhard Industries Inc/H A Wilson Div
Highheat-TM—Engelhard Industries Inc/H A Wilson Div
Hi Lab—Holt Instrument Labs Div
Hi Lo—Hi Lo Mfg Corp
Hi-Lok Fasteners—Hi-Shear Rivet Tool Co
Hi-Meg—Victoreen Instrument Co
Hi Purity—Fisher Scientific Co
Hi-R®—Bourns Laboratories Inc
Hi-Shear Rivets—Hi-Shear Rivet Tool Co
Hi Superlite—Engelhard Ind Inc/Charles Engelhard Inc
Hi-Torque Bolts—Hi-Shear Rivet Tool Co
Hi-Treadite—Linemaster Switch Corp
Hogan Faximile—Hogan Laboratories Inc
Hogan Laboratories—Hogan Faxpaper
Holex—Holex Inc
Hollings-Worth—HoHingsworth Co/Solderless Terminal Div
Holtite Products—Continental Screw Co
Holtzer-Cabot—National Pneumatic Co Inc/Holtzer-Cabot Div
Homocarb—Leeds & Northrup Co
Homosil—Engelhard Industries Inc/Amersil Quartz Div
Hope—LeMoree C D
Hornel—New York Transformer Co Inc
Hotpack—Electric Hotpack Co Inc
The House of Abalon Products—Abalon Precision Mfg Corp
House of Knobs—Gee Lar Mfg Corp
House of Resistors—Clarostat Mfg Co Inc
Hoyt—Burton Rogers Co
Hovt—Hoyt Electrical Ins Works Inc
H T Constant-TM—Engelhard Industries Inc/H A Wilson Division
Hubby Pot—Hub-Pot Inc
Hudson American—Conn Marine Instrument Co
Hufco—Hufco Industries
Humdinger—Clarostat Mfg Co Inc
Humidolain—Star Porcelain Co
Humiseal—Columbia Technical Corp
Hummingbird—Pesco Products Div/Borg-Warner Corp
H-W Bandmaster—Harvey-Wells Electronics Inc
HWD—Firth Sterling Inc
HY-A-SIL—Sanford Miller Co
Hydent—Burndy Corp/Omaton Div
Hydratube—Recora Co Inc
Hydrox—Patterson Moos Div/Universal Winding Co Inc
Hyematic—Burndy Corp/Omaton Div
Hyfen—Burndy Corp/Omaton Div
Hyfilin—Acme Wire Co
Hyflux Alnico—Indiana Steel Products Co

Hydrograph—Weksler Instrument Corp
Hylink—Burndy Corp/Omaton Div
Hylog—Burndy Corp/Omaton Div
H M 80—Magnetics Inc
Hypots—Associated Research Inc
Hypress—Burndy Corp/Omaton Div
Hyprez—Ennis Equipment Co
Hypro Phillips—Continental Screw Co
Hyring—Burndy Corp/Omaton Div
Hy-Therm—Hopkins Eng'g Co
Hytool—Burndy Corp/Omaton Div
Hyvac—Central Scientific Co

I

I C Co—Industrial Control Co
Indentasleeve—General Plastics Corp
Idesco—Identification Service Corp
IE—Meredith & Co Ltd C C
IERC—Int'l Electronic Research Corp
I L G—ILG Electric Ventilating Co
IMP—Kaar Eng'g Corp
IMRA—Warner & Swasey Co
INCO—International Nickel Co
INCO—Porter Co Inc H K
INCO—Whitehead Metals Inc
Incredutor®—CGS Labs Inc
Incuro 20—Western Gold & Platinum Co
Incuro 60—Western Gold & Platinum Co
Incusil 10—Western Gold & Platinum Co
Incusil 15—Western Gold & Platinum Co
Indalloy—Indiana Steel Products Co
Indalloy—Indium Corp of America
IndiRow—Cleveland Instrument Co
Indiscan—General Railway Signal Co
Indox—Indiana Steel Products Co
Inductronic—Weston Instruments Div/Daystrom Inc
Indulflux—Irwin Laboratories Inc
Industralox—Electronic Engineering Co
Industro—Industro Transistor Corp
Industrial—General Electric Co
Inertia Switch—Inertia Switch Inc
Inso—Inso Co Div/Barry Controls
Inspect-O-Film—Harwald Co
Instalite—Engelhard Industries Inc/Charles Engelhard Inc
Instant solder—Cole Radio Works
Instapac—Onan & Son Inc D W
Insulbrite—Insulator Dept/Gen Elec Co
Insulcone—Insulator Dept/Gen Elec Co
Insul-Ment—Perfection Mica Co
Insulug—Burndy Corp/Omaton Div
Insulgrease—Insulator Dept/Gen Elec Co
Insulvel—Insulator Dept/Gen Elec Co
Interelectronics—Interelectronics Corp
Interstate—Interstate Electronics Corp
Interzone—Rockbestos Products Corp
Intrex—Interelectronics Corp
Intron—Interelectronics Corp
Invaro—Firth Sterling Inc
Invercone—Weston Instruments Div/Daystrom Inc
Ionostat—U S Radium Corp
Ionovac—DuKane Corp
Ionotron—U S Radium Corp
IPC—Industrial Products/Div of Amphel Borg Electronics Corp
IRC—Int'l Resistance Co
IRN—Williams & Co C K
Iron Fireman—Iron Fireman Mfg Co/Electronics Div
Iron Grip—Equipto
Irwin—Irwin Laboratories Inc
Iso—Isolantite Mfg Corp
Isobond—Isochem Resins Corp
Isocast—Isochem Resins Corp
Isodex—Shure Brothers Inc
Isoduct—Isochem Resins Corp
Isolif—Isochem Resins Corp
Isogel—Isochem Resins Corp
Isolantite—Isolantite Mfg Corp
Isolite—United States Radium Corp
Isomelt—Schenectady Varnish Canada Ltd

Isomade—MB Mfg Co
Isoneel—Acme Wire Co
Isoneel—Schenectady Varnish Canada Ltd
Isophon—Arnhold Ceramics Inc
Isotric—Isochem Resins Corp
Isoterge—Isochem Resins Corp
Iteco—Industrial Test Equipment Co
Itt—Federal Electric Corp

J

JAB SAW—Dreier Brothers Inc
Jackson—Jackson Electrical Instrument Co
Jagabi—Biddle Co James G
Javex—Javex Electronics
Jem—Jem Electronics Corp
Jensen—Jensen Ind Inc
Jet Flux—All State Welding Alloys Co Inc
Jetlac—Sterling Varnish Co
Jiffy—Campro Products Inc
Jiffy—Eagle Electric Mfg Co Inc
JK—James Knights Co
Joclamp—Joelin Mfg Co
Joy—Joy Mfg Co
Jr Rate—Minneapolis-Honeywell Regulator Co/Boston Div
JRT Rate—Minneapolis-Honeywell Regulator Co
J S C—Jersey Specialty Co Inc
J-W—Johnson-Williams Inc

K

Kable Kit—Pickering & Co Inc
Kalotron—Thermosen Inc
Kane Quality—Kane Mfg Corp
Kanthal—Kanthal Corp
Kantlin—Nat'l Lock Washer Co
Kasepal®—Minnesota Rubber Co
Karadio—American Telev & Radio Co
Karak—Ohio Carbon Co
Kathabar—Surface Combustion Corp
Kel-F Rod—Resistoflex Corp
Kemet—Kemet Co
Kenna metal—Kenna metal Inc
Kennet—Nat'l Vulcanized Fibre Co
Kentrall—Torsion Balance Co
Kentrion—Torsion Balance Co
Keppo—Keppo Inc
Kers®—Shakeproof Div/Illinois Tool Works
Kessco—Kessler Chemical Co Inc
Ketaf—Ketaf Dept-Norden Div/United Aircraft Corp
Key—Key Resistor Corp
Key—Stromberg-Carlson Div/General Dynamics Corp
Kevnoter—Audograp—Grav Mfg Co
Keystone—Keystone Carbon Co
Kic—Kemet Co
Kiddle—Kiddle & Co Inc
Kilo-Kay—Kay Electric Co
Kilo-Sweep—Kay Electric Co
Kilowatt—Johnson Co E F
Kimco—Kline Iron & Steel Co Inc
Kinney—Kinney Mfg Div/New York Air Brake Co
Kip—Kip Electronics Corp
Kit-Tronics—Kit-Tronics
Kleen-Sweep—Duotone Co Inc
Klieglight—Kliegl Bros/Universal Electric Stone Lighting Co
Klioklamp—Wedgelock Corp of Calif
Kliplack—Wedgelock Corp of Calif
Klip Pac—Wrought Washer Mfg Co
Klixon®—Metals & Controls Corp
Knight—Allied Radio Corp
Knight-Kit—Allied Radio Corp
Koilfed Kords—Koilfed Kords Div/Whitney Blake Co
Koil Kradles—Benchmark Mfg Co
Kollmorgen—Kollmorgen Optical Corp
Kontes-Brand—Kontes Glass Co
Kooltron—Kooltron Fan Co
Koolzone—Rockbestos Products Corp
Kostreel—Kost Products Co Inc
Kotokast®—Minnesota Rubber Co
K Rate—Minneapolis-Honeywell Regulator Co/Boston Div
Kristol—Krisz Electronics
Kromover—Engelhard Industries Inc/Hanovia Lamp Div
Kromover—All State Welding Alloys Co
Krylon—Krylon Inc
Krystinel—Krystinel Corp

Kulgrid—Sylvania Electric Products
Kurl-tite—Chase Mfg Co
Kurman—Kurman Electric Co/Div Norbute Corp
KTR—Raytheon Mfg Co/Equip & Systems Div
K-W—K-W Engineering Works
KWIK-CHEK—Hamilton Watch Co
KWIKY-DOTS—By-Buk Co
KWIK-KALL—Loge Sound Engrs J M
KWIK-TERM—Cannon Elec Co
Kwikheat—Kwikheat Mfg Co
Kwiky-Dots—By-Buk Co
K-W Universal—K-W Engineering Works
Kybernettes—Hagan Chemicals & Controls Inc

L

LA-100—Minneapolis-Honeywell Regulator Co/Boston Div
LA-300—Minneapolis-Honeywell Regulator Co/Boston Div
LA-500—Minneapolis-Honeywell Regulator Co/Boston Div
LA-600—Minneapolis-Honeywell Regulator Co/Boston Div
LA-700—Minneapolis-Honeywell Regulator Co/Boston Div
LAB-AIDS—Authorized Mfg Service Co Inc
Lab-Crest—Fischer & Porter Co
Labil—Stromberg-Carlson Div General Dynamics Corp
Lackon—U S Radium Corp
Ladder Line®—Alumitronic Eng Co
Lamator—Lamaco Inc
Lamco—Laminations Co
Lampanel—Miller Dial & Name Plate Co
Lancaster Glass—Lancaster Glass Corp
Lance—Lance Antenna Mfg Co
Landauer—Landauer & Co R S Jr
Laqua—Fidelity Chemical Prod Corp
Layclair—Star Porcelain Co
Lavite—Steward Mfg Co D M
Leak Lock—Highside Chemicals Inc
Leak Proof—Ray-O-Vac Company Div/Electric Storage Battery Co
Leetric Aire—Radex Corp
Lee—Lee Electric Inc
Leedal—Leedal Inc
Leesona—Universal Winding Co
Leiman—Leiman Bros Inc
LeJohn—Dumont-Airplane & Marine Instruments Inc
Lektro-Lok Linemaster Switch Corp
Lenk—The Lenk Mfg Co
Letheray—Engelhard Industries Inc/Hanovia Lamp Div
Level Rite—Felters Co
Lewis—Western Coil & Electrical Co
Lewis Vertical—Universal Products Engineering Co
L-G-P-30—Librascope Inc
Libratrol-500—Librascope Inc
Lico—Life Instrument Co Inc
Life—Life Instrument Co Inc
Lifetime—Reeves Soundcraft Corp
Lifetone—Duotone Co Inc
Light Warden—Electric Cord Co
Light Watchman—Ripley Co Inc
Ligna-Sweep—Kay Electric Co
Limpander—Electronics Systems Engineering Co
Lindsay Structure—Int'l Steel Co
Lindsay Structure—Premco Inc
Linearsyn—Sanborn Co
Lineator—Airborne Accessories Corp
Linemaster—Linemaster Switch Corp
Linemaster Jr—Linemaster Switch Corp
Linipot®—Bourns Laboratories Inc
Linometer®—Bourns Laboratories Inc
Lithoforms—Amchem Prod Inc
Little Gem—Equipto
Little Gem—Great Eastern Mfg Co
Little Jewel—Argonne Electronics Mfg Corp
Livermont—Richmont Inc
Load Sentry—Assembly Products Inc
Loctite—American Sealants Co

Loge Lectern—Loge Sound Engrs J M
Log Etronic—Logetronics Inc
Loggers—Audio Instrument Co Inc
Logix Blocks—Rese Engineering Inc
Logo—Bee Chemical Co/Logo Div
Logosol—Bee Chemical Co/Logo Div
Lokuts®—Shakeproof Division/Illinois Tool Works
Lo Mount—Barry Controls Inc
Lo Ohm—Bradford Components Inc
Lo Ohm—Workman TV Inc
Loopohm—Ward Leonard Electric Co
Loogsticks—Superex Electronics Inc
Lorace—Seiscor Mfg Co/Div Seismograph/Service Corp
Lorain—Lorain County Radio Corp
Lowell—Lowell Mfg Co
L-R Blower—Ripley Co Inc
Lube-Lok—Electrofilm Inc
Lubri-Bond—Electrofilm Inc
Lumatrol—Micro Balancing Inc
Lumetron—Photovolt Corp
Lusterized—American Electric Cable Co
Lu-alloy—Engelhard Industries Inc/Baker Dental Div
Luxor—Engelhard Industries Inc/Hanovia Lamp Div
Lustral—Superior Electric Co
Lysyn—Sanborn Co
LX-140—X-Ray Dept/General Electric Co
LYN A SYN—Minatron Corp
Lynn Lighting—Vaco Products Co
Lyon—Lyon Metal Products Inc

M

McLean—McLean Eng'g Labs
McMillan—McMillan Industrial Corp
Macallen—LaMoree C D
Mackay—Mackay Radio & Telegraph Co Inc
Mack Phaerltrion—Mack Electric Devices Inc
Mack Thermo Alarm—Mack Electric Devices Inc
Magdelay—Automation Inc
Maggio Circle—A R F Products Inc
Magmeter—Airpax Electronics Inc
Mag Mix—Technical Appliance Corp
Mag-Mod—General Magnetics Inc
Magnadyne—Richardson Labs
Kenneth
Magnaflex-TM—Engelhard Industries Inc/H A Wilson Div
Magnaflex—Magnaflex Corp
Magnaplo—Magnaflex Corp
Magnastat—Consolidated Controls Corp
Magna-See—Reeves Soundcraft Corp
Magnasync—Magnasync Manufacturing Co Ltd
Magna-Sweep—Kay Electric Co
Magnatest—Magnaflex Corp
Magnatrol—Dynamic Control Co
Magnelutch—Vickers Inc/Electric Products Div
Magnecrim—Burndy Corp/Omaton Div
MagneDISC—Texas Instruments Inc
MagneLine—Patwin Div
Magnepak 60—Magnetic Controls Co
MAGNE PAK 400—Magnetic Controls Co
Manepaint—Micro-Circuits Co
Magnepulse—Magnetic Research Corp
Magnestat—Magnetic Research Corp
Magnesyn—Bendix Eclipse Pioneer Div
Magniphase—Continental Electronics Mfg Co
Magniport—Electronics Division/Diamond Power Specialty Corp
Magnistro®—Acme Electric Corp
Magnox—Nat'l Beryllia Corp
Magnorite—Norton Co
Mainliner—Jerrold Electronics Corp
Malco—Malco Mfg Co
Malcomatic—Malco Mfg Co
Malfese—Bache & Co Semon
Malfese X-ray—Bache & Co Semon
Manning 100—John A Manning Parer Co Inc

BRAND & TRADE NAMES

- Marathon—Marathon Battery Co
 Marco—Rowe
 Marconi—Canadian Marconi Co
 Marke-Sweet—Kay Electric Co
 Mark 16—American Research Products
 Markem—Markem Machine Co
 Markite—Markite Products Corp
 Marksman—West Instrument Corp
 Mark Time—Rhodes Inc M H
 Mark Two Thin Slide—Grant Polley & Hdwe Corp
 Martindale—Martindale Electric Co
 Marvelite—C B C Electronics Co
 Masterline—Blonder Tongue Labs Inc
 Mastermet—Cannon-Muskegon Corp
 Mastertape—Audio Master Corp
 Master III—Weston Instruments Div/Daystrom Inc
 Matchbox—Johnson Co E F
 Matchstick—Johnson Co E F
 Matrix—Engis Equipment Co
 Mattern—Land-Air Inc
 Maxaw—Cummins Portable Tool Div/John Oster
 Max-Min—Weston Instruments Div/Daystrom Inc
 Maytrol—Jeffrey Mfg Co
 MC-5800—Mid-Century Instrument Corp
 MCM—Miller Co M C
 MC-5900—Mid-Century Instrument Corp
 MCR—Raytheon Co/Equip & Systems Div
 MDL—Microwave Development Laboratories Inc
 M E C—M E C Inc
 M E C Model 65—Milgo Electronic Corp
 M E C Model 66—Milgo Electronic Corp
 M E C Model 67—Milgo Electronic Corp
 M E C Model 68—Milgo Electronic Corp
 M E C Model 1002-1005—Milgo Electronic Corp
 M E C Model 3010—Milgo Electronic Corp
 Mega-Chart—Kay Electric Co
 Megalator—Kay Electric Co
 Megalyzer—Kay Electric Co
 Megaliner—Kay Electric Co
 Mega-Marker—Kay Electric Co
 Mega-Marker Sr—Kay Electric Co
 Mega-Match—Kay Electric Co
 Mega-Node—Kay Electric Co
 Mega-Pix—Kay Electric Co
 Mega-Pulser—Kay Electric Co
 Megasorber—Continental Electronics Mfg Co
 Mega-Sweet—Kay Electric Co
 Mega-Switch—Photo-Crystals Inc
 Megger—Biddle Co James G
 Mek A Punch—Taller & Cooper Inc
 Me Labs—Microwave Eng'g Labs
 Melacon—Photocircuits Corp
 Mello-O-Ray—Eagle Electric Mfg Co Inc
 Melody Master—Melody Master Mfg Co
 Memotron—Hughes Products/Hughes Aircraft Co
 Menaphonic—Magnasync Mfg Co Ltd
 Mercury—Durakool Inc
 Mercury—Gordos Corp
 Merix—Merix Chemical Co
 Meta-Caps—Chicago Condenser Corp
 Metal-Cell—Topatron Inc
 Metallon—Shure Bros Inc
 Metal "O"—Advanced Products Co
 Metalset—Smooth on Mfg Co
 Metermax—Leeds & Northrup Co
 Meteor—Associated American Trading Winding Mach
 Meters Inc—Meters Inc
 Metilbond®—Narmco Resins & Coatings Co
 Metrotyre—Bailey Meter Co
 Mica—Micracraft Products Inc
 Micaply—Mica Corp
 Micradjust—Fairchild Recording Equipment Corp
 Micrelay—Ebert Electronics Corp
 Microcorder—Micrometrical Mfg Co
 Micro Ac—Cleveland Instrument Co
 Microcarb—Leeds & Northrup Co
 Microflow—Littlefield Inc
 Micro-Gar—Utah Radio & Electronic Corp
 Microids—Burnell & Co Inc
 Microline—Ozalid/Div of General Aniline & Film Corp
 Microler—Kay Electric Co
 Micromatic—Du Kane Corp
 Micromatic—Micromech Mfg Corp
 Micrometer—Lampkin Labs Inc
 Micro-Mini-Chokes—Superelectronics Corp
 Micro Namic—Micro Balancing Inc
 Micro-Node—Kay Electric Co
 Micronta—Radio Shack Corp
 Micropaint—Micro-Circuits Co
 Microptic—Engis Equipment Co
 Micro-Pulser—Kay Electric Co
 Microsen—Manning Maxwell & Moore Inc
 Micro-7—Fairchild Recording Equipment Corp
 Micro-Shims—Staver Co Inc
 Microstak—Int'l Resistance Co
 Microsyn—Minneapolis-Honeywell Regulator Co/Boston Div
 Micro Targue—Johnson Electronics Inc
 Micro-Tin—Nat'l Standard Co
 Microtintacts—Weston Instruments Div/Daystrom Inc
 Microweb—Millipore Filter Corp
 Midflex-TM—Engelhard Industries Inc/H A Wilson Div
 Midflex 46-TM—Engelhard Industries Inc/H A Wilson Div
 M I G—Minneapolis-Honeywell Regulator Co/Aeronautical Div
 MIDGET—Midget Louver Co
 MIL-AC—Ellis & Watts Products Inc
 MIL-C-25—Hopkins Eng'g Co
 Miller Meter—Miller M C
 Miller Trojan—Miller Trojan Corp
 Millipore—Millipore Filter Corp
 Miller Robinson Co—Miller-Robinson Co
 Mil R-93B—Reon Resistor Corp
 Mil R-94B—Reon Resistor Corp
 Mil R-944A—Reon Resistor Corp
 Milwaukee Wrot Washers—Wrought Washer Mfg Co
 Min Amp—Eo Electronics Inc
 Minatron—Minatron Corp
 Mini Brite—C B C Electronics Co Inc
 Mini-Choke—Superex Electronics Corp
 Minicube®—Sanders Associates Inc
 Minifier—Int'l Resistance Co
 Minify—Photocircuits Corp
 Mini Gator—Mueller Elec Co
 Mini-Lab—Stanley Aviation Corp
 Minilines—Columbia Technical Corp
 Mini-Markers—Westline Products Div of Western Lithograph Co
 Mini Mite—Thermo Electric Co Inc
 Mini Noise—Microdot Inc
 Minipak—Radio Specialty Mfg Co
 Minirelay—Ebert Electronics Corp
 Mini-Spot—Pesco Products Div/Borg-Warner Corp
 Minitape—Stancil-Hoffmann Corp
 Minitron—Radio Eng'g Co
 Minjector®—Minnesota Rubber Co
 Minoxo—Engelhard Industries Inc/Chemical Div
 Minshall—Minshall Organ Inc
 Minisource—Electronic Assembly Co Inc
 Minster—Minster Machine Co
 Mirorpoint—Duotone Co Inc
 Mk 5 APR—Canadian Applied Research Ltd
 Mobile—Mobile Electronics Mfg Co
 Model 158—Millitest Corp
 Model 200—Advanced Electronics Mfg Co
 Model D-315—Dyna-Empire Inc
 Model D-855—Dyna-Empire Inc
 Model D-862-5—Dyna-Empire Inc
 Model D-862-10—Dyna-Empire Inc
 Model LSD—Segal Edward
 Model NR-ESSM—Segal Edward
 Model Nr Eyelet—Segal Edward
 Model PM-5—Rirmont Inc
 Model Thmol—Millitest Corp
 Modern—Modern Lab Equip Co Inc
 Moducell—Topatron Inc
 Modulok—Burndy Corp/Omaton Div
 Mod-U-Rak—Premier Metal Products Co
 Modu Wave—Sciaky Bros Inc
 Moisture/Monitor—Strandberg Eng'g Labs
 Molcote—Frenchtown Porcelain Co
 Molded On—Component Mfg Service Inc
 Molly—Molly Corp
 Molsycray—Elmet Div/North American Philips Co
 Monastrip—Mona Industries Inc
 M-149—Wayne Kerr Corp
 Monel—Int'l Nickel Co
 Monitor—Moore Assoc Inc
 Moody Kit—Moody Machine Products Co Inc
 Moog—Moog Valve Co Inc
 Morco—Moore Co Howard J
 Morflex-TM—Enghard Industries Inc/H A Wilson Div
 Morris—Morris Co J I
 Motiograph—Motiograph Inc
 Motorlag—Sterling Varnish Co
 Motorola—Addison Industries Ltd
 Motoresearch—Motoresearch Co
 MR 1-B—BJ Electronics/Borg-Warner Corp
 MR 2-B—BJ Electronics/Borg-Warner Corp
 MR-11—BJ Electronics/Borg-Warner Corp
 MR-53—BJ Electronics/Borg-Warner Corp
 MRA—Munston Mfg & Service Inc
 MRC—Marlin Rockwell Corp
 MRT—Munston Mfg & Service Inc
 M-S-A—Mine Safety Appliances Co
 Multi-Pulser—Kav Electric Co
 Multisource—Applied Research Labs Inc
 Multiwave/R—Narmco Resins & Coatings Co
 MTR—American Electronics Co
 Muffex-TM—Engelhard Industries Inc/H A Wilson Div
 Multi Elmac—Multi Products Co
 Multitress—Denison Engineering Div/American Brake Shoe Co
 Multiverter—Parkard Bell Electronics Corp
 Mumeta—Magnetics Inc
 Munsell—Munsell Color Co Inc
 Munston—Munston Mfg & Service Inc
 Murasonde—Whitley Electronics Inc
 Music Minder—C B C Electronics Co Inc
 MUX 16—Rixon Electronics Inc
 Myvaplast—Film Capacitors Inc
 Mylar—LaMopa C D
 Mylar—U S Plastic Rope Inc
 Mytron—Mytron Mfg Co
- N**
- Nagra—Electronic Applications Inc
 Nail-It—Eagle Electric Mfg Co Inc
 Nalco—North American Electric Lamp Co
 NALCOBRITE—North American Electric Lamp Co
 Namettes—Swenson Co Inc V H
 Narmtape®—Narmco Resins & Coatings Co
 Nassau—Munston Mfg & Service Inc
 National—Engelhard Industries Inc/Nat'l Electric Instrument Div
 National—Valco Mfg Co
 National Pneumatic—Nat'l Pneumatic Co Inc/Holtzer-Cabot Div
 National's—Nat'l Cash Register Co
 Nautilus—Linemaster Switch Corp
 Navidico—Nat'l Video Corp
 Navigator—John Co E F
 N C C—Nat'l Coil Co
 Neatrak—American Smelting & Refining Co/Federated Metals
 Nenator—Hunter Spring Co
 Nelco 100—New England Laminates Co Inc
 Nelco 130—New England Laminates Co Inc
 Nelco 230—New England Laminates Co Inc
 Neo-Flash—Auto-Test Inc
 Neolube—Huron Ind
 Neptel—Sheffield Corp
 Netco—New England Tape Co/Div
 United Carr-Fastener Corp
 Ne-2—Harristahl Labs Inc
 Ne-6—Harristahl Labs Inc
 Neumade-Shepard—Neumade Products Corp
 Neumann—Gotham Audio Development Corp
 Nevaco—Nelson Vacuum Pump Co
 Newark Control—Newark Controls Co
 Newcomb—Newcomb Audio Products Co
 Nibscrew®—Shakeproof Div/Illinois Tool Works
 Nicad—Nicad Div/Gould-Nat'l Batteries Inc
 Nickely—Nat'l Standard Co
 Nicoro 80—Western Gold & Platinum Co
 Nicole—Frenchtown Porcelain Co
 Nicusil 3—Western Gold & Platinum Co
 Nielsen Hardware—Nielsen Hardware Corp
 Nikrothal—Kanthal Corp
 Nilcor—Nat'l Standard Co
 Ninel-R—Internat'l Resistance Co
 Niore—Western Gold & Platinum Co
 Nite Beam—Eagle Electric Mfg Co Inc
 Nitronal—Engelhard Industries Inc/Chemical Div
 NL—Nat'l Electronics Inc
 Nobatron—Sorensen & Co Inc
 Nobl-Ohm—Fairchild Controls Corp/Components Div
 Nobrush—Georator Corp
 Noel—Noel Mfg Co Inc
 Norhyde—Flock Process Co Inc
 Norman & Berg—Erikson Specialized Tool Co
 NPC—Nucleonic Products Co Inc
 NSL—Nat'l Scientific Labs Inc
 NU BLAC—Star Porcelain Co
 Nublack—Sterling Varnish Co
 Nuclear—Sterling Varnish Co
 Nugent—Nugent Electronics Co
 Nu-Way—John Marshall Asso Inc
 NWL—Nothelfer Winding Labs Inc
 NX—General Railway Signal Co
 NYCO—New York Coil Co
 NY-Grid—Weckesser Co
 Nylok—Nylok Corp
 N.Y.T.—New York Transformer Co Inc
 Nytran—New York Transformer Co Inc
 Nyvar—Acme Wire Co
- O**
- 1/A—Instrumentation Assoc
 1-100—Neff Instrument Corp
 0/1—Telemeter Magnetics Inc
 0-22C—Wane Kerr Corp
 OAK—Oak Mfg Co
 Observer—Blonder-Tongue Labs Inc
 Officemaster Pabx—Palmer Inc
 M V
 OFHC—American Metal Climax Inc
 Ohiohm—Ohio Carbon Co
 Ohio Special Quality—Ohio Seamless Tube Div/Copperweld Stl Co
 Ohmoid—Wilmington Fibre Spec Co
 Ohmspun—States Co
 Oilite—Amplex Div-Chrysler Corp
 Okonite—The Okonite Co/Sub Kenecott Copper Corp
 Omega—B-I-F Industries Inc
 Oneguard—Thomas A Edison Industries/McGraw-Edison Co
 OMV—Brush Beryllium Co
 O-PAC—Opad Electric Co
 OPCO—Onondaga Pottery Co
 Optics—Zoomar Inc
 Optosil—Engelhard Industries Inc/Amersil Quartz Div
 Oralium—Engelhard Industries Inc/Baker Dental Div
 Orgeledtra—La Marche Mfg Co
 Orthicon—Zoomer Inc
 Orthoclasp—Engelhard Industries Inc/Baker Dental Div
 Orthonal—Magnetics Inc
 Orthonull—General Radio Co
 Orthosil—Thomas & Skinner Inc
 Oscillostat—Saine Equipment Lab Harry T
 Oscillotron—Saine Equipment Lab Harry T
 OSTUCO—Ohio Seamless Tube Div/Copperweld Stl Co
 Ovaltube—Plastoid Corp
 Oxalloy—Sylvania Electric Products/Inc Parts Div
 O-175—X-Ray Dept/General Electric Co
 OX-250—X-Ray Dept/General Electric Co
 O-Z—O Zernickow
 Ozalid—Ozalid/Div General Aniline & Film Corp
 Ozalith—Ozalid/Div General Aniline & Film Corp
- P**
- Pacemaker—Johnson Co E F
 Pacitor—Simmonds Aerocessories Inc
 Pacitron—Simmonds Aerocessories Inc
 Packmaster—Radio Specialty Mfg Co
 Pak Fone—Industrial Radio Corp
 Pal—Palnut Co
 Palnut—Palnut Co
 Paloro—Western Gold & Platinum Co
 Pampa 5-20—Pampa Electronics Corp
 Panacoustic—U S Recording Co
 Panalar—Panellit Inc
 Panascan—Panellit Inc
 Pandux—Pacific Transducer Corp
 Panellit—Panellit Inc
 Panelpack—Waterman Products Co Inc
 Panelscope—Waterman Products Co Inc
 Pantro-Sert—Electro-Machinery
 Paperite—Acme Wire Co
 Par AC—Cleveland Instrument Co
 Parafactor—Scala Radio Co
 Paragon—Paragon Electric Co
 Parallel T—Newton Co
 Parami—Parsons Co Ralph M
 Par-Metal—Par-Metal Products Corp
 Parprocess—Tubular Rivet & Stud Co
 Parset—Parsons Co Ralph M/ Electronics Div
 Partek—Magnaflex Corp
 Pathfinder—Cannon Electric Co
 Paulite—Luminous Resins Inc
 P C—Milgo Electronic Corp
 Pearce Simpson—Pearce Simpson Inc
 Peco—Pomona Electronics Co Inc
 Peerless—Nat'l Vulcanized Fibre Co
 PeeWee—Mueller Elec Co
 Peirce Adn—Peirce Dictation Systems
 Peirce Portable—Peirce Dictation Systems
 Pem-Dudek & Co R C
 Penco—Penco Div Alan Wood Steel Co
 Pennrod—Brush Beryllium Co
 Perco—Linell Eng Corp
 Perfectocol—Engelhard Industries Inc
 Perfectone—Audiomation Labs
 Peri—Printed Electronic Research Inc
 Periodic—Unit Process Assemblies Inc
 Periscope—Lenox Instrument Co
 Perkins—Perkins Machine & Gear Co
 Perma-Caps—Chicago Condenser Corp
 Permacel—Permacel
 Permacode—Revere Corp of America
 Permadyne—Melody Master Mfg Co
 Perma-Grip—Krengel Mfg Co
 Perma-Mold—Douglas Randall Inc
 Perma Nuts—Tubular Rivet & Stud Co
 Permasat—Jeffrey Mfg Co
 Permatag—Actioncraft Products
 Perma Torq—Cambridge Thermionic Corp
 Permoflux—Permoflux Div
 Perf Portable—Portable Electric Tools Inc
 Pexto—Peck Stow & Wilcox Co
 Phazor—Industrial Test Equipment Co
 Phenolite—Nat'l Vulcanized Fibre Co
 Phenoweld—Hardman Co Inc H V
 PHI—Computing Devices of Canada Ltd
 Phillips—Phillips Radio Div
 Phonodograph—Gray Mfg Co

Phostube—All State Welding Alloys Co
 Photobell—Photobell Co Inc
 Photoprobe—Electro-Physics Co
 Photosync—Automation Inc
 Photoswitch—Electronics Corp of America (Canada)
 Photronic—Weston Instrument Div
 Pi-Caps—Chicago Condenser Corp
 Pichost—CBC Electronics Co Inc
 Pick-A-Shaft—Clarostat Mfg Co Inc
 Pic-Sync—Fairchild Recording Equipment Corp
 Pi Dux—Alumitronic Eng Co
 Piece-Maker—Minster Machine Co The
 Pig Tailer—Bruno N Y Industries Corp
 Pilot—Pilot Radio Corp
 Pilot Scintillator—Pilot Chemicals Inc
 Pioneer—Chase Mfg Co
 Pioneer—Pioneer Patents & Products Co
 Pip Quick-Release—Aviation Developments Inc
 Planet Gear—Haydon Instrument Co
 Plagohm—Ward Leonard Electric Co
 Plaskon—Allied Chemical Corp
 Plasteck—Plasteck Inc
 Plastex—Steel Protection & Chemical Co Inc
 Plastic Melt—Thermo Electric Co Inc
 Plastilease—Ram Chemicals Inc
 Platinalloy—Engelhard Industries Inc
 Electron—Electron Corp
 Plug-Inline—Dynapar Corp
 Plus-Dix—Southern Plastics Co
 Plus-50—Reeves Soundcraft Corp
 Plus-100—Reeves Soundcraft Corp
 Plymaster—Rubber & Asbestos Corp
 Plyoghen—Reichhold Chemicals Inc
 P N P—Workman T V Inc
 Pocketscope—Waterman Products Co Inc
 Pocketape—Broadcast Equipment Specialties Corp
 Polar Path—Eclipse Pioneer Div/Bendix
 Poliflex-TM—Engelhard Industries Inc
 Polar Path—Bendix/Eclipse Pioneer Div
 Polylyte—Reichhold Chemicals Inc
 Polystrip—Int'l Resistance Co
 Polyvar—Acme Wire Co
 Poly-Varicon—Argonne Electronics Mfg Corp
 Polyvial—Olympic Plastics Co Inc
 Porta-Kall—Lone Sound Engineers J M
 Port-A-Lab—Triplett & Carton Inc
 Porterplate—Porter Co Inc H K
 Post-Rite—General Railway Signal Co
 Post-Tronic—Nat'l Cash Register Co
 Potpot—Clarostat Mfg Co Inc
 Potter & Blumfield—Potter & Blumfield Inc
 Potter Model 906—Potter Instrument Co Inc
 Potter Model 909—Potter Instrument Co
 Potter Model 3260—Potter Instrument Co
 Power Master—Mosely Electronics Inc
 Power OHM—Workman T V Inc
 Power Packer—Dynex Inc
 Power-Pak—Grant Gear Works
 Powerstat—Superior Electric Co
 Powr Amr—Hagan Chemicals & Controls Inc
 Powr Log—Hagan Chemicals & Controls Inc
 Powr Mag—Hagan Chemicals & Controls Inc
 Precac—Airpax Electronics Inc
 Precise-OHM—Precision Inc
 Precision—Newman Corp M M
 Precisioners—Sheffield Corp
 Precisionered—Induction Motors Corp
 Precision Coaxtube—Precision Tube Co Inc

Preis-Panto—Preis Engraving Machine Co H P
 Premabraz—Handy & Harman
 Premaloy—Handy & Harman
 Premier—Nat'l TV Tubes Inc
 Pre-Monitor—Audiotronics Labs
 Prem-O-Rak—Premier Metal Products Co
 Press-Fit—Sealecort Corp
 Pressure Transducers—Photocon Research Products
 Pres-Tite—Wind Turbine Co
 Presto—Bogen Presto Co
 Presto Splicers—Prestoseal Mfg Corp
 Printate—American Printed Circuits Co
 Probograph—Warner & Swasey Co
 Probomat—Warner & Swasey Co
 Productimeter—Durant Mfg Co
 Professional—Reeves Soundcraft Corp
 Professional Dynamic—Shure Brothers Inc
 Proficorder—Micrometrical Mfg Co
 Profilometer—Micrometrical Mfg Co
 Progress-O-Matic—Minster Machine Co The
 Prong-Lock—Waldes Kohinor Inc
 Proportioners—B-I-F Industries Inc
 Protect-O-Film—Harwald Co
 Protocircuits—Photocircuits Corp
 Prototypes by Kotokast—Minnesota Rubber Co
 Pulsecope—Waterman Products Co Inc
 Pulsite—Airpax Electronics Inc
 Pum-Rouge—Engelhard Industries Inc
 Puridryer—Engelhard Industries Inc
 Pushnut—Palnut Co
 PVC—Paul & Stein Bros Inc F H
 Pryomark—Tempil Corp
 PRYP—Pyrometer Instrument Co Inc
 Pultec—Pulse Techniques Inc
 Pyle Starline—Pyle Nat'l Co
 Pylet—Pyle Nat'l Co
 Pyrotrom—Bailey Meter Co
 Pyroxid—Technicraft Co
 P & W Co—Patrick & Wilkins Co
 Pye Telecommunications Ltd—Pye Telecommunications Ltd
 Q-251—Wayne Kerr Corp
 Q-Beston—Auburn Mfg Co
 Q Comparator—Boonton Radio Corp
 Q Meter—Boonton Radio Corp
 Quad Bak—Minnesota Rubber Co
 Quad Bon—Minnesota Rubber Co
 Quad Kup—Minnesota Rubber Co
 Quad Lib—Minnesota Rubber Co
 Quadlite—Electro Snap Corp
 Quad Rings—Minnesota Rubber Co
 Qualitone—Qualitone Co Inc
 Quantascan—Quantametric Devices Inc
 Quantometer—Applied Research Labs Inc
 Quantovac—Applied Research Labs Inc
 Quantrol—Applied Research Labs
 Quick Hot—Wen Products Inc
 Quick-Wedge—Kedman Co
 Quiretrole—Quiretrole Co
 Quik-Lok—Eagle Electric Mfg Co Inc

R

Radaligner—Kay Electric Co
 Rada-Node—Kay Electric Co
 Rada-Pulser—Kay Electric Co
 Rada-Sweep—Kay Electric Co
 Radelin—U S Radium Corp
 Radiac—Arnhold Ceramics Inc
 Radio-Com—Trans-Tel Corp
 Radio Craftsmen—Prevision Radiation Instruments Inc
 Radiofyne—Western Coil & Electrical Co
 Radiometer—Bach-Simpson Ltd
 Radio-Web—Stavid Engineering Inc
 Radite #75—Radar Design Corp
 Radium—Radium Chemical Co Inc

Rafax—Haller Raymond & Brown Inc
 Rakscope—Waterman Products Co Inc
 Ramco—Ramco Products
 Rangaire—Roberts Mfg Co
 Ranger—Johnson Co E F
 Rapid Test—Rapid Specialties Co
 Rapromatic—Specialties Inc
 Rate!—Ratel Inc
 Ratiotran—Gertsch Products Inc
 Raven Screens—Raven Screen Corp
 Rawson—Formsprag Co
 Rayflex-TM—Engelhard Industries Inc/H A Wilson Div
 Raymaster—Gates Inc George W
 Raymike 600—X-Ray Dept/General Electric Co
 Rayonic—Waterman Products Co Inc
 Rayotube—Leeds & Northrup Co
 Ray-O-Vac—Ray-O-Vac Co Div/
 Electric Storage Battery Co
 Raytheon—Raytheon Co/Semiconductor Div
 Raytron—Lance Antenna Mfg Co
 Raz Wax—Z & W Mfg Corp
 R-B-M—R-B-M Controls Div/
 Essex Wire Corp
 R D F Stikons—Ruge Asso Inc
 Arthur C
 R D F Strapons—Ruge Asso Inc
 Arthur C
 RD-150—Engelhard Industries Inc/Chemical Div
 RD-150 C—Engelhard Industries Inc/Chemical Div
 REA—Rea Magnet Wire Co Inc
 REAC—Reeves Instrument Corp
 Ready-Eddy—Rolab Photo-Science Labs
 Realistic—Radio Shack Corp
 Reconfax—Haller Raymond & Brown Inc
 Record Center—Duotone Co Inc
 Rectiformer—Weston Instruments Div/Daystrom Inc
 Recti/riter—Texas Instruments Inc
 Rectodyne—Christie Electric Corp
 Rectopower—Mallory & Co Inc
 P R
 Red Cap—Vaco Products Co
 Red Diamond—Reeves Soundcraft Corp
 Red E Nut—Frederick Tool & Eng'g Corp
 Red Point—Red Point Co
 Red Seal—Analogue Controls Inc
 Red Streak—Brown-Bridge Mills Inc
 Reevelec—Reeve Electronics Inc
 Refvolt—Consolidated Controls Corp
 Regulinear—Continental Electronics Mfg Co
 Regumatic—C B C Electronics Co Inc
 Regester—Kremrote Labs Inc
 RE-746—Railway Electronics Inc
 Resinite—Borden Chemical Co/
 Resinite Dept
 Resisteg—Internat'l Resistance Co
 RE-646—Railway Electronics Inc
 RE-648—Railway Electronics Inc
 RE-546—Railway Electronics Inc
 Resontron 1000—General Electric Co/X-Ray Dept
 Resontron 2000—General Electric Co/X-Ray Dept
 Resontron 300—General Electric Co/X-Ray Dept
 Restrictor—North Electric Co
 Reuter-Stokes—Reuter Stokes Electronic Components Inc
 Revmaster—Opal Electric Co
 Rev-O-Trol—Acme Electric Corp
 Revox—Electronic Applications Inc
 Rex—Air Controls Inc
 Rex—Crucible Steel Co of America
 Rexweld—Crucible Steel Co of America
 R F—Kings Electronics Co Inc
 R F C—Radio Frequency Co Inc
 R F Connectors—Dage Electric Co Inc
 Ribflex—Ward Leonard Electric Co
 Richmond—Lowell Mfg Co
 Rigid—Mectron Co The
 Rigid Tube—Alproco Inc
 Rijid—Engelhard Industries Inc/Baker Dental Div
 Rinco—Bridge—Rinco Inc

Rinco-Pot—Rinco Inc
 Riverside—Porter Co Inc H K
 R M C—Radio Materials Co
 RME—Electro-Voice Inc
 RME—Radio Mfg Engineers Inc
 Robins—Robins Industries Corp
 Robot—Alumitronic Eng Co
 Roflan—Roflan Co
 Roger—Rolab Photo-Science Labs
 Roger Eye—Rolab Photo-Science Labs
 Rogers—Rogers Corp
 Roger S F—Rolab Photo-Science Labs
 Rokide—Norton Co
 Rollaweigh—Exact Weight Scale Co
 Rollerscreening—Canrad Precision Industries
 Rol-Pot—Hub-Pot Inc
 Rondo—Rondo of America
 Roseal—Rome Cable Corp/Sub Alcoa
 Rotalyzer—Kay Electric Co
 Roto-Drive—Parameters Inc
 Rotolector—Kliegl Bros Universal Electric Stage Lighting
 Rotomatic—Johnson Co E F
 Roto Mold—Linear Inc
 Rotomotor—Conoffor Corp
 Rotoculser—Dynapar Corp
 Rotorac—Airborne Accessories Corp
 Roto Records—Williams Recording Service Ash
 Rotorelay—Corona Eng'g Service
 Rotorette—Airborne Accessories Corp
 Rotoroids—Burnell & Co Inc
 Rotosil—Engelhard Industries Inc/Amersil Quartz Div
 Roto-Tork—Haydon Co A W
 Royal—Royal Electric Corp
 Royal Blue—Linlar Inc
 Royal Blue Cone—Permoflux Products Co
 Royal Precision LGP-30—Royal McBee Corp Data Processing Div
 Royalty Line—Jersey Specialty Co Inc
 Royco—Royco Instruments Inc
 RP—Rue Products
 Printrometer—Electro-Physics Co
 RS—Rapid Specialties Co
 R-Theta—Canadian Applied Research Ltd
 RTV—Clarostat Mfg Co Inc
 Rubal—Ruby Chemical Co
 Rubban—All State Welding Alloys Inc
 Rubex—Ruby Chemical Co
 Rubicon—Minneapolis-Honeywell Regulator Co
 Rubyluid—Ruby Chemical Co
 Rurax—Palmer Inc M V
 Rust Release—Krylon Inc
 RVC—Royal Electric Corp
 RYCOM—Railway Communications Inc
 Ryetran—Rye Sound Corp
 RX Meter—Boonton Radio Corp

S

St Mary's—St Marys Carbon Co
 "Safe-T-Aire"—Engelhard Industries Inc/Hanovia Lamp Div
 Safety-Glo—Rodale Mfg Co Inc
 "Safex-TM"—Engelhard Industries/H A Wilson Div
 "Safpatch"—Kliegl Bros/Universal Electric Stage Lighting Co
 Sa Fuse—Electric Machinery Mfg Co
 Saki—Solartron Electronic Group Ltd
 Sali—Adalet Mfg Co
 Salimeter—Controls Circuits Inc
 Sarah—Simmonds Aerocessories Inc
 Saratoga Industries—Espy Mfg Co Inc
 Saxl—Tensitron Inc
 Scaico—Scaico Controls Inc
 Scandex—Intelligent Machine Research Corp
 Schafer—Schafer Customs Engineering
 Scientific—Scientific Radio Products Inc
 Scintillator—Precision Radiation Instruments Inc
 Scotch—Minnesota Mining & Mfg Co
 Scotsman—Utah Radio & Electronic Corp
 Scott—Scott Inc H H
 SCR Dimmer—Kliegl Bros/Universal Electric Stage Lighting
 Screen—Technical Appliance Corp

Screw Lock—Heli Coil Corp
 Sealin—Burrudy Corp/Omaton Div
 Sea Rad—Multi Products Co
 Sea Slave—Conn Marine Instrument Co
 Sebit 25 A—Rixon Electronics Inc
 Sec—Standard Electronics Div/
 Radio Eng'g Labs Inc
 Seco—Seco Mfg Co
 Seco—Stewart Eng'g Co
 Secode—Secode Corp
 Security Controls 100—Security Controls Inc
 Security Controls 400—Security Controls Inc
 Security Controls 500-1B—Security Controls Inc
 Security Controls 600—Security Controls Inc
 Sei—Scantlin Electronic Inc
 seis MAC—Texas Instruments Inc
 Seismation—Texas Instruments Inc
 Selectohm—Barnett Instrument Co
 Selectomatic—Seeburg Corp
 Selectophon—Audio Master Corp
 Selectrol—Exact Weight Scale Co
 Selectrez—Internat'l Resistance Co
 Selek—Associated American Trading Winding Machinery
 Sellevision—Hallamore Electronics Co/Div Siegler Corp
 Sel-Lok—Standard Pressed Steel Co
 Semicap—Internat'l Rectifier Corp
 Sems—Shakeproof Div/Illinois Tool Works
 Senior—Linemaster Switch Corp
 Sensiphone—Superex Electronics Corp
 Sensistor—Texas Instruments Inc
 Sensitrol—Weston Instruments Div/Daystrom Inc
 Sensitron—West Instruments Div/Daystrom Inc
 Sensory—Sensory Inc
 Sentinel—Johnson-Williams Serc Diamatrol—Standard Electronics Research Corp
 Serc Radi-Rf-Meter—Standard Electronics Research Corp
 Servite—Clad S Gordon Co
 Servus—Phone Motograph Inc
 Sessions—Sessions Clock Co
 Seymour—Seymour Mfg Co
 Shadograph—Exact Weight Scale Co
 Shakeproof—Shakeproof Div/
 Illinois Tool Works
 Shamco—Chamman & Co W S
 Shannon—Shannon Luminous Materials Co
 Shannon-Glow—Shannon Luminous Materials Co
 Shaped Circuits—Key Resistor Corp
 Sharpshooter—Trio Mfg Co
 Sherard—Sherard Labs Inc
 Sherwood—Sherwood Electronics
 Shop-Aids—Authorized Mfg Service Co Inc
 Shopmate Portable—Portable Electric Tools Inc
 Shrader—Shrader Co F W
 Shrink Tite—Dielectric Materials Co
 Shur-Code—Westline Products Div/Western Lithograph Co
 Shurfo—Annhormetal Co Inc
 Shuvalay—Portable Electric Tools Inc
 Shuvee—Entron Inc
 Siamese—Englhard Industries Inc
 Baker Dental Div
 Si FeMag—Thomas & Skinner Inc
 Sightmaster—Sightmaster Corp
 Signa Glow—Industrial Development Labs Inc
 Signal Sentry—Johnson Co E F
 Signamatic—Lamarche Mfg Co
 SiNuclear—Engelhard Industries Inc
 Silastic—Dow Corning Corp
 Silastic RTV—Dow Corning Corp
 Silcad—Yardney Electric Corp
 Silcath—Jensen Ind Inc
 Silcora 60—Western Gold & Platinum Co
 Silcora 75—Western Gold & Platinum Co
 Silenthloc—Clevite Harris Products Inc
 Silflake—Handy & Harman
 Sil-Fos—Handy & Harman
 Silicohm—Sage Electronics Corp

BRAND & TRADE NAMES

- Silkenite—Acme Wire Co
 Silotron—Thermosen Inc
 Silpaint—Handy & Harman
 Silpower—Handy & Harman
 Sil Quar—Mesa Plastic Co
 Sil Rap—Minnesota Rubber Co
 Sil Spray—Jensen Ind Inc
 Siltube—All State Welding Alloys Co Inc
 Silva-Brite—Engelhard Industries Inc American Platinum & Silver Div
 Silvaloy—Engelhard Industries Inc American Platinum & Silver Div
 Silvercel—Yardney Electric Corp
 Silver-Lite—Kriss Electronics Inc
 Silver Q—Decimeter Products Co
 Silvertone—Warwick Mfg Corp
 Silver Wand—Peerless Products Industries
 Silvex-TM—Engelhard Industries Inc H A Wilson Div
 Silvsteel—Emerson Sack Warner Corp
 Silwynd—Republic Foil Inc
 Simplex—Barnett Instrument Co
 Simplex—Desmond Stephan Mfg Co
 Simplytrol—Assembly Products Inc
 Simpson—Simpson Elec Co
 Simpson-Bach—Simpson Ltd
 Simpson—Simpson Electric Co
 Sinclair Phoenix—Phoenix Precision Co
 Sineverters—Power Sources Inc
 Sinton—Nat'l Radiac Inc
 "6N2"—Johnson Co E F
 6 PDT—Filtors Inc
 60 CPS—Advanced Products Co S & J—Shand & Jur Co
 S K F—S K F Industries Inc
 Skiatron—Skiatron Electronics & Television Corp
 Skia Model KI—Reiter Co F
 SKL—Spencer-Kennedy Labs
 SKY-Hi—Thomas Mold & Die Co
 Sk Yline—Computing Devices of Canada Ltd
 SKY—Scan—Skiatron Electronics & Television Corp
 Slater Lifetime—Slater Electric & Mfg Co Inc
 Slikwynd—Republic Foil Inc
 Slip-Drive—Clarostat Mfg Co Inc
 Slo Blo—Littelfuse Inc
 Sloflex-TM—Engelhard Industries Inc H A Wilson Div
 Slo Speed—Sterling Electric Motors Inc
 Slo-Syn—Superior Electric Co
 S L R—Mallinckrodt Chemical Works
 Slumber-Glo—Rodale Mfg Co Inc
 S MC—St Mary's Carbon Co
 Smith—Smith Inc Herman H
 Smog Free—Radex Corp
 Smooth On—Smooth on Mfg Co
 Snapac—Controls Co of America
 Snapit—Cable Electric Products Inc
 Snap-On—Snap-on Tools Corp
 Sniffer—Johnson-Williams Inc
 Sola-Jet—Temperature Engineering Corp
 Solarscope—Solartron Electronic Group Ltd
 Solder Master—Hexacon Electric Co
 Solu Bridge—Industrial Instruments Inc
 Somco-Simpson Optical Mfg Co
 Sonalator—Kay Electric Co
 Sona-Stretcher—Kay Electric Co
 Sona-Sweep—Kay Electric Co
 S-121—Wayne Kerr Corp
 Sonizon—Magnalux Corp
 Soundflo—Canadian Astatic Ltd
 Soundorama—Hoffman Electric Corp/Consumer Products Div
 Southco—South Chester Corp; Southco Div
 Solidcel—North Hills Electric Co Inc
 Solux Lamp—Engelhard Industries Inc Hanovia Lamp Div
 Sonagram—Kay Electric Co
 Sona-Graph—Kay Electric Co
 SonBlaster—Narda Ultrasonics Corp
 Sonic-Eye—Strandberg Engineering Labs Inc
 Sonicut—Sheffield Corp
 Sonite—Smooth on Mfg Co
 Space—Solartron Electronic Group Ltd
 Span-Sensory Inc
 Spanette—Hoffman Electric Corp/Consumer Products Div
 Spar-Video Accessory Mfg Co
 Spaulding—Spaulding Fiber Co Inc
 Spaulding's Strato Tower—Spaulding Products Co
 Spauldite—Spaulding Fiber Co Inc
 Spauldo—Spaulding Fiber Co Inc
 Speak O Clock—Lowell Mfg Co
 Spectralaire—Specialties Inc
 Spectra-Coder—Spectra-Strip Wire & Cable Corp
 Spectra-Ink—Spectra-Strip Wire & Cable Corp
 Spectra-Flex—Spectra-Strip Wire & Cable Corp
 Spectra-Strip—Spectra-Strip Wire & Cable Corp
 Spectra-Twist—Spectra-Strip Wire & Cable Corp
 Spectropure—Engelhard Industries Inc Baker Dental Div
 Speedairbond—Sterling Varnish Co
 Speedbins—Electric Cord Co
 Speedcraft—Wire Stripper Co
 Speed Drive—Sterling Electric Motors Inc
 Speedminder—Glaser-Steers Corp
 Speedmax—Leeds & Northrup Co
 Speed Trol—Sterling Elec Motors Inc
 Speed-X—Johnson Co E F
 Speedy-Mark—North Shore Nameplate Inc
 Speedy-Cal—North Shore Nameplate Inc
 Sperry—Sperry Semiconductor Div
 Sperry—Sperry Electronic Tube Div
 Sperry Gyroscope Co
 Sperti-Faraday—Sperti-Faraday Inc
 Spin-a-Brush—Portable Electric Tools Inc
 Srin Pin—Bruno N Y Industries Corp
 Spira-Coil—Com-Tronics Inc
 Spirator—Hunter Spring Co
 Splicer—Alonco Products Inc
 Spoolare—All State Welding Alloys Inc
 Sportsman—Ray-O-Vac Co
 Srotcheck—Magnalux Corp
 Srotlay—Engelhard Industries Inc D E Makepeace Div
 SPS Compartment—Service Parts Systems Inc
 SPS Ful Vu—Service Parts Systems Inc
 Sps Space Saver Bins—Service Parts Systems Inc
 Square Ohm—Workman TV Inc
 Srs—Metal & Thermit Corp (SS) (tm)—Sperry Semiconductor Div
 Stabiline—Superior Electric Co
 Staloc—Mallory & Co Inc P R
 Stancor—Chicago Standard Transformer Corp
 Stancote—Standard Wire & Cable Co
 Standard Automation—Standard Tool & Mfg Co
 Standard-Tm—Engelhard Industries Inc/H A Wilson Div
 Stando—Sticht Co Inc
 Herman H
 Standee—Clarostat Mfg Co Inc
 Stanflex—Standard Wire & Cable Co
 Stanomatic—Standard Register Co
 Stanscrew—Standard Screw Co
 Stapin—Burdny Corp/Omaton Div
 Star-A—Star-A Electric Mfg Co Inc
 States—States Co
 Statiflux—Magnalux Corp
 Sta-Warm—Sta-Warm Electric Co
 Staver Mini-Shield—Staver Co Inc
 Stavolt—Christie Electric Corp
 Steel Age—Corry-Jamestown Corp
 Stenay—Arnhold Ceramics Inc
 Stenac—Norgen-Stenac Inc
 Stenafax—Times Facsimile Corp
 Sten O Tape—American Geloso Electronics Inc
 Stepper—Land-Air Inc
 Stercon—Firth Sterling Inc
 Sterodyne—Dynaco Inc
 StereoMaster—Scott Inc H H
 Stereosound—Rye Sound Corp
 Steritron—Engelhard Industries Inc/Hanovia Lamp Div
 Stervac—Firth Sterling Inc
 Stethosound—Rye Sound Corp
 Stevens—Revere Corp of America
 Stevenson—Stewart & Stevenson Service Inc
 Stewart—Stewart & Stevenson Inc
 Strat-O-Lites—Strat-O-Seal Mfg Co
 Strat-O-Seals—Strat-O-Seal Mfg Co
 Stresscoat—Magnalux Corp
 Stripmaster—Ideal Industries Inc
 Stripohm—Ward Leonard Electric Co
 Strippits—Wales Strippit Inc
 Stroboe—Kemlite Laboratories Inc
 Strobemct—C B C Electronics Co Inc
 Strobeselector—Califone Corp
 Strobite—Strobite Co
 Strobolux—General Radio Co
 Strobo-Sync—Winkler Labs
 Strobotac—General Radio Co
 Structures for Circuitry—Vector Electric Co
 Stur D Lace—Gudebrod Bros Silk Co Inc
 Stur D Lace H—Gudebrod Bros Silk Co Inc
 Sturges Batteries—Electronic Batteries Inc
 Subscriber-Vision—Skiatron Electronics & Television Corp
 Snswitch—Riley Co Inc
 Super Brighteners—Workman TV Inc
 Supercap—United Electronic Mfg Corp
 Superior—Superior Electric Co
 Superheat—Selas Corp of America
 Superior 5 Way—Superior Electric Co
 Superlite—Kriss Electronics Inc
 Superlux—Engelhard Industries Inc/Amersil Quartz Div
 Superspeed—Enthoven Solders Ltd
 Supertemp—Modern Labs Equip Co Inc
 Suretester—Calif Technical Ind
 Suretite—Engelhard Industries Inc/Charles Engelhard Inc
 Sunplas—Southern Plastics Co
 Supro—Valco Mfg Co
 Surface—Surface Combustion Corp
 Surgelite—Kemlite Laboratories
 Suspension System—Service Parts Systems Inc
 Switchmatic—Recoa Co Inc
 Switchmatic—Eagle Electric Mfg Co Inc
 Sylvania—Sylvania Home Electronics
 Symhonic—Symphonic Radio & Electronic Corp
 Synchronous Master—Stromberg Time Corp
 Synco-an—General Railway Signal Co
 Synco Snap—Torq Engineered Prod Inc
 Syncostep—General Railway Signal Co
 Synkote—Plastoid Corp
 Synprotex—Torq Engineered Prod Inc
 Synprotex—Torq Engineered Products Inc
 Synthane—Synthane Corp
 Synthynol 901—Rome Cable Corp/Sub Alcoa
 Synthographic—Synthane Corp
 Syntholva—Variflex Corp
 Systemat—Waterman Products Co Inc
- T**
- Taber—Taber Instrument Corp
 Taco—Technical Appliance Corp
 Tadanac—Consolidated Mining & Smelting Co of Canada
 Takk—Hewson Co
 Talkmaster—Dalmotron Co
 Talk A Phone—Talk A Phone Co
 Tally—Tally Register Corp
 Tally Pack—Barkley & Dexter
 Tantalytic—General Electric Co-Capacitor Dept
 Tan-Ti-Cap—Texas Instruments Inc
 Tapak—Broadcast Equipment Specialties Corp
 Tape Ard—Calif Technical Ind
 Tap-Lok—Groov-Pin Corp
 Tarc—Tarc Electronics Inc
 TARMAC—Texas Instruments Inc
 Tattelite—Stittler Corp
 Taylor—Continental Elec Co
 Taylor—Taylor Fibre Co
 Taylor-Hobson—Engis Equipment Co
 Tayloreels—Tayloreel Corp
 TBTO—Metal & Thermit Corp
 Techline—Techline Div of Wheelabrator
 Technigraph—Technicraft Co
 Techniques—Techniques Inc
 Tefifon—Audio Master Corp
 Tekmold—Bemis Bros Bag Co
 Tektronix—Tektronix Inc
 Tela—Giantview Television Network/Div Meilink Steel Safe Co
 Telecord—Dictaphone Corp
 Telecom—Webster Electric Co
 Teletron—Telectro Industries Corp
 Teletron—Teletron Co/Div Elliott & Evans Inc
 Teledyne—Taber Instrument Corp
 Teleflight—Taber Instrument Corp
 Telepage—Webster Electric Co
 Telepulse—Shand & Jurs Co
 Telering—Telkor Inc
 Teltalk—Webster Electric Co
 Tele Trot—Jerrold Electronics Corp
 Televex—Televex Co
 Televoice—Electro-Sonic Labs Inc
 Televolter—Jackson Electrical Instrument Co
 Tele-Vue—Tele-Vue Towers Inc
 Telkor—Telkor Inc
 Tel Labs—Tel Labs Inc
 Tel-Tru—Hill & Co E Vernon
 Tel O Set—Minneapolis-Honeywell Reg Co/Industrial Div
 Temp-Alarm—Tempil Corp
 Tempcor—Temperature Eng'g Corp
 Temp Guard—Franklin Dales Co
 Tempil—Tempil Corp
 Tempilap—Tempil Corp
 Tempilstiks—Tempil Corp
 Temp Lace H—Gudebrod Bros Co Inc
 Temp Lace H—Gudebrod Bros Silk Co Inc
 Temp Lace S—Gudebrod Bros Silk Co Inc
 Tempbraid—Hitemp Wires Inc
 Tempo—Tempo Instrument Inc
 Temprene—Hitemp Wires Inc
 Temcrex—Hitemp Wires Inc
 Temprite—Hitemp Wires Inc
 Temp-R-Taps—Connecticut Hard Rubber Co
 Tensolox—Tensolite Insulated Wire Co Inc
 Tensolite—Tensolite Insulated Wire Co Inc
 Tensolon—Tensolite Insulated Wire Co Inc
 Terado—Terado
 Termatic—Burdny Corp/Omaton Div
 Tesco—Eastern Specialty Co
 Testing—Parameters Inc
 Tevco—Tevco Insulated Wire
 Texas Crystals—Texas Crystals/Div Westronix Corp
 The Fisher—Fisher Radio Corp
 Therma Bridge—Industrial Instruments Inc
 Thermal-Cal—North Shore Nameplate Inc
 Thermalex—Essex Wire Corp
 Thermalex F—Essex Wire Corp
 Thermal-Indicator—Minco Products Inc
 Therma Line Series 400—International Radiant Corp
 Thermalon—Hitemp Wires Inc
 Thermal-Ribbon—Minco Products Inc
 Thermatool—New Rochelle Tool Corp
 Thermek—Heatron Inc
 Thermistemp—Yellow Springs Instrument Co Inc
 Thermo-B—Sterling Varnish Co
 Thermobond—Sterling Varnish Co
 Thermo Cable—Thermo Electric Co Inc
 Thermocap—Niagara Electron Labs
 Thermodur—Sterling Varnish Co
 Thermodyne—Modern Lab Equip Co Inc
 Thermo Electance—Thermo Electric Co Inc
 Thermo Electric—Thermo Electric Co Inc
 Thermo-F—Sterling Varnish Co
 Thermogel—Sterling Varnish Co
 Thermometal-TM—Engelhard Industries Inc/H A Wilson Div
 Thermohm—Leeds & Northrup Co
 Thermolain—Star Porcelain Co
 Thermo Jet Driver—General Research & Supply Co
 Thermochem—Induction Heating Corp
 Thermopoxy—Sterling Varnish Co
 Thinplates—Park Nameplate Co Inc
 Thermo-Tip—Ideal Industries Inc
 Thorox—Nat'l Beryllia Corp
 Three Phase—Sciaky Bros Inc
 33H Turntable—Grav Mfg Co
 Thorox—Nat'l Beryllia Corp
 Thrifty—Marathon Battery Co
 Thunderbolt—Johnson Co E F
 TI-CO—Thomas Instrument Co
 Timmy—Pearce Simpson
 Time Cards—Cincinnati Time Recorder Co
 Timefax—Times Facsimile Corp
 Time-Master—Dictaphone Corp
 Time-O-Lite—Industrial Timer Corp
 Time Recorders—Cincinnati Time Recorder Co
 Time Stamps—Cincinnati Time Recorder Co
 Time Stamps—Stromberg Time Corp
 Tinol—American Solder & Flux Co
 Tinymag—Torwico Electronics Inc
 Tinymax—Torwico Electronics
 Title Fit—Bemis Bros Bag Co
 T Lock Amer Plate—Amercoat Corp
 TM—General RF Fittings Inc
 TNC—General RF Fittings Inc
 TNT—Mastra Co
 Tokavox—Cooper Electronics Inc
 Tom Thumb—Automatic Radio Mfg Co Inc
 Tonepac—Lee Electric Inc
 Toncam—Allen B Du Mont Labs Inc
 Tone Arms—Gray Mfg Co
 Tonotron—Hughes Products/Hughes Aircraft Co
 Top Hat—Times Facsimile Corp
 Topliner—Technical Appliance Corp
 Tops Records—Precision Radiation Instruments Inc
 Torbal—Torsion Balance Co
 Torrit—Torrit Mfg Co
 Torrington—Torrington Co
 Touchette—Rodale Mfg Co Inc
 Touch-Plate—Touch-Plate Mfg Co Inc
 TR—Industro Transistor Corp
 Tracmaster—Universal Drafting Machine Corp
 Traffic Master—General Railway Signal Co
 Trak—CGS Labs Inc
 Transducer—BJ Electronics/Borg-Warner Corp
 Transalyzer—Kay Electric Co
 Trans Citer—Multi Products Co
 Transifier—Kay Electric Co
 Trans Sil—Trans Sil Corp
 Transiply—Kay Electric Co
 Transiprobe—Kay Electric Co
 Transistor-Straightener—Electro-Machinery/Div Design Tool Corp
 Transitar—Mallinckrodt Chemical Works
 Transitol—Dynamic Control Co
 Trans-Lux—Trans-Lux Corp
 Transonic—Transonic Inc
 Transtat—Standard Electronic Div/Radio Eng Labs Inc
 Trap Master—Mosley Electronics Inc
 Trapper—Technical Appliance Corp
 Treadlite—Linemaster Switch Corp
 Tri-Band—Telrex Labs
 Trice—Packard Bell Electronics Corp
 Tri-Ex—Tri-Ex Tower Corp
 Trig-R-Heat—Wall Mfg Co P
 Tri Flux—Redmond Co Inc
 Trig Towers—Rostan Corp
 Tri-Ind-X—Triplett & Barton Inc
 Trilsch—Trilsch Inc John D
 Trimit—Bourns Labs Inc
 Trimmers—Erie Resistor of Canada Ltd
 Trimpot—Bourns Labs
 Trimpot Jr—Bourns Labs Inc
 Trim-tite—Fairchild Controls Corp-Components Div
 Trim-tite Jr—Fairchild Controls Corp-Components Div
 Trim Trol—Airborne Accessories Corp
 Tristor—Westinghouse Electric Corp
 Trion—Trion Inc

Triplomatic—Hardman Co Inc
H V
Tri-Plate®—Sanders Associates Inc
Triplac—Pyle Nat'l Co
Tristao—Tri-Ex Tower Corp
T R S—Tubular Rivet & Stud Co
Truarc—Waldes Kohinoor Inc
Trucoat—Nat'l Standard Co
True Stereo Jr—Linlar Inc
True Stereo Jr—Permoflux Products Co
True Stereo Sr—Linlar Inc
True Stereo Sr—Permoflux Products Co
Tru-Flange—American Brass Co
Trylite—Electro Snap Corp
Trylon—Wind Turbine Co
T-6—Ideal Industries Inc
T T T—T T Electronics Inc
Tuck—Technical Tape Corp
Tuffon—Tensolite Insulated Wire Co Inc
Tuff Title—Townsend Co-Engineered Fasteners
Tuf-Plate—Photocircuits Corp
Tur-Bo—Tur-Bo Jet Products Co Inc
Turbo—Brand & Co Inc William
Turboflap—Brand & Co Inc William
Turbolene—Brand & Co Inc William
Turbolex—Brand & Co Inc William
Turbo 117—Brand & Co Inc William
Turbosil—Brand & Co Inc William
Turbotemp—Brand & Co Inc William
Turbotherm—Brand & Co Inc William
Turbotuf—Brand & Co Inc William
Turbo Tufflex—Brand & Co Inc William
Turbozone—Brand & Co Inc William
Turn-Tyte—Rodale Mfg Co Inc
TVX—X-Ray Dept/General Electric Company
Twinlite—Electro Snap Corp
Twinpot®—Bourns Labs Inc
Twinfacts—Weston Instruments Div/Daystrom Inc
2 Brand—Automatic Radio Mfg Co Inc
Two In One—Bemis Bros Bag Co
2PDT—Filtors Inc
2-200—Neff Instrument Corp
2-300—Neff Instrument Corp
TW200—Boesch Mfg Co Inc
TW201—Boesch Mfg Co Inc
TW251—Boesch Mfg Co Inc
TW300—Boesch Mfg Co Inc
Tymeter—Pennwood Numechron Co
Tyniswitch—Detroit Controls/Div American Standard Corp
Type B—General Railway Signal Co
Typatron—Hughes Products/Hughes Aircraft Co

U
Uac—Universal Transistor Products Corp
U ASH IT—Electronic Engineering Co

Ucion—Metal & Thermit Corp
U-Line®—Ilumitronic Eng Co
Ultraudio—UltraAudio Products Div Oberline Inc
Ultraformer—Kay Electric Co
UltraMet—Cannon-Muskegon Corp
Ultramicrowave—DeMornay Bonard
Ultra-Min-Elec—Argonne Electronics Mfg Corp
Ultra-Pix—Kay Electric Co
Ultra Purity—United Carbon Products Co
Ultrasil—Engelhard Industries Inc/Amersil Quartz Div
Ultrasounder—Pearce Simpson Inc
Ultra-Sweep—Kay Electric Co
Ultratube—Plastoid Corp
Ultravestor—Blonder Tongue Labs Inc
Ultrimmer—Ultronix Inc
Ultrohm—Ultronix Inc
Ulvir—Axler Associates Inc
Unbrako—Standard Pressed Steel Co
Undark—U S Radium Corp
Unecap—United Electronic Mfg Corp
Unicast—Engelhard Industries Inc/Baker Dental Div
Uni-Cast—Redmond Co Inc
Uni Chassis—Kibbey Instrument Co
Unichrome—Metal & Thermit Corp
Uni Core—Alpha Metals Inc
Unidial—Barnett Instruments Co
Uni-Drive—Utah Radio & Electronic Corp
Unileads—Kibbey Instrument Co
Uniline—Cascade Research Div/Monogram Precision Ind
Unilite—Electro Snap Corp
Uniloc—Burndy Corp/Omaton Div
Unimesh—Bishop & Co Platinum Works J
Union Carbide—Silicones Div/Union Carbide Corp
Unipolse—Pickering & Co Inc
Unipole—Andrew Corp
Uniring—Burndy Corp/Omaton Div
Unisorb—Felters Co
Unispeed—Stromberg Time Corp
Unistac—Internat'l Rectifier Corp
United Metallic O-Rings—United Aircraft Products Inc
Unit-ized—Stechell-Carlson Inc
Unitric—Stromberg Time Corp
Universal—Authorized Mfg Service Co Inc
Universal—Joslyn-Hudson Inc
Universal—Mueller Elec Co
Universal—Shielding Inc
Universal—Universal Motor Co
Universal Atomics—Universal Transistor Products Corp
Universal Bridge—Wayne Kerr Corp
Universal Tv Tower—Universal Products Engineering Co
Univerter—Boonton Radio Corp
Uniwave—Uniwave Inc
Unyslugs—Applegate & Co C J
U-182—Wayne Kerr Corp
U-281—Wayne Kerr Corp
Usrc—U S Relay Co
Utilator—Kay Electric Co
Utlumount—Electronics Div/Diamond Power Specialty Corp

Utiliscope—Electronics Div,
Diamond Power Specialty Corp
Utiliport—Electronics Div,
Diamond Power Specialty Corp
Utilivue—Electronics Div/
Diamond Power Specialty Corp

V
Vaco—Vaco Products Co
Vac-U-Therm—Temperature Eng'g Corp
Valiant—Johnson Co E F
Val 90—Valverde Labs
Valvband—Dynex Inc
Vam—Video Accessory Mfg Co
Van Chip—Firth Sterling Inc
Vanistor—Weston Instruments Div/Daystrom Inc
Van Keuren—Van Keuren Co
Vapocarb—Leeds & Northrup Co
Vapoflash—Consolidated Controls Corp
Vapoclash—Consolidated Controls Corp
Varactors—Microwave Associates Var E Pack—Electric Products Co
Varfil—Varflex Corp
Variac®—General Radio Co
Varicell—Superior Electric Co
Vair-Choke—Superex Electronics Corp
Varicon—Elco Corp
Varicord—Photovolt Corp
Varicow—Elco Corp
Vari Flex—Hammer Electronics Co Inc
Varigan Amplifier—Parameters Inc
Vari-L—Vari-L Co Inc
Variogon—Nilsen Mfg Co
Vari-Ohm—Ketay Dept/Norden Div/United Aircraft Corp
Varipack—Elco Corp
Vair/Phase—Clarostat Mfg Co Inc
Varipulse—Barry Controls Inc
Varisource—Jarrell Ash Co
Vari-Sweep—Kay Electric Co
Varitar—PAR Products Corp
Vari-Tronic—Aviation Electronic Service
Vari-Vox—Kay Electric Co
Varometer—Micrometrical Mfg Co
Var-O-Power—Bendix-Eclipse Pioneer Div
Varo Power—Eclipse Pioneer Div
Varytape—Audiamation Labs
Veco—Victory Eng'g Corp
Vector—Vector Mfg Co
Veegro—General-American Valve Co
Veetube—Veeco Vacuum Corp
Veriflex-TM—Engelhard Industries Inc/H A Wilson Div
Verilocap—Spectra-Strip Wire & Cable Co
Vertell—West Instrument Corp
Verniertemp—Modern Lab Equip Co Inc
Vernistat—Vernistat Div Perkin-Elmer Corp
Vernitel—Hoover Electronics Co
Versamid—General Mills Inc Chemical Div
Versatrol—Assembly Products Inc
Vertar—PAR Products Corp
Vest Pocket—Mosley Electronics Inc
VHF—Radio Mfg Engineers Inc
Vhs—Assembly Products Inc

Vibralyzer—Kay Electric Co
Vibroground—Associated Research Inc
Vibromonometer—BJ Electronics/Borg-Warner Corp
Vibrotest—Associated Research Inc
Vibrotone—BJ Electronics/Borg-Warner Corp
Vidaire—Vidaire Electronics Mfg Corp
Vidaligner—Kay Electric Co
Video-Lectronic—Kane Productions Inc AI
Viking—Johnson Co E F
Viking—Viking of Minneapolis Inc
Vip—Texas Instruments Inc
Viscore—Weston Instruments Div/Daystrom Inc
Visi-Mag—Magnesories
Visulite—Keystone Electronics Corp
Visutrol—Stewart Instrument Co
Vitramon—Vitramon Inc
Vitrohm—Ward Leonard Electric Co
Vitrolain—Star Porcelain Co
V-M—V-M Corp
V M—Harmon Lichtenstein & Co
Voldicon—Adage Inc
Volk—Volk Radiochemical Co
Vol-O-Flu—Nat'l Instrument Labs Inc
Volt A Test—Sittler Corp
Voltbox—Superior Electric Co
Volter—Electro-Physics Co
Volt-ohmatic—Bergen Labs Inc
Voltrio—Acme Electric Corp
Volunteer—Industrial Radio Corp
Von—Hewson Co Inc
Vrc—PAR Products Corp
Vtms—Seco Mfg Co
Vu—Beede Electrical Instrument Co Inc
Vyna-Kote—Spectra-Strip Wire & Cable Corp

Westgo AI 399—Western Gold & Platinum Co
Westgo AI 400—Western Gold & Platinum Co
Westgo AI 995—Western Gold & Platinum Co
Westgo AI 1009—Western Gold & Platinum Co
Welco—Wesche Electric Co B A
Wessco Glo-Melt—Wassco Electric Products Corp
Westime—Westlab Inc
Westlab—Westlab Inc
Weston—Weston Instruments Div/Daystrom Inc
Wharfedale—British Industries Corp
Wheelabrator—Wheelabrator Corp
Whirltemp—Modern Lab Equip Co Inc
Whitley—Whitley Electronics Inc
Whitney-Jensen—Whitney Metal Tool Co
Wick-O-Lite—North American Electric Lamp Co
Wigo—United Audio Products Inc
Wilbac—Bach-Simpson Ltd
Wilbro—Wildberg Bros Smelting & Refining Co
Wilco—Engelhard Industries Inc/H A Wilson Div
Willard—Electric Storage Battery Co
Wilmington Vulcanized Fibre—Wilmington Fibre Spec Co
Winco—Premco Inc
Winco—Wincharger Corp
Wircor—Wircor Electronics Inc
Wire-Wrap—Gardner-Denver Co
Wish—Workman TV Inc
Worden—Texas Instruments Inc
Workometer—Stewart Instrument Co
Wrap A Wire—Malco Mfg Co
W T V—Workman TV Inc
W W—Tel Labs Inc
Wyco—Wyzenbeek & Staff Inc

W
WacLine—WacLine Inc
Wac-Tac—WacLine Inc
Waco Wire—Calcon Mfg Co
Wagenseller—Acme Mfg & Gasket Co
Walloy—Wall Mfg Co P
Warner—Warner Electric Brake & Clutch Co
Watco—Waterbury Cos Inc
Waterwrite—Bache & Co Semon
Watterson—Davis & Co D W
Wavometer—Micrometrical Mfg Co
Wdrl—Mytron Mfg Co
Webster Electronic—Webster Electric Co
Webster Phono—Webster Electric Co
Webster Pilot—Webster Electric Co
Webster Transistorized Converters—Webster Electric Co
Wedgelock—Wedgelock Corp of Calif
Weldmatic—Weldmatic
Weller—Weller Electric Corp
Welwyn—Welwyn Electrical Labs Ltd
Wen—Wen Products Inc
Westgo AI 90-220—Western Gold & Platinum Co
Westgo AI 300—Western Gold & Platinum Co

X
Xactemp—Gordon Co
Xactline—Gordon Co
Xcelite—Xcelite Incorp
XI—Essex Electronics of Canada Ltd
Xrd-5—General Electric Co/X-Ray Dept
Xtend IT—Workman TV Inc
Xtrador—Hexacon Electric Co
X Var—Fidelity Chemical Prod Corp
Xy—Stromberg-Carlson Div/General Dynamics Corp
Xy—Milgo Electronic Corp

Y
Yardmaster—Reeves Instrument Corp

Z
Zeiss Kollmorgen—Kollmorgen Optical Corp
Zeniac—Internat'l Rectifier Corp
Zenith—Zenith Electric Co
Zephyr—Pioneer—Trio Mfg Co
Zephyr Royal—Trio Mfg Co
Zero-Max—Zero-Max Co
Zippertubing—Zippertubing Co
Zirox—Nat'l Beryllia Corp
Zoomar—Zoomar Inc
Zygo—Magnaflex Corp

engineers, advertisers: — watch for!

8th Annual WESCON issue . . . our August issue . . . advertising closing July 1, 1959

7th Annual Microwave Round-up Issue—our November issue—advertising closing October 1, 1959 . . . 17th Annual IRE issue—our March issue—advertising closes Feb. 1, 1960



A Chilton Publication—Chestnut & 56th Streets, Phila. 39, Pa., SHerwood 8-2000

ELECTRONIC INDUSTRIES DIRECTORY of

Representatives ("Reps")

This section of the 1959 Electronic Industries Directory lists those independent sales organizations selling electronic products. Factory staff salesmen are not included. The "Rep" organizations are listed alphabetically by state and city. The information describes the general types of products handled, the territory covered and

whether warehousing facilities are available. Membership in one of the two principal "Reps" organizations is indicated by Δ or * preceding the name. The Δ denotes the Manufacturers Agents National Association; the * denotes the "Electronic Representatives Association."

ALABAMA

BIRMINGHAM

GAUGGEL ENGINEERING CO INC 767 Euclid Circle (P O Box 9065) TR 1-8443—Ala & Northwest Fla—Radioactive Gauges

ARIZONA

PHOENIX

COULSON ROY E P O Box 9215 WI 3-8935—Ariz—Power Equipment—Warehouse

GRAMER & CO 111 W Osborn Rd CR 9-1231—Ariz—Electronic Components

HOWE & HOWE 4328 N 42nd Pl AM 5-9185—Ariz—Components

LINSLEY CO VERN 2902 W Villa St AP 8-2266—Ariz, New Mex, El Paso Co (Texas)—Electronic Components—Warehouse

MOORE SALES CO HARRY A 4142 N 18th St AM 5-4662—Ariz, New Mex, El Paso (Texas)—Components—Warehouse

SHEFLER-KAHN CO 240 S 1st Ave AL 8-7893—Ariz, New Mex, El Paso Co (Tex), Clark Co (Nev)—Components, Instruments—Warehouse

WESTERN ENGINEERING CO 8905 N 17th Ave WI 4-0431—(Br O) 306 Enterprise Bldg Denver Colo—El Paso Co (Tex)—Components

SCOTTSDALE

CARTER ASSOCIATES 217 S Hinton Rd (P O Box 94) WH 5-3611—Ariz, New Mex—Components, Microwave Products

TUCSON

TERRAZAS PINA & MOORE 314 E 6th St MA 3-8302—New Mex, Northern Mexico, Cochise, Maricopa, Pima Cos. (Ariz), El Paso Co (Tex)—Aircraft-Missile Components—Warehouse

CALIFORNIA

LOS ANGELES AREA

*A-F ASSOCIATES 385 E Green St (Pasadena) RY 1-5631—Ariz, Southern California—Components, Precision Type Military Instruments

ALLEMAN F F 1625 Blake Ave CA 2-8128—Ariz, Calif—Components—Warehouse

AUF DER HEIDE CO P O Box 201 2245 N Lake Ave (Altadena) RY 1-9568—(Br O) Ron Marco Co 2880 Ridgeway Ave San Bruno Calif—Ariz, Calif, Nev—Hi-Fi Components, Recording & Studio Equipment for TV, Film & Radio Broadcast—Warehouse

*BERMAN CO INC JACK 1141 S La-Cienega Blvd OL 5-8920—(Br O) 8146 N 1st Ave Phoenix Ariz, WH 5-9321—Ariz, Southern California, Clarke Co (Nev)—Warehouse

*BRAY & CARTER 2234 W 11th St DU 9-3173—Ariz, Southern Calif, Clark Co (Nev)—Component sales to OEM; Distributor Lines—Warehouse

BRENNER-FIELDER & ASSOCIATES INC 7563 Melrose WE 6-7128—Southern Calif; Clarke Co (Nev)—Instruments and Systems Controls

CAPELL CO RICHARD 2639 S La Cienega Blvd TE 0-8616—Ariz, Calif—Components

CHAFIN & ASSOCIATES 1541 W Olympic Blvd DU 5-3955—Southern Calif—Computer Components—Warehouse

*COCHRANE-BARRON CO 544 So Mariposa Ave DU 5-0095—(Br O) 318 W State Ave Phoenix Ariz CR 7-0506—2215 S El Camino Real San Mateo Calif FI 5-7981—Ariz, Calif, New Mex—Components, Systems

COMPONENTS SALES CALIF INC 4626 Van Nuys Blvd Suite 202 (Sherman Oaks) ST 8-4550—(Br O) Palo Alto Calif—Ariz, Calif—Components, Instruments

CONNELLY SALES CO 14529 Manecita Dr (La Mirada) RA 3-8611—Ariz, Calif, Nev—"Ham" Items, O E M Components and Instruments

*COSTELLO & CO 2740 La Cienga Blvd TE 0-8537—(Br O) 563 Murphy Ave Sunnyvale Calif RE 9-4640 Ariz, Calif—Components, Instruments

CORMAN WALTER W 7432 West 80th St OR 0-2520—Southern Calif—Components—Warehouse

DAVIDSON & ASSOCIATES JOE 2803 Los Flores Blvd (Lynwood) NE 6-2245—(Br O) 750 Natoma St San Francisco Calif HE 1-0464—Ariz, Calif, Nev, New Mex, El Paso Co (Tex)—Electrical, Electronic, Electromechanical Equip

DUDEK & CO R C 407 N Maple Dr (Beverly Hills) BR 2-8097—Calif, Ore, Wash—Fasteners—Warehouse

EASTMAN PACIFIC CO 5240 Alhambra Ave CA 3-1351—(Br O) (Verne Linsley) 2902 West Villa St Phoenix Ariz AP 8-2266—(Hank Birnbaum) P O Box 561—San Mateo Calif FI 1-3364—Ariz, Calif, New Mex—Components

*EDWARDS CO JACKSON 4101 Lankershim Blvd P O Box 568 (No Hollywood) ST 7-9603—(Br O) (E J Foley) 3480 N Jokake Dr Scottsdale Ariz WH 5-4290—Ariz, Southern Calif—Warehouse

ELECTROGRAPHIC LABORATORIES P O Box 2433 South Annex (Van Nuys) ST 7-5211—Southern Calif—Instruments—Warehouse

ELECTRO - MEDICAL ENGINEERING CO 2317-A West Olive Ave (Burbank) TH 8-9344—(Br O) 667 Arguello San Francisco 18 Calif SK 2-6658—Calif—Medical Electronic Equip

*ERLANGER SALES CO 4217 W Jefferson Blvd RE 1-2238—Ariz, Calif, Nev—Warehouse

*FELDMAN CO HENRY 1244 So Grand Ave RI 9-8803—Ariz, Southern Calif, Southwestern Nev—Hi-Fidelity Components, Soldering Guns

FERRIS WE E 422 W Roses Rd P O Box 141 (San Gabriel) AT 1-8339—Southern Calif—Varistors

Δ GEE & ASSOCIATES HARRY 5333 So Sepulveda Blvd (Culver City) TE 0-1742—Ariz, Calif, New Mex—Components & Instruments

*GEIST & CO W K 3177 Glendale Blvd NO 5-8910—Ariz, Calif, Nev, New Mex—Test Equipment & Systems

GRATIOT CO ROY F 1261 S Glendale Ave (Glendale) CH 5-3746—Ariz, Southern Calif—Components

*HARMON CO W S 121 N Robertson Blvd (Beverly Hills) OL 5-6340—Ariz, Southern Calif—Components

HARRIS CO BUCKY 3440 Overland Ave TE 0-4647—(Br O) 900 3rd St San Francisco Calif GA 1-7147—11 Western States—Electrical Wire & Cable—Warehouse

Δ HEIM & SCHEER INC 11168 Santa Monica Blvd BR 2-5133—(Br O) 2112 Jackson St Dallas, Texas RI 3-5293—Ariz, Calif, Texas—Warehouse

*HILL CO J T 420 South Pine St (San Gabriel) AT 7-9633—(Br O) 1682 Laurel St San Carlos Calif LY 3-7693 1864 Bacon St San Diego Calif AC 3-7133—Ariz, Calif, Nev—Instrument & Technical Components—Warehouse

*HOLMES CO CARL E 107 No Ave 64 CL 6-2255—(Br O) 1436 El Camino Real Menlo Park Calif DA 6-3762—Ariz, Calif, Nev—Components—Warehouse

*INSTRUMENTS FOR MEASUREMENTS 3455 Cahuenga Blvd (Hollywood) HO 9-7294—(Br O) 3150 El Cajon Blvd San Diego Calif AT 3-2081—251 S Murphy Sunnyvale Calif RE 6-3680—Ariz, Calif, Nev—Instruments

*JEWETT CO SAMUEL O 13537 Addison St (Sherman Oaks) ST 9-8103—(Br O) 516 W Vernon Ave Scottsdale Ariz WH 5-9711—Ariz, Calif—Components and Instruments

KING ENGINEERING CO 5321 1/2 Hollywood Blvd HO 4-7166—(Br O) 1763 Lombard St San Francisco 23 Calif WE 1-2168—Ariz, Calif, Clark Co (Nev)—Transducers, Data Acquisition & Data Reduction Equip—Warehouse

*LUSCOMBE ENGINEERING CO OF LOS ANGELES 1129 South Fair Oaks Ave (Pasadena) RY 1-3386—(Br O) 130 North "B" St, San Mateo Calif DI 2-7057—Ariz, Calif, Clark Co (Nev) Components—Warehouse

LYNCH & SON C R 3307 Glendale Blvd NO 3-8236—Ariz, Nev, Southern Calif—Components, Radio

*McCARTHY ASSOCIATES 1055 E Walnut (Pasadena) RY 1-7411—(Br O) 111 W Osborn Rd Phoenix Ariz CR 9-1891—635 Oak Grove Menlo Park Calif DA 6-7937—934 W Laurel San Diego Calif BE 9-2265—Ariz, Calif, Nev—Instruments—Warehouse

MARKMAN CO R MARK 4260 Lankershim Blvd (North Hollywood) ST 7-3368—Ariz, Southern Calif, Southern Nev—Parts Jobber Items, Audio Components—Warehouse

"REPRESENTATIVES"

*MARSHALL CO G S 2065 Huntington Dr (San Marino) RY 1-6781—(Br O) 3915 E Broadway Tucson Ariz EA 7-1501—2015 El Camino Real Redwood City Calif EM 6-8214—3525 5th Ave San Diego 3 Calif CY 8-8234—Ariz, Calif—Warehouse

*MARSHANK SALES CO 7422 Melrose Ave—Ariz, Hawaii, Southern Calif, Southern Nev—Components, Hi-Fi—Warehouse

*MARTIN MANN ASSOCIATES 14751 Keswick St (Van Nuys) ST 3-2850—Southern Calif, Clark Co (Nev)—Components, Hi-Fi—Warehouse

*MARSH CO J W 4216 W Jefferson Blvd RE 2-0145—(Br O) 305 East Indian School Rd Phoenix Ariz CR 4-7343—1258 Fitzgerald Ave San Francisco 24 Calif VA 4-6714—Ariz, Calif, Hawaii, Nev—Components, Audio, Hi-Fi—Warehouse

MOXON ELECTRONICS CORP 489 S Robertson Blvd (Beverly Hills) BR 2-9311—(Br O) 4434 Ingraham St San Diego Calif HU 8-2901—15 41st Ave San Mateo Calif FI 5-7961—Instruments, Expensive Components

*MUELLER ELECTRONIC SALES CO 3225 Exposition Pl AX 5-3239—Ariz Southern Calif, Southern Nev—Electronics, Components, Hi-Fi—Warehouse

*NURCHES CO PAUL 3250 Rida St (Pasadena) SY 6-5844—Calif, Southern Nev—Lab Test Equip, Power Supplies

*OWENS CO LEE H 1102 So Western Ave RE 5-0203—Ariz, Southern Calif—Components, Instruments—Warehouse

PACIFIC ELECTRO-SALES 6053 1/2 E Whittier Blvd RA 3-3396—(Br O) P O Box 9344 San Diego Calif—Ariz, Southern Calif—Relays, Resistors, Capacitors, Potentiometers

PENWARDEN CO J G 7311 Van Nuys Blvd (Van Nuys) ST 5-1019—(Br O) 111 E 20th St San Mateo Calif FL 5-2663—Ariz, Calif, Hawaii, Nev—Components—Warehouse

*PERLMUTH ELECTRONIC ASSO INC 5057 W Washington Blvd WE 1-1041—(Br O) 941 Charleston Rd Palo Alto Calif DA 1-5064—Ariz, Southern Calif—Industrial Components, Distributor Prods, Instrumentation—Warehouse

PRAGER'S MFG & DISTR CO JAY 4210-12-14-16 Lankershim Blvd (No Hollywood) ST 7-3063—National—Warehouse

PREMMCO INC 5470 Valley Blvd—CA 2-0167—(Br O) Premco of Ariz P O Box 663 Scottsdale Ariz WH 5-4486 Premco of No Calif P O Box 412 Alameda Calif LA 3-9495—11 Western States, Hawaii & Alaska, El Paso (Tex)—Electronic Components & Systems—Warehouse

*RISSI AL J 8417 E Las Tunas Dr (San Gabriel) CU 3-7614—Ariz Southern Calif Clark, Esmeralda, Lincoln, Nye Cos (Nev)—Components

*ROBERTS & ASSOCIATES INC E V 5068 W Washington Blvd WE 8-2541—(Br O) Phoenix Ariz AL 2-8904—San Carlos Calif LY 3-7878—San Diego Calif AT 3-2149—Albuquerque New Mex AL 5-7304—Ariz, Calif, Nevada, New Mex—Components, Instruments, Chemicals—Warehouse

*RUIP CO V T 307 Parkman Ave DU-7-8224—(Br O) 3150 El Cajon Blvd San Diego Calif AT 2-0642—636 San Mateo S E Albuquerque New Mex AL 6-0798—Ariz, New Mex, Southern Calif—Instruments

RUSH & ASSOCIATES C B 3757 Wilshire Blvd DU 8-7111—Ariz, Calif, Nev, Ore, Wash, Denver (Colo)—Components—Warehouse

*SHEPHERD-WINTERS CO 7407 1/2 Melrose Ave WE 8-2996—Ariz, Nev, Southern Calif—Components—Warehouse

SIMONITE & ASSOC LEWIS 10460 Magnolia Blvd (No Hollywood) ST 7-1674—Ariz, Southern Calif, Southern Nev—Jobber Parts Lines, Hi-Fi Lines, Industrial Jobber Lines—Warehouse

*SNITZER CO T LOUIS 5354 W Pico Blvd WE 8-2074—(Br O) 7814 Ivanhoe Ave La Jolla Calif GL 4-2191—510 So Mathilda Ave Sunnyvale Calif RE 6-6733—Ariz, Calif, Nev—High Quality Instrumentation

*STOLAROFF CO M A 4622 W Slauson AX 3-6226—Ariz, Southern Calif, Clark Co (Nev)—Electrical & Electronic Components

*STRASSNER CO ELLARD E 1865 North Western Ave HO 2-0916—(Br O) 1485 Bayshore Blvd San Francisco 24 Calif JU 7-8700—Ariz, Calif, Nev, New Mex—Industrial Components—Hi-Fi Components—Warehouse

THOMPSON & CO BRAD 14915 Rhinestone Dr (Sherman Oaks) ST 8-0800—Ariz, Southern Calif, Southern Nev—Components & Instruments—Warehouse

VAN LEEUWEN & ASSOCIATES 7122 Melrose Ave WE 3-5683—Calif—Tape Recorders, Accessories—Warehouse

*VAUGHAN CO G H 2366 E Foothill Blvd (Pasadena) MU 1-4511—Ariz, Calif, Nev—New Mexico—Instruments

AWAGNER & ASSOCIATES DORR 1212 El Mirador (Pasadena) RY 1-4060—Southern Calif—Components

*WESCO SALES CO 2837 Wilshire Blvd (Santa Monica) EX 3-0441—Ariz—Calif—Industrial Lines—Warehouse

AWESREP CORP 2022 S Sepulveda Blvd BR 2-3757—Ariz, Calif, New Mex—Components, Instruments—Warehouse

*WOOD CO ASH M P O Box 1158 (Arcadia) CU 3-1201—Western Ariz, Southern Calif, Southern Nev—Components

WRIGHT ENGINEERING CO 180 E Calif St (Pasadena) RY 1-8488—(Br O) 126 25th Ave San Mateo Calif FI 5-3157—Ariz, Calif, Nev—Instruments, System Engineered Components

*YARBROUGH SALES CO 2636 Mission St (San Marino) RY 1-3331—Ariz, Calif, Ore, Wash—Materials for Electronic Equipment Production—Warehouse

SAN DIEGO AREA

BRUNSON & ASSOC R M 7440 Girard Ave (La Jolla) GL 4-0794—Ariz, New Mex, San Diego Co (Calif)

CLEAVES CO 3694 Kettner Blvd CY 8-7223—San Diego, Imperial Cos (Calif)—Components, Instruments

DAWSON CO SAM 1602 Vista Grande Rd (El Cajon) HI 4-3212—San Diego Co (Calif)—Production Components

DENNY SALES CO WILLIAM H 1854 Bacon St AC 3-3852—San Diego Co (Calif)—Components, Hardware

JUPIN GEORGE 7705 Fay Ave (La Jolla) San Diego Co (Calif)—Electronic Instruments & Components

SAN FRANCISCO AREA

*AULT ASSOCIATES 906 Willow Rd (Menlo Park) DA 6-1760—Northern Calif, Northern Nev—Electronic Instruments & Components

*BRANDT & CO E W 1122 Folsom St—Northern Calif, Northern Nev—Hi-Fi, Parts Jobber, O E M—Warehouse

CAHN CO BERNARD L 420 Market St SU 1-7981—Hawaii, Nev, Northern Calif—Components, Audio, Instruments—Warehouse

CERRUTI & ASSOCIATES 841 Woodside Rd (Redwood City) EM 9-3354—Northern Calif, Northern Nev—Lab Instruments & Technical Components

*DALTON ASSOCIATES C R 132 El Camino Real (San Carlos)—Nev, Northern Calif—Components

*DEERE ASSOCIATES INC JERRY 1665 Laurel St (San Carlos) LY 3-8083—(Br O) 5822 South Wilshire Dr E Tucson Ariz AX 8-6173—12041 Wilshire Blvd Los Angeles 24 Calif BR 2-2149—Ariz, Calif, Colo, Nev, New Mex, Utah—Components

*EICHORN & MELCHIOR INC 749 Bryant St DO 2-1038—Northern Calif, Northern Nev—Components

ELECTRICAL SPECIALTY CO 158 Eleventh St HE 1-8450—(Br O)—(Wm C Smith) P O Box 232 Phoenix Ariz AL 2-2107—(R H Bosworth) 2026 Arapahoe St Denver 5 Colo CH 4-4588—(L M Swanson) 2820 East 12th St Los Angeles 23 Calif AN 9-9511—(J H McLean) 212 Northwest 14th Ave Portland 9 Ore CA 7-3188—(C D Flood) 2406 First Ave South Seattle 4 Wash MA 3-8061—11 Western States—Warehouse

FEATHERSTONE & SALISBURY CO INC 1355 Market St UN 1-1466—Northern Calif, Northern Nev—Instruments, Radio, TV Sets, Hi-Fi—Warehouse

HALE & CO JAMES C 282 7th St KI 2-0353—Calif, Colo, Mont, Ore, Wash, British Columbia—Packaging Equipment—Warehouse

*HARRISS-KOETKE SALES CO 204 E Hillsdale Blvd (San Mateo) FI 1-2909—Hawaii, Northern Calif, Northern Nev—Components—Warehouse

*HEATON CO JAMES S 413 Lathrop St (Redwood City) Nevada (except Clarke Co), Northern Calif—Hi-Fi, Components, Instruments, Jobber—Warehouse

ΔHERRMANN ASSOCIATES CARL P O Box 1179 (291 Lambert St) (Palo Alto) DA 6-6033—(Br O) 551 E Walnut St Pasadena Calif RY 1-5111—11 Western States—Scientific Equipment—Warehouse

KAUFMAN JACK 126 25th Ave (San Mateo) FI 1-4942—Nev, Northern Calif—Components

LEWIS & KAUFMAN LTD/DIV MONOGRAM PRECISION INDUSTRIES P O Box 337 (Los Gatos) EL 4-3540—United States, Canada, Europe—Components

LOGAN & STONE 1485 Bayshore Blvd DE 4-1200—Northern Calif, Northern Nev—Components

MARCO RON CO 2880 Ridgeway Ave (San Bruno) JU 3-3955—Nev, Northern Calif—Hi-Fi Components, Commercial Sound Lines, Industrial Sound Lines—Warehouse

*NICKERSON-GRAY & ASSOCIATES INC 2434 Park Blvd (Palo Alto) DA 6-0152—Hawaii, Northern Calif, Reno (Nev)—Components, Hi-Fi—Warehouse

PENINSULA ASSOCIATES 1345 Hancock St (Redwood City) EM 9-1226—(Br O) Los Angeles, Calif; Seattle, Wash; Calif, Ore, Wash—Instruments, Systems, Laboratory Equipment—Warehouse

*RUDAT & EWING 1477 Dana Ave (Palo Alto) DA 2-5232—Northern Calif, Honolulu (Hawaii), Reno (Nev)—Components

SERVICE RADIO WHOLESALE 1461 Pine St GR 4-7816—Northern Calif, Honolulu (Hawaii), Guam, Panama Canal—Auto Radios—Warehouse

*WHITE & COMPANY 788 Mayview Ave (Palo Alto) DA 1-3550—Northern Calif, Northern Nev—Electronic & Nuclear Instruments, Nuclear Components

ΔWilcox CO E A 277 7th St HE 1-6670—(Br O) 6436 E Corvette St Los Angeles 22 Calif RA 3-6436—915 Arctic Bldg Seattle 4 Wash MU 2-1468—Ariz, Calif, Idaho, Nev, Ore, Utah, Wash—Warehouse

COLORADO

COLORADO SPRINGS

*PEYSER & CO 1501 N Weber ME 4-3401—Colo, Idaho, Mont, New Mex, Utah, Wyo, Western Neb, El Paso Co (Tex)—Components, Instruments, Hi-Fi, TV Sets, Audio—Warehouse

DENVER

*Bowen Co R G 721 S Broadway—(Br O) 2228 A San Mateo Blvd NE Albuquerque New Mex AL 5-4603—2022 S Main St Salt Lake City Utah IN 6-6663—Colo, New Mex, Utah, Wyo, Southern Idaho, Eastern Mont, Western Neb, El Paso Co (Tex)—Electronic Components, Service Test Equipment, Audio Recording Equipment, Hi-Fi Equipment

ELECTRONIC NETWORK INC 1435 Market St TA 5-1248—Colo, Wyo—Audio Equipment—Warehouse

*HYDE ELECTRONICS CO 88 S Lipan St WE 6-3456—(Br O) 5206 Constitution Ave NE Albuquerque New Mex AM 8-1111—2803 Connor St Salt Lake City 9 Utah IN 7-5763—Ariz, Colo, Idaho, Mont, New Mex, Utah, Wyo, Western Neb, El Paso (Tex)—Components, Instruments—Warehouse

*KAUB & CO HUBERT 1025 Santa De Dr MA 3-4606—Colo, Mont, Wyo, Northern New Mex—Electric Motors, Variable-Speed Units—Warehouse

"REPRESENTATIVES"

LAHANA & CO 1886 S Broadway PE 3-3791—(Br O) 1332 Varden Way Salt Lake City Utah AM 6-1721—Colo, Utah, Wyo, Eastern Idaho, Eastern Mont, Southwestern Neb — Electronic Production, Laboratory Test Equipment—Warehouse

*PEARSON & CO MEL 1860 South Acoma SP 7-7878—(Br O) 288 Canyon Rd Salt Lake City Utah—Ariz, Colo, Mont, New Mex, Utah, Wyo, El Paso Co (Tex)—Warehouse

PETERSON CO 4949 Colorado Blvd DE 3-5434—Colo, Utah, Wyo & Southern Idaho—Instruments & Components—Warehouse

*WILLIAMS & ASSOCIATES INC 2261 S Albion SK 6-9403—(Br O) 3221 Silver Ave S E Albuquerque New Mex AL 5-9632—Ariz, Colo, Neb, New Mex, Utah, Wyo, Southeastern Idaho, El Paso Co (Tex)—Components and Instruments—Warehouse

ENGLEWOOD

BROOKS, FEEGER & ASSOC 3041 S Broadway SU 1-7375—(Br O) 1122-C San Mateo S E Albuquerque New Mex—2109 E Grant Rd Tucson Ariz—Ariz, Colo, New Mex, Utah—Components, Instruments—Warehouse

LITTLETON

ELECTRONIC COMPONENTS SALES INC P O Box 420 EM 6-8744—Colo, New Mex, Utah, Wyo, Eastern Idaho, Eastern Mont, Western Neb—Components

CONNECTICUT

ΔDAGGON & POTTER 209 Ocean Dr E (Stamford) FI 1-7310—Delaware, Md, New England, N J, N Y, Penna, Va—Electric Motors & Electronic Components

HOFFMAN ENG'G CORP 183 R Sound Beach Ave (Old Greenwich) NE 7-3557—(Br O) George Agency P O Box 265 New Hall Cal—G. E. Arneson 1407 Holdridge La Wayzata Minn—Emlen Peterson Co 304 King of Prussia Rd Radnor Pa—Eastern U S—Laboratory Measurements of Light, Certifications, Repair & Calibration

NEUMAN & CO GEORGE J Blue Mt Rd (Norwalk) VI 7-4618—Conn, Mass, Me, N H, R I, Vt

HARTFORD AREA

ABBOTT-ALLISON CO P O Box 467 (Meriden) BE 7-9232—Conn, Maine, Mass, New Hampshire, R I, Vt—Components, Instruments—Warehouse

*BAHR SALES CO Red Oak Hill Rd (Farmington) OR 7-0020—(Br O) 183 North Rd Colebrook Conn FR 9-3247—462 Granby Rd Chicopee Mass LY 2-3213—16 Westfield Rd Natick Mass OL 3-9291—New England, Northern N Y (excluding New York City)—Electronic Components

ΔCOLDWELL INC MICHAEL S 289 Fairfield Ave Hartford 6 Conn JA 2-5832—(Br O) 41 Lancaster Rd Needham 92 Mass—New England—Instruments

JONES AGENCY ROBERT M 40 Mountain Rd (West Hartford) Ja 3-4576—(Br O) 54 Longfellow Rd Needham Mass HI 4-4600—New England, Metropolitan New York, Phila (Pa)—Components, Production Equipment

*KOSOWICZ FRAN 2 Madsen Rd (West Hartford) AD 3-7883—New England—Components

Δ*LAVIN ASSOCIATES HENRY P O Box 196 (Meriden) BE 7-5527—(Br O) 82 Curve St Needham Mass HI 4-3446—New England—Electronic Components, Electronic Raw Materials

WALWORTH CONTROLS CO 131 Main St Rocky Hill Ja 9-6806—New England—Electro-Mechanical—Warehouse

ZASLOW SALES CO 108 Foxcroft Rd (West Hartford) Ad 6-3265—(Br O) 371 Howard St Northboro Mass BX 3-8150—New England—Electrochemical

NEWTOWN

SALES ENGINEERING CO Sugar La GA 6-4482—(Br O) 89 High St Chelmsford Mass—New England—Components

NEW HAVEN AREA

REISS ASSOC ROBERT S 70 Jesse Dr (West Haven) WE 4-3261—(Br O) 85 Pearl Ave Revere Mass RE 3-7792—New England—Components

TOLLAND

STOCKWELL TECHNICAL SALES CO Box 118—(Br O) 44 Walker St Cambridge Mass TR 6-5115—New England—Electronic Components

DISTRICT OF COLUMBIA

BRIMBERG ASSOCIATES 221-5 Investment Bldg 1511 K Sts N W DE 2-8000—Del, Md, Va, Washington D C—Instruments, Components

INDUSTRIAL ASSOCIATES INC 826 Connecticut Ave ME 8-4543—Md, Va, Washington D C, Redstone Arsenal (Huntsville Ala), Wright-Patterson (Dayton O)

ISRAEL ASSOC FRED 734 15th St N W Suite 500 EX 3-5991—Washington D C & Vicinity

JODON INC F R 8510 Beech Tree Rd EM 5-1515—(Br O) 2408 Burrigade Rd Baltimore 14 Md NO 8-1933—301 Arcadian Circle S W Vienna Va DU 5-7992—Del, Md, Va, Washington D C—Instruments & Records

M S INDUSTRIES 1835 "K" St EX 3-7223—Md, Va, Washington D C

ΔSUMMERBELL CO WILLIAM E Dupont Circle Bldg HU 3-3354—Md, Va, Washington D C

WHITE CO 2000 P St N W DE 2-5172—Delaware, Md, N J, Washington D C, Va, Greater Phila—Instruments & Lab Testing Equipment

FLORIDA

CASSELBERRY

JOHNSON ASSOCIATES OF FLA P O Box 1676 MI 4-3311—Fla, Huntsville (Ala)—Components, Instrumentation—Warehouse

COCOA BEACH

IDEM RESEARCH CORP Stoddard Bldg P O Box 521 SU 3-2438—Ala, Fla, Ga, Oak Ridge (Tenn), Tullahoma (Tenn)—Guided Missile Instrumentation

FORT LAUDERDALE

SMITH W CHESTER 207 E Broward Blvd JA 4-7172—(Br O) 501 Metropolitan Bank Bldg., Miami Fla FR 1-6688—Fla

INDIAN RIVER CITY

BROWN & ASSOCIATES INC W A 201 Capron Rd 1086—(Br O) Huntsville (Ala), Orlando (Fla), Baltimore (Md), Winston-Salem (N C), Alexandria (Va)—Ala, Del, Fla, Ga, Md, Miss, N C, S C, Tenn, Va, Washington D C—Instruments

JACKSONVILLE

*BARNHART CO L E 1003 Gunka Rd RA 4-0987—Ala, Fla, Ga, N C, S C, Eastern Tenn—TV & Radio Components, Hi-Fi Components, Test Instruments

LUTZ

*WALLACE ASSOCIATES INC STANLEY K P O Box 67 MacManus Bldg WE 9-3241—(Br O) 5525 Embassy Dr Pine-Castle Branch Orlando Fla Ga 4-0294—207 W Alfred St Tampa Fla Tampa 24-4221—715 Flamingo Dr S W Atlanta Ga PL 3-8463—117 Middleton Dr Charlotte N C FR 6-2963—5621 Murrayhill Rd Charlotte N C JA 3-6109—608 Rochelle Dr Nashville Tenn VE 2-0794—Ala, Fla, Ga, Miss, N C, S C, TENN—Components, Hi-Fi Instrumentation

MIAMI BEACH

GEARTNER CO JACK 235 Lincoln Rd JE 1-020—(Br O) 711 Magnolia Ave Orlando Fla GA 4-3926—3713 Needles Dr Orlando Fla CY 3-4152—Fla—Components, Consumer End Products

NORTH MIAMI

WINFIELD ELECTRONICS SALES CO 666 N E 125 St PL 1-5566—Fla—Components, Hi-Fi

NORTH MIAMI BEACH

BENZ SALES CO P O Box 178 FR 4-1391—Cuba, Fla, Puerto Rico—Electric Components—Warehouse

ORLANDO

PHELPS DON J 1401 Ceylon Dr GA 4-9716—Fla, Ga—Components, Assemblies, SMALL CO CHRIS 1703 Conway Rd P O Box 1346 GA 4-2071—Fla—Components

ST PETERSBURG

BICKER FRANK F 17715 Gulf Blvd Redington Shores Box 129 WA 1-4196—Fla—Components

GEORGIA

ATLANTA

*CHAIRMAN & CO CARY 672 Whitehall St S W JA 4-7388—(Br O) 2516 Eighth Court North Birmingham Ala FA 3-5236—301 East Tenth Ave Hiawahit Fla PO 5-2519—213 S Front St New Orleans La TU 5184—1009 S Elm St Greensboro N C BR 3-9473—Ala, Fla, Ga, La, Miss, N C S C, Tenn, Va, Eastern Ark—Warehouse

*KENNON CO W N 7 Camden Rd TR 4-5566—Ala, Ga, Eastern Tenn—Electronic Items

LANDERS CO L MORRIS 251 Spring St S W MU 3-9112—(Br O) Birmingham, Ala—St Petersburg, Fla—Ala, Fla, Ga, Miss, Tenn—Connectors & Conductors—Warehouse

*MILLAR ASSOCIATES JAMES 1036 Peachtree St TR 6-0919—(Br O) Maitland, Fla—Charlotte, N C—Ala, Fla, Ga, Miss, N C, S C, Tenn—Components

*SMITH CO MAITLAND K 208 14th St N W TR 5-8031—(Br O) (H E Cain) 3133 Woodcliff Circle Birmingham Ala TR 9-7197—(Ben Farmer) 117 N Keystone Ave Clearwater Fla 34-4494—(John F Thompson) 322 Riverside Dr Ormond Beach Fla—OR 7-2298—(James M Clymer) Rt 1 Box 170 Matthews N C EM 6-0452—Ala, Fla, Ga, Miss, N C, S C, Tenn—Components, Hi-Fi—Industrial—Warehouse

*MURPHY & COTA 2110 Peachtree Rd TR 6-3020—(Br O) Lane Plaza Huntsville Ala JE 6-9121—1220 Edgewater Orlando Fla GA 4-2167—2036 Norton Rd Charlotte N C ED 2-7536—1106 Burke St Winston-Salem N C PA 4-0750—Ala, Fla, Ga, Miss, N C, S C, Tenn, Va—Components, Instrumentation, Radio & TV Accessories

SCIENTIFIC SALES ENGINEERING CO 2162 Piedmont Rd TR 3-2475—(Br O) 918 Snell Isle Blvd St Petersburg Fla St 5-7874—2831 S Main St Winston-Salem N C PA 3-3281—Ala, Fla, Ga, Miss, N C, S C, Tenn, Va—Precision Components, Instruments, Engineering Contracts

THORNWELL INC E A 1537 Howell Mill Rd TR 5-7895—Ala, Ga—Instruments—Warehouse

DECATUR

Δ*McCORVEY CO V AVIS 215 Church St Dr 7-6167—(Br O) 403 Cherry St Gadsden Ala—708 San Juan Blvd Orlando Fla—211 Highland Dr Elberton Ga—Ala, Fla, Ga, Miss, N C, S C, Tenn—Components

EAST POINT

*HAYDEN ASSOCIATES PAUL 116 W Nabell Ave PO 6-0261—(Br O) PO Box 1931 Birmingham Ala AL 1-8271—1060 N E 180 Terr N Miami Beach Fla WI 5-5793—682-B Lindbergh Dr Atlanta Ga CE 3-4743—423 W Fifth St Burlington N C CA 7-3479—Ala, Fla, Ga, Miss, N C, S C, Tenn, Va—Electronic Components—Warehouse

HAWAII

HONOLULU

HASTIN & BROWNE 235 Cooke St 511-755—Hawaii & outer Pacific to Japan—Warehouse

*PIETY FACTORS INC GENE 2030 Home Rule St 83-105—Hawaii & Pacific area—Warehouse

ILLINOIS

CHICAGO AREA

ANDERSON & ASSOCIATES INC BURT 6414 W Higgins Ave SP 4-4474—Ill, Ind, Iowa, Mich, Minn, Ohio & St Louis (Mo)—Components & Instruments

"REPRESENTATIVES"

*ANGEL & CO JAY C 2743 W Peterson
UP 8-0653—Ill, Northern Ind, Eastern
Iowa, Southern Wis, Berrien, Cass Cos
(Mich)—Components

*BACHER & ASSOCIATES LOUIS G 4216
W Division St BE 5-6601—(Br O) 2120
Greenwood Dr S E Cedar Rapids, Iowa—
Ill, Ind, Mich, Eastern Iowa, Southern
Wis—Components

BROUILLETTE & ASSOCIATES W G
1558 Newcastle Ave (Westchester) PI 5-
6500—Ill, Ind, Iowa, Mich, Minn, Wis

*BRUNING CO A H 1758 W Lawrence
Ave ED 4-0989—Northern Ill, Southeast-
ern Wis—Components, Instruments—
Warehouse

BURKE & JAMES INC 321 S Wabash HA
7-3398—U S & Foreign Countries—TV
lenses, Electronic & Photo optical Equip-
ment, Special Mounts, Special Project

*BIER CO LEROY W 6518 W North Ave
Ill, Wis, Eastern Iowa—Components

*BURGOYNE WILLIAM E 7001 N Clark St
HO 5-2112—Northern Ill, Northern
Ind—Components & Solders

Δ*CAINE ELECTRONIC SALES CO 3020
N Cicero Ave SP 7-4022—Ill, Ind, Iowa,
Mich, Minn, Wis—Components

*COLE CO G McL 6514 W Higgins Ave
SP 4-3535—Wis, Northern Ill, Cedar Rap-
ids (Iowa)—Components—Warehouse

*CROSSLEY ASSOCIATES INC 2711 W
Howard St SH 3-8500—(Br O) 5420 N Col-
lege Indianapolis Ind CL 1-9255—842 Ray-
mond Ave St Paul 14 Minn, MI 6-7881—
2801 Far Hills Ave Dayton 19 Ohio AX 9-
3594—Ill, Ind, Iowa, Minn, Neb, N Dak,
S Dak, Southwest Ohio—Instruments,
Precision Components—Warehouse

*DIETHERT CO INC RUSS 2030 W Mont-
rose LO 1-7627—(Br O) PO Box 510
Gastonia N C UN 5-3771—1130 North Wat-
ter St Milwaukee Wis BR 3-6318—Ala,
Conn, Ill, Ind, Mass, Miss, N J, N C, S C,
Tenn, Va, Wis—Raw Materials

DOLIN SALES DAVE 3553 W Peterson
Ave JU 8-3738—Ill, Ind, Wis—Components
—Warehouse

*ELLINGER SALES CORP 6540 N North-
west Highway—(Br O) Fort Wayne Ind—
Clarion Iowa—Ill, Ind, Iowa, Neb, Wis—
Components

ELMAC ENGINEERING CO 10027 S Pax-
ton RE 4-3700—Northern Ill, Lake Co
(Ind)—Instruments—Warehouse

*ENGLE CO KARL D 4724 N Sheridan
UP 8-6363—Ill, Ind, Southeastern Wis—
Prime Materials for Electronics & Elec-
tronic Industry

EPCO SERVICES 888 E Northwest Hiway
PO Box 156 (Mt Prospect Ill)—Northern
Ill, Northern Ind, Southern Wis—Control
Systems, Alarm Systems

*FITZSIMMONS ASSOC INC 6124 Mil-
waukee Ave NE 1-7660—(Br O) 15 E 38th
St Minneapolis Minn—Ill, Minn, N Dak,
So Dak, Wis, Davenport (Iowa)—Instru-
ments, Hi-Fi—Warehouse

*FRIEDMAN CO MORTON L 2814 W
Balmoral Ave LO 1-4257—Ill & Wis—
Warehouse

*GASSNER & CLARK CO 6644 N West-
ern Ave Pk 4-6121—Ill, Ind, Wis, East-
ern Iowa—Components—Warehouse

GLENN & CO J J 605 W Washington
Blvd ST 2-9606—(Br O)—135 Westbrook
Rd Dayton 15 Ohio CR 5-3354—7915 Boyd
Way Milwaukee 17 Wis Flagstone 2-7262
—Ill, Ind, Iowa, Ohio, Wisconsin, East-
ern Mich—Elec Insulation—Warehouse

GOLTEN CO JERRY 2750 W North Ave
EV 4-5959—Ill, Ind, Southwestern Mich,
Southern Wis—Components

*GORMAK CO 7001 N Clark St RO 4-6366
—Northern Ill, Southern Wis—Lake, Por-
ter, LaPorte Cos (Ind), Berrien Co (Mich)
—Components—Warehouse

*GREEN & ASSOCIATES LOREN F 5218
W Diversey Ave PA 5-6824—Ill, Ind, Wis
—Electronic Instruments

GROTZ & ASSOCIATES ANTHONY N
5809 W Montrose SP 7-9525—(Br O) 4443
N 66th St Milwaukee 18 Wis HO 1-9952—
Ill, Minn, Wis—Components, Circuit Con-
trol & Components—Warehouse

*HALINTON HARRY 6400 N Leoti Ave
RO 3-2131—OEM Electronic Components—
Warehouse

*HASKELL ASSOCIATES 202 N Marion
(Oak Park) EU 6-5741—Ill, Wis, Lake
County (Ind)—Components—Warehouse

*HIGGINS CO ROYAL J 10105 S Western
Ave BE 3-7388—Ill, Ind, Mich, Wis, Cedar
Rapids (Iowa)—Communications—Ware-
house

*HUNTER ASSOCIATES F B 4441 W
Irving Park Rd SP 7-2500—Ill, Iowa, Wis

JENSEN & ASSOCIATES FRED A 510
N Dearborn St SU 7-3809—Radius of 150
miles from Chicago—Components

*KLEKER CO JEROME H 177 Sunset
Ave (Glen Ellyn) 2297—Ill, Wis, East Mo

*KNOBLOCK & MALONE INC 1603 N
Newland Ave NA 2-4005—Ill, Ind, Wis—
Components, Instruments—Warehouse

KOPETZKY & ASSOCIATES KARL A
4908 N Lincoln Ave LO 1-1081—Ind, Iowa,
Northern Ill, Eastern Wis—Warehouse

*LANGHAUS-LEVY ASSOC 5317 S Cot-
tage Grove DO 3-5344—Ill, Wis—Compo-
nents

*LEWIS & TRIMBLE INC 5500 N Menard
Ave SR 4-1444—Ill, Wis—Warehouse

*LINZ & ASSOCIATES WILLIAM M 6322
N Cicero Ave MU 5-2022—Ill, Wis

*MARSH & ASSOC WALTER F 308 N
Scoville (Oak Park) EU 6-1782—(Br O)
411 W White St Champaign Ill FL 2-1546
—Northern Ill, Eastern Iowa, Northern
Ind, Eastern Wisconsin—Electronic In-
struments, Equipment, Sophisticated
Components, Hi-Fi—Warehouse

MARSLAND & CO HUGH 6699 Lincoln
Ave OR 6-1100—(Br O) 6730 E 19th St
Indianapolis 19 Ind FL 6-4249—231 N
Edgewood Ave Minneapolis 27 Minn LI 5-
4481—Ill, Ind, Iowa, Ky, Minn, Mo, Wis—
Test Equipment, Components—Ware-
house

MEYERS CO KENNETH CO 6713 N Oli-
phant Ave SP 4-6440—Ill, Ind, Wis, East-
ern Iowa—Test Equipment, Components

RIDGWAY ENGINEERING INC 6100 W
North Ave TU 9-5715—(Br O) 1224 North
Capitol Ave Indianapolis 2 Ind ME 5-
2401—Ill, Ind, Eastern Iowa, Northwest-
ern Ky, Eastern Wis—Electronic Instru-
mentation

*ROUSSEY & ASSOCIATES INC RALPH
F 426 Edgewood Pl (River Forest) FO 9-
6253—Ind, Ill, Mich, Ohio—Components

SAFFRO ASSOCIATES 5209 N Kimball
Ave JU 8-0905—Instruments—Warehouse

*SARKIS & CO HENRY 5604 N Western
Ave Ardmore 3774—Ill, Ind, Wis, parts of
Iowa, Mich, Ohio—Components—Ware-
house

SIMPSON & CO JAMES R 1210 S 17th
Ave (Maywood) PI 5-1613—Northern Ill,
Lake Co (Ind)—Components for Auto-
matic Control

Δ*STEMM R EDWARD 5681 W Lake St
ES 9-2700—(Br O) 123 S 3rd St Minneap-
olis 1 Minn PE 5-7172—Ill, Ind, Iowa,
Minn, Wis, Bullitt, Jefferson, Meade, Old-
ham Cos (Ky), Jefferson, Lincoln, St.
Charles, St Louis Cos (Mo)

*STEMM ROYAL A 21 E Van Buren St
WE 9-4840—Northern Ill, Southeastern
Wis—Warehouse

STEVENS ENGINEERING CO 5306 W
Lawrence Ave PE 6-0432—(Br O) J B
Wright, Lumber Exchange Bldg, Minne-
apolis 1 Minn—Ill, Minn, Wis, La Porte
Co (Ind)—Components—Warehouse

SWINKE & CO W F 541 Diversey Pkwy
HJ 8-4343—Ill—Components

*TATRO & ASSOC FRANK B 6022 N
Rogers Ave KE 9-4535—Ill, Ind, Wiscon-
sin, Eastern Iowa, Cape Girardeau, St
Louis (Mo)—Components—Warehouse

Δ*TAYLOR CO ROBERT F 308 W Wash-
ington AN 3-1808—Ill, Ind, Wis—Compo-
nents for OEM Users

TWIST CO JOHN G 5232 W Diversey
Ave SP 7-2250—Ill, Southern Wis

WACKER SALES AFFILIATE 35 E
Wacker Dr Ce 6-0375—(Br O) 2500 W
Washington Blvd Chicago Ill Mo 6-6710
—Ill, Iowa—Inspection Equip—Warehouse

WADE J WALTER 333 N Michigan Ave
—Greater Chicago Area—Components

*WARNER CO DAYTON L 815 MacAr-
thur Dr (Chicago Heights) SK 4-0028—
Ill, Eastern Wis—Components, Communi-
cations Equipment—Warehouse

*WITHERS & ROPEK ENGINEERS 5439
W Division AU 7-7292—Northern Ill,
Northern Ind, Eastern Iowa, Southern
Wis—Electronic Components

WOODS A ALLEN 3403 Broadway BU 1-
4200—Chicago—Electronic Components—
Warehouse

DEERFIELD

RITTER SALES CO PO Box 64 730 Wau-
kegan Rd WI 5-1400—Ill, Kan, Mo, Wis—
Components

INDIANA

ANGOLA

*CLANCY & CO INC JOE Wilder Rd PO
Box 269 793 (Br O) 5750 N Ewing St
Indianapolis Ind CL 1-7669—798 Orlando
Ave Akron 20 Ohio UN 4-0848—1940 W
Shantz Dayton O AX 8-3052—Ind, Ky,
Ohio, Berrien Co (Mich)—Components,
Instruments, Hi-Fi

FORT WAYNE

MENZE FLOYD E 729 W Packard Ave
K-3171—Ind, Ky, Western Ohio—Electri-
cal Components

*VALENTINE INC FORREST C 511 Ft
Wayne Bank Bldg AN 9122—(Br O) 12417
Cedar Rd Cleveland Hts 6 Ohio PA
1-0266—Ind, Ky, Ohio—Components

INDIANAPOLIS

*DEVOE CO LESLIE M 4010 Washing-
ton Blvd AT 3-1395—Ind, Ky, Southwest-
ern Ohio—Components

*MORRIS CUNNINGHAM & ASSOCS
6208 North College Ave CL 1-3222—Ind,
Ky, Berrien Co (Mich)—Components

NATIONAL ENGINEERING CO 5775
Hillside Ave CL 1-1132—Central Ind—In-
struments

O E M Sales Co PO Box 55232 LI 6-2452—
Ill, Ind, St Louis area (Mo)—Components

ROCKWELL ENGINEERING CO 2133
East 45th St CL 1-9453—Ind (except Lake
& Porter Cos) Northern half of Ky—
Measuring & Control Instruments—Ware-
house

*THOMAS & SUKUP INC 5226 N Key-
stone Ave CL 1-4574—Ind, Ky

Δ*WHITSELL & ASSOCIATES R O 6620
E Washington St FL 9-5374—(Br O) PO
Box 2717 Cincinnati O ME 1-9210—PO
Box 5 Cleveland Ohio SU 1-1855—2600
Far Hills Bldg Dayton O AX 8-4261—Ind,
Ky, Ohio, W Va, Western Pa—Compo-
nents—Warehouse

WRIGHT ENGINEERING CORP 4241
Melbourne Rd WA 3-8888—(Br O) 2503
Orsby Fort Wayne H-50533—Ind, Ky—
Components

MARKLE

WILLIAMS CO A E R I SK 8-5703—
Ind, Ky, Mich, Ohio—Components for
OEM Accounts

IOWA

CEDAR RAPIDS

HERSEY CO J TAYLOR 2120 Greenwood
Dr S E EM 22031—Iowa, Neb—Compo-
nents

DES MOINES

DECO ENGINEERING PRODUCTS 1112
Locust St AT 8-5721 (Br O) Davenport,
Iowa—PO Box 568, Zone 1 Omaha Neb
J Jackson 4-111—Iowa, Neb, Rock Island
Co (Ill)—Warehouse

"REPRESENTATIVES"

KANSAS

MISSION

HAGLIN SALES 5920 Nall Itm 101 RA 2-2441—Iowa, Kan, Mo, Neb, Southern Ill, Northern Okla—Components

INLAND ASSOCIATES 6047 Howe Dr EN 2-2366—(Br O) 1480 Hoyt St Lakewood Colo BE 7-6881—Colo, Iowa, Kan, Mo, Neb, Utah, Wyo—Components

OVERLAND PARK

*TERWILLIGER SALES CO 7133 W 80th St N1 2-2421—Iowa, Kan, Mo, Neb, Southern Ill

SHAWNEE

GOLL WILBUR E 10511 W 56th Terrace RA 2-2528—Iowa, Kan, Mo, Neb, Madison, St Clair Cos (Ill)—Components

WICHITA

AVIATION PRODUCTS CO INC P O Box 1955 1015 E Second AM 7-7955—(Br O) 817 Quentin St Denver CO EM 6-7651—6115 Denton Dr Dallas Tex FL 7-1129—Colo, Kan, Mo, New Mex, Okla, Tex, Utah, Parts/Iowa, Neb, Wyo

LOUISIANA

NEW ORLEANS

HUEY CO WILLIAM S 202 Board of Trade Annex TU 4049—La, Mobile Co (Ala), South Miss—Instruments, Process Equipment—Warehouse

ΔMOORE CO EARL K 5864 Louisville AU 2407—Ark, La, Miss, Mobile (Ala), Pensacola (Fla), Memphis (Tenn)

MARYLAND

BALTIMORE

BERLE-SCHAAR CO 425 Stratford Rd RI 7-3227—(Br O) Rd # 1 Lewisberry Pa PO 6-3995—Mid-Atlantic States—Components—Warehouse

GOODMAN CO S W 32 West Biddle St SA 7-6116—Md, Wash D C, Northern Va—Components—Warehouse

KORMAN L G (CHIP) 3643 Beswick Rd LY 2-7898—Md, Va, Wash D C, Sullivan Co (Tenn), Harrisburg, York (Pa)—Components, Instruments

PHOENIX

McCORMICK CO HAROLD A Phoenix PO Cockeysville 214—Md, Wash D C, Adams, Franklin, York Cos (Pa), Arlington, Fairfax, Loudon Cos (Va)

SILVER SPRING

ANSELL ENGINEERING CO 11212 Grandview Ave LO 5-0960—Md, Va, Wash D C—Components

*LIENAU CO INC CHARLES W 9427 Georgia Ave JU 7-5888—(Br O) 2004 Erie St Adelphi Md HE 9-1123—1148 Greentree La Narberth Pa MO 4-6924—Box 671 Rd 2 Reading Pa WA 6-3475—5121 Westridge Ave Wash 16 D C OL 4-2333—Md, Va, Wash D C, Southern N J, Eastern Pa—Warehouse

*TAYLOR CO MORRIS F 9431 Georgia Ave JU 9-4002—(Br O) (Ralph J Palmisano) 4304 Corona St Tampa Fla 62-4071—(R H Van Dusen) 940 Lake Elbert Dr Winter Haven Fla CY 4-2941—(Wm T Little) 2396 Connally Dr East Point Ga PO 1-6353—(Arthur T Koyce) 9500 Buckhorn Rd Baltimore Md NO 8-9054—(James W Ferris) 11911 Lafayette Dr Silver Spring Md WH 6-3569—(Lee S Reed) 1224 Dresden Dr W Charlotte N C ED 4-7633—(Lester B Benner) 543 Ellen St Bethlehem Pa TE 8-8503—(James J Fahy) 275 Bryn Mawr Ave Lansdowne Pa MA 2-0383—(Ralph S Mullen) 5436 Youngridge Dr Pittsburgh 36 Pa OL 5-7712—Ala, Del, Fla, Ga, Md, N C, Pa, S C, Tenn, Va, Wash D C, W Va, Southern N J, Ashland (Ky), E Liverpool, Steubenville, Warren, Youngstown (Ohio)—Components, HI-FI

*WHITE & CO INC L G 880 Bonifant St JU 5-3141—(Br O) 2080 Beach St Winston-Salem N C PA 5-3612—134 N Narberth Ave Narberth Pa MO 4-6505—Del, Md, N C, Va, Wash D C, Southern N J, Eastern Pa, Carter, Greene, Johnson, Sullivan, Unicoi, Washington Cos (Tenn),

Berkeley, Grant, Hardy, Jefferson, Mineral, Morgan Cos (W Va)—Components, Data Reduction Equipment

TOWSON

BARNHILL & ASSOCIATES R B 19 W Penna Ave PO Box 6892 VA 5-3431—(Br O) 2413 Jersey St Orlando Fla GA-9863—Suite 403 Broadway-Stevens Bldg, Camden N J WO 4-1181—Del, Fla, Md, N C, Va, Washington D C, Southern N J, Eastern Pa—Components

HABCO ELECTRONICS SALES CO 603 Allegheny Ave VA 5-9637—Del, Md, Va, Washington D C, Southern N J, Eastern Pa—Components

*J-H ELECTRONIC SALES CO Box 6844 VA 5-4441—(Br O) Newtown Pa Middle Atlantic States—Components

TESSCO INC 19 W Penna Ave PO Box 6892 VA 5-3590—(Br O) 2413 Jersey St Orlando Fla GA 4-9868—Suite 403 Broadway-Stevens Bldg Camden N J WO 4-1181—Del, Wash D C, Fla, Md, N C, Va, Southern N J, Eastern Pa—Instruments

VALLEY ELECTRONICS INC 1735 E Joppa Rd VA 5-7820—Md, Va, Wash D C—Components—Warehouse

MASSACHUSETTS

BOSTON AREA

ABBETT & JUSTIS 1245 Highland Ave (Needham) HI 4-5470—(Br O) PO Box 62 Ridgefield Conn—New England—Components

*ANDERSON SALES CO INC 177 State St CA 7-2950—New England—Components

BORDEWIECK ENGINEERING SALES CO 221 Grove St (Braintree) VI 3-0845—New England—Computers, Transducers—Warehouse

*BROWN KENNETH L 54 Atherton Rd (Brookline) BE 2-3969—New England—Components, HI-FI, Radio, TV Sets

*CHAMBERLIN HAROLD A Civilian Air Terminal (Bedford) CR 4-0044—New England, Dutchess, Orange, Putnam, Rockland, Ulsters Cos (New York)—Components

*COAKLEY INC TIM 148 Needham St (Newton Highlands) DE 2-4800—New England—Components

DARBURY CORP 99 Elm St (West Newton) BI 4-2053—New England

DEA CO 30 Arlington St (Lynnfield) Lynnfield Centre 4-3575—New England—Components

*DEVEER SALES ENGINEERING CO 1492 Highland Ave (Needham) HI 4-4200—New England—Components

*EASTERN ELECTRONIC SALES CO 145 University Rd (Brookline) AS 7-5675—(Br O) 15 Chatham Drive S Norwalk Conn TE 8-3111—New England—Industrial & Jobber Components

ELECTRICAL APPARATUS CO INC 1200 Soldiers Field Rd ST 2-7440—(Br O) Brimfield Conn CH 5-9877—Vernon Conn MI 3-2673—Holbrook Mass WO 3-1478—New England—Electrical Controls

ELECTRONIC COMPONENTS & SERVICES 30 Huntington Ave (PO Box 35 Newton Centre) KE 6-8581—(Br O) Newtowne Conn GA 6-5175—Springfield Mass—New England—Components & Instrumentation—Warehouse

*ELTRON ENGINEERING SALES INC 246 Walnut St (Newtonville) DE 2-6975—(Br O) 2345 Whitney Ave Hamden Conn AT 8-9276—New England—Components—Warehouse

*GERBER SALES CO INC 48 Pearl St (Brookline) BE 2-2425—(Br O) 443 Winthrop Ave New Haven Conn—New England—Components—Warehouse

GOSTENHOFER & ASSOC INC GEORGE 7 Wellington St (Waltham) TW 4-9500—New England—Electronic Instruments—Warehouse

GREGORY ASSOCIATES GEORGE 99 Elm St (West Newton) BI 4-4832—New England—Electronic Test Instruments from D C to Microwave

*GYSAN ASSOCIATES 12 Foster St (Wenham) WA 2-5770—New England—Microwave Instruments & Components, Precision Metal Stampings

*HATHAWAY ELECTRONICS INC GLENN M 238 Main St (Cambridge 42) KI 7-0380—(Br O) Ducillo Bldg Canaan Conn TA 4-7215—New England—Components

HATZIS & SONS THOMAS J Rm 469 Statler Office Bldg HA 6-2332—New England States & Canada east of the Province of Manitoba—Metal Components

HENDRICKSON CO WILLIAM A 291 First Parish Rd (Scituate) LI 5-0652—New England—Electronic

HUBERT ASSOCIATES ALEXANDER PO Box 143 130 Westbourne Terrace (Brookline) AS 7-2467—(Br O) Robert Kempton 252 Asylum St Hartford Conn CH 7-8000—New England—Components

ΔINSTRUMENT DYNAMICS INC 11 Albion St (Wakefield) CR 6-5100—(Br O) 75 Wilcox Rd Milford Conn TR 4-3289—New England—Precision Components & Instruments

*KELLY CO WILLIAM T 77 Lovett St (Beverly) WA 2-0065—New England—Components

LANMAN SALES CO 10 Ardlock Pl (Webster) WE 1727—New England—Warehouse

*MACDONALD-WALDMAN CO INC 1213 Chestnut St (Newton Upper Falls 64) WO 9-8980—New England (except Fairfield Co Conn)—Components

*NEW ENGLAND AREA REPRESENTATIVES INC (NEAR INC) 99 Highland Ave (Somerville) PR 6-2262—(Br O) Box 184—Yalesville Wallingford Conn—New England—Component Parts, Capacitors, Relays

MONAHAN & CO PO Box 474 (Norwood) NO 7-5961—New England—Electronic Components

*PIERSON & CO INC RAY 1870 Centre St FA 3-1008—(Br O) 36 Louis St Trumbull Conn AM 8-9631—New England—Components, Instruments

PIERCE STANLEY B 583 Neponset St (Norwood) NO 7-3164—New England—Components

ΔSCHAAL ASSOCIATES INC 11 Muzzey St (Lexington 73) VO 2-3578—New England—Components

*SCOTT CO MICHAEL 90 Edmunds Rd (Wellesley Hills) CE 5-0102—(Br O) W R Parvin Jr Mgr North Racebrook Rd Woodbridge Conn—New England—Components—Warehouse

Δ*SEGEL CO INC HENRY P 336 Washington St (Brookline) BE 2-7525—New England—Components; Some Instruments & HI-FI—Warehouse

*STEVENS & CO K C 235 Bedford St (Lexington) VO 2-1812—New England—Components

*STURGEON INC PAUL R 25 Huntington Ave CO 6-7705—(Br O) 189 Broad St Milford Conn TR 4-6080—New England—Components & Instruments

TECHNICAL INSTRUMENTS INC 90 Main St (Reading) RE 2-3930—(Br O) 281 Fairfield Ave Bridgeport Conn ED 3-4193—229 Sunflower Dr Liverpool N Y (Syracuse) GR 1-7870—4 Regent St Rochester 7 N Y GR 3-0860—New England—Upstate New York—Instruments, Data Handling, Production Equipment

WHITESIDE CORP FRED 10 High St HA 6-0846—New England, Maryland South through Georgia, Northern Ala, Eastern Tenn—Instruments, Precision Cleaning Equipment

MICHIGAN

DETROIT AREA

ΔARMSTRONG CO CLIFFORD 16817 Grand River Ave VE 8-4248—Michigan, Toledo, Sarnia (Ohio)

BARNUM CO H H 12201 Merriman Rd (Livonia) KE 1-7504—Lower Mich, Northwestern Ohio—Instruments, Regulators, Valves—Warehouse

CLIFFORD DANIEL J 623 Fisher Bldg TR 5-3544—Mich, Toledo (Ohio)

ELECTRO-REP DIV/LLOYD N ALLEN
INC 22519 Telegraph Rd EL 6-7211—Ind,
Mich, Ohio—Components, Test Equip-
ment

ELECTRO MEC ASSOCIATES 4012 East
Nine Mile Rd (Warren) JE 6-1000

HABER CO GEORGE 22901 Timberline
Rd KE 3-5100—Eastern Mich—Electronic
Gages & Instruments

*HENSCHEN JENSEN & CO 2542 W
Grand Blvd TR 1-0308—Mich—Compo-
nents

*KURTZ CO PAUL 17181 Appoline Ave
UN 4-8957—Mich—Warehouse

*MERCHANT & CO INC R C 18411 W
McNichols KE 5-6000—Mich—Warehouse

MOORE SALES CO HOWARD W 401
Margaret West TU 3-0218—Ind, Ky, Mich,
Ohio

RUBIN CO BEN Z 16130 Meyers Rd UN
4-4958—(Br O) 4749 Archmore Dr Dayton
40 O, AX 3-5664—Ind, Ky, Mich, Ohio,
Wis, Northern Ill—Nuclear Instruments

*SHAFFER GRANT CO 14241 Fenkell
Ave BR 3-5390—Mich—Electronic, Hi-Fi
delity Components—Warehouse

*SHALCO INC 23525 Woodward Ave
(Perndale) LI 7-4771—(Br O) 700 Rose-
wood Ave S E Grand Rapids 6 Mich CH
5-8762—Mich, Ohio—Warehouse

SPENSER CO WILLARD 20144 Livernois
Ave UN 3-5198—(Br O)—Cincinnati,
Cleveland, Ohio—Grand Rapids, Mich—
Windsor, Ontario, Canada—Ind, Mich,
Ohio, Ontario, Quebec (Canada), Indus-
trial Areas of Ky, Western Pa, West Va
—Electrical & Electronic Components

*THORPE JACK M 640 Hidden La TU
4-1360—Michigan—Components

MINNESOTA

MINNEAPOLIS

*BONAMENT HEYDA 6101 Auto Club Rd
TU 1-9166—Minn, N D, S D, Northern
Iowa, Western Wis—Components Equip-
ment

*FOSTER CO MEL 2402 Hennepin Ave
FR 4-2612—Iowa, Minn, N D, S D, East-
ern Neb, Northwestern Wis—Components,
Instruments, Hi-Fi, Recording Equip-
ment—Warehouse

*HAMILTON & BAYLE 3359 Republic
Ave WE 9-7891—Minn, N D, S D, Barron,
Chippewa, Douglas, Eau Claire, LaCrosse,
Trempealeau, Washburn Cos (Wis) —
Components

HEIMANN CO 1711 Hawthorne FE 2-
5457—(Br O) 6636 Agnes St Kansas City
Mo JA 3-2126—Iowa, Kan, Minn, Mo,
Neb, N D, S D, Wis—Warehouse

*KIRKEBY CO MARVIN H 204 Sunny-
ridge Ave FR 7-3239—Minn, N D, S D

*RIPLEY RAY 7222 James Ave S UN 6-
6882—Minn, N D, S D, Western Wis—
Components, Instruments, Hi-Fi

SAUNDERS SALES CO R C 715 Ken-
wood Pkwy FR 7-6392—(Br O) Malden
Rock Wis MR 36—Minn, N D, S D, North-
ern Iowa, Northwest Mich, Western Wis
—Wire, Cable, Cords—Warehouse

ASCHULTZ CO D A COMPONENTS
DIV 801 S E 8th St FE 9-7701—Minn—
Components

*WARNER CO A J 5022 29 Ave S PA
9-7371—Minn, Neb, N D, S D, Western
Iowa, Western Wis—Components, Ham
Receivers and Parts, Sound

ST PAUL

*NORTHPORT ENGINEERING INC 1729-
31 Selby Ave MI 6-2621—Minn, N D, S D,
Western Wisconsin—Components and In-
struments—Warehouse

MISSOURI

CLAYTON

TEASDALE ASSOCIATES 164 N Mera-
mec PA 7-2212—Mo, Southern Ill

JEFFERSON CITY

*VIGNOLA ASSOCIATES CARMINE A
1202 Peyton Dr PO Box 569—Iowa, Kan,
Mo, Neb, Southern Ill—Aircraft Compo-
nents, Hi-Fi and Audio Equip, Electronic
Tubes, TV and Radio Components —
Warehouse

KANSAS CITY

COLLINS-HAVERCAMP ASSOC INC
6825 N Baltimore GL 3-4497—(Br O) Des
Moines, Iowa—Iowa, Kan, Mo, Neb,
Southern Ill—Components

ENGINEERING SERVICES CO 4550 Main
JE 1-7765—(Br O) 1305 Oakland Gardens,
Cedar Rapids, Iowa EM 5-6183—3325 E
Indianapolis Wichita Kan MU 3-3751—
6635 Delmar Blvd St Louis Mo VO 3-3660
—Iowa, Kan, Mo, Neb, Southern Ill—Elec-
tronic Components, Instruments, Mate-
rials and Accessories—Warehouse

*FORRISTAL-YOUNG SALES CO INC
4053 Broadway VA 1-5330—(Br O) 8147
Delmar St Louis Mo PA 5-7701—Iowa,
Kan, Neb, Mo, Southern Ill—Components,
Hi-Fi

*FRY & CO W E 406 W 34th St JE 1-
5236—(Br O) W E Fry & Co Inc 6616 W
Florissant St Louis 21 Mo EV 2-3500—
Iowa, Kan, Mo, Neb, Southern Ill—Com-
ponents (OEM & Radio Jobbers) Hi-Fi

*KELLY-SCHMITZ-WINKELER ASSO-
CIATES 7449 Broadway HI 4-2013—Iowa,
Kan, Mo, Neb, Southern Ill—Components,
Hi-Fi sound

LJE MARK ASSOCIATES PO Box 8467
NI 2-3313—(Br O) 2001 Big Bend Blvd St
Louis 17 Mo MI 7-1470—Colo, Kan, Mo,
Neb, Southern Ill—Test Instruments,
Components

*McDOWELL - REDLINGSCHAFFER
SALES CO 1103 E Armour Blvd WE 1-
5622—(Br O) 140 Pompano St PO Box
177 Florissant (St Louis) Mo TE 7-8678—
Iowa, Kan, Mo, Neb, Southern Ill—Ware-
house

*ROES & CO H A 2601 Cherry St BA 1-
0866—(Br O) 2444 Glenn Oaks Dr Wichita
Kan MU 4-3993—7120 Florissant Ave St
Louis Mo CO 1-0055—Iowa, Kan, Mo,
Neb, Okla, Southern Ill—Electronic Com-
ponent Parts

SCHWERIN CO E B 4210 Main St WE
1-7564—(Br O) 817 Gerald Ave St Louis
21 Mo JA 1-8725—Iowa, Kansas, Mo, Neb,
Southern Ill—Components

*SOMERS & CO F C Suite 500 Davidson
Bldg, 17th & Main Sts GR 1-1355—Iowa,
Kan, Mo, Neb, Southern Ill—Compo-
nents—Warehouse

WOOD SALES CO F O 3508 W 89th St
MI 9-1084—Kan, Mo, Neb, Southern Ill

KIRKWOOD

LORENZ CO RUDIE 413 East Madison
P O Box 3865 TA 1-4119—Iowa, Kan, Mo,
Neb, Southern Ill—Components, Instru-
ments, Industrial Recorders, Amplifiers,
Instruments—Warehouse

ST LOUIS

DESIGN & SALES ENGINEERING CO
25 N Meramec PA 1-6403—(Br O) 6920
Nall Mission Kan RA 2-2441—Iowa, Kan,
Mo, Neb, Southern Ill—Components, In-
struments

FIXMAN ENGINEERING CO GORDON
8160 Stanford Ave PA 5-5219—Kan, Mo,
Southern Ill—Electrical and Electronic
Components and Instruments

*KELLY-SCHMITZ-WINKELER ASSO-
CIATES 3938 Lindell OL 2-6455—(Br O)
7449 Broadway Kansas City Mo HI 4-2013
—Iowa, Kan, Mo, Neb, Southern Ill—Elec-
tronic Components, Hi-Fi—Warehouse

ASTAHLHUT ROBERT B 110 S Central
PA 5-7733—Mo, Southern Ill, Eastern Kan
—Electrical and Mechanical Components

NEW JERSEY

NORTHERN N J (See New York N Y
area)

SOUTHERN N J (See Philadelphia Penna
area)

NEW MEXICO

ALBUQUERQUE

BROOKS FEEGER & ASSOCIATES 1122-
C San Mateo SE AM 8-1724—(Br O) 2109
E Grand Rd Tucson Ariz EA 6-3543—3041
S Broadway Denv Colo SU 1-7375—Ariz,
Colo, Utah, Clark Co (Nev), El Paso Co
(Tex), Southern Wy—Electronic Instru-
ments—Warehouse

GENE FRENCH CO 120 San Pedro SE
AM 8-2478—(Br O) 8905 N 17 Ave Phoenix
Ariz WI 3-2842—3395 S Bannock St Engle-
wood Colo SU 9-3551—Ariz, Colo, New
Mex, Utah, Wy, Eastern Idaho, Clark Co
(Nev) El Paso Co (Tex)—Electronic &
Nuclear Instrumentation

R E McCLENDON CO 915 Yale Blvd SE
CH 3-4551—(Br O) 137 Walnut Hill Village
Suite 14B Dallas 20 FL 2-4054—Ariz, New
Mex, Tex—Components

NEW YORK STATE

ALBANY

*REGAN CO INC J A 45 N Lake Ave
6-9649—(Br O) 117 Clarence Dr N Syra-
cuse N Y HO 3-8301—145 Millbrook Dr
Williamsville N Y PL 2727—New York
State (excluding Long Island & New York
City)—Test Equipment & Precision Compo-
nents

BUFFALO

CHIPPWEA INDUSTRIAL SALES CORP
118 W Chippewa St MO 1730—Western
N Y, Northern Penna, Southern Ontario
(Can)—Pneumatic & Electric Indicating
Recording & Controlling Instruments—
Warehouse

MITSCHER CO INC R W 487 Ellicott Sq
Bldg WA 2517—New York State (except
Met New York City)—Electrical Lines

SPITZER CO M L P O Box 2324—West-
ern & Central New York State—Indus-
trial Electronics & Control

MOUNT VERNON

BENJAY ASSOCIATES INC 521 S 5th
Ave OW 9-4440—(Br O) 15 Elmwood Rd
White Plains N Y RO 1-0781—Northern
N J, Met New York, Westchester Co
(N Y)—Components & Hi-Fi

ABURLINGAME ASSOCIATES 510 S
Fulton Ave MO 4-7530—(Br O) 8218 Wis-
consin Ave Washington D C OL 4-6400—
974 Main St Waltham Mass TU 4-1955—
514 University Bldg Syracuse N Y GR
4-7409—222 Long Lane Upper Darby
Penna SH 7-9080—Delaware, Washington
D C, Md, New England States, N J, N Y,
Eastern Penna, Northern Va—Precision
Electronic Instruments—Warehouse

*SONKIN ASSOCIATES DAVID 10 Fliske
Pl MO 8-9809—Northern N J, New York
City, Long Island, Westchester Co (N Y)
—Components

NEW YORK CITY & METROPOLITAN AREA

Including Northern N J. "Reps" having
no city following local address are in
New York City proper

AARON ASSOCIATES PAUL D Profes-
sional Bldg Port Washington N Y PO
7-8480—Northern N J, New York City,
Long Island, Westchester Co (N Y)—
Electronic Components

LAGRESS M CLIFFORD 891 Fulton St
(Valley Stream) VA 5-8955—New York
Met Area—Components

ATOMIC ASSOCIATES INC 139-21 85th
Dr Jamaica 35 N Y—(Br O) 2312 W
Redondo Beach Blvd Gardena Calif—1020
Irving St San Francisco Calif—1447
Peachtree St NE Atlanta 9 Ga—P O Box
49 Cambridge Mass—540 N Lake Shore Dr
Chicago 11 Ill—30129 Minton Livonia Mich
—4926 Del Ray Ave Bethesda 14 Md—
413 Johnson St Jenkintown Penna—3983
Wm Penn Hwy Monroeville Penna—4924
Greenville Ave Dallas 6 Tex—U S A—
Specialize in Nuclear Field

*BAUME ELECTRONIC SALES CO 20
Jerusalem Ave (Hicksville N Y) OV 1-
2490—N J & Met N Y City—Warehouse

*BETTAN SALES MARTY 167-16 73rd
Ave (Flushing N Y) OL 7-6659—Northern
N J, Met New York City—Components,
Hi-Fi—Warehouse

*BERLANT ASSOCIATES 96 S Grand
Ave (Baldwin N Y) BA 3-1636—N Y—
Components—Warehouse

*BITTAN CO D R 104 S Central Ave
(Valley Stream N Y) LO 1-2444—North-
ern N J, Met New York City, Southern
New York State—Electronic & Aircraft
Components

"REPRESENTATIVES"

BOYCE & CO WM E 925 Belvidere Ave (Plainfield N J) PL 7-9363—Delaware, Md, N J, N Y, New England States, Eastern Penna—Radio, TV, Hi-Fi

BRADLEY ASSOCIATES CORP 215 W 88th St 7-7227—Met New York City—Systems, Components & Instruments

*BRESSLER JULES J 4808 Bergenline Ave (Union City N J) UN 4-9577—N Y, Northern N J—Components

BRENNER MELVIN 432 Beach 140th St (Belle Harbor 94 N Y) NE 4-7103—N Y, New England States, Northern N J—Fasteners

*BREUER CO INC R E 10 Columbus Circle CO 5-0440—Delaware, Md, N J, N Y, Penna—Components

CENTRAL ASSOCIATES 44 N Dean St (Englewood N J) LO 8-3655—Met New York City, Orange, Putnam, Rockland & Westchester Cos (N Y)—Instruments & Systems Components

*CERF & CO ART 744 Broad St (Newark N J) MI 2-6734—Delaware, Washington D C, Md, N J, N Y, Va, Eastern Penna

CLARFIELD ALBERT 90 Robert Pl (Roosevelt N Y) PL 7-6454—Northern N J, New York City, Long Island & Westchester Co (N Y)—Electronic Components

COMPONENTS FOR ELECTRONICS INC 91 E Shore Rd (Mt Lakes N J) DE 4-2921—Northern N J, Met, N Y, Westchester Co (N Y)

*CRANE & EGERT CORP 97 Reade St WO 4-0996—Greater New York & Greater Phila—Industrial & Govt Type Components & Instruments

CROFTON ASSOCIATES T J 30 Rockefeller Plaza CI 7-5782—Met N Y—Electrical, Electronics—Warehouse

DAGE CORP 219 E 44th St MU 2-6755—Components, Instruments—Warehouse

DYNAN CO J V P O Box 6 (West End N J) CA 2-1953—Conn, Northern N J, Met New York (including Long Island & Westchester)—Components

*EGERT CO SAMUEL S 97 Reade St WO 4-0996—Fairfield Co (Conn), Northern N J, Greater New York—Components

*FORREST BERNARD J 102 Warren St CO 7-1711—N J & Met N Y—Components—Warehouse

ELLIS-HABER CORP Oakland Gardens Sta (Flushing N Y) FL 7-5220—South-Western Conn, Northern N J, Met N Y—(Br O) 217-27 47th Rd Bayside N Y BA 9-3622—26 Bowbell Rd White Plains N Y WH 8-8650—Components for OEM Customers

ENGEL & ASSOC INC G CURTIS 210 S Broad St (Ridgewood N J) GI 4-1400—N J, Northern Delaware, New York City, Long Island, Southern N Y State, Eastern Penna—Industrial & Laboratory Electronic Test Instruments—Warehouse

*FIELDS & SIMON SALES CO 109 Valley Rd (Montclair N J) PI 6-6717—Northern N J, Met New York (including Long Island, Rockland & Westchester Cos)—Hi-Fi Components—Warehouse

FISHER SALES CO STEVE 800 Greenwood Ave (Brooklyn 18 N Y) CH 2-5825—Northern N J, New York City, Long Island & Westchester Co (N Y)—Electronic Parts, Components, Instruments

*GALASSO DAVID P 382 Franklin Ave (Nutley N J) NO 1-1300—Northern N J, Met N Y, Long Island—Components

*GARTEN & ASSOCIATES LOUIS A 645 Eagle Rock Ave (W Orange N J) RE 1-1800—(Br O) 730 Washington Lane Jenkintown Penna WA 7-1200—N J, Southern N Y State, Eastern Penna—Instruments, Test Equipment

GAWLER-KNOOP CO 178 Eagle Rock Ave (Roseland N J) CA 6-4545—(Br O) 8732 Flower Ave Silver Springs Md JU 5-7550—835 Glenside Ave Wyncote Penna WA 7-1820—Delaware, Washington D C, Md, N J, Va, Met New York City & Long Island, Eastern Penna—Instrumentation & Precision Components—Warehouse

GRAY ASSOCIATES HAROLD 46 Tenafly Rd (Tenafly N J) LO 7-3585—Northern N J, Met New York, Poughkeepsie N Y—Components

GREENBERG ASSOCIATES JAY 514 Broadway WA 5-4433—Met N Y, Met N Y—Components, Hi-Fi—Warehouse

*HELLER ASSOCIATES JOSEPH L 250 W 57th St JU 6-8898—Northern N J, Met New York City, Long Island & Westchester Co (N Y)—Components

*HOUSER ASSOCIATES 188 Water St (Perth Amboy N J) HI 2-3159—Delaware, Md, Southern N J, Eastern Penna, Southeast Va—Components, Test Equipment

*HUGHES CO INC KENNETH E 4808 Bergenline Ave (Union City N J) UN 7-3204—(Br O) Fayetteville N Y—P O Box 54 Syracuse N Y—101 N 33rd St Phila 4 Penna—N J, N Y, Eastern Penna—Engineered Components, Digital System Equipment—Warehouse

*JOSEPH ASSOCIATES BEN 43 S Middle Neck Rd (Great Neck N Y) HU 7-9395—(Br O) New York City MU 2-0815—Delaware, Washington D C, New England States, Northern N J, Met New York City, Eastern Penna—Radio Hardware

PULEO CO R S 5 Whittier St (Lynbrook N Y) LY 9-4875—Met New York—Radio Communications—Warehouse

*KAELBER & MACK 1 Park Ave (Manhasset N Y) MA 7-6620—(Br O) (John Kaelber) 112 Gorham Rd Fairfield Conn CL 9-6709—(Howard Jappe) 37 Hillcrest Rd Wakefield Mass CR 6-4816—Northern N J, Met New York, Long Island & Westchester Co (N Y)—Components

*KAHGAN SALES CORP 1261 Broadway MU 4-7772—Northern N J, Southern N Y State, Greater New York City, Long Island & Westchester Co (N Y)—Components—Warehouse

*KUBRICK & YURMAN 475 S Franklin St (Hempstead N Y) IV 3-7230—Northern N J, Met N Y—Components, Hi-Fi Items
LEVINSON CO BEN T 270 Harvard Ave (Rockville Centre N Y) RO 6-4421—(Br O) 64 Mountain Ave Chatham N J MU 5-7237—Northern N J, Met New York City—Components

*LEVINSON SALES CO INC 545 Fifth Ave MU 2-2995—(Br O) 1465 Peninsular Blvd Hewlett N Y FR 4-4064—Met New York City

MACNEILL PAUL G 100 Wellwood Dr (Fayetteville N Y) NE 7-9205—Eastern New York State (excluding New York City)—Components, Raw Materials

*MARCY ASSOCIATES ROBERT J 1776 Broadway CI 5-3880—Northern N J, Met New York City, Southeastern New York State—Audio Products, Components, Electro-mechanical Assemblies & Instrumentation for the Electronic Industry—Warehouse

MARTIN INC HAROLD 165 Palisades Ave (Cresskill N J) LO 7-4836—New York New Jersey Met Area—Components

MARTIN-NERRILL INC 64 Serpentine Ave (Roslyn N Y) NA 1-8209—Fairfield Co (Conn), Northern N J, Met New York—Electronic Instruments

METROREP P O Box 162 (Teaneck N J) TE 6-3474—Met New York City—Industrial Jobber Components, Hi-Fi

*MILLER BEN P O Box 72 (Little Neck 63 N Y) BA 4-4673—Met N Y—Components

*MORSE SALES IRV 150 Broadway CO 7-2913—Northern N J, Met N Y—Electronic Components, Hi-Fi Equipment—Warehouse

*MURRAY DIRECTOR ASSOCIATES 115-62 237th St (Elmont N Y) CU 5-6823—Northern N J, Met N Y (including Long Island & Westchester Co)—Components, Hi-Fi—Warehouse

NEMETH ASSOCIATES ED 261 Elm St (East Paterson N J) SW 7-7500—Northern N J, Met N Y (including Long Island & Westchester Co)—Components

NLR ASSOCIATES 19 Lenox Terrace (W Orange N J) RE 1-0774—N J, Met New York (north to Poughkeepsie) & Long Island, Eastern Penna—Instruments

*PICKETT JAMES M 205 E 66th St TR 9-9520—Northern N J, Met N Y—Components

PINT CO W R 160 Woodbine Ct (Floral Park N Y) FL 2-1742—N J, Southwest Conn, New York (South of Poughkeepsie including New York City & Long Island), Eastern Penna—Wire & Electrical Insulation—Warehouse

RECIPUTI & WEISS INC 635 Oak St (Copiague N Y) AM 4-3322—(Br O) Arlington Tex CR 5-0401—East Coast, Mid Southwest—Aircraft Components—Warehouse

REED & SIDDETT CO 1106 Jericho Turnpike (New Hyde Park N Y) FL 4-6719—(Br O) 190 Riverdale Rd (Westwood P O) Riverdale N J NO 4-6250—Northern N J, Southern N Y State (including New York City & Long Island)—Components

*RICHARDT CO JOHN W Rt 46 (Pine Brook N J) CA 8-0600—Met N Y—Components, Instruments

RINGER CO L P O Box 114 (Glen Rock N J) GI 4-1434—Northern N J, Southern N Y—Components

ROBURN AGENCIES INC 431 Greenwich St WO 6-2130—Export Market Only (no domestic)—Electronics—Warehouse

ROLLER INC WM G 159 Liberty Ave (Mineola N Y) PI 6-4480—N J, N Y—Warehouse

ROTHMAN ARTHUR M 3720 87th St (Jackson Heights IL 8-2555—N J, Long Island, New York City, Westchester Co (N Y)—Phila Area—Microwave Tube Components & Equipment Electronic Specialties

R & S ELECTRONIC SALES CORP P O Box 217 (Hempstead N Y) PR 5-7852—Delaware, Washington D C, Conn, Maine, Md, Mass, N J, N Y, Penna, Va—Production Equipment—Warehouse

SANFORD CO L C 202 Woodland Ave (Rutherford N J) WE 9-0979—Met New York City—Electronic Components

SCHMITT CO INC F EDWIN 136 Liberty St WO 2-6550—Met N Y—Components—Warehouse

SCHWARTZ CO MEL 39-16 Tierney Pl (Fair Lawn N J) SW 7-3435—Northern N J, Met N Y, Long Island, Westchester Co North to Poughkeepsie (N Y)—Components—Warehouse

*SHULAN & CO WALLY 880 Bergen Ave (Jersey City N J) WO 2-0365—(Br O) (Dick Hancock) 1415 Providence Rd (Townsend Md—(Jerry Sucher) 144 Vinoyard Rd Edison N J LI 9-4186—Delaware, Washington D C, Md, N J, Va, New York City, Eastern Penna.—Components

SMITH HOWARD F 265 W 14th St CH 2-2398

SOLOMON & CO INC GEORGE 395 Broadway CA 6-5736—(Br O) Bayamon PR P O Box 562 Havana Cuba—West Indies, Central & South America—Radio & TV Replacement Parts, Stereo Components, Tubes—Warehouse

*SPRUNG ASSOCIATES JOSEPH 254 W 31st St LO 5-1820—Northern N J, Met N Y (including Long Island & Westchester Co)—Components

*STEINBERG CO H A 220 Bergen Ave (Jersey City 6 N J)—(Br O) 1122 Cliveden St Phila Penna LI 9-1122—Delaware, N J, Met N Y, Eastern Penna—Components, Capacitors, Hi-Fi

STOLLMACK MICHAEL W 67 Dorchester Rd (Emerson N J) CO 1-2313—Northern N J, New York City, Long Island, Westchester Co (N Y)—Components

TRAVCO ASSOCIATES 148-03 Hillside Ave (Jamaica 35 N Y) OL 7-8630—Northern N J, Met N Y—Components

VERTER SALES CO 2352 E 66th (Brooklyn N Y) HI 4-3880—Northern N J, Met N Y—Components (Electronic), Hi-Fi Test Equipment

*WEILAND GEORGE H 76-49 168th St (Flushing 66 N Y) OL 8-4061—(Br O) 907 Monroe Ave Rochester 20 N Y BR 1-2136—N Y, Northern N J—Components

*WEISS & ASSOCIATES WM W 1780 Broadway CI 6-5777—New York, New Jersey Met Area—Magnetic Components

OLEAN

GENERAL INDUSTRIAL SALES CO 217 N 2nd St OL 3632—Western N Y, Western Penna—Materials & Plastics

PHELPS

LEROY & MCGUIRE INC Rd 1 KI 8-4891—(Br O) Rd 4 Amsterdam N Y VI 2-5979—Upper New York State—Hi-Fi & Components

ROCHESTER

ELECTRO-REPS SALES CO 187 Culver Rd GR 3-7398—New York State (excluding New York City, Nassau, Suffolk & Westchester Cos)—Amateur Communications, Hi-Fi & Test Equipment

ΔJOHNSON AGENCIES INC H C 111 Mt Hope Ave HA 6-1090—(Br O) 9 Ivan Lane Binghamton N Y 3-5889—422 Niagara Falls Blvd Buffalo 23 N Y AM 459—Davis Bldg 404 E Genessee St Fayetteville N Y NE 7-9383—727 DeCamp Ave Schenectady N Y FR 4-5901—N Y State (excluding Met New York City). Western Penna—Components—Warehouse

ΔKELLER INDUSTRIAL PRODUCTS INC 217 East Ave HA 6-3255—(Br O) 50 Kinsey Ave Buffalo 17 N Y RI 3938—216 DeWitt Rd Syracuse N Y GI 6-2780—Upstate New York—Rotating Equipment

ΔLAZOR JOHN P O Box 307 LU 6-6619—Met N Y (including Dutchess, Sullivan & Ulster Cos)—Components & Specialty Items

OSSMAN & ASSOC INC EDWARD A 330 Linden Ave LU 6-4940—(Br O) 2363 James St Syracuse N Y HE 7-8446—149 Front St Vestal N Y EN 5-0296—Upper New York State—Components & Instruments—Warehouse

RICHTER CORP WILLIAM 790 Linden Ave LU 6-6464—(Br O) (Robt Richter) 645 E Washington St Hanson Mass TA 6-2821—(C V Hinxman) 107 Dolores Terr S N Syracuse N Y GL 4-1051—Upper New York State & New England—Electronic Components

SCARSDALE

SHPRENTZ CO HERBERT P O Box 147 SC 5-0485—Fairfield Co (Conn). Northern N J, Met N Y—Instruments

SODUS

DECEW AGENCY ALLAN E 13 Main St E 3261—New York State (except Met New York City)—Electrical & Electronic Components—Warehouse

SYRACUSE

*FRANKLIN CO H A 2 Standish Terrace GI 6-1120—Electrical & Electronic Components

LANZENDORF 513 Cumberland Ave GR 2-4195—New York State (north of Westchester Co)

LAUNT DAVID S P O Box 184 HE 7-5181—Upstate N Y—Components, Military Type

PERKINS CO ARTHUR L 639 S Warren St GR 1-8828—Pittsfield (Mass), Western N Y, Erie (Penna)—Components

TUCKAHOE

Δ*LAND-C-AIR SALES CO 140 Marblehead Rd WI 1-4700—(Br O) 4730 Pine St Phila Pa GR 7-2725—201 Epsilon Pl Annandale Va JE 3-7310—Delaware, Washington D C, Md, N Y, Eastern Penna.

YONKERS

*BLAIR SALES CO INC 45 S Broadway YO 3-0150—(Br O) 9131 Hollyoak Dr Bethesda Md EN 5-1670—114 Park Rd Havertown Pa HI 7-1694—1122 E Cliveden St Phila Penna LI 9-1122—Delaware, Washington D C, Md, N J, Va, Met N Y, Eastern Penna—Warehouse

*BROWN ASSOCIATES JACK 207 Rose-dale Rd SP 9-7330—(Br O) 157 Rawlinson Rd Rochester N Y—Northern N J, N Y—Warehouse

*SHAW CO S A 361 Central Park Ave YO 3-5700—Northern N J, New York City, Long Island & Westchester Co (N Y)—Components

NORTH CAROLINA

CHARLOTTE

FURMAN JR & ASSOCIATES CHARLES M P O Box 2624 ED 4-7855—N C, S C, Va

HIGHSMITH CO JAMES L 3733 Monroe Rd FR 7-2546—Ala, Ga, N C, S C, Tenn, Va—Components & Instruments—Warehouse

ΔHILE CO W K 1236 E Morehead St FR 7-5062—Fla, Ga, N C, S C, Va, Eastern Tenn—Special Alloys & Metals, Electrical Heating Equipment, Electric Temp Controls & Systems

*MURPHY & COTA 2110 Peachtree Rd NW TR 6-3020—(Br O) Lane Plaza 250 Governors Dr SE Huntsville Ala JE 6-9121—1220 Edgewater Dr Orlando Fla GA 4-2167—2036 Norton Rd Charlotte N C ED 2-7356—1106 Burke St Winston-Salem N C—Ala, Fla, Ga Miss, N C, S C, Tenn—Jobber Components, OEM Components, Instruments

GREENSBORO

ASSOCIATED AGENTS INC P O Box 2513—BR 4-3051—N C, S C, Va—Industrial Instruments—Warehouse

*ATCHESON & ADAMS 601 North Elm St BR 2-6838—(Br O) J C Wagner Box 138 Fern Park (Orlando) Fla MI 4-2082—Brooks Selph Box 4867 Atlanta Ga MA 2-9646—E E Scott Box 157 Nashville Tenn TU 3-2429—Ala, Fla, Ga, Miss, N C, S C, Tenn—Components, Accessories

WINSTON-SALEM

CANDOR CO 2080 Beach St PA 2-1432—(Br O) 2238 Duncan Dr Clearwater Fla JU 4-3745—Ala, Fla, Ga, N C, S C, Western Tenn, Southern Va—Components, Instruments

OHIO

BAY VILLAGE

PAISLEY CO R A 27326 Donald Dr ED 3-0569—Ohio (excluding Toledo area), Northeastern Pa—Plastics

BRECKSVILLE

ΔDEUNK & ASSOC ROBERT K 10005 Chippewa Rd JA 6-4317—Ohio, Southeastern Mich, Western Pa—Electrical, Electronic Components

*NACE CO ALLEN Box 146 JA 6-4323—(Br O) Dayton Ohio CR 7-8215—Pittsburgh Pa TE 5-5217—Ohio, W Va, Western Pa—Components to OEM Accounts

CHAGRIN FALLS

ALEXANDER CO E H 545 Hemlock Point Rd ED 8-6861—Ohio, Western Pa, Parts of Ind, Ky, W Va—Components to Mfrs Only

ΔTECHNICAL ASSOCIATES INC 4475 Lander Rd TE 1-9884—(Br O) 4162 Home Ave Cincinnati 36 O—Ky, Ohio, W Va, Western Pa—Electronic, Electrical Components

CINCINNATI

ARMSTRONG CO G H P O Box 25 Station K KI 1-3692—Ashland, Frankfort, Lexington, Louisville (Ky)—Chillicothe, Lima, Marion, Portsmouth (Ohio)—Instruments

CAMPISANO FRANK J 5446 Green Acres Ct HU 1-2652—Ky, Southern Ind, Southwestern Ohio—Components

SHERIDAN ASSOCIATES INC Roselawn Center Bldg ME 1-2460—(Br O) 6333 York Rd Cleveland 30 O TU 4-8060—53 Park Ave Dayton 18 O AX 9-0161—Ohio, Ind (except Lake, Porter, La Porte, St Joseph Cos), Western Pa—Precision Components—Warehouse

CLEVELAND

*BAEHR, GREENLEAF & ASSOC INC 14700 Detroit Ave LA 1-8468—(Br O) 7960 Mitchell Farm La Cincinnati O TW 1-3827—4096 Fer Don Rd Dayton O CR 5-4655—Ohio, Northern Ky—Components

*BAIER CO ARTHUR H 12417 Cedar Rd FA 1-5644—(Br O) 384 W First St Dayton Ohio BA 8-5493—Ohio—Electronic, Electrical Components

*BRAUER & ASSOCIATES WALTER J 15631 Lakewood Hts Blvd LA 1-7268—(Br O) 543 Old Orchard Dr Cincinnati 30 Ohio PL 2-9384—Ky, Ohio, W Va, Western Pa—Electronic & Electrical Components

COMPONENTS INC 5755 Ridge Rd P O 7317 TU 6-1830—Ohio, Western Penna—Components

"REPRESENTATIVES"

DANNEMILLER ASSOCIATES INC J R 3955 Lee Rd LO 1-4567—(Br O) 1204 North Woodward Royal Oak Mich LI 8-4440—384 W First St Dayton Ohio BA 2-0662—Ky, Mich, Ohio, W Va, Western Pa—Instruments, Components

ELECTRO SALES ASSOCIATES INC 281 E 216 St RE 2-7444—(Br O) 36500 Weideman Rd Mt Clemens Mich HO 8-2461—Dabel Sta Box 143 Dayton 20 Ohio CH 4-5551—Mich, Ohio, Southern Ind, Northern Ky, Western Pa—Instruments, Precision Components

FINNICUM & ASSOCIATES J L 4500 Euclid Ave HE 1-7477—North Central Ohio, Western Pa—Electrical Controls, Timing & Counting Devices, Relays & Limit Switches

FISHER ASSOCIATES INC HARRY 7016 Euclid Ave UT 1-5757—(Br O) Hibbard Bldg Cuyahoga Falls Ohio WA 8-1115—2266½ E Main St Columbus Ohio BE 6-8649—P O Box 3167 Youngstown Ohio SK 8-4569—Ohio, Lawrence & Mercer Cos (Penna), Northwestern W Va—Power Apparatus

GOLD FRANK A & ROBERT H P O 765 LO 1-6835—Ohio—Components

*GOORY SALES CO 19555 Henry Rd ED 1-1500—Ohio—Components

HENGER-FAIRFIELD CO 1812 Columbus Rd CH 1-1018—(Br O) 415 Fourth St N W Canton, Ohio—124 E 7th St Cincinnati 2 Ohio—101 N High St Columbus 15 Ohio—401 Commercial Bldg Dayton 2 Ohio—1105 Jefferson St Toledo 2 Ohio—Ohio, Parts of W Va—Components—Warehouse

HERRICK CO GEORGE L 15326 Lorain Ave WI 1-4406—(Br O) 5603 Kinoll Ave Cincinnati Ohio—Ohio, Southern Ind, Western Pa—Component parts

ΔHILTEBRANDT-GREENLEAF CO 8905 Lake Ave OL 1-6900—Ohio, Southern Ind, Northern Ky, Western Pa—Wire, Switches, & Plastics Custom to OEM Trade

JOHNSON LESTER CO 3909 East 123rd St SK 1-7040 (office at 11506 Fremantle Dr Cincinnati Ohio RE 1-2280)—Ohio, part of Ky—Automatic Control Systems for Industry.

*LANDFEAR CO INC J M 12429 Cedar Rd FA 1-4533—Ohio, W Va, Western Pa—Warehouse

*LEVIN & ASSOC SID 6252 Mayfield HI 2-3340—(Br O) 1705 Norton Ave Dayton—3093 Denver Ave Columbus Ohio—W Va, Western Pa—Components & Equipment

*MIDWEST SALES CO 3219 W 117th St WI 1-2700—(Br O) Detroit, Mich—Pittsburgh, Pa—Ind, Ky, Mich, Ohio, W Va, Western Pa

*MORROW CO LES A 3123 W 117th St CL 1-5700—Ohio, W Va, Western Pa—Components, Hi-Fi

*OLSEN CO JOHN O 16201 Shaker Blvd SK 2-5444—(Br O) 4016 Diehl Ave & 7870 Jolian Dr Cincinnati Ohio SY 1-1297 & TW 1-6140—104 Elatan Dr & 1843 Maydell St Pittsburgh Pa BR 9-2550 & FI 1-3391—Ohio, West Va, Western Pa, Boyd, Boone Campbell Kenton Cos (Ky), Alleghany & Garrett Cos (Md)—Components

POWERS & POWELL CO 1390 East 30th St PR 1-7333—Ohio—Electrical Supply Field—Warehouse

*ROBINSON CO C A 4143 Mayfield Rd EV 1-9049—(Br O) 333 W 1st St Dayton Ohio BA 2-0832—Ohio—Components

Δ*ROTH SALES CO MIKE 13947 Cedar Rd YE 2-4262—(Br O) 2279 Yorkshire Pl Dayton 19 Ohio AX 9-9808—3386 Columbia Dr Pittsburgh 34 Pa LO 3-5616—Ohio, W Va, Western Pa

*SCHROEDER SALES CO 2309 Prospect Ave MA 1-5075—Mich, Ohio, W Va, Western Pa—Components & TV Sets—Warehouse

SEAWAY INT'L 1510 Garden Dr EV 1-9377—(Br O) Oscar Herrera Santa Fe Argentina—I V Pressure Controllers, Haarlem Netherlands—Electronic Enterprises Bombay India—Dae Yoo Trading Co Ltd, P O Box 273 Central Seoul Seoul Korea—Components & Industrial Equipment

"REPRESENTATIVES"

SIDNELL & CO R G 1229 Westlake Ave AC 1-1313—Ohio, Western Pa—Components

TIBY CO 2245 Warrensville Center Rd ER 1-5335—(Br O) 18222 James Couzens Highway Cleveland Ohio UN 4-9288—4955 Mad River Rd Cleveland Ohio AX 8-4211—Mich, Ohio, Western Pa—Instruments & Components

COLUMBUS

McNEIL & ASSOCIATES R H 1521 Barrington Rd HU 6-1483—Ind, Ky, Mich, Ohio

DAYTON

JAY ENGINEERING CO 1721 E Third St CL 3-2151—(Br O) 5413 Pearl St Cleveland 29 Ohio TU 4-4080—Ohio—Components—Warehouse

LOMBARD CO J A 1447 Amberly Dr CR 5-6336—Southern Ohio (except Cleveland, Akron, and Youngstown-Canton areas)—Components

OHMER & ASSOCIATES GEORGE H P O Box 34 Sta D AX 3-3761—Component & Test Sets

REUTLINGER & ASSOCIATES INC R M Hulman Bldg 120 W 2nd St BA 3-4171—Fla, Ind, Ky, Mich, Ohio, Tenn, W Va, Northwestern N Y, Western Pa—Preservation, Packaging & Packing Supplies

ASCHENCK BROWER & ASSOCIATES 2263 W Schantz Ave AX 9-4144—Ind, Ohio (excludes Chicago area & Cleveland area)

TEPLITZ & CO HARVEY 3543 Cornell Dr CR 7-9178—(Br O) 19942 Inkster Rd Detroit 19 Mich KE 7-9058—671 Sycamore Dr Cleveland 32 Ohio RE 1-5676—Mich, Ohio, Western Pa—Instruments, Precision Components

WOODALL SALES & SERVICE CO INC 3070 Far Hills Ave AX 9-3151—(Br O) William F Melloh 5156 Vallantrae Ct Cincinnati O BL 1-1104—James J McCune 4720 Musket Way, Columbus Ohio TR 8-5621—Ky, Southern Ohio—Warehouse

EUCLID

PETERS CO ROBERT W 350 East 215th St (Cleveland 23) AN 1-2330—Ohio, W Va, Western Pa—Components, Parts, Hi-Fi & Tubes

FAIRBORN

CROSSE GILES S INDUSTRIAL CONSULTANT 17 Mann Ave TR 8-6171—Ohio—Communication Equipment, Nuclear Instruments, Refractometry—Warehouse

KENT

HIPKISS & HULBERT INC 310 South Water St—Ind, Ky, Mich, Ohio, W Va—Hand Tools

TOLEDO

*CHILCOTE SALES CO JIM 636 Nesselwood CH 1-3826—Ohio—Hi-Fi, TV—Radio—Components—Warehouse

WESTERVILLE

SCHENCK ASSOCIATES EARL W P O Box 112 TU 2-4838—(Br O) 7743 Oglesby Ave Chicago 49 Ill SO 8-1915—2530 Maplewood Dr S E Grand Rapids Mich GL 2-8170—3303 Fulton Rd Cleveland 6 Ohio ON 1-2712—Ind, Ky, Ohio, Southern Mich, Western Pa—Components

WESTLAKE

AODELL CO M P 26614 Center Ridge Rd TR 1-8000—(Br O) 10531 W McNichols Detroit 21 Mich UN 2-1573—2676 Salem Ave Dayton 6 Ohio CR 7-4441—750 Penn Ave Pittsburgh 21 Pa FR 1-1231—Ohio, Eastern Mich, Western Pa, W Va Panhandle—Instruments

WEST RICHFIELD

*BEAR CORP NEAL 3435 Streetsboro Rd OL 9-3331—(Br O) 2801 Far Hills Ave Dayton 19 Ohio AX 9-3566—1974 Gregory Ave Monroeville Pa VA 3-5117—Ohio, W Va, Western Pa, Boone, Campbell, Kenton Cos (Ky), Allegany, Garrett Cos (Md)—Components—Warehouse

WORTHINGTON

ROC ENGINEERING & SALES Box 241 TU 5-1057—Ohio—Lines Connected with National Defense

*WELLER-RAHE CO P O Box 212 TU 5-7819—(Br O) 11816 McCracken Rd Cleveland 25 Ohio LU 1-1748—Ohio, W Va, Western Pa—Electronic Components & Equipment

OKLAHOMA

OKLAHOMA CITY

COMER SALES CO 1411 Classen Blvd JA 8-5196—Okla—Lighting Fixtures

TULSA

GIBBS CO LLOYD T 1021 Petroleum Bldg DI 3-4425—Okla, Wichita (Kan)—Equipment Housings

OREGON

PORTLAND

BURCHAM CO DON H 510 N W 19th Ave CA 6-4148—(Br O) 422 1st Ave West Seattle Wash AT 4-7297—Alaska, Idaho, Mont, Ore, Wash, British Columbia (Canada)—Warehouse

ECKERSLEY JAMES W 3150 S W Hamilton St CH 6-3183—Idaho, Mont, Ore, Wash—Components

LEGG CO RICHARD 1633 N W 21st Ave CA 3-9720—(Br O) 1565 Sixth Ave South Seattle 4 Wash MU 2-7764—Alaska, Idaho, Mont, Ore, Wash, British Columbia (Canada)—Components—Warehouse

McMILLAN ELECTRONICS 10111 SW 62nd Ave CH 4-7830—Tape Recorders, Transceivers, Instruments—Warehouse

OREGON INDUSTRIAL FACTORS 6840 S W Macadam CH 4-4040—Ore, Vancouver (Wash)

PACIFIC ELECTRIC SALES CO 140 S E 28th Ave BE 5-4137—(Br O) (D E Erickson) 3825 35th West Seattle 99 Wash—(Glen M Donley) E 1115 Thurston Spokane 36 Wash—Idaho, Ore, Wash, Western Mont (to Billings)—Components—Warehouse

WELLS CO WAYNE C 6055 N E Glisan St BE 5-2437—Alaska, Ore, Wash—Electrical Distributor Lines—Warehouse

PENNSYLVANIA

PHILADELPHIA AREA including Southern New Jersey. "Reps" having no city following local address are located in Philadelphia.

*ANDCO SALES - ENGINEERING 5823 Greene St VI 4-9100—Delaware, Washington D C, Maryland, Southern N J, Eastern Penna, Northern Va—Components

ANGUS-SLOANE ASSOCIATES 13 E Main St (Moorestown, N J) BE 5-1900—Washington D C, Southern N J, Eastern Penna, Eastern Va—Electronic Components—Warehouse

ARNOLD ASSOCIATES INC 528 Ryers Ave (Cheltenham Pa) PI 2-0600—Washington D C, Delaware, Md, Southern N J, Eastern Penna, Northern Va—Components

AROBONE & CLINE Wilford Bldg-Rm 516 33rd & Arch Sts EV 2-6520—(Br O) Washington D C JU 8-2425—Delaware, Washington Md, Va, Southern N J, Eastern Penna—Industrial & Laboratory Instruments

^BANCROFT HARTLEY S 209 Cooper St (Westmont N J) CO 5-5215—Delaware, Washington D C, Md, Va, Southern N J, Eastern Penna.—Components & Sub-Components—Warehouse

BARTLETT & CO FRED F 153 Morlyn Ave (Bryn Mawr Pa) LA 5-7030—Washington D C, Delaware, Md, Va, Southern N J, Eastern Penna—Instruments, Systems & Systems Components

BORDEN CO C C Tomlinson Rd (Huntington Valley Pa) WI 7-2110—Eastern U S—Equipment

BRADDOCK EDWARD P O Box 305 (Haddonfield N J) HA 9-0087—Delaware, Washington D C, Md, Southern N J, Eastern Penna, Arlington, Fairfax & City of Alexandria Cos (Va)

BRESSON ASSOCIATES JERRY 246 Haverford Ave (Narberth Pa) GR 7-7800—Mid-Atlantic States, Eastern Penna—Components

BRIGGS ASSOCIATES C A 220 S Easton Rd (P O Box 151) (Glenside Pa) TU 7-4080—Washington D C, Delaware, Md, Southern N J, Eastern Penna, Fairfax Co (Va)—Components & Systems for Industrial Control & Automation Systems

BRYANS CO W ROBERT P O Box 85 (Broomall Pa) EL 6-1359—(Br O) 37 S 13th St Phila Pa RI 6-2961—Delaware, Southern N J, Eastern Penna

CLIVER SALES-ENGINEERING CO 213 Edgewood Ave (Westfield N J) AD 2-6284—(Br O) New York City CO 7-2913—N J, N Y—Megacycle Heating & Specialties

DUNCAN & ASSOCIATES WILLIAM I 5452 Charles St CU 9-7525—Delaware, Washington D C, Md, Southern N J, Eastern Penna, Northern Va—Military & High Quality Commercial Components

EMLJEN-PETERSON CO 304 King of Prussia Rd (Radnor Pa) MU 8-0151—Delaware, Washington D C, Md, Southern N J, Binghamton-Utica Area (N Y), Eastern Penna—Electronic & Electro-Mechanical Instruments, Electronic Apparatus

ELECTRONIC COMMUNICATIONS CO 710 Weiser St (Reading Pa) FR 2-1000—15 Southeastern States—Radio

ENERGY CONTROL CORP 3147 N Broad St BA 8-7900—Delaware, Cape May (Md), Western N J, Eastern Penna—Berkeley, Jefferson, & Morgan Cos (W Va)—Controllers & Recorders—Warehouse

*FRIEDMAN & ASSOCIATES MARTIN J 7 Heather Rd (Bala-Cynwyd Pa) MO 4-6090—Delaware, Washington D C, Md, Va, Southern N J, Eastern Penna—Acoustic Devices, Communications, Components, Tape Recording, & Sound Equipment

FULLER JR LAWRENCE C 32 Rittenhouse Pl (Ardmore Pa) MI 2-2468—Delaware, Washington D C, Va, Southern N J, Eastern Penna—Components & Instruments

AGLASER CO JOSEPH L 53 Cricket Ave (Ardmore Pa)—Delaware, Md, Southern N J, Eastern Penna.—Custom-made Parts

HITCHENS CO R R 323 Homestead Ave (Haddonfield N J) HA 9-2431—Delaware, Md, N J, Eastern Penna—Components

HOYT CO F O 195 Nassau St (Princeton N J) WA 4-4450—Delaware, Washington D C, Md, Va, N J, Long Island & Hudson River Valley, Eastern Penna—Materials & Components

*JEFFRIES INC SAMUEL A 105 Forrest Ave (Narberth Pa) MO 4-3500—Washington D C, Md, Penna, Va, W Va, Southern N J—Components—Warehouse

KEEGAN & CO W F 771 Shelbourne Rd (Upper Darby Pa) SH 8-1165—Delaware, Southern N J, Eastern Penna—Traffic Signal Equipment & Industrial Timers—Warehouse

*KELLER & CO HAL 653 Ferne Blvd (Drexel Hill Pa) CL 9-6758—Delaware, Washington D C, Md, Va, Southern N J, Eastern Penna—Components, Hi-Fi & Radio—Warehouse

KESSLER ASSOCIATES 31 Larkspur Rd (Levittown Pa) WI 5-0350—Govt offices/Phila, Fort Monmouth & Mechanicsburg Area

LAIRD EQUIPMENT CO 204 Wyncote Rd (Jenkintown Pa) TU 4-8198—Delaware, Washington D C, Md, "Phila Trading Area," Eastern Penna, Western Va—Marking Equipment—Warehouse

LORMONT ASSOCIATES Box 72 (Horsesham Pa) OS 5-8133—Washington D C, New Jersey, Penna—Electronic Assembly to Customer Specification

*MAGUIRE & CO J A 116 N 7th St (Camden 2 N J) WO 6-3118—(Br O) 29 Allegheny Ave Towson Md VA 5-3836—1707 Avondale Dr Durham N C DU 1742—Southern N J, Central Penna, Eastern Tenn

MASSEY ASSOCIATES 529 Brookhurst Ave (Narberth Pa) MO 4-4200—(Br O) 111 Centerway Greenbelt Md—Delaware, Washington D C, Md, Va, Southern N J, Eastern Penna—Components

MOLLER CO G W 300 Broadway (Camden 3 N J) 1-3916—(Br O) 1844 Edgewood Rd Baltimore 4 Md VA 5-1130—Delaware, Washington D C, Va, Eastern Md, South Jersey, Eastern Penna—Components

MOORE CO PAUL J 56 Broad St (Bloomfield N J) PI 8-7700 (Br O) 7 1/2 E Main St Mystic Conn JE 6-9617—Conn, N J, R I, New York City, Long Island, Orange, Richmond, Rockland Ulster & Westchester Cos (N Y)—Warehouse

*MOYER CO HAROLD A P O Box 14 (Haddonfield N J) HA 9-7792—Mid-Atlantic States, Fairfax & Arlington Cos (Va)—Components & Hi-Fi

M & S ELECTRONICS P O Box 185 (Haddonfield N J) RI 6-5463—(Br O) Audubon N J LI 7-6390—U S A

NELSON-PLATT SALES CO 312 Cherry Hill Blvd (Merchantville N J) MO 3-1400—(Br O) Lionon Rd McAlpine, Ellicott City Md 1110—Delaware, Washington D C, Md, Va, Southern N J, Eastern Penna—Replacement Parts

*NEWSON & ASSOCIATES C II 813 Bethlehem Pike CH 8-3377—(Br O) (J. Dougherty) 201 W. Chesapeake Ave Town-4 4 Md—Delaware, Md, Southern N J, Eastern Penna—Components

NOLAN & ASSOCIATES JOHN J 314 W Sparks St WA 4-1595—Delaware, Washington D C, Md, Va, Southern N J, Eastern Penna

PARK CO E L 651 Paddock Rd (Southampton Pa) EL 7-7805—Mid-Atlantic States, Delaware, Southern N J, Eastern Penna—Component Lines for Parts Jobbers

POLYMETRIC DEVICES CO 122 York Rd (Jenkintown Pa) TU 7-4873—Washington D C, Md, Southern N J, Eastern Penna, Eastern Va—Transducers & Associated Instruments

RICHTER INC HENRY G 467 Hillside Ave (Westfield N J) AD 3-4615—(Br O) (Wm. Sheffer) 4605 Old Frederick Rd Baltimore 29 Md WI 5-4126—N J, New England, Baltimore (Md) Area, Met. N Y—Electronic Components, Injection Molding

*ROTHENHEBER & CO 53 Cricket Ave (Ardmore Pa) TR 7-9090—Va, Mid-Atlantic States, Ranson W Va—Electronic Components, Valves

*SATTERTHWAITE W F 103 E Township Line Rd (Upper Darby Pa)—Delaware, Washington D C, Md, Va, Southern N J, Eastern Penna—Component Parts, Component Assemblies, Materials & Instruments

*STINSON - MUSTICO ASSOCIATION 2124 Darby Rd (Havertown Pa) HI 7-0922—Delaware, Washington D C, Md, Va, Southern N J, Eastern Penna

SLUBIN & CO LEWIS 2305 Fairmount Ave ST 7-2072—Delaware, Washington D C, Md, N J, Penna—Components, Instrumentation—Warehouse

*STOBBART ARTHUR J 56-14 Revere Rd (Drexel Hill Pa) CL 9-3881—Mid-Atlantic States

△*TEMCO INC 10 Tanner St (Haddonfield N J) HA 8-4400—Baltimore, Harrisburg, New York City & Philadelphia Areas—OEM Components—Warehouse

THOMAS CHARLES W 4719 Longshore St DE 3-9600—Delaware, Washington D C, Md, Southern N J, Eastern Penna, Northern Va—Warehouse

△TOWLE & SON CO 402 Bethlehem Pike (Erdenheim) CH 8-3233—Delaware, Washington D C, Md, Va, Southern N J, Eastern Penna—Components, Engineered Specialties, Maintenance (Industrial) Items—Warehouse

△VAN RENSLER 337 Lincoln Ave (Lansdowne Pa) CL 9-4423—Delaware, Washington D C, Md, Southern N J, Eastern Penna

WEBER CO R E 15 Terry Lane (E Brunswick N J) CL 7-5243—Delaware, N J, Met. New York, Long Island, Eastern Penn—Precision Test Equipment—Warehouse

WELDE & SONS WM C 120 N 32nd St EV 6-0925—Delaware, Washington D C, Md, Va, Southern N J, Eastern Penna—Warehouse

PITTSBURGH AREA

*BEIL & WHITAKER INC 3623 Jacksonwald Ave (Reading Pa) FR 5-6337—Eastern Penna (exclusive of Phila)

ASSEMBLY PRODUCTS OF PITTSBURGH 517 2nd Ave—Eastern Ohio, Western Penna, W Va—Electronic Components & Instrumentation

AUTOMATION & CONTROL CO Nat'l Transit Bldg (Oil City Pa) 47-334—Western N Y, Eastern Ohio, Western Penna, Northern W Va—Instruments for Special Measurement Problems—Warehouse

BILTMORE PRODUCTS CO 1501 Potomac Ave LO 3-0808—West Va, Western Penna, Ohio Border Countries Instrumentations

LEVIN ALBERT 11 Jonquil PL LO 1-7027—W Va, Western Penna—Component & Accessories

△LOWRY DIETRICH CO 1404 Swantek St WA 1-2959—North East Ky, Ohio, W Va, Western Penna—Electronic Components and Instrumentation

NEWELL CO P W 6101 Penn Ave MO 1-5766—Southwest N Y, Eastern Ohio, Western Penna, Northern W Va

TANNER & COVERT ASSOCIATES 300 Mt Lebanon Blvd LO 1-5067—W Va, Western Penna—Components

TENNESSEE

CHATTANOOGA

McALLESTER ELECTRONICS 1510-12 Central Ave AM 7-8623—Components—Warehouse

SUPLEE H L 119 Hilldale Dr MA 2-1232—Ala, Fla, Ga, Miss, N C, S C, Tenn—Components

MEMPHIS

OVERMAN CO R E 2065 Union Ave BR 5-0844—Ark, Southwestern Ky, Northern Miss, Southwestern Tenn—Industrial Heating, Ventilation & Air Handling, Electronic Process Controls

NASHVILLE

INDUSTRIAL ELECTRIC CO 123 S 11th St AL 6-4906—TVA Area—Automation, Spot Welding

TEXAS

DALLAS

*AMMON & WOODS ASSOCIATES 5602 E Mockingbird LA TA 6-4171—Ark, La, Okla, Tex—Components

*ANTLE-SMITH SALES 2721 Brookfield Ave FL 7-7279—Ark, La, Okla, Tex (excluding El Paso)—Components, instruments, Hi-Fi—Warehouse

*AYMOND CO EDWARD F 4312 Maple Ave LA 6-5233—Ark, Okla, Tex—Components

△*CAMPION SALES CO 9002 Chancellor Row FL 7-4095—Ark, La, Miss, Okla, Tex—Warehouse

*CORRY CO HAL F 6315 Hillcrest Ave LA 8-9172—(Br O) 2305 Branard St Houston Tex JA 9-2085—Ark, La, Okla, Tex (except El Paso)—Components for Hi-Fi & Radio—Warehouse

*CROCKETT-LUND & CO 2204 Griffin RI 2-5777—Ark, La, Okla, Tex—Components—Warehouse

*DELZELL-MAYNARD SALES CO 2013 Cedar Springs RI 2-2027—(Br O) Ralph G Maynard 8165 Milredge Houston 17 Tex MI 4-5724—Ark, La, Okla, Tex—Components, Hi-Fi—Warehouse

*ELECTRONIC SALES CO 531 Kirkwood Dr DA 7-1745—(Br O) P O Box 19387—Houston 24—Ark, La, Okla, Tex—Warehouse

GREEN CO JOHN A 6815 Oriole Dr FL 1-9947—(Br O) Box 911 Tulsa Okla RI 2-4657—7118 Envoy Ct Dallas Tex FL 1-9947—3400 Montrose Rm 110 Houston Tex JA 6-2959—Okla, Tex (excluding 12 Northwestern Counties)

HALE CO DUANE H 2633 Westminster EM 8-1695—Ark, La, Okla, Tex—Components, Industrial Tool Specialties

KANTENBERGER CO 711 Reverchon Dr WH 8-9535—(Br O) 1231 So Gary St Tulsa Okla WE 6-7979—3011 Prescott Houston Tex MO 4-2736—1502 W Gramercy San Antonio Tex PE 2-2151—La, Okla, Tex—Supervisory & Remote Control, Telemetering, Lab Test Instruments, Instruments, Controls, Counting—Warehouse

KEMP ENGINEERING CO 2618 Manana Dr P O Box 13251 FL 7-6663—(Br O) Petefish-Kemp Eng'g Cq 6414 A Hampton St Louis 9 Mo—Mo, Okla, Tex, Southern Kan—Components, Instruments, System, —Warehouse

KOCH ENGINEERING & SALES CO 309 Meadows Bldg EM 1-1765—(Br O) 1607 Jefferson Houston 2 Tex FA 3-7051—Okla, Tex (except for Area West of Pecos River)—Electro-Mechanical Components—Warehouse

MACRAE-SMITH CO P O Box 35113 BL 3-2006—(Br O) P O Box 19387 Houston 24 Tex—Ark, La, Okla, Tex—Warehouse

PECK CO GORDON V 130 Casa Linda Plaza DA 1-6579—Ark, La, Okla, Tex—Components—Warehouse

*NESBITT CO ROBERT E 1925 Cedar Springs RI 7-5824—(Br O) 4810 Hazard Houston Tex JA 8-3811—Okla, Tex—Components

NORVELL ASSOCIATES 3603 Lemmon Ave LA 6-7861—Ark, La, Okla, Tex (excluding El Paso Co)—Precision Components

△*PACKARD ASSOCIATES Love Field Terminal Bldg FL 7-5713—Ark, La, Okla, Tex—Components—Warehouse

PRECISION METAL SPECIALTIES 500 N Tyler St P O Box 4341 WH 2-0122—Ark, La, Okla, Tex—Electronic Components Parts, Fasteners, Metal & Non-metallic Parts for Electronic Industry—Warehouse

*SOUTHWEST ELECTRONIC INDUSTRIES 4515 Prentice EM 3-1671—Ark, La, New Mex, Okla, Tex—Components, Instruments

THOMSON ENGINEERING SERVICE 2520 Oak Lawn Ave LA 6-8741—Kan, Mo, Okla, Tex—Components

△*WILKS CO ERNEST L 1212 Camp St RI 7-2637—Ark, La, Okla, Tex (except El Paso Co)—Components, Equipment, Hi-Fi—Warehouse

WRIGHT INDUSTRIAL PRODUCTS CO 5738 No Central Expressway TA 4-2571—(Br O) 1803 Calumet Houston Tex JA 3-5651—Okla, Tex—Systems, Part Systems—Warehouse

EL PASO

SANTA RITA WESTERN CO INC P O Box 227 LO 5-1573—Ariz, New Mex, Tex

STEPCO 1035 Eastside Rd P O Box 3626 PR 2-5274—(Br O) 411 N Central Ave Rm 629 Phoenix Ariz AL 3-6311—5900 Domingo Rd N E Albuquerque N M AL 6-9612—Ariz, New Mex, Western Tex—Instruments

FORT WORTH

ADCO INDUSTRIES 3414 Camp Bowie Blvd ED 2-3339—(Br O) 306 Tuloma Bldg Tulsa Okla LU 7-6189—Kan, Mo, Okla, Tex—Aircraft—Warehouse

CAREY CO D B P O Box 6072 PE 8-1702—Ark, La, Okla, Tex—Components, Instruments for Industrials

*ENGINEERING ASSOCIATES INC 2912 Stanley Ave WA 3-7386—Ark, La, New Mex, Okla, Kan—Components, Instruments, Systems—Warehouse

*INDUSTRIAL ASSOCIATED ELECTRONICS INC 5007 E Lancaster Ave JE 1-1132—(Br O) 600 S Broadway Wichita Kan AM 5-2567—413 E Central Ave Albuquerque N M CH 3-3585—2016 Int'l Airport El Paso Tex PR 2-2441—Ark, La, New Mex, Okla, Sedgwick Co, Kan—Instruments & Systems

GRAND PRAIRIE

TEX-O-KOMA SALES CO 235 S E 14th St AN 2-0866—(Br O) Fort Worth CR 4-4530—Okla, Tex—Components—Warehouse

“REPRESENTATIVES”

HOUSTON

CHENOWETH CO ROBERT 530 Esperon Bldg CA 2-2863—La, Tex—Components, O E M

GAY SALES CO INC 420 Sul Ross St JA 9-3479—(Br O) P O Box 2905 Baton Rouge La EL 7-2423—P O Box 8414 Dallas Tex EM 8-2325—P O Box 229 New Braunfels Tex MA 5-6941—Texas (except El Paso, the Panhandle)—Components, Instruments—Warehouse

*KLICPERA CO M F P O Box 3113 JA 2-8459—(Br O) Jackson Miss FL 5-4942—P O Box 2094 Tulsa Okla—Dallas Tex RI 2-2515—Ark, La, Miss, Okla, Tex, Western Tenn—Electronic Components—Warehouse

PROCESS SALES CO 9802 Clifford Dr PA 3-3710—Tex, La (Gulf coast)—Industrial Instrumentation

SALTER R E 208 Sidney St WA 3-8720—Alaska, Ark, La, Miss, Tex, Latin American Countries—Geophysical & Industrial Magnetic Tape, Test Instruments, Modular Components, Relays, Stepping Switches.

SOUTHWESTERN CONTROLS 4716 Eli St P O Box 13352 UN 2-8874—(Br O) Ave Mexico 49, Mexico 11 D F—Texas, Mexico—Control Components, Instruments—Warehouse

LAREDO

GUARANTEE RADIO SUPPLY CO 1314 Iturbide St RA 2-3233—(Br O) Guarantee Radio Parts & Equipment 423 S 17th St McAllen Tex MU 6-6682—Laredo Area—Hi-Fi & Broadcast—Warehouse

UTAH

SALT LAKE CITY

ELECTRIC EQUIPMENT CO 130 W Commonwealth H U5-0932—Idaho, Mont, Utah, Western Colo, Eastern Nev, Northern N M—Electronic & Electric Instruments & Controls—Warehouse

*GATES CO F Y 200 S Main St Rm 822 EL 9-1101—(Br O) 3395 S Bannock Englewood Colo SU 1-8566—122 Harvard Dr SE Albuquerque New Mex CH 3-8010—Ariz, Colo, New Mex, Utah, Wyo, Southern Idaho, El Paso Co (Tex)—Instruments & Components

NABAUM & CO SHERMAN 4777 S 1300 East St CR 7-0459—(Br O) 718 S Owyhee St Boise Idaho—Idaho, Utah, E Nev, SW Wyo—Components, Instruments, TV—Warehouse

SPENCER & CO C H 210 W 3300 South IN 6-8683—Colo, Utah, S Idaho, W Nev, E Wyo—Power Plant & Industrial Equip—Warehouse

VIRGINIA

ALEXANDRIA

ANDERSON CO JOSEPH F 300 Belle View Blvd SO 8-7151—Washington D C, Md, Va—Component Lines for the Parts Jobbers

ARLINGTON

SAPHIR FRANK P O Box 3555 JA 7-7393—Wash D C

BRISTOL

MYERS ASSOCIATES P O Box 164—(Br O) Wash D C EX 3-3580—Ala, N Car, S Car, Wash D C, Ga, Tenn, Va, Part/Fla—Components & Equipment

FAIRFAX

HILDENBRAND CO P O Box 1060 CR 3-2334—Wash D C, Md, Va, Dela (except New Castle Co)—Instruments

FALLS CHURCH

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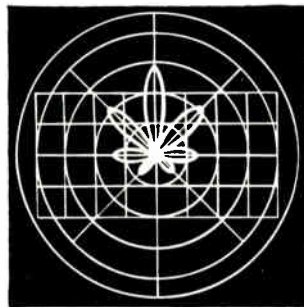
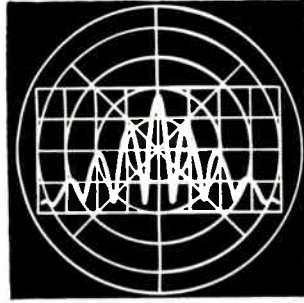
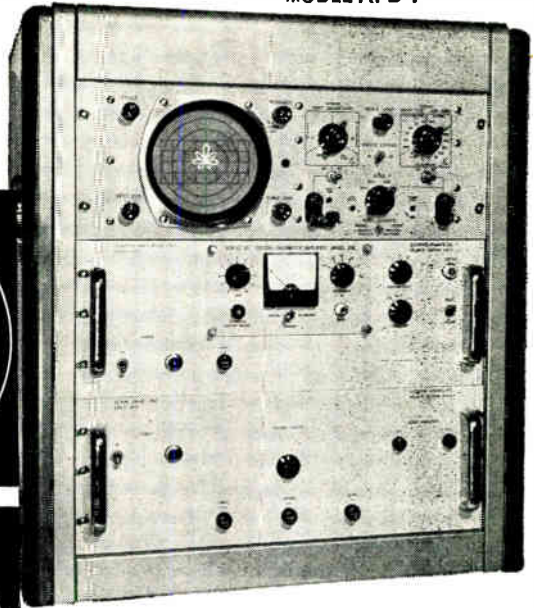
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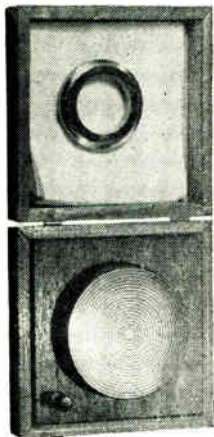
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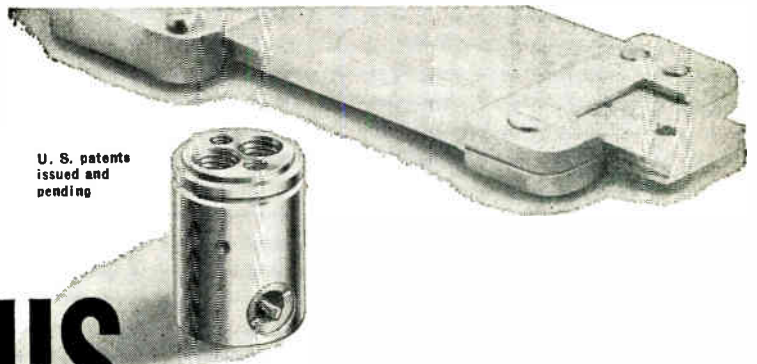
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Alphabetical Listing of Manufacturers

A listing of the names and addresses of manufacturers in the electronic and allied industries. Phone numbers are included to speed contacts. All the information in this listing, and in the product listing section has been supplied by the manufacturer.

For additional reference value many of the manufacturers are using this listing to draw attention to their representatives and sales offices. This information directly follows the firm's alphabetical listing.

A-1 Precision Products 3622 W Jefferson Blvd
Los Angeles 16 Calif RE 1-8268
A A Metal Products Inc 154 Elliott St Brat-
tleboro Vt AL 4-4333
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Abbeon Supply Co 17915 Jamaica Ave Jamaica
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Abrams Instrument Corp 606 E Shiawassee
St Lansing 1 Mich IV 4-9441
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MO 6-5600
Accurate Electronics Corp 169 S Abbe Rd S E
Elyria Ohio EM 6-7925
Accurate Mfg Co 44 Hepworth Pl Garfield
N J GR 3-2900
Accurate Spring Mfg Co 3811 W Lake St Chi-
cago 24 Ill VA 6-5900
Accuracy Inc 4 Gordon St Waltham 54 Mass
TU 4-1126
Ace Coil & Electronics Co 914 Lincoln Hwy
Metuchen N J TI 8-3580
Ace Electric Mfg Co 1458 Shakespeare Ave
New York 52 N Y
Ace Electronics Associates 99 Dover St Somer-
ville 44 Mass SO 6-5130
Ace Eng'g & Machine Co Inc Tomlinson Rd
Huntingdon Valley Penna WI 7-1900
Ace Plastic Co 91-30 Van Wyck Expwy
Jamaica 35 N Y VA 3-5500
Ace Spring Mfg Co Inc 146 32nd St Brooklyn
32 N Y AL 4-4267
ACF Electronics Div ACF Industries 1321
Leslie Ave Alexander Va KI 8-4000
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Ackerman Engravers 458 Broadway New York
13 N Y BA 7-1479
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Conn DA 4-4125
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Acme Electric Heating Co 1217 Washington St
Boston 18 Mass HA 6-1569
Acme Industrial Co 200-222 N Laffin St Chi-
cago 7 Ill MO 6-4122
Acme Mfg & Gasket Co 738 N 41 St Phila-
delphia 4 Pa EV 6-8622
Acme Model Eng Co 6224 15 Ave Brooklyn 19
N Y BE 2-1310
Acme Wire Co 1255 Dixwell Ave New Haven
14 Conn LO 2-2171
Acorn Electronics (Div James Vibrapowr Co)
1107 E Eighth St Gibson City Ill
ACOUSTICA ASSOC
Fairchild Ct Plainview N Y CU 1-2100
Acoustic Research Inc 24 Thorndike St Cam-
bridge 41 Mass UN 4-7310
Acro Div Robert Shaw Fulton Control Co
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Acromag Inc 22519 Telegraph Rd Detroit 41
Mich EL 6-7211
Acromark Co 309 Morrell St Elizabeth N J
EL 2-6500
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cago 40 Ill LO 1-1807
Actioncraft Products 2 Yennicock Ave Port
Washington N Y PO 7-4500
Acton Laboratories Inc 533 Main St Acton
Mass CO 3-7756
A C Transformer Corp 89 Madison St New-
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Actuator Products Corp P O Box 247 40
Nashua St Woburn Mass WE 3-1400
Adams & Westlake Co 1025 N Michigan Elk-
hart Ind 2-0550
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Rd Cleveland 17 Ohio RE 1-8000
A & D Electronics Inc Mt Pascal Rd Hacketts-
town N J GA 5-5716
Adhesive Products Corp 1660 Boone Ave New
York 60 N Y
Adler Electronics Inc 1 Lefevre Lane New
Rochelle N Y NE 6-1620
Advanced Instruments 45 Kenneth St Newton
Highlands 61 Mass DE 2-8200
Advanced Products 59 Broadway North Haven
Conn CE 9-1664
Advanced Technology Labs 369 Whisman Rd
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Ave Miami 33 Fla HI 8-6503
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 Westrex Corp 111 8 Ave New York 11 N Y CH 3-2300
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 Westronix Corp/Texas Crystal Div 8538 W Grand Ave River Grove Ill GL 3-3555
 Wharfedale Div/British Industries Corp 80 Shore Rd Port Washington NY PO 7-7700
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 Wheelabrator Corp/Techline Div 1471 Ave "V" Vicksburg Mich
 Wheeler Electronic Corp 150 E Aurora St Waterbury 20 Conn PL 4-5191

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 Whitaker Cable Corp 1301 Burlington St N Kansas City 16 Mo GR 1-4640
 White Co O C 17 Hermon St Worcester 8 Mass PL 5-7333
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 Whitley Electronics Inc P O Box 349 Huntington Ind Sterling 6-3371
 Whitney Blake Co 1565 Dixwell Ave New Haven 14 Conn
 Whitney Metal Tool Co 110 Forbes St Rockford Ill WO 2-5571
 Wiancko Eng'g Co 255 Halstead St Pasadena Calif RY 1-4471
 Wickes Eng'g & Construction Co 12 St & Ferry Ave Camden 4 N J WO 4-4912
 Widney-Dorlec Div/British Industries Corp 80 Shore Rd Port Washington NY PO 7-7700
 Wiedemann Machine Co Gulph Rd King of Prussia Pa BR 9-1120
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 Wilco Corp 546 Drover St Indianapolis 21 Ind ME 7-5439
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 Wilder Mfg Co Mechanic St & Erie R R Port Jervis N Y 3-2291
 Willard Storage Battery Div 246 E 131 St Cleveland Ohio UL 1-2600

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 Wright Zimmerman Inc New Brighton St Paul 12 Minn ME 3-3131
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 Zenith Optical Lab 1940 Great Neck Road Copiague L I N Y
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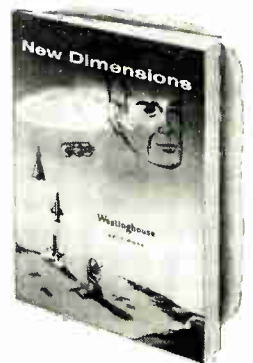
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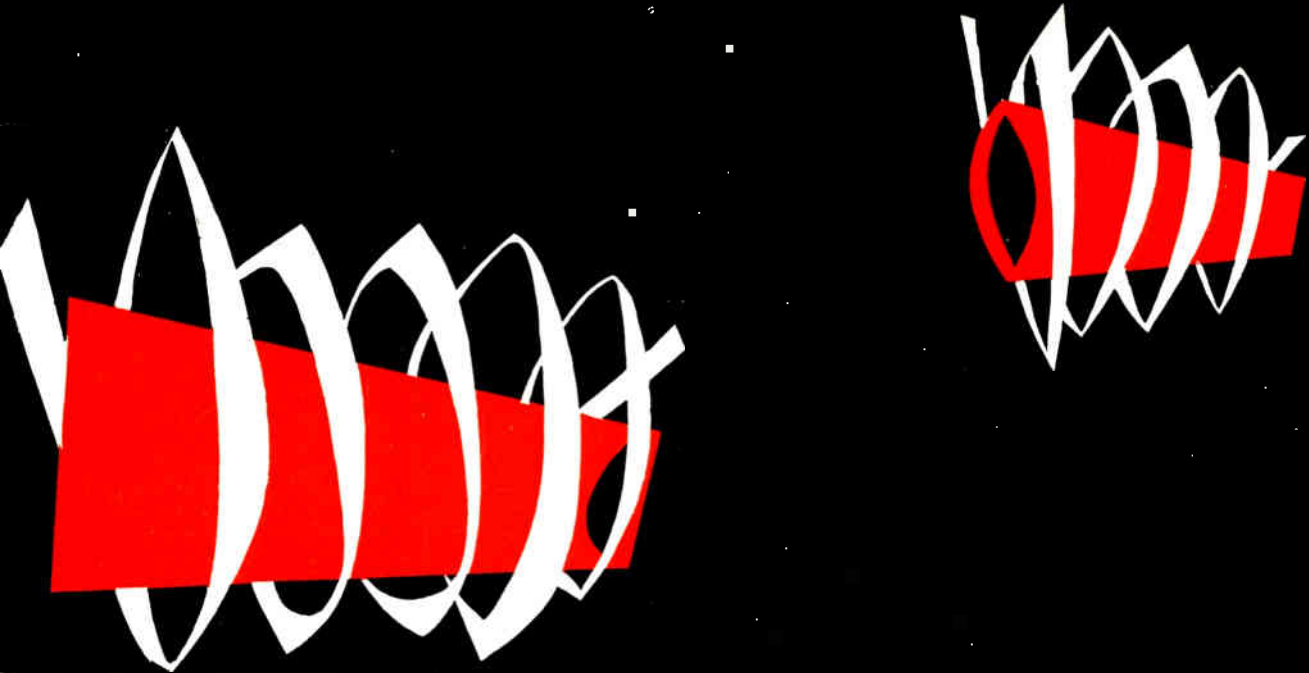
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1959 Guided Missile Directory

Listing the major operational and developmental guided missiles and the electronic firms and military agencies directly responsible for their design, development, testing and production.

U. S. ARMY

NIKE-AJAX is the Nation's first supersonic anti-aircraft guided missile designed to intercept and destroy the enemy target regardless of evasive action. It is about 20 ft. long and about 1 ft. in dia. with fins for guidance. It is initially boosted to supersonic speed by a solid-propellant, separable booster and sustained in flight by an integral liquid-propellant motor. Missile and booster weigh more than a ton. Development contractor—Bell Telephone Laboratories. Prime production contractors—Western Electric and Douglas Aircraft.

CORPORAL guided missile may be equipped with an atomic or conventional type warhead and is capable of engaging tactical targets over 75 mi. away. Corporal follows a ballistic trajectory during most of its flight to the target. Weather and visibility conditions place no restriction on the use of the weapon. The propulsion system uses a liquid-propellant rocket motor. It travels through space at several times the speed of sound. Being manufactured by Firestone Tire and Rubber Co. and Gilfillan Brothers, Inc.

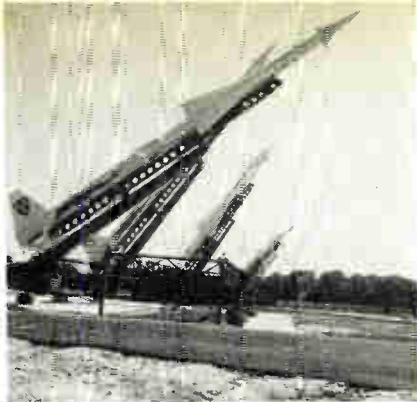
REDSTONE is the largest surface-to-surface ballistic guided missile employed by the Army. Developed at the Army's Redstone Arsenal, it is an operational field missile and a basic "step" toward the new JUPITER. Developed under the supervision of Dr. Wernher von Braun and produced by Chrysler Corp.

NIKE-HERCULES is the nation's second land-based, combat ready, mobile, surface-to-air, guided missile system. More effective than its predecessor, the NIKE-AJAX, it is inexpensive and simple, uses solid propellants, and has greater range. The dart shaped missile is 27 ft. long. The booster is 14.5 ft. long. Designed, developed, and produced by the Army, Western Electric Co., The Bell Telephone Laboratories, and Douglas Aircraft Co.

SERGEANT is a solid-propellant, surface-to-surface, ballistic guided missile development that will eventually succeed the CORPORAL. The SERGEANT is 30 ft. long and has more power, range and accuracy. It is invulnerable to any known enemy countermeasures. It is under design and development by the Jet Propulsion Laboratory. It will be made by Sperry Gyroscope Co.

PERSHING is in an early development stage. It is a solid-propellant ballistic missile smaller, lighter, and more mobile than REDSTONE designed to provide the Army with a more versatile and flexible weapon. Work on the PERSHING will be under the supervision of the Army Ballistic Missile Agency, Redstone Arsenal.
(Continued on page 442)

NIKE
U. S. Army



REDSTONE
U. S. Army



JUPITER
U. S. Army



HAWK
U. S. Army



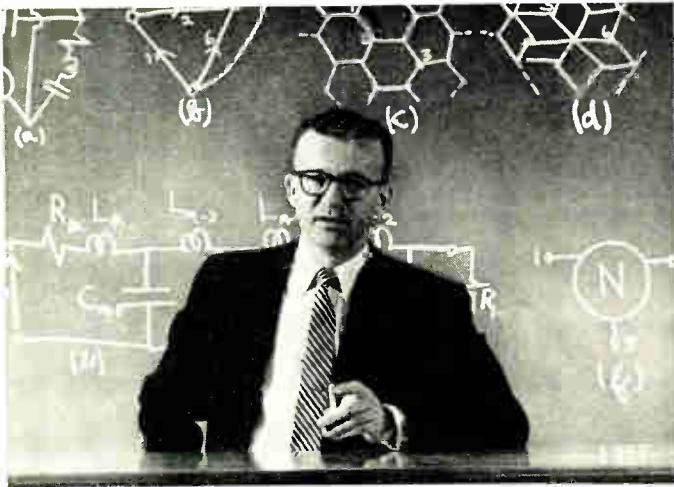
LACROSSE
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The Hughes Field Engineer is typical of engineers and scientists throughout the Hughes organization. Here, the individual is given every opportunity to work out his ideas, to add measurably to his professional stature.

At Hughes Ground Systems Division, for example, engineers and scientists are now exploiting a major breakthrough—3-D radar. This new development is acknowledged as the most significant progress step since radar itself was discovered.

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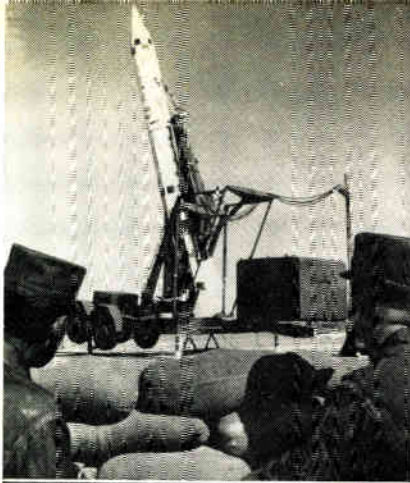
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U. S. ARMY MISSILES (cont.)



SERGEANT
U. S. Army

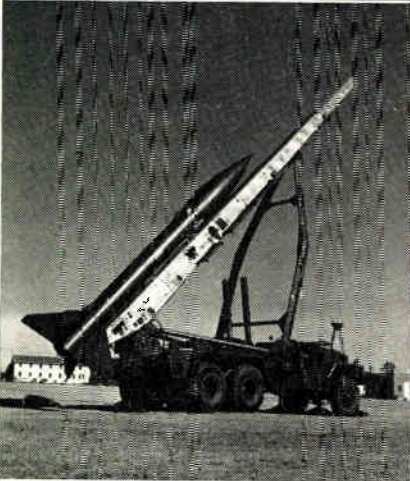
JUPITER is an Army-developed and Air Force-employed intermediate range ballistic missile, capable of being launched from land. The Air Force has announced the formation of operational squadrons utilizing the JUPITER. Chrysler Corp. has been awarded the engineering and production work on the missile.

LACROSSE is a highly accurate, general support, field artillery guided missile for use in close tactical support of ground troops. An all-weather missile it will replace and supplement conventional artillery. The propulsion system uses a solid-propellant rocket motor. Developed by Cornell Aeronautical Laboratory, it is being produced by the Martin Co.

HAWK is one of the Army's newest air defense weapons. It will complement the defense provided by the NIKE-AJAX and NIKE-HERCULES where extreme low-altitude capability is required. It can engage extremely low flying targets at tree-top level and can maintain a rapid rate of fire. It is approx. 17 ft. long and 14 in. in dia. It uses a solid fuel propellant. Developed and produced by Raytheon Manufacturing Co.

NIKE-ZEUS, a solid-propellant missile is being developed to provide a defense against all forms of the air threat in the 1960-1970 time period with special emphasis on the ICBM threat. Being developed by Western Electric, Bell Telephone Laboratories, and Douglas Aircraft Co.

PLATO is a transportable, surface-to-air, guided missile system under component development by the Army to provide a defense against ballistic missiles for overseas installations and our armies in the field. The PLATO system will use the NIKE-ZEUS missile. PLATO effort has been in progress for 5 years by Sylvania Electric Products.



HONEST JOHN
U. S. Army

HONEST JOHN is a long-range, free-flight, artillery rocket capable of carrying an atomic or a conventional high explosive warhead. Range is equivalent to medium-to-long range artillery. It consists of a rocket weighing several tons and a highly mobile self-propelled launcher. Developed by Army Ordnance and several industrial firms including: Douglas Aircraft Co. and Emerson Electric Co.

LITTLE JOHN is a 12½ in. rocket, about 12 ft. long. It uses a solid-propellant rocket engine. Lightweight launchers and ground equipment are adaptable for an extremely high degree of mobility on the ground and are easily airlifted. It has been issued for training and development of combat techniques. Manufactured by Emerson Electric Co.



LITTLE JOHN
U. S. Army

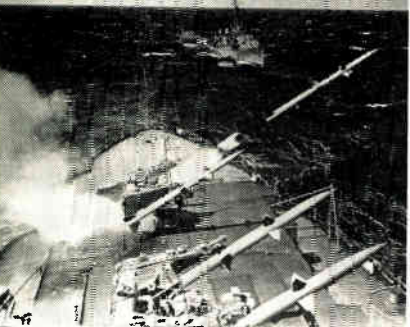
U. S. NAVY

SIDEWINDER is guided by an infra-red or heat-seeking device. A relatively inexpensive and reliable weapon it measures 9 ft. in length and weighs about 155 lbs. It is designed for destroying high-performance aircraft from sea level to over 50,000 ft. Developed by the Navy Ordnance Test Station of the Bureau of Ordnance, China Lake, Calif. Primary production sources are Philco Corp., and General Electric Co.

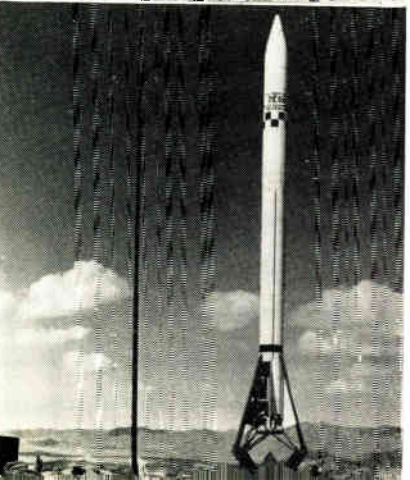
REGULUS I was the first operational attack missile to join the fleet. It is a surface-to-surface missile resembling a modern swept-wing jet fighter about 30 ft. long. Range is around 500 mi. It travels at high subsonic speed and can carry a nuclear warhead. It is powered by a turbojet engine and has electronic guidance. Developed by Chance Vought Aircraft Co.

TERRIER is an all-weather surface-to-air missile. The 15 ft weapon weighs about 1.5 tons, has a range of about 10 mi., and uses a solid-fuel rocket motor. It employs beam-riding guidance. Developed by the Applied Physics Laboratory of Johns Hopkins University, it is made by Convair. Launching equipment was designed and built by Northern Ordnance, Inc.

SPARROW I is a 12 ft. long, 300 lb., 1,500 mph, air-to-air missile. It is powered by a solid-propellant rocket motor. It is guided to the target by a beam transmitted by the launching aircraft's radar. It is a versatile weapon, permitting effective attack against high and low altitude enemy aircraft. It does not have nuclear capability. It is being replaced by SPARROW III. Developed by Sperry-Farragut Co.



TERRIER
U. S. Navy



CORPORAL
U. S. Army

(Continued on page 444)

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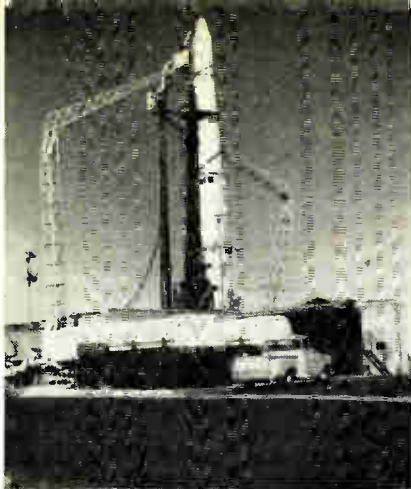
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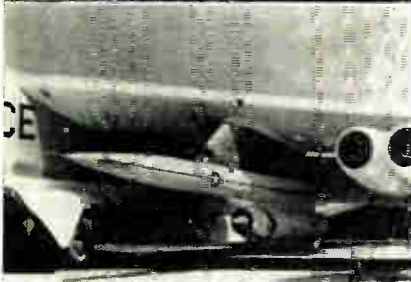
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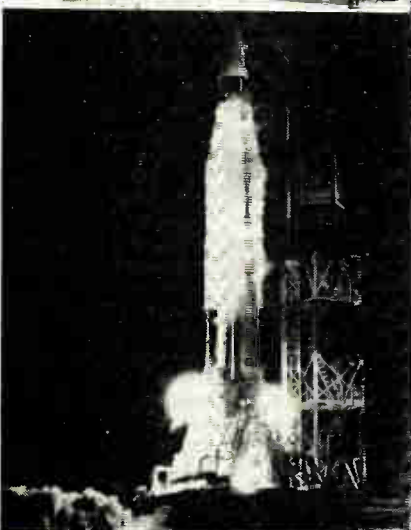
U. S. NAVY MISSILES (cont.)



THOR
U. S. Air Force



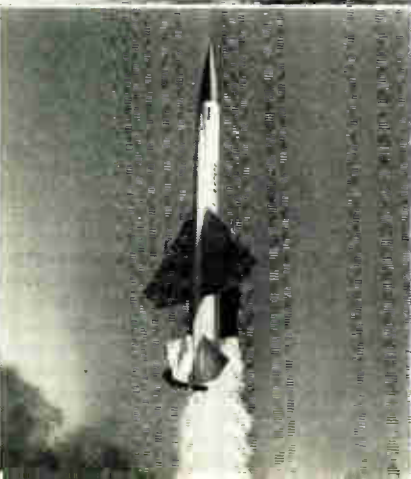
HOUNDDOG
U. S. Air Force



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U. S. Air Force



SPARROW III
U. S. Navy



BOMARC III
U. S. Air Force

SPARROW III, developed by Raytheon Manufacturing Co., is replacing SPARROW I in fleet air defense. The new missile is 12 ft. long, weighs about 350 lbs., and has a speed of over 1,500 mph. It is an all-weather missile being developed as a primary weapon for many present and all future all-weather fighters. It is now being manufactured by Raytheon Manufacturing Co.

TALOS is a supersonic surface-to-air missile, powered by a ramjet, 40,000 hp engine. It weighs about 3,000 lbs., is about 20 ft. long, and 30 in. in dia. Capable of destroying aircraft at high altitudes it has a range of over 65 mi. A proximity fuze detonates the high-explosive or nuclear warhead. Effective against supersonic and subsonic targets, it can be used against enemy planes with air-to-surface missiles and against ships and shore bombardment targets. Developed by the Applied Physics Laboratory of Johns Hopkins University and manufactured by the Bendix Aviation Corp. It is now being flight tested.

REGULUS II is an improved version of REGULUS I and has a 1000 mi plus range. It is designed to exceed speeds of Mach 2. It is 57 ft. long and has a 20 ft. wing span. A recoverable version is equipped with a retractable landing gear.

SIDEWINDER—IC is an advanced model of the present SIDEWINDER. It will provide greater speed and greater range capabilities than the present missile. Development work is being done by Philco Corp. and the Naval Ordnance Test Station, China Lake.

ADVANCED TERRIER is intended for the same surface-to-air requirements as the TERRIER. It will have improved guidance features and will provide improvements in coverage. It will be made by Convair.

PETREL is operational but has been phased out of production. It is an air-to-surface weapon, 24 ft. long, with a wing span of 13 ft., and weighs 3,800 lbs. Powered by a turbojet engine it uses radar homing for guidance. Production contractor was Fairchild Guided Missiles Div.

TARTER is a surface-to-air missile designed especially for use aboard destroyers. Described as a junior version of the original TERRIER, it has about the same range. It uses a solid-propellant rocket. Being built by Convair Div. of General Dynamics Corp.

POLARIS is a shipboard IRBM. Smaller and lighter than most other missiles it is designed especially for submarine use and will use a solid propellant. Its range will be about 1,500 miles. Major contractors are Lockheed Aircraft Co., Aerojet General Corp., Massachusetts Institute of Technology, General Electric Corp., Interstate Electronic Corp., and Westinghouse Corp.

SUBROC, an advanced tactical missile to be launched from submarines, is a surface-to-surface missile now in an early developmental stage. Fired from above or below the surface, it can detect a submarine at long range, compute its course and speed, and fire the missile. It is being developed at the Naval Ordnance Laboratory, White Oak, Silver Spring, Md. Goodyear Aircraft Corp. is the prime weapons system contractor.

BULLPUP is an air-to-surface tactical guided missile, 11 ft. long, weighing 540 lbs. Now in production by Martin Co., it is relatively inexpensive, highly accurate, and simple in design. It is powered by a solid-propellant rocket at supersonic speeds and is used primarily against small targets such as pillboxes and tanks.

CORVUS is an air-to-surface missile for use against surface ships and for penetrating heavily defended areas. It is designed for use on carrier-based aircraft. The prime contractor for this solid-fuel rocket is the Temco Aircraft Corp.

EAGLE is a long range air-to-air guided missile under early development. Other information is classified.

WEAPON ABLE is a 500 lb., 12.75 in. anti-submarine rocket equipped with conventional explosives. It is designed to be used by destroyers.

HVAR, or High Velocity Aircraft Rocket, is a 5.0 in. World War 2 weapon. About 6 ft. long and 140 lb., it has a velocity of about 1,500 fps. Out of production since 1955.

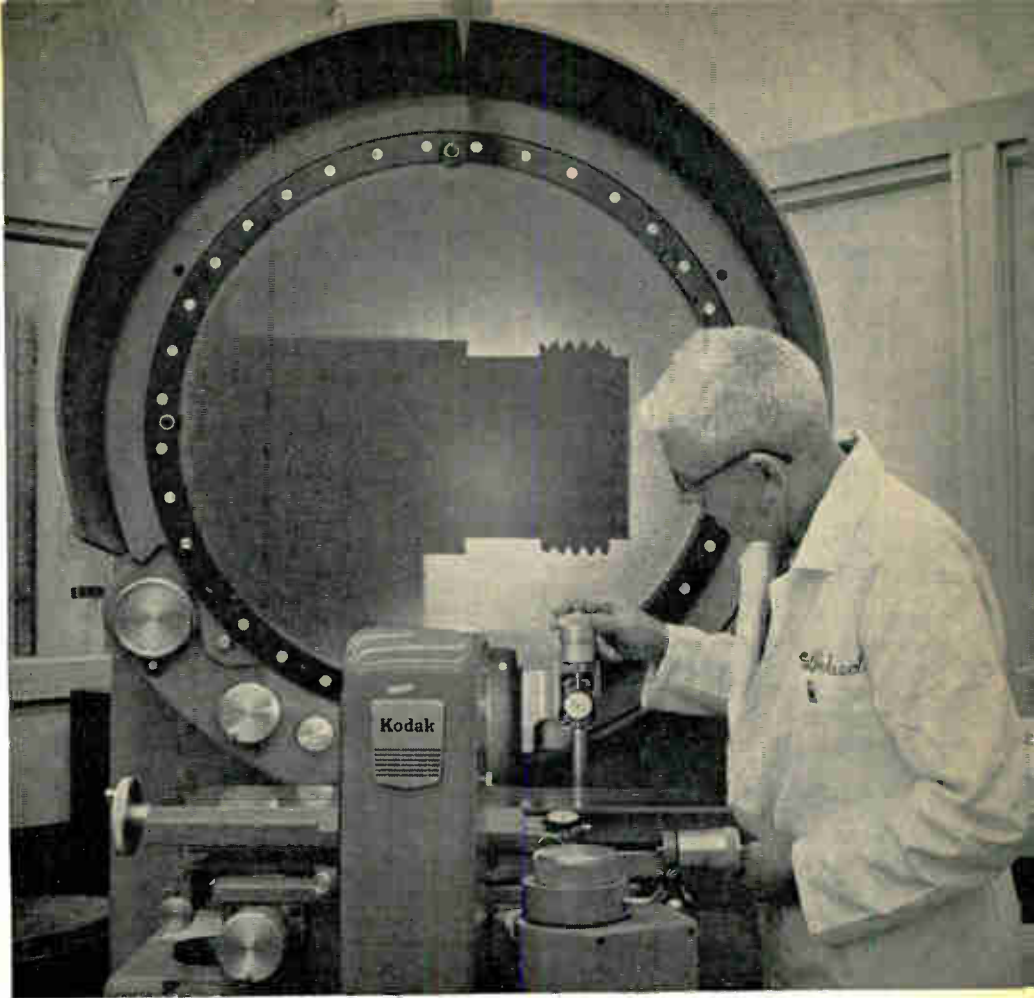
ZUNI is a 5.0 in. folding-fin, solid propellant, all-weather, conventional explosive rocket. Designed primarily as an air-to-surface

(Continued on page 447)

(right) Checking accuracy of machine threads on a 30 inch magnification contour projector

(top) Nation's first successful re-entry tests were conducted with Lockheed X-17

(bottom) Optical gauge determines measurements within 5 millionths of an inch



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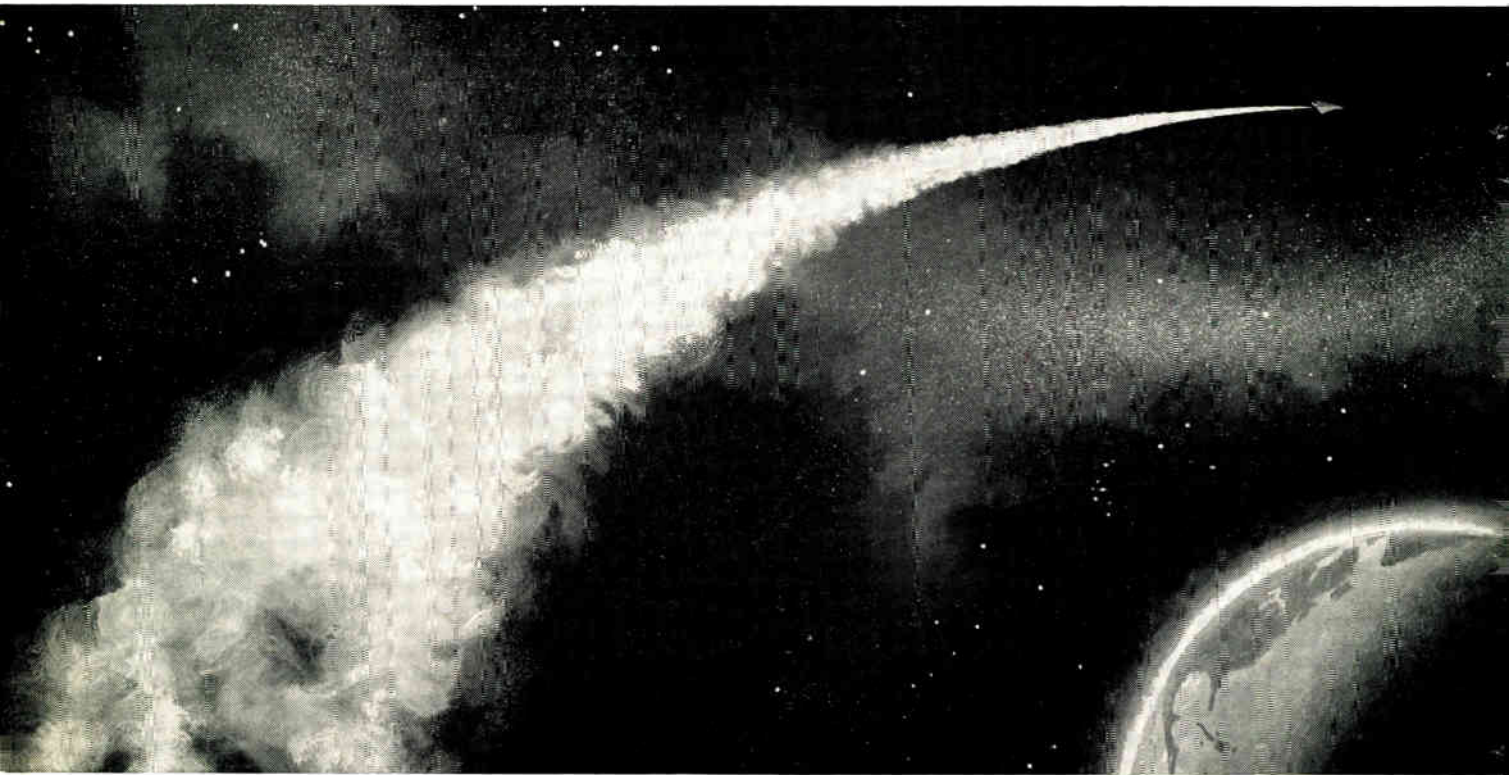
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DYNA-SOAR



Dyna-Soar (for dynamic soaring) is a joint project between the Air Force and the NASA, and is an attempt to solve the technical problems of manned flight in the sub-orbital regions. Advance knowledge on the project indicates how a boost-glide vehicle can operate from the outer fringes of the atmosphere where it can maneuver and be recovered undamaged. Studies show that by varying the original rocket boost,

and thus the velocity, and with the control available to the pilot, the Dyna-Soar aircraft can circumnavigate the earth, followed by a normal and controlled landing. Boeing Airplane Company, one of the competing companies for the development contract for the complete boost-glide system, has delegated to RCA the responsibility for the development of important electronic components of Dyna-Soar.



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U. S. NAVY MISSILES (cont.)

weapon it is used against small targets. It was built to replace the WW-2 HVAR. Developed by the Naval Ordnance Test Station, China Lake, Calif. A pilot production plant is being developed by the Bridgeport Brass Co. for the aluminum rocket motor tubes.

RAT is a rocket-thrown, torpedo weapon system, consisting of a rocket-propelled anti-submarine torpedo, 13½ ft. long, weighing 480 lbs. It is fired through the air and dropped to the water by parachute. It then searches out and attacks the enemy submarine. It was conceived, designed, developed, and tested by the Naval Ordnance Test Station. The fire-control system is by Librascope, Inc. The detection system was provided by the Bureau of Ordnance, Clevite Research Center. The rocket is made by Allegany Ballistics Laboratory.

GIMLET is an air-launched rocket under research and development. All other information is classified.

U. S. AIR FORCE

SNARK (SM-62) is America's first intercontinental missile. It has a speed in the near-sonic range. Manufactured by Northrop, it has a wing span of 42 ft., a length of 67.2 ft., and a height of 15 ft. It is powered by a Pratt and Whitney J-57 engine which develops 15,000 lb thrust. It carries a nuclear warhead and can be launched from the U. S. and enter a target area from any direction at high or low altitude.

ATLAS (SM-65) America's first intercontinental ballistic missile has a speed in excess of 15,000 nautical mph and weighs 195,000 lb. when loaded for launching. Manufactured by Convair Div., General Dynamics, it is 80 ft. long and has a dia. of 9 ft. It is powered by North American, liquid rocket engines. Two types of inertial guidance systems may be used.

TITAN (SM-68) an Air Force strategic bombing weapon, is being developed as a back-up to the ATLAS which it will follow into operation. A 15,000 mph missile, it will be made by Martin Co. It will have a range of 5,500 nautical miles and be powered by an Aerojet General two-stage liquid rocket. It also will have both radio-inertial guidance and an all-inertial guidance. It will be launched from underground sites.

MINUTEMAN will be another addition to the family of ICBMs. A second generation ballistic missile it is expected to be lighter, smaller and simpler than earlier ICBMs. It will be a 3-stage, solid propellant missile in the 5,000 mile class and have nuclear warhead capability. Contracts have been let with Aerojet General Corp., Thiokol Chemical Corp., and Hercules Powder Co. for solid propellant developments. North American, Autonetics Div. will supply Guidance and Control. AVCO Corp has the nose cone contract. Boeing Airplane Co. will assemble and test the MINUTEMAN.

THOR (SM-75). An Intermediate Range Ballistic Missile manufactured by Douglas, this 1500 nautical-mile missile is powered by a North American liquid rocket engine. Guided by an all-inertial control system, it can carry a nuclear warhead to an altitude of several hundred miles.

MATADOR (TM-61), (TM-61C) is a jet-driven, 650 mph, tactical missile. It can carry nuclear or conventional explosives. Manufactured by Martin Co., it is powered by an Allison J-33 jet engine, and surface launched by a rocket. Wingspan is 28.7 ft. Length is 39.6 ft. Diameter is 9 ft. It can fly at an altitude of 35,000 ft and is electronically controlled from the ground.

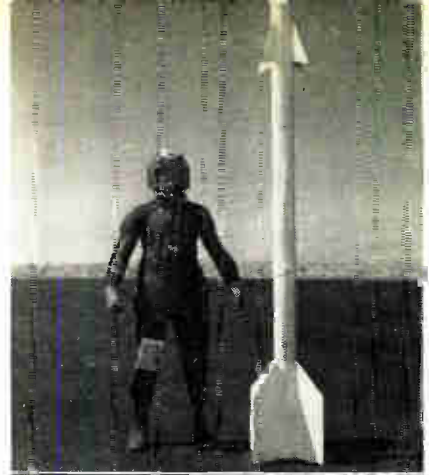
MACE (TM-76A), manufactured by Martin, is an improved version of the MATADOR. Improvements include an extension in range of over 600 miles and an improved guidance system.

RASCAL (GAM-63) is an air-to-surface guided missile. The bomber-launched, supersonic missile is over 32 ft. long and 4 ft. in dia. It has a range of over 75 m. and carries a nuclear warhead. It can hit a 1500 ft. target area.

HOUND DOG (GAM-77) is an air-launched, supersonic missile designed to deliver a nuclear warhead over several hundred miles. Powered by a Pratt and Whitney J-52 jet engine it has an inertial guidance system. It is being developed by North American.

(Continued on page 448)

SIDEWINDER
U. S. Navy



QUAIL
U. S. Navy



BULLPUP
U. S. Navy



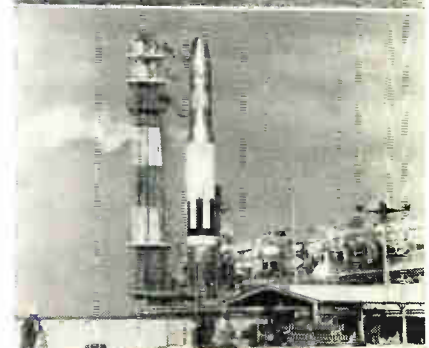
SNARK
U. S. Air Force



MACE
U. S. Air Force



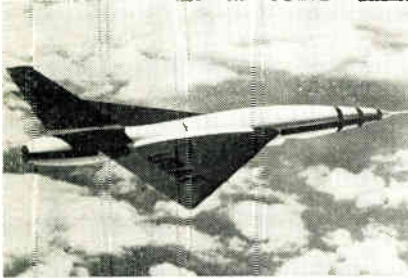
TITAN
U. S. Air Force



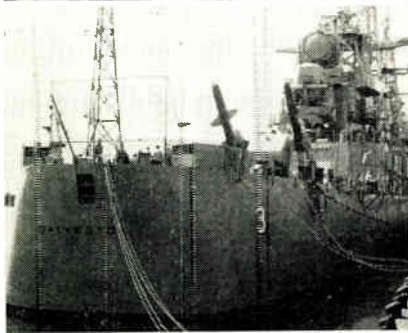
U. S. AIR FORCE MISSILES (Cont.)



FALCON
U. S. Air Force



GOOSE
U. S. Air Force



TALOS
U. S. Navy

BOMARC (IM-99) is a supersonic, rocket-launched, ground-to-air missile. Range is over 200 m. Manufactured by Boeing, it has a wingspan of 18 ft., a length of 47 ft., and a dia. of 35 in. It weighs about 15,000 lbs. Its Marquardt twin ram-jet engines carry it to an altitude of over 60,000 ft. at supersonic speeds. It has an electronic guidance system including a terminal guidance system in the missile itself. It can carry a nuclear or a conventional warhead.

FALCON (GAR), is the name of a family of super-sonic air-to-air rockets which are among the smallest missiles in production. Manufactured by Hughes, these solid-propellant rocket powered missiles are approx. 6 ft. long, have a span of 20 in., and a dia. of 6.4 in. They weigh slightly over 100 lbs. They are guided by radar or by a heat-seeking device.

GOOSE (SM-73) is a ground launched diversionary missile designed to penetrate enemy defenses. Manufactured by Fairchild, it has been successfully flight-tested but operational data has not yet been released.

GREEN QUAIL (GAM-72) is an air-launched diversionary missile developed to penetrate enemy air defenses. Manufactured by McDonnell, it is powered by a General Electric J-85 jet engine. It has been successfully flight tested.

GENIE (MB-1) with its atomic warhead, is the most powerful air-to-air rocket in operation. Manufactured by Douglas, it is powered by an Aerojet General rocket engine. It is part of the weapons inventory of the Air Defense Command.

SPARROW II is an air-to-air missile developed by the Douglas Aircraft Corp. as an experimental missile and was not intended for fleet use. It will be manufactured by CANADAIR LTD for RCAF use.

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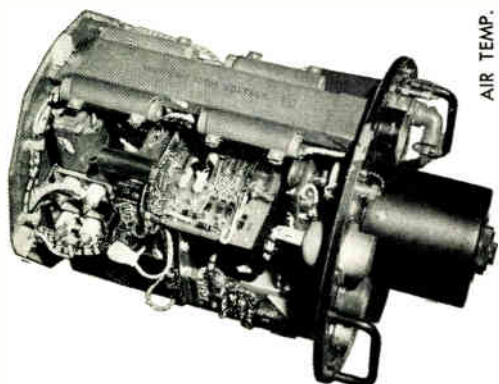
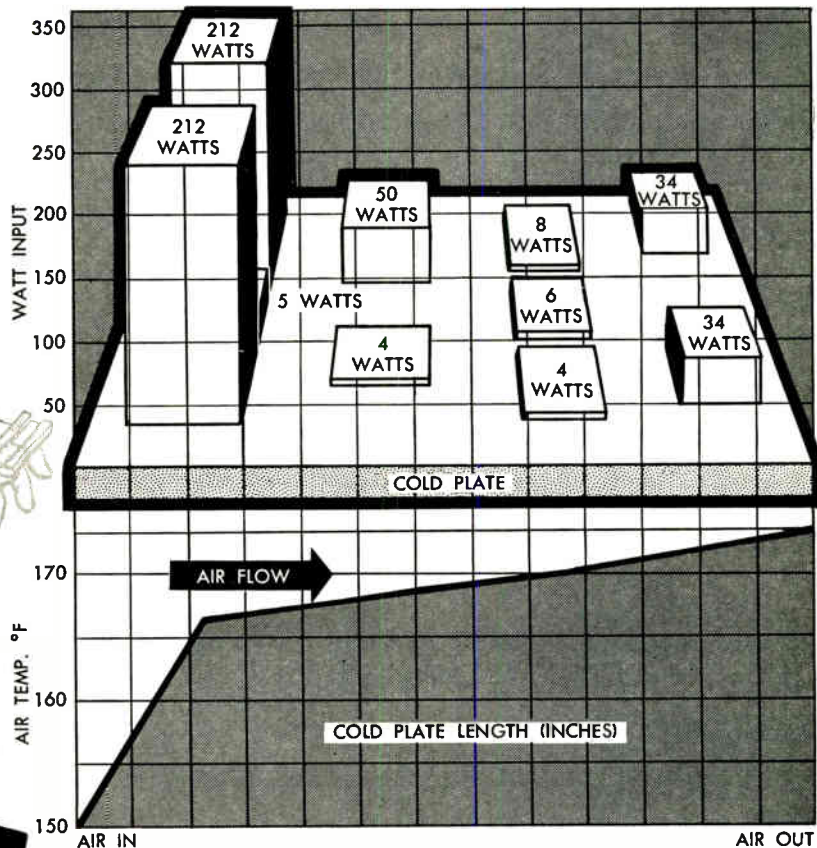
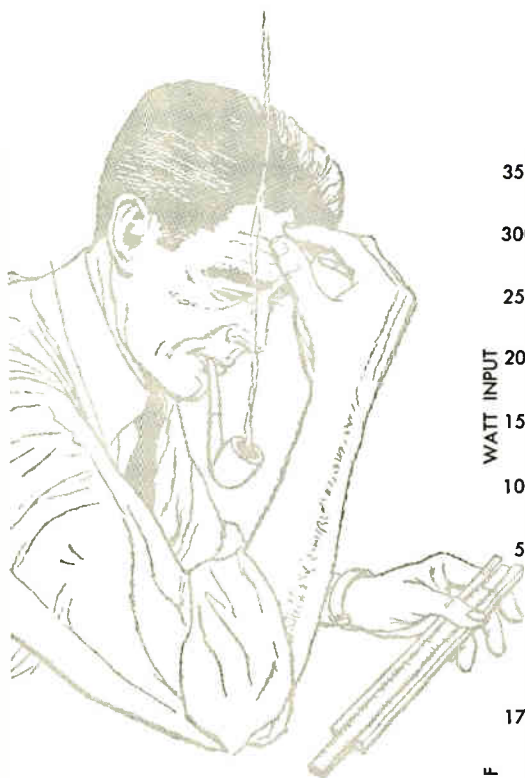
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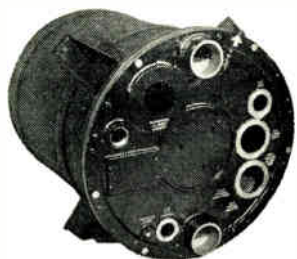
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Lt Cdr S P Gory	65877
Surface Gun & Launcher Branch	
SHORT RANGE MISSILE LAUNCHER SYSTEMS	
L L Ludlow	66887
MEDIUM RANGE MISSILE LAUNCHER SYSTEMS	
R B Carlberg	63937
LONG RANGE MISSILE LAUNCHER SYSTEMS	
W J Lowery	63043
Propulsion Branch, GM Propulsion Sect	
Lt Cdr E J Sheehy	65594
Underwater Missile Branch	
Cdr L H Keator	63554
Air Launched GM Branch Cdr T G Forrest	63739

SPECIAL PROJECTS OFFICE

TECH DIV Capt L Smith	67111
FIRE CONTROL BRANCH, MISSILE GUIDANCE SECT	
H Meyerson	67117
MISSILE BRANCH Cdr R O Middleton	

BUREAU OF AERONAUTICS

ASST CHIEF FOR PLANS & PROGRAMS	
R Adm D J Welch	64701
DIR OF SYSTEMS OFFICE	
Capt R C Millord	63546
GUIDED MISSILES SYSTEMS	
Cdr B G Swonitz	64988
AVIONICS DIV	
ASST DIR FOR WEAPONS DELIVERY SYSTEM	
Cdr R J Schneider	66647
Guided Missile Branch W L Webster	61668
Rodor Branch K G Orman	64176
MISSILE ELECTRONIC EQ SECT	
H F McPherson	65628
GUIDED MISSILES DIV	
DIR Capt L S Chambers	64446
Air-To-Air Branch Cdr J V Rowney	64250
Air-To-Surface Branch Cdr C W Griffing	65017
Ship Launched Branch Cdr H L Anderton	63593
Specification Branch P H Dougherty	64300

RESEARCH DIV

GM Research Branch S R Alexander	62685
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SHIP INSTALLATIONS DIV

Missile Branch Cdr R H Lachman	62638
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CONTRACTS DIV Capt T D Davies

Purchase Branch Cdr E E Sack	66858
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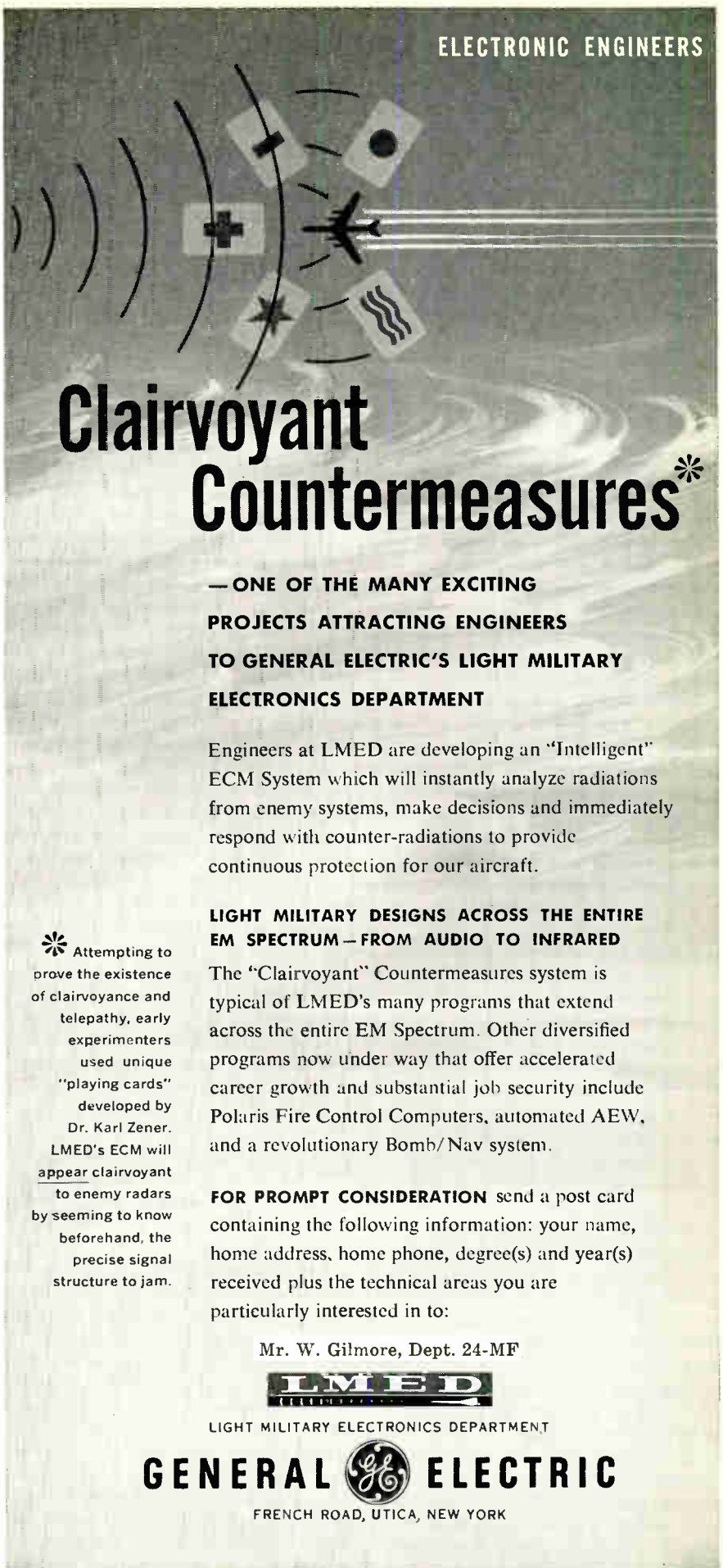
PRODUCTION DIV

Aircraft Production Branch	
GM Production Control Cdr F Collendo	64703

BUREAU OF SHIPS

ELECTRONICS DIV	
Director Capt J H Allen	64586
CONTRACT DIV Capt G W Underwood	62112
Purchase Branch Cdr J C Snyder	63746

ELECTRONIC ENGINEERS



Clairvoyant Countermeasures*

— ONE OF THE MANY EXCITING PROJECTS ATTRACTING ENGINEERS TO GENERAL ELECTRIC'S LIGHT MILITARY ELECTRONICS DEPARTMENT

Engineers at LMED are developing an "Intelligent" ECM System which will instantly analyze radiations from enemy systems, make decisions and immediately respond with counter-radiations to provide continuous protection for our aircraft.

LIGHT MILITARY DESIGNS ACROSS THE ENTIRE EM SPECTRUM—FROM AUDIO TO INFRARED

The "Clairvoyant" Countermeasures system is typical of LMED's many programs that extend across the entire EM Spectrum. Other diversified programs now under way that offer accelerated career growth and substantial job security include Polaris Fire Control Computers, automated AEW, and a revolutionary Bomb/Nav system.

FOR PROMPT CONSIDERATION send a post card containing the following information: your name, home address, home phone, degree(s) and year(s) received plus the technical areas you are particularly interested in to:

Mr. W. Gilmore, Dept. 24-MF

LMED
LIGHT MILITARY ELECTRONICS DEPARTMENT

GENERAL ELECTRIC
FRENCH ROAD, UTICA, NEW YORK

* Attempting to prove the existence of clairvoyance and telepathy, early experimenters used unique "playing cards" developed by Dr. Karl Zener. LMED's ECM will appear clairvoyant to enemy radars by seeming to know beforehand, the precise signal structure to jam.

The following list classifies and gives the value of electronic equipment selected from contracts awarded by government agencies from January to December 1958. These contract awards appeared in "Synopsis of U. S. Government Proposed Procurement Sales and Contract Awards," issued daily by the U. S. Department of Commerce. It does not list classified contracts or awards for less than \$25,000.

Accelerometers	419,682
Amplifiers	5,496,316
Amplifiers, audio	271,240
Amplifiers, magnetic	31,358
Amplifiers, r-f	171,343
Amplifiers, servo	1,332,916
Analyzers	913,208
Analyzers, spectrum	1,657,869
Antenna towers and supports..	2,189,388
Antennas, systems, assemblies..	10,471,419
Attenuators	62,368
Batteries, dry	13,007,892
Battery chargers	1,803,733
Battery packs	73,010
Beacon equipment, radar.....	1,239,829
Beacon equipment, radio.....	1,195,132
Cable assemblies	1,853,930
Cable, electronic	25,689
Cable, telephone	158,489
Calibrators	382,501
Capacitors	370,710
Cavities tuned	83,300
Cells, solar	500,000
Circuit breakers	247,012
Coils	26,323
Communications systems	4,999,561
Computer, analog	442,700
Computer, airborne	19,497,709
Computers and accessories	25,806,878
Connectors	1,004,305
Controls	291,552
Co-ordinate data equipment...	4,546,502
Converter equipment	777,536
Countermeasures equipment	3,346,342
Couplers	33,071
Crystal units	318,342
Delay lines	111,878
Diodes, variable capacitance microwave	99,150
Direction finder sets	2,524,427
Dummy loads	250,791
Earphone	28,969
Echo box	342,618
Equipment, telemetry	2,360,180
Facsimile equipment	293,891
Filters	219,515
Fire control equipment.....	3,240,000
Frequency standards	625,122
Fuses and accessories.....	281,853
Generators, signal	4,478,201
Generators, pulse	63,228
Gyros	6,583,424
Handsets	229,304
Headsets	944,348
Headset-microphone	1,031,379

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ENGINEERS**

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- Information Theory
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- Doppler Radar
- Countermeasures
- Radome & Antenna Design
- Microwave Circuitry & Components
- Receiver & Transmitter Design
- Airborne Navigational Systems
- Jamming & Anti-Jamming
- Miniaturization-Transistorization
- Ranging Systems
- Propagation Studies
- Ground Support Equipment

Please send resume in complete confidence to:

MR. GEORGE R. HICKMAN

Engineering Employment Manager, Dept. 13F



REPUBLIC AVIATION

Farmingdale, Long Island

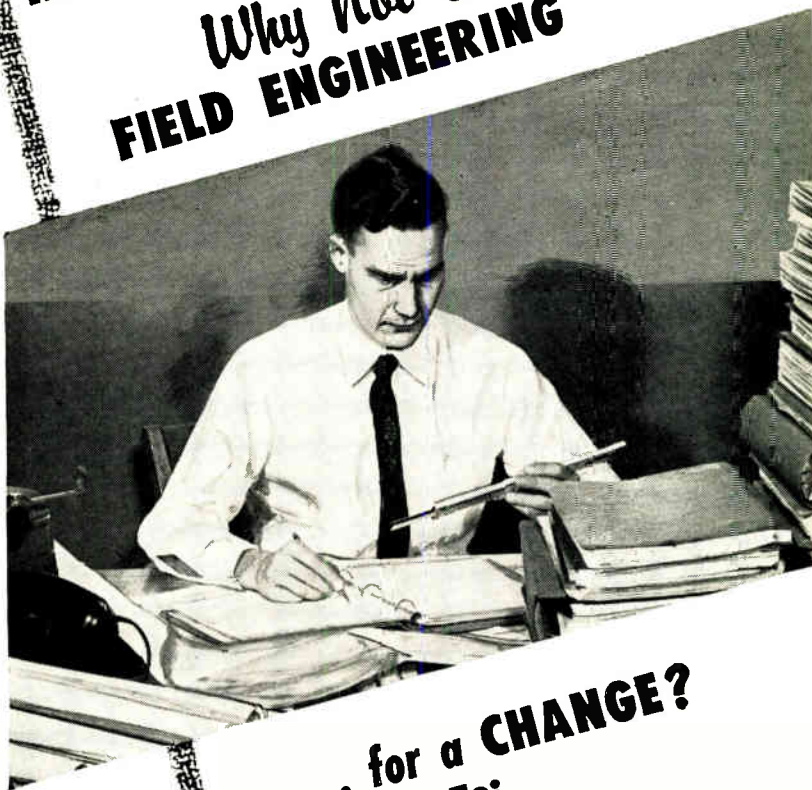
New York

Awards For 1958

Identification sets	120,000
Indicators	16,035,731
Indicators, radar	1,152,198
Infrared equipment	1,018,305
Isolators	59,445
Integrator, video signal	146,098
Intercom equipment	379,544
Inverters	626,427
Kits, avionic modification	115,825
Kits, computer modification	794,290
Kits, electronic training	36,997
Kits, fire control modification	61,382
Kits, modification	5,149,860
Kits, radar installation	1,744,060
Kits, radar modification	2,628,170
Kits, radio modification	104,354
Loudspeakers	222,818
Meters	295,303
Meters, amp	96,143
Meters, field strength	167,281
Meters, frequency	2,974,231
Meters, ohm	29,084
Meters, volt	803,441
Meters, watt	179,100
Microphones	439,272
Microwave equipment	1,490,927
Mine detectors	1,341,026
Modulators	309,900
Monitors	1,662,963
Multimeters	1,381,190
Multiplexers	1,975,691
Oscillators	1,416,556
Oscillographs	210,738
Oscilloscopes	3,963,022
Paper, recording, electrosensitive	208,958
Patching racks, video	54,000
Potentiometers	277,001
Power supplies	2,547,893
Public address sets	70,433
Radar equipment	54,107,312
Radiac equipment	1,054,511
Radio equipment	1,619,001
Radio equipment, SSB	9,864,691
Radio receivers	8,146,909
Radio sets	25,824,554
Radiosonde	1,878,089
Radio transmitters	15,998,518
Radio transceivers	24,193,464
Radomes	1,042,519
Reactors	36,478
Receivers, telemetry	394,703
Recorder/reproducers and accessories	11,283,049
Rectifiers	150,256
Relays	1,177,824
Relays, armature	265,047
Relay assemblies	378,691
Relays, solenoid	245,730
Resolvers	586,425
Resistors	1,186,908
Semiconductor diodes	740,038
Simulators	149,565
Sonar equipment	5,294,422
Stroboscopes	64,952
Switchboard equipment	671,548

(Continued on page 456)

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PHILCO TECHREP DIVISION

DEPT. 32, 22nd & Lehigh Avenue,
 Philadelphia, Pa.

Govt. Contracts (cont.)

Switch electronic	35,995
Switches	1,023,452
Switching assemblies	303,820
Switch, pressure	75,807
Switch, rotary	101,235
Switch, toggle	185,808
Synchros and assemblies	3,133,901
Synchro signal amplifiers	108,477
Systems, telemetry	48,730
Tape, magnetic	105,244
Tape, recording	3,162,666
Telephone terminals	63,451
Teletype equipment	12,289,988
Teletypewriter, radio	1,997,879
Test bridges	262,800
Testers	7,146,947
Test sets	968,329
Test set, radar	4,942,332
Transducers	371,450
Transformers	446,557
Transistors	308,376
Transmitter, rate gyro	81,778
Transmitter/receiver, tape	12,267
Transmitter, synchro	198,117
Transponder sets	2,205,865
Tube, cathode ray	102,844
Tube, electron	50,337,068
Tube, klystron	604,450
Tube, magnetron	1,556,517
Tube testers	473,466
Tube, thyratron	41,665
Tubes, traveling wave	41,400
Tuners	29,033
TV equipment	984,232
Ultrasonic equipment	60,319
Voltage regulators	132,458
VTYM	50,068
Waveguide and accessories	108,099
Wire and cable	12,946,993
X-ray equipment	192,420

GOVERNMENT ELECTRONIC CONTRACT AWARDS

This list classifies and gives the value of electronic equipment selected from contracts awarded by government agencies in April 1959.

Amplifiers	1,579,814
Amplifier, synchro signal	116,100
Antennas & systems	291,280
Batteries, dry	163,260
Batteries, storage	258,313
Batteries, thermal	40,695
Cable assemblies	53,252
Cable, telephone	212,424
Components, electronic	719,907
Connectors	128,238
Converters, digital to analog	33,600
Converters, signal	96,182
Decoders, audio	139,482
Diodes, semiconductor	102,945
Direction finder sets	591,944
Equipment, telemetry	101,507

(Continued on page 458)

Fellow Engineers and Scientists:

My company has asked me to tell you of the unusual opportunities in operations research at System Development Corporation. These range from positions for engineers and scientists who would like to develop their skills working in a team under an experienced leader to opportunities for those who are looking for positions of leadership. I hope that the following account of our work will lead you to inquire for further information.

Briefly, SDC's business is automated decision-making systems. More fully, we develop large scale, computer-based information processing systems in which the computer is used as an on-line, centralized control element for a system operating in real-time. At this stage of the art these systems are semi-automatic, the man-machine type in which man shares the repetitive control function with the computer. Our work is concept-oriented, rather than hardware-oriented, and deals with problems of over-all system design, data processing development, and man-machine system training.

The most fully developed large-scale semi-automatic system is the SAGE (Semi-Automatic Ground Environment) Air Defense System. We have a major responsibility in the development of SAGE. Our experience and unique team skills have led to diversification of our activities; we now have important contracts for other major military and government systems vital to our country. The demand for our services is reflected in our growth from 70 to more than 2,700 employees since 1955, and the intriguing possibilities of automated decision-making are only beginning to be realized.

In this brief message, I can only suggest the variety of operations research problems at SDC. Perhaps the most important point is that this variety is limited only by the imagination and initiative of our scientists.

Some examples of areas of work are: (1) allocation of decision-making functions between man and machine for optimal system performance; (2) measures of system capacity and system performance; (3) exploration and evaluation of design changes by operational gaming; (4) quality control and testing of operational computer programs; (5) allocation of computer capacity among several system functions; (6) scheduling and costing of production of operational computer programs; (7) optimal assignment of mixed weapons to targets.

SDC recognizes the importance of a well planned research program for the vitality and future of the company, and we are carefully organized to carry out such a program. The following are some areas our operations research people are involved in: (1) simulation and operational gaming techniques in problems of control systems; (2) information retrieval and theory of information processing; (3) medical data processing; (4) universal language for computer programming; (5) logistics. We have unusual facilities for research at SDC—these include one of the largest computer facilities in the world and outstanding simulation laboratories.

We have given considerable thought to organizing the activities at SDC to provide for professional development and self-expression. Operations research professionals are carefully assigned so that their individual talents are matched with company needs. These assignments are reviewed regularly to make sure that developing talents are directed into new company opportunities. We regard the publication of research articles and participation in professional societies as activities important to the company. We encourage new ideas and provide the time and means to explore them.

SDC is one of the leaders in a field which will have a remarkable technological and scientific development. It is a new and vigorous company with a bright future. I encourage you to join us.

Please write Mr. R. W. Frost at the address below if you wish to pursue this invitation.

William K. Smith

Circle 812 on "Opportunities"
Inquiry Card ➔

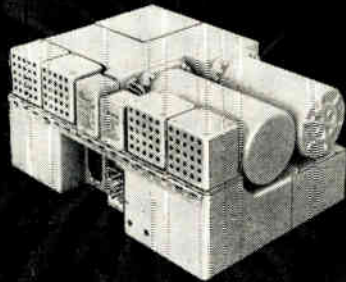
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William Karush
Assistant Director for Research
Operations and Management Research
System Development Corporation

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Centralized Air Data Computer

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- **SERVO-MECHANISMS AND ELECTRO-MAGNETICS** Requires engineers with experience or academic training in the advanced design, development and application

of magnetic amplifiers, inductors and transformers.

- **FLIGHT INSTRUMENTS AND TRANSDUCERS DESIGN ANALYSIS:** Requires engineers capable of performance analysis throughout preliminary design with ability to prepare and coordinate related proposals.
- **DEVELOPMENT:** Requires engineers skilled with the analysis and synthesis of dynamic systems including design of miniature mechanisms in which low friction, freedom from vibration effects and compensation of thermo expansion are important.
- **PROPOSAL AND QUALTEST ENGINEER** For specification review, proposal and qualtest analysis and report writing assignments. Three years electronic, electrical or mechanical experience is required.

Forward resume to:
Mr. G. D. Bradley

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AIRESEARCH INDUSTRIAL • AERO ENGINEERING
AIRSUPPLY • AIR CRUISERS • AIRESEARCH AVIATION SERVICE

Govt. Contracts

(Continued from page 456)

Indicators, frequency channel	869,484
Limiters, fuse	38,271
Meters, frequency	75,000
Modulators	34,250
Monitors, coordinate data	923,200
Monitors, radio frequency	156,301
Monitors, telemetric data	167,452
Oscillators	63,283
Oscillographs	185,937
Power supplies	683,326
Radomes	3,310,226
Radar sets-accessories	6,513,215
Radio sets	2,043,301
Receivers, radio	814,043
Receiver/transmitter sets	756,872
Rectifiers	183,708
Recorders with oscillograph	27,050
Recorders, magnetic variation	121,750
Recorders, video tape	233,024
Recorders/reproducers	211,275
Relays & assemblies	59,768
Relays, solenoid	68,416
Resistors	260,436
Signal generators	35,360 +
Slotted lines	91,238
Sonar equipment	268,892
Spare parts, radar	423,366
Standards, frequency	250,000
Switch, thermostatic	97,009
Switches	36,263
Switch, pressure	27,126
Switch, rotary	25,073
Synchros	853,860
Transmitters, radar	289,880
Tubes, electron	2,649,342
Tubes, klystron	361,000
Tubes, magnetron	1,667,569
Tubes, thyratron	128,775

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REFERENCE ISSUE

1959 MILITARY ELECTRONIC PROCUREMENT DIRECTORY

This is an up-to-date listing of key AIR FORCE, NAVY and ARMY procurement and production personnel, indicating the organizational placement of the men concerned with electronic procurement.

U. S. AIR FORCE

AIR RESEARCH & DEVELOPMENT COMMAND HEADQUARTERS

Andrews Air Force Base Washington 25 D C
Phone REdwood 5-8500

Responsible for research and development projects originated by various Centers, each of which does its own procurement*

	Tel Ext
COMMANDER	
Lt Gen B A Schriever	89225
VICE COMM	
Maj Gen J W Sessums Jr	89251
DEP COMM FOR RESOURCES	
Maj Gen D R Ostrander	89251
DIR OF PROCUREMENT R E Miedel (acting)	3209
CONTRACT DIV	
Maj J A Murphy	3114
R & D Branch Of Contract Div	
G G Bruder	2265

Exec For Small Business	
J C Eiden	81104

DEPUTY COMM FOR WEAPONS SYSTEMS	
Brig Gen M F McNickle	6218

TECH DIR A G Wimer Jr	87266
------------------------------	-------

ASST FOR GUIDED MISSILE SYSTEMS	
Col E A Kiessling	5111

San Antonio R & D Procurement Office

Lackland AF Base, Texas	
Phone WALnut 3-3411	
CHIEF W F Fister	2113

TECH DIRECTOR J E Keto	25252
-------------------------------	-------

DEPUTY FOR DEV Col H P Huglin	38200
--------------------------------------	-------

DEPUTY COMM FOR RESOURCES	
Col D B Diehl	38201

CHIEF OF STAFF Col E R Jacoby	20159
--------------------------------------	-------

DIR OF PROCUREMENT Lt Col T Watkin	23158
---	-------

CONTRACT DIV Maj B B Biggs	33228
-----------------------------------	-------

DIR OF LABORATORIES Col J A Jack	28217
---	-------

AF CAMBRIDGE RESEARCH CENTER

L G Hanscom Field Bedford Mass
Phone CRestview 4-6100

Responsible for research, development and test in electronics, physics, radio-biology, etc.

COMMANDER Col E W Richardson	2301
-------------------------------------	------

PROCUREMENT DIR W Irwin	2201
--------------------------------	------

ELECTRONIC RES DIR Dr L M Hailingsworth	600
--	-----

ROME AIR DEV CENTER

Griffiss AF Base Rome N Y
Phone ROME 3200

Responsible for applied research, development and test of electronic ground, ground-to-air and certain airborne systems such as detection, control, identification, countermeasures, navigation, communications, data transmission, associated components and automatic flight equipment

COMMANDER Brig Gen D P Graul	7701
-------------------------------------	------

DEPUTY Col D M Harvey	7702
------------------------------	------

DIR OF PROCUREMENT Col H Burhanna	2201
--	------

SCIENTIFIC DIRECTOR H Davis	5134
------------------------------------	------

DIR OF INTELLIGENCE & ELECTRONIC	
---	--

WARFARE Col R J Quinn	75128
------------------------------	-------

AF FLIGHT TEST CENTER

Edwards AF Base Calif
Phone Edwards AF Base 1101

Responsible for flight testing, research, parachute development, static rocket engine testing and experimental high-speed track testing

COMMANDER Brig Gen J W Carpenter 3d	2100
--	------

DEPUTY COMM Col P C Ashworth	21021
-------------------------------------	-------

TECHNICAL DIR P R Bickle	31001
---------------------------------	-------

DIR OF FLIGHT TESTS Col R N Baker	3200
--	------

DCS FOR MATERIEL Col R W Busching	49121
--	-------

DCS FOR OPERATIONS Col J R Hoover	31301
--	-------

PROCUREMENT DIV Maj J R Pugh Jr	
--	--

AIR FORCE OFFICE OF SCIENTIFIC RESEARCH

Temp X Bldg Washington 25 D C
Phone LIncoln 6-5650

COMMANDER	
Brig Gen B G Holzman	221

DIR OF PROCUREMENT	
Lt Col A L Thayer	283

WRIGHT AIR DEV CENTER

Wright-Patterson AF Base Ohio
Phone CLEARwater 3-7111

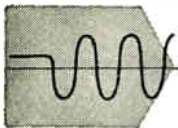
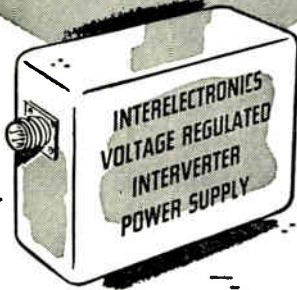
Responsible for research, development and test of assigned systems, components, etc. Also to provide technical and test support to weapons and systems assigned to other ARDC Centers

COMMANDER	
Maj Gen S T Wray	26124

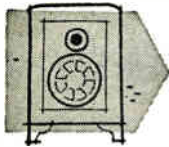
VICE COMM Col W R Grohs	28232
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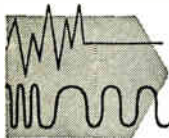
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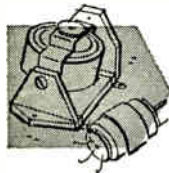
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AF MISSILE TEST CENTER

Holloman AF Base New Mexico
Phone (At Alamogordo) GRanite 3-6511

Responsible for tests, research and development related to tests of pilotless aircraft and guided missiles

COMMANDER Brig Gen D E Hooks	6681
DEPUTY Col A T Culbertson	7081
DIRECTOR OF ADVANCED TECHNOLOGY	
Col J O Cobb	354
DIR OF AIRCRAFT MISSILE TEST	
Col R S Maloney Jr	
DIR OF PROCUREMENT	
Maj C LaBarr	201

AF MISSILE TEST CENTER

Patrick AF Base Fla
Phone Cocoa Beach 2231

Responsible for tests, research and development related to tests on controlled target drones, guided missiles, components

COMMANDER Maj Gen D N Yates	21171
VICE COMM Brig Gen W L Rodgers	22273
DEP COMM/RANGE Col P R Cooper	22207
DEP COMM/TESTS Col H E Warden	35211
PROCUREMENT DIV Lt Col J M Venable Jr	33239
DCS FOR MATERIEL Col H C Rankin	

AIR MATERIEL COMMAND

Wright-Patterson AF Base Ohio
Phone CLearwater 3-7111

Responsible for all AF procurement and production other than research and development

COMMANDER Lt Gen S C Anderson	6-0333
VICE COMM Lt Gen W F McKee	5-6103

CHIEF OF STAFF Brig Gen J T Kingsley Jr

DEP CHIEF OF STAFF Col J H Bowman 5-6226

DIR OF PROCUREMENT AND PRODUCTION
Maj Gen W O Senter 2-7119

DEPUTY DIR OF PROCUREMENT
Brig Gen W A Davis 2-2200

Ballistic Missile Center

Inglewood, Calif
Phone SPring 6-1444

COMMANDER Maj Gen B I Funk
DIR OF PRODUCTION Col S E Ellis

OFFICE OF PROCUREMENT COMMITTEE
R W Burns

AERONAUTICAL EQUIPMENT DIV
Col E H Wilson

AIRLINES MAINTENANCE & SERVICE
CONTRACTS DIV Col L F Tanberg

AERONAUTICAL SYSTEMS CENTER

Wright-Patterson AF Base Ohio
Phone CLearwater 3-7111

Responsible for purchases for the Air Force in the field of aircraft and guided missiles

COMMANDER Brig Gen H B Warren	27214
CHIEF OF AIR DEFENSE SYSTEM	
Col W E Chambers	
AIR EARLY WARNING & COMMUNICATION	
Lt Col K E Beary	

DAYTON AIR FORCE DEPOT

Wilmington Pike Dayton Ohio
Phone CLearwater 2-6551

Responsibility to buy electronic components

COMMANDER Brig Gen C E Jung

DIRECTORATE OF PROCUREMENT & PRODUCTION
DIRECTOR Col R L Salzerullo

SMALL BUSINESS & CONTRACTORS RELATIONS OFFICE N A Hess

CONTRACT SUPPORT DIV Capt J D Chatfield

EQUIPMENT DIV Maj T H Morgan

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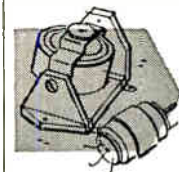
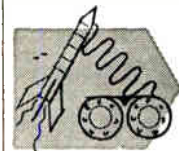
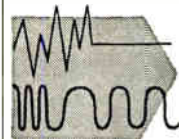
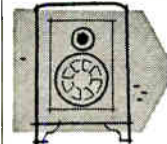
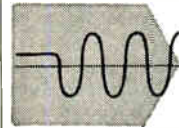
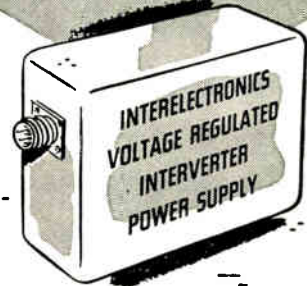
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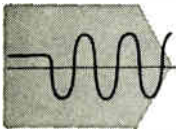
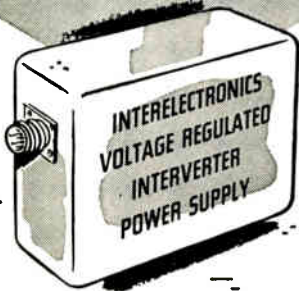
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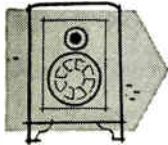
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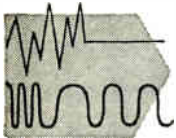
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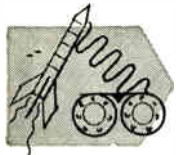
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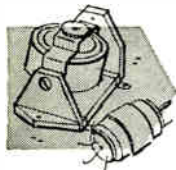
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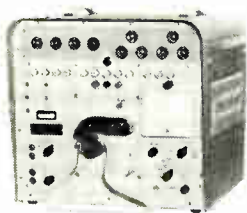
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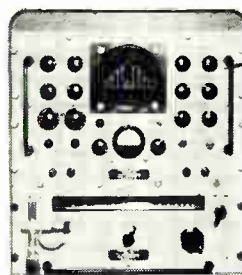
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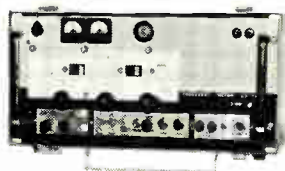
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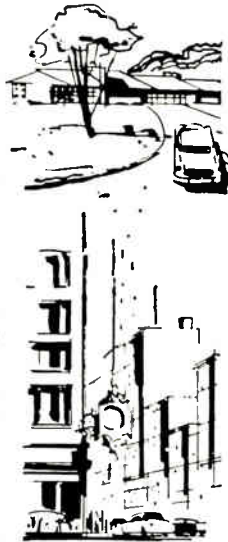
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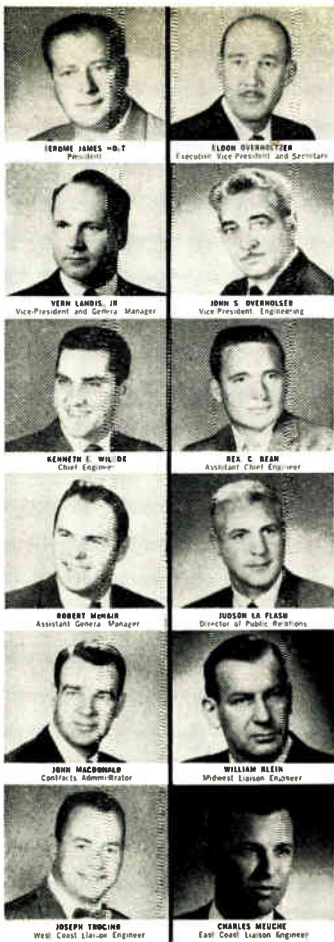
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- "General Procurement Information On Guided Missiles, Rockets and Target Drones" (March 1959). From Supt. of Documents, U S Govt. Printing Office, Wash. 25, D. C. Price 15 cents.
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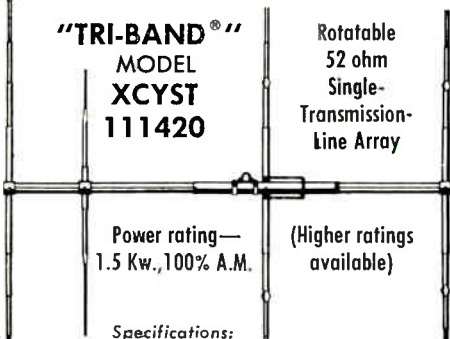


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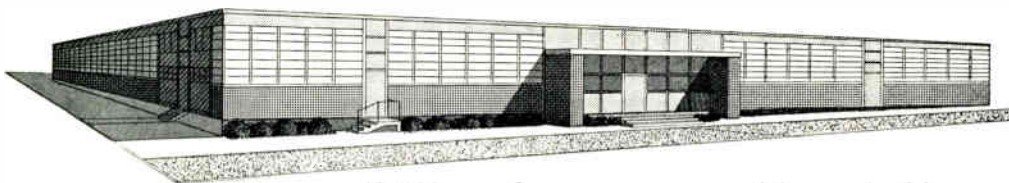
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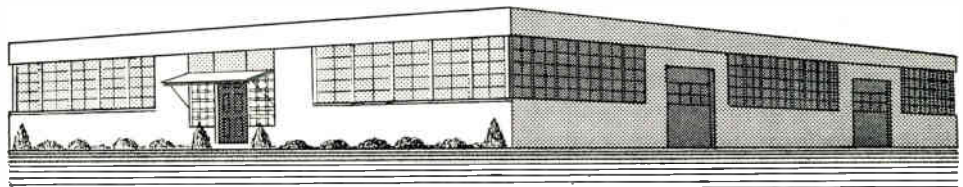
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GROUP	OFFICER AND MAILING ADDRESS	ITEM	GROUP	OFFICER AND MAILING ADDRESS	ITEM
<i>Signal Corps</i>	Chief Signal Officer, Room 2D-260, The Pentagon, Wash. 25, D. C. Commanding Officer, Signal Corps Supply Agency, 225 S. 18th St., Phila. 3, Pa.	Res. & Dev. Fixed & Mobile Communication Equipment	<i>Ordnance Corps</i>	Chief of Ordnance, Room 1B-466, The Pentagon, Wash. 25, D. C. Commanding General, Redstone Arsenal, Huntsville, Ala.	Res. & Dev. Rockets & Guided Missiles

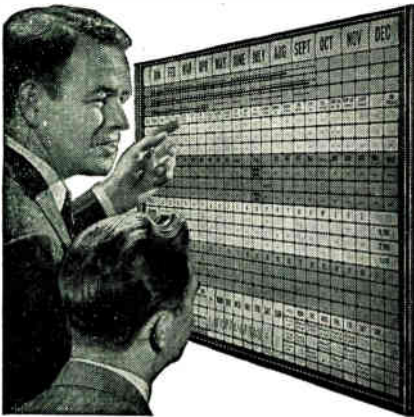
DEPT. OF THE NAVY

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<i>BUORD</i>	Chief, Bureau of Ordnance, Dept. of the Navy, Wash. 25, D. C.	Res. & Dev., Radar, Guided Missiles		Quartermaster General, Headquarters, U. S. Marine Corps, Dept. of the Navy, Wash. 25, D. C.	Electronic Eq. & Spare Parts
<i>BUSHIPS</i>	Chief, Bureau of Ships, Dept. of the Navy, Wash. 25, D. C.	Res. & Dev., Electronic Eq., Radio, Radar, Communication Eq.		Commanding Officer, Aviation Supply Office, 700 Robbins Ave., Phila. 11, Pa. Commanding Officer, Electronic Supply Office, Great Lakes, Ill.	Aeronautical Electronic Eq. Electronic Maintenance & Repair Parts

DEPT. OF THE AIR FORCE

Commander, Headquarters, Air Materiel Command, Wright-Patterson Air Force Base, Ohio Attn.: Director of Procurement & Production	Guided Missiles	Commander, Dayton Air Force Depot, Gentile Air Force Station, Wilmington Pike, Dayton, O. Attn.: Director of Procurement & Production	Switches, Relays, Capacitors, Vacuum tubes, radio crystals, lab. & shop test equipment
Headquarters, Air Research & Dev. Command, Andrews Air Force Base, Wash. 25, D. C. Attn.: Director of Procurement	Basic Res. & Dev.	Commander, Rome Air Force Depot, Griffiss Air Force Base, Rome, N. Y. Attn.: Director of Procurement and Production	Ground radio, radar, navigation equipment, Ground communications, R. & D. for ground electronic eq.

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ANTENNAS, PROPAGATION

Determining the Phase Center of a Radiator Using the Method of Least Squares, A. A. Borodulin. "Radiotek." July 1958. 4 pp. The method of least squares is used to derive simple and accurate formulas for determining the coordinates of the phase center of a radiator. The error of the method is computed.

The Practicality of Using the Term "Tropospheric Radiowaves," M. P. Dolukhanov. "Radiotek." June 1958. 2 pp. Using new data on the long-range propagation of ultra-short waves proof is given of the practicality of introducing the concept of "tropospheric waves"; this is an addition to the conventional subdivision of radiowaves into classes corresponding to the method by which they are propagated around the earth's sphere by "earth and ionospheric" waves.

A Conical Helical Antenna with a Constant Pitch Angle, N. P. Timirev. "Radiotek." June 1958. 8 pp. The paper gives a theoretical analysis of the computation of directivity patterns for a conical helical beam antenna with a constant pitch angle. It is shown that when a conical helix is used it is impossible in principle to obtain circular polarization in the axial direction. Recommendations are made on selecting the optimum constant parameters for the radiator.

On a Certain Method of Successive Approximations in the Theory of Reflectors Having Special Shapes, B. V. Kinber. "Radiotek." May 1958. 9 pp. The paper represents the directivity patterns of scattering reflectors in the form of the sums of the patterns corresponding to geometric-optics and diffraction patterns. The resulting pattern, due to the phase difference between the components of the pattern, has a slightly "chopped up" appearance. An equation is derived for correcting the shape of the reflector; this equation makes it possible to use the computations and experiments to refine the shape of the reflector and to improve the approximation to the specified directivity pattern. Experimental results are given demonstrating the verification of the correction equation.

On the Theory of a Double Block of Slot Resonators, M. F. Stel'makh. "Radiotek." Aug. 1958. 7 pp. The paper studies the propagation of electromagnetic waves in a double block of slot resonators (a double "comb"). Dispersion equations are derived, and expressions are determined for the coupling coefficients between the field and the beam for aligned and non-aligned blocks.

General Formulas for Computing the Field Produced by an Arbitrary Oriented Dipole Above a Plane Homogeneous Earth, L. S. Tartakovskii. "Radiotek." Apr. 1958. 8 pp. The paper presents and analyzes the general formulas for computing fields in the wave region produced by vertical and horizontal suspended electric dipoles which are located above a plane homogeneous earth. The paper indicates the special features of radiowave propagation over a region with a surface containing iron ore.



CIRCUITS

Applications of Phase-Shift Automatic Frequency Control, A. D. Artym. "Radiotek." Aug. 1958. 10 pp. The paper studies various applications of phase-shift automatic frequency control when it is used for band-pass filtering, frequency modulation and phase detection.

A method for Computing the Variations in the Parameters of Nonlinear Multipole Networks, A. A. L'vovich. "Radiotek." Aug. 1958. 9 pp. The paper is devoted to deriving generalized computation formulas which make it possible to establish the relationship between parameter variations in nonlinear multipole networks and variations in the controlling voltages (or currents) which are applied to the network. A study is made of nonlinear multipole networks with any number of nonlinear elements (resistances).

A Low-Frequency Power Amplifier with Distortion Compensation, G. Ia. Gurovich. "Radiotek." Aug. 1958. 4 pp. The paper demonstrates the possibility in principle of fully compensating frequency, nonlinear, amplitude, phase and noise distortion, etc., in a low-frequency power amplifier without reducing its gain. This is achieved using a special circuit for coupling the tubes, which makes it possible to apply a special type of negative feedback to each stage.

A Circuit for Measuring Weak Signals with a Continuous Spectrum, V. S. Voiutskii and A. I. Slutskovskii. "Radiotek." Sept. 1958. 5 pp. The paper describes a circuit for measuring weak signals with a continuous spectrum; the unit eliminates the effect of intrinsic equipment noise and gain instability. The principles of the circuit are given, as well as its description and the results of an experimental test of the unit.

Computing the Equivalent Parameters for Evaluating the Thermal Operating Mode for Pulse Modulator Capacitors, D. E. Vakman. "Radiotek." Sept. 1958. 8 pp. The paper

evaluates the conditions governing the operation of capacitors in transmission-line shaping segments and establishes the criteria which determine the practicality of the capacitors under these conditions.

Instrumentation Errors of a Differential Phase Shifter, V. S. Ignatov. "Radiotek." Sept. 1958. 4 pp. The paper studies a number of factors which affect the accuracy of a differential phase shifter. A quantitative evaluation is made of the errors caused by these factors; a method is given for measuring them. The paper shows that it is possible to achieve mutual compensation of certain errors in the phase shifter.

Temperature Stabilization of Transistorized Voltage Amplifiers, Iu. R. Nosov, B. I. Khazanov. "Radiotek." Feb. 1958. 8 pp. A condition is derived for thermal stabilization of the gain of transistorized voltage amplifiers and methods are indicated for satisfying this condition. The following topics are treated in detail: 1) thermal variation of the gain; 2) the condition governing thermal stabilization; 3) temperature variation of the currents through the transistor; 4) achieving complete thermal stabilization.

The Analysis and Design Method of the Transients of Generations Excitation Controlled by Magnetic Amplifier, V. R. Kulikov. "Avto. i Tel." June 1958. 10 pp. The author proposes a method that enables design of the equivalent time constant of a unit which includes the operating winding of magnetic amplifier, single-cycle bridge-circuit of rectification and active-inductive load simulating the excitation winding of the generator.

ABBREVIATIONS

Avto. i Tel. Avtomatika i Telemekhanika
Radio. Radio
Radiotek. Radiotekhnika
Rad. i Elek. Radiotekhnika i Elektronika
Iz. Acad. Bulletin of Academy of Sciences, USSR.

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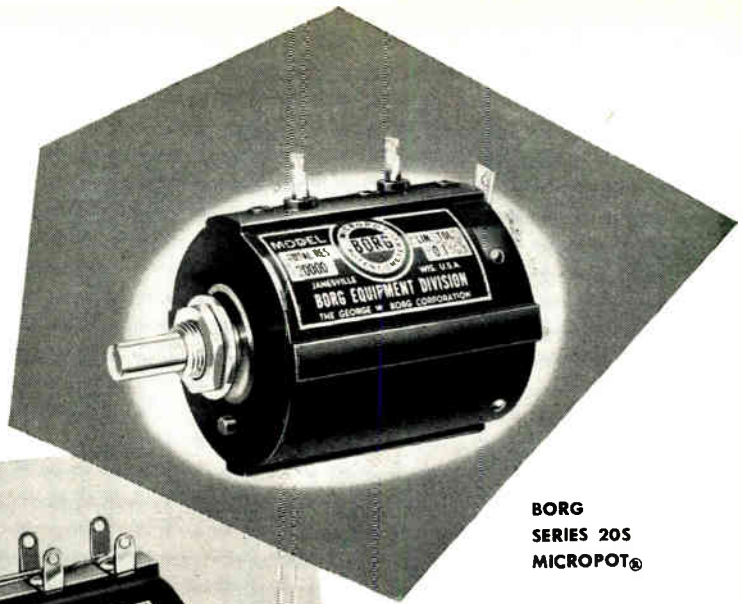
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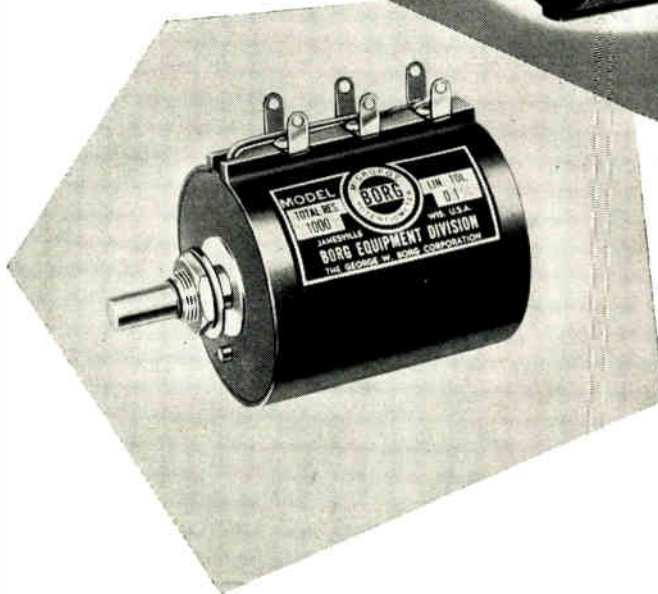
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Investigating the Passage of Various Frequencies Through a Double-Tuned System With Artificially Controlled Intrinsic Dissipation in the First Tuned Circuit, E. G. Aleksandrova. "Radiotek." May 1958. 8 pp. The paper studies the frequency properties of a system consisting of two coupled tuned circuits with artificially controlled intrinsic dissipation in the first tank circuit. The paper shows that in a number of cases it is possible to appreciably widen the pass band of the system (compared to the pass band obtained when dissipation is introduced into the second tank circuit) by increasing the dissipation in the first tank circuit.

The Effect of a Random Voltage on a One-Shot Multivibrator with Two Stable States of Equilibrium, A. M. Vasil'ev. "Radiotek." Jan. 1958. 8 pp. Based on special assumptions, the paper treats the effect of a random voltage which is applied to the control grids of a one-shot multivibrator with two stable states of equilibrium. The paper derives functions which determine all of the probability characteristics for the voltage at the output of the multivibrator. The probability of a given state is computed, as well as the average value and correlation function for the output voltage.

The Serial Mode in a Multiphase Multivibrator, Ia. E. Belen'kii and A. N. Svenson. "Radiotek." March 1958. 5 pp. The paper treats the so-called serial mode in a multiphase multivibrator. For such a mode the device generates not one but a series of pulses. The operating mechanism of the multivibrator is described, and the basic design relationships are derived.

The Theory of Critical Overshoot for Multistage Pulse Amplifiers, V. P. Shasherin. "Radiotek." March 1958. 13 pp. The paper demonstrates that the previous formulation of critical overshoot theory for multistage pulse amplifiers is inaccurate. This formulation is refined on the basis of computing the overshoot of the transient responses for multistage amplifiers with a simple compensating circuit.

A Circuit for the Automatic Frequency Trimming of a Synchronous Oscillator, I. lu. Klugman. "Radiotek." March 1958. 13 pp. The paper describes the operation of the "four diode" circuit used in the majority of Soviet synchronous oscillators. The condition governing stable operation is introduced for the specified circuit, and the relationship between the circuit parameters and the stability condition is given. The stability condition is verified experimentally. Circuit parameters are computed which guarantee stable operation for optimum control performance.

A Direct-Coupled Transistor Amplifier, N. S. Nikolaenko. "Radiotek." Feb. 1958. 9 pp. The paper studies the circuit, the computation and test results for a direct-coupled transistor ac amplifier. The advantages of this very simple circuit, which contains a minimum of components and makes it possible to operate at an ambient temperature of up to 100 deg C, are demonstrated.

Simulating the Input Admittance of a Tube, A. M. Gasanov. "Radiotek." Jan. 1958. 3 pp. The paper proposes a network which makes it possible to simulate the resistive component of the input admittance of a tube. The electrical design of the network is given.

The Passage of a Pulse Through an Amplifier With High-Speed AGC, B. Kh. Krivitskii. "Radiotek." Apr. 1958. 8 pp. The paper studies the special features governing the passage of a trapezoidal pulse through an amplifier having the simplest high-speed automatic gain control. An approximate determination is made of the shape and magnitude of the pulse at the output of the amplifier.

Relaxation Oscillators and Relaxation Multivibrators Which Use the Driven-Multivibrator Circuit (the Schmitt Circuit), G. P. Petin. "Radiotek." July 1958. 4 pp. The paper describes relation oscillators which produce rectangular and linear-sawtooth voltages. When the magnitude of one resistance in the circuit is varied these oscillators become relaxation multivibrators with one stable state. They generate rectangular pulses or pulses with a linearly decreasing voltage.

Computing the Losses in a Symmetrical Three-Section UHF Filter with Quarter-Wave Coupling, B. E. Rubinshtein. "Radiotek." July 1958. 11 pp. The paper derives relationships for the insertion losses of the filter as a function of its parameters in the pass band; a graphical method is given which makes it possible to find the filter losses under conditions where the distances between elements are not equal to a quarter wavelength and the resonant wavelength is arbitrary.

A Bridge Circuit for a Gas-Tube Voltage Stabilizer, V. I. Kislov. "Radiotek." June 1958. 3 pp. The paper analyzes a bridge-type gas tube voltage stabilizer with compensation for the voltage increment represented by the tube drop increase which occurs when the current through the tube increases. As a result the low voltage remains rigorously constant.

On the Synthesis of Amplifier Circuits, V. P. Shasherin. "Radiotek." June 1958. 4 pp. The paper discusses the use of certain orthogonal polynomials (Hermitian and Cramp functions) for the analysis and synthesis of amplifiers. This proposal undoubtedly merits attention since it is possible to reduce the time required for computations. However, previous papers on this subject are based on approximations which are too coarse, and thus the results are substantially at variance with results obtained by accurate methods. The accuracy of the results is much worse than the 5-10% cited in previous papers. The following topics are treated: 1) analysis of transient response; 2) synthesizing an amplifier from the specified slope of the transient response; 3) synthesizing an amplifier according to the overshoot of the transient response; 4) synthesizing an amplifier from the duration of the rise corresponding to the interdecimal (0.1 to 0.9) differential between the ordinates of the transient response.

Input Circuits of Contact-Modulated Amplifier, D. E. Polonnikov. "Avto. i Tel." June 1958. 10 pp. The main requirements for input circuits of electronic amplifiers in automatic potentiometers are set forth. The table of diagrams of input circuits with contact-modulated is given, and formulae to determine the parameters of the circuits in question are deduced. Peculiarities of the circuits are determined, and there are some instructions as to how to use the circuits under consideration in the amplifiers of automatic potentiometers.

Transistorized RC Phase-Shift Oscillators, V. M. Lubin. "Radiotek." Feb. 1958. 7 pp. Various circuits for RC phase-shift oscillators are treated. Formulas are given for the oscillation frequency and the amplification criteria. The concept of the potential (ideal) stability coefficient is introduced.

A Method For Increasing the Accuracy Of Pulse Demodulation, B. N. Mitiashev. "Radiotek." May 1958. 9 pp. The paper describes a method developed by the author for pulse demodulation. The method achieves a higher demodulation accuracy as compared to conventional methods. A series of pulses which is pulse-duration modulated or pulse-position modulated can easily be converted to a series which is amplitude modulated. Therefore the description of the method is given only for the case of amplitude modulation. Two demodulator circuits are given and experimental results are cited.

Bridge Circuits for Harmonic Quartz Oscillators, M. M. Pruzhanskii. "Radiotek." June 1958. 9 pp. The paper discusses the theoretical basis for designing harmonic quartz oscillators with LC and purely capacitive bridges in the feedback loop.

Analysis of Various Circuits of Wide-Band Tuning Devices of High Voltage Line Traps, G. V. Mikutsky. "Avto. i Tel." July 1958. 9 pp. Various circuits of wide-band tuning devices of high voltage line traps are considered. Generalized characteristics are given that make it easy to design elements. Some recommendations as to how to defend the elements of the line traps against overvoltage are suggested.

Automatic Compensation of Zero Drift in Electrometric Amplifiers, D. E. Polonnikov. "Avto. i Tel." July 1958. 11 pp. Automatic compensation of zero drift in electrometric amplifiers is treated. The compensation error origin is revealed. The way to remove errors is suggested. The paper includes some circuits for compensation of zero drift. The said circuits provide minimum errors. An amplifier with a dynamic condenser and with automatic compensation of zero drift is described.

Two-Channel Automatic Optimizer, R. I. Stachovsky. "Avto. i Tel." Aug. 1958. 13 pp. The circuit and some blocks of the electronic automatic optimizer enabling to find minimum points (taking into account some limitations) are described in detail. The experimental results corresponding to its different operational regimes are given.

On the Optimum Pass Band of a Tuned System for Pulses With an Arbitrary Duty Ratio, A. L. Feisikhman. "Radiotek." May 1958. 6 pp. The paper studies the dependence of the optimum pass band of a resonant system (with respect to the reception threshold) on the pulse duty ratio. The problem is solved in general form, and also as it applies to rectangular and bell-shape pulses.

On the Theory of High-Frequency Oscillators With Lagging Feedback, I. F. Gonorovskii. "Radiotek." May 1958. 12 pp. The paper studies the possibility of stable generation of a spectrum of equidistant frequencies, depending on the shape of the frequency response for the tank circuit and the relationship between the system transmission band and the magnitude of the delay. The oscillator is represented as a combination of a tuned amplifier and an amplitude limiter in the feedback loop.



COMMUNICATIONS

The Effect of Fluctuating Noise in FM Communications Systems, V. A. Smirnov. "Radiotek." Sept. 1958. 10 pp. The paper presents a new method for the theoretical investigation of the effect of fluctuating noise in FM communications systems. A series of papers has been written on this subject; however, in the majority of cases either many simplifying assumptions were made, or the analysis was sufficiently general but extremely complex. In our paper we present a sufficiently general solution of the problem which at the same time seems to us simpler than the analysis offered in previous papers. The resulting relationships can be used for practical computations.

About Noise Stability of Pulse-Frequency Telemetering, N. V. Pozin. "Avto. i Tel." Oct. 1958. 9 pp. Real noise stability of pulse-frequency telemetering is analyzed by means of signal discretion. As criteria of noise stability, mean error and mean-square error are assumed. Calculation formulae for noise stability evaluation are deduced.



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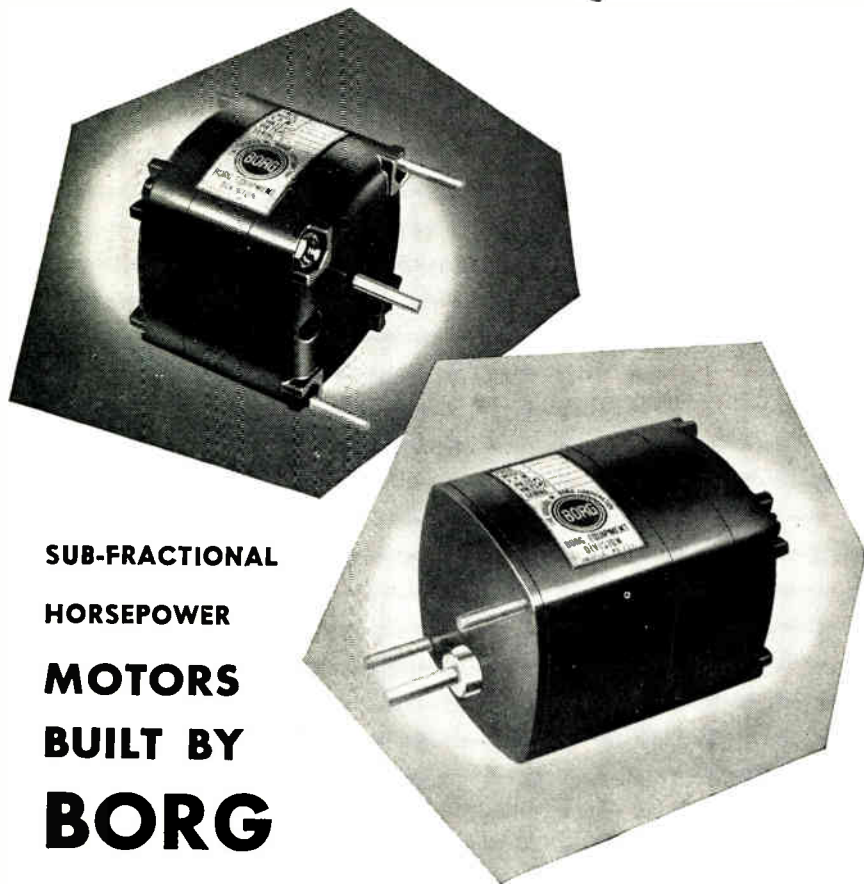
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Magnetic Modulators With Perpendicularly Superposed Magnetic Fields, F. I. Kernbnikov and M. A. Rozenblatt. "Avto. i Tel." September 1958. 13 pp. The operation and the design of magnetic modulators with perpendicularly superposed magnetic fields are considered. Formulae for first and second harmonics of the output voltage for the corresponding types of modulators are obtained. The theoretical results are confirmed by experimental data.

The Effect of Fluctuating Noise on a Discriminator and an Automatic Frequency Control System, A. P. Belkin. "Radiotek." Sept. 1958. 7 pp. The article studies the passage of signal plus fluctuating noise through a discriminator; a formula is derived for the DC component of the discriminator output voltage. A study is made of the effect of fluctuating noise on the discriminator characteristic in the case of a stagger-tuned discriminator. The effect of fluctuating noise on an automatic frequency control system is analyzed when the input to the system consists of a signal and fluctuating noise.

Efficiency of Using Frequency Band in Telemetering, R. R. Vasiliev. "Avto. i Tel." Nov. 1958. 4 pp. Determination of efficiency of using telemetering channels frequency band in various modulation ways is considered. Determination is based on use of information criteria for telemetering systems evaluation.

On A Certain Commutation Circuit, V. G. Lazarev and Yu. L. Sagalovich. "Avto. i Tel." May 1958. 4 pp. Binary commutation circuits are treated. The synthesis based on using the theory of groups makes it possible to get optimal circuits without hard work.

The Statistical Properties of Message Sets, D. S. Lebedev. "Radiotek." Jan. 1958. 8 pp. Within the framework of the discrete case the paper refines the relationship between the statistical properties of message sets and the problems involving the transmission of messages from this set over a communication system. Messages are classified, and an attempt is made to develop a new statistical model for phototelegraphic and television messages. (U.S.S.R.)

On the Theory of Transmission Capacity for Binary Transmission, B. A. Varshaver. "Radiotek." Jan. 1958. 11 pp. Based on the general relationships derived by C. E. Shannon for communication theory and V. A. Kotel'nikov's theory for potential (ideal) noise stability, the transmission capacity of a binary channel is determined for various types of modulation. It is assumed that fluctuating noise is present in the channel.

The Use of Auto-Anode Modulation, A. I. Miroshin. "Radiotek." March 1958. 6 pp. Circuits are given for transmitters using auto-anode modulation. These circuits have been tested under operating conditions in functioning radio stations. The performance of these circuits is discussed.

The Effect of Weak Pulse Noise on FM Receivers, V. M. Sidorov. "Radiotek." March 1958. 14 pp. The effect of weak pulse noise on an FM receiver is treated for the case where there is an arbitrary frequency deviation at the instant the noise appears. The effect of the types of filters in the receiver on the time variation and spectral density of the pulse noise at the receiver output is analyzed.

The Use of Controlled Skin Effect for Modulation Purposes, V. S. Etkin. "Radiotek." March 1958. 4 pp. Various resonant oscillatory systems with ferromagnetic elements were studied when they operated as modulators. The elements operated so as to produce both forced and natural oscillation. Experiments were performed on iron, steel and permalloy. The results demonstrated that permalloy is most sensitive and has the least magnetic losses at microwave frequencies.

—International ELECTRONIC SOURCES

Fluctuating Noise In FM Radiolines When A Pulse-Phase Modulated Multichannel Signal is Transmitted, G. A. Malolepskii. "Radiotek." July 1958. 14 pp. Based on the results cited in previous papers on fluctuating noise in FM systems, the problems of the noise stability of a pulse-phase modulation system are treated for the case when transmission is effected by means of frequency modulation. The analysis is performed for both strong and weak signals. The threshold of the system is determined. The effect of the system parameters on the noise stability is evaluated. Graphs are given for determining the noise stability of radiolines in pulse-phase modulation-FM systems.

On The "Volume" Of A Signal Which Acts On A Filter With Variable Parameters, A. S. Vinitakii. "Radiotek." June 1958. 8 pp. The paper uses a simple example to show that when filters with variable parameters are present in a communication channel the conventional concepts of signal volume and channel capacity are inapplicable. In order to analyze such systems a method is proposed for effecting generalized measurements of the signal and channel; the method is based on using a time scale and amplitude scale which are normalized to the selective portion of the communication channel. It is shown that the conventional formulation of generalized measurements is thus reduced to the degenerate case which applies to a selective section with constant parameters.

The Efficiency of Using The Standard USSR Norms For Industrial Radio-Interference For Improving Radio Reception and Television Reception, V. V. Roditi, M. S. Gartsenshtein. "Radiotek." June 1958. 8 pp. A method is given for determining the probability of interference from residual industrial radio-interference; the results of the corresponding computations are given and the efficiency of using existing norms for certain groups of noise sources is evaluated.

Experimental Studies Of The Extrapolation Method For Combating Pulse Noise In Radio Reception, Iu. I. Medvedev. "Radiotek." June 1958. 6 pp. The paper studies the results of an experimental analysis of a pulse noise suppressor based on the method of "cutting in" the low-frequency channel of the receiver during the time that the pulse noise acts. It is shown that the use of linear signal spectrum converters yields a substantial increase in the effectiveness of the noise suppression. Detailed experimental results are given.

Problems of Noise Stability in a Communication System Which Receives the Signal "As A Whole," K. A. Meshkovskii. "Radiotek." June 1958. 14 pp. The paper develops methods for determining the probabilities of correct reception for certain classes of optimal and almost-optimal codes. A brief analysis is given of the advantages and disadvantages of certain communication systems which transmit a finite number of equally-probable and independent messages. A new communication system is proposed which is free from the disadvantages discussed.

Cross-Modulation Distortion in the High-Frequency Amplifier of an FM Receiver, Z. G. Krasnotsvetova. "Radiotek." May 1958. 4 pp. The paper studies the nonlinear mode in the RF amplifier of an FM receiver; the essential physical meaning of cross-modulation frequency distortion is studied. It is demonstrated that this type of distortion is small. The cases of zero grid current and grid current are analyzed.

Optimum Frequency Deviation in the One-Channel Telemetering Systems, Yu. I. Chugin. "Avto i Tel." April 1958. 9 pp. The method of determination of optimum frequency deviation in the one-channel telemetering system with fluctuating noise is given. The method is based on the analysis of power noise spectrum.

Theory and Design of Frequency Modulators Using Semiconductor Control Elements, V. I. Samoilenko. "Radiotek." May 1958. 7 pp. The paper studies the method of varying oscillator frequency by controlling the capacitance of the n-p-junction in semiconductor diodes and triodes; this method can be used both for frequency modulation and for tuning an oscillator over a wide frequency range. The design method for a frequency modulator is given.

The Transmission Capacity of Communication Channels With Random Variations of the Dissipation, V. I. Siforov. "Radiotek." May 1958. 12 pp. The paper determines the lower boundary of the transmission capacity for a channel with random variations of the dissipation when additive noise is simultaneously present. It is demonstrated that single-ray channels with relatively slow random variation of the dissipation have a very high transmission capacity.

On the Laws Governing the Distribution of Null and Extremal Points in Russian Speech Signals When They are Severely Amplitude Limited, Iu. G. Rostovtsev. "Radiotek." Apr. 1958. 5 pp. A method is described for determining the probability distributions of the repetition frequencies for the null and extremal values of Russian speech signals. Detailed experimental results are given.

Phase Correlation Properties of Signals and Gaussian Noise in Two-Channel Phase-Shift Systems, V. V. Tsvetnov. "Radiotek." Apr. 1958. 10 pp. The paper studies the correlation properties for phase differences in two channel phase-shift systems when they are subjected to Gaussian noise. Analytical relationships are derived for the correlation functions of the phase differences for the case of pure noise and for the case of large signals. Correlation properties of the phase differences are compared with the correlation properties of the Gaussian noise envelope.

Evaluating the Transmission Capacity of Certain Practical Communication Channels, I. A. Ovseevich, M. S. Pinsker. "Radiotek." Apr. 1958. 11 pp. Using previous results, the paper evaluates the transmission capacity for the following types of channels: a) a practical communication channel with time-fixed parameters; b) a channel in which the time variation of the parameters is of the "white noise" form; c) a channel which is a combination of the first two. Examples are used to show that the derived results are generalizations of the known cases analyzed by Sunde and Feinstein.

Noise Stability of Telemetering Signals Transmission Along a Channel with Fluctuation Noise, V. A. Kashirin and G. A. Shastova. "Avto. i Tel." Aug. 1958. 14 pp. Potential noise stability of parameters, transmission is determined when there are amplitude, frequency, pulse-frequency, time, width and code modulation. Generalized transmission parameters are introduced. The fact is proved that within a certain range of the ratio signal/noise, frequency modulation provides the highest noise stability.

New Principles of Construction of Telemetering Systems with Time and Width-Pulse Modulation, V. A. Iljin and A. I. Novikov. "Avto. i Tel." Aug. 1958. 5 pp. The construction principles of single-channel and multichannel telemetering systems with the exponential transducers are considered. These principles enable to create the multichannel systems with time channel division without commutators. The paper contains some expressions for transducers and an example of a system.

Computing the Intrinsic Noise of Transistorized Radio Receiver Units, V. V. Pavlov. "Radiotek." Sept. 1958. 8 pp. The paper presents a method for designing and measuring the intrinsic noise coefficient for transistorized radio receiver equipment.



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COMPONENTS

The Use of Ferrites for Designing Coaxial Rectifier Systems, A. L. Mikaelian, M. M. Kozlova. "Radiotek." Apr. 1958. 6 pp. The paper studies the problem of using ferrites for designing coaxial rectifier systems. An experimental study is made of the non-reciprocal attenuations in a transverse-magnetized ferrite-dielectric plate located in a coaxial line, as functions of the size and permittivity (permeability) of the dielectric and the ferrite. Characteristics are given for the coaxial rectifier at a 10 cm wavelength.

Some Design Problems for an Asynchronous Clutch with a Monolithic Rotor, T. A. Glazenko. "Avto. i Tel." Aug. 1958. 9 pp. Electromagnetic field in the gap and in the rotor of an asynchronous clutch is analyzed. As a result of the analysis formulas for maximum torque and for maximum sliding are deduced. The effect of some design factors on the torque and on mechanical characteristic shape is found out.

Influence of the Dimensions of Toroidal Cores on Their Static Magnetic Properties, M. A. Rosenblatt. "Avto. i Tel." Aug. 1958. 12 pp. The influence of the OD/ID ratio of toroidal cores on their magnetization curves and hysteresis loops is considered. Formulae for the determination of these characteristics are given. It is shown that the influence of the OD/ID ratio is the most for magnetic materials with a rectangular hysteresis loop or with a sharp knee on the magnetization curve.

Dynamics of an Electric Relay Servomechanism with the Load Changing Proportionally to Motion, N. S. Gorskaya. "Avto. i Tel." June 1958. 18 pp. The paper treats the dynamics of an electric relay servomechanism with the load changing proportionally to motion. Motion of the servomechanism is described by a complete second-order differential equation. The right part of the equation gives a relay function with a loop and dead zone. A complete solution of this nonlinear problem by means of the point conversion method is given.

Contactless Relay with Transistors, F. L. Varpakhovskiy and R. A. Lipman. "Avto. i Tel." Nov. 1958. 9 pp. The paper deals with a contactless relay with transistors that is constructed in correspondence with the d-c two-cascade amplifier having a deep positive feedback. The circuit operation is analyzed, main calculation formulae and experimental results are given.

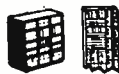
Determination of Heating of Electromagnetic Relay Windings, M. I. Vitenberg. "Avto. i Tel." Nov. 1958. 12 pp. Heating of electromagnetic relay windings is analyzed. Accepted coefficients of heat yielding of relay windings are shown to be unfit to design relays of small size. Formulae to find ratio of the mean coefficient of heat yielding to cooling surface of the winding are given. An idea of specific exceeding of winding temperature is expounded.

The Theory of Structure of Combinational Mechanisms, S. M. Yakovlev. "Avto. i Tel." March 1958. 12 pp. The paper includes the description of an induction potentiometer with linear correlation between output voltage and the angle of rotor turn in the range of about $\pm 90^\circ$. The way of calculation and experimental analysis of the potentiometer in question is considered. The experimental results are given.

Concerning Some Properties of Ferromagnetic Clutches, P. N. Kopay-Gora. "Avto. i Tel." April 1958. 10 pp. Ferromagnetic clutches are compared with electromotors, friction and hydraulic clutches with regard to their starting time, electromagnetic time constant, control power and the ratio of output moment and inertia moment. The said parameters of ferromagnetic clutches appear to be better than those of electromotors and friction clutches.

Punched Cards Synthesis Method of Switching Systems, V. I. Shestakov. "Avto. i Tel." June 1958. 14 pp. The paper deals with vector-algebraic method of synthesis of sequential switching systems of two-position relays by using special cards. This method is available both for autonomous and nonautonomous relay systems.

Synthesis of Systems with Step Selectors, G. Ioanin. "Avto. i Tel." September 1958. 9 pp. The paper deals with step selectors, their construction and action. Step selectors action is described by functions determined for multiposition elements. Some systems with step selectors are synthesized.



COMPUTERS

The Method of Solving a Certain Class of Integral Equations by Using Computers, U. S. Valdenberg. "Avto. i Tel." Aug. 1958. 6 pp. Zeidel's iterative method of approximate solution of Friedgolt's and Voltterra's 1st and 2nd type linear integral equations is worked. The use of computers to solve special types of these equations is indicated. The results of practical application of this method to the automatic control system synthesis problems are considered.

An Analog Computer Realizing Conformal Mapping for N-Order Polynomial, V. A. Brick and S. A. Ginsburg. "Avto. i Tel." July 1958. 10 pp. An analog computer is described that makes it possible to analyze n-order polynomials ($n=1, \dots, 10$) with real and imaginary coefficients. The main destination of the computer is to determine characteristic equations roots and to plot Michaelov locus.

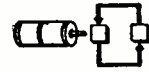
Electro-Mechanical Calculating Device, V. V. Goraky. "Avto. i Tel." May 1958. 8 pp. An electro-mechanical calculating device and its operation are described. The device may be used to plot Michaelov curve and inverse amplitude-phase characteristics of single-loop systems, to make functional transformation of speed feedback, to calculate certain functions, to find real roots of algebraic equations and so on.

Sampled-Data Systems with Extrapolating Devices, Ya. Z. Tsypkin. "Avto. i Tel." May 1958. 12 pp. Sampled-data systems with extrapolating devices are considered. Equations of the said systems describing the process at any moment of time are given. The analysis of the system under consideration is illustrated by an example.

The Way of Forming Transfer Functions of Sampled-Data Control Systems with Extrapolating Devices, S. S. Ermakov and E. M. Esipovich. "Avto. i Tel." May 1958. 7 pp. The paper deals with the way of forming conditional transfer functions of extrapolating devices for digital-to-analog conversion. The transfer function expression depends on the shape of input pulses.

One-Cycle Shift Register, A. Ya Artukhin and V. Z. Khanin. "Avto. i Tel." Oct. 1958. 11 pp.

The analysis of the work of the simplest magnetic shift register circuit, its approximate calculation, the experimental designing data including the use of one core per sign are given. The influence of the length of the shift impulse on the register operation is discussed.



CONTROLS

On Existence of a Cycle Beyond Absolute Stability Conditions of a Three-Dimensional System, B. V. Shirokorad. "Avto. i Tel." Oct. 1958. 15 pp. Beyond absolute stability conditions (under Lurje-Letov (1)) of a closed-loop system with neutral object and regulator having non-linear velocity of controls resetting there always exists a non-trivial (periodical, in particular) stable regime. Physical interpretations of the system are given.

Elaboration of an Almost Optimal System by Means of an Electronic Analog, R. A. Velerstein and A. A. Feldbaum. "Avto. i Tel." September 1958. 12 pp. The paper deals with design of an almost optimal control element, as to its high-speed, for an electronic actuator of a press device in a rolling mill. The design method consists in division of the known part of the system into blocks. A simple optimal control element is elaborated for each block; input value of blocks is controlled in such a way that difference between a real input value and an optimal one approaches zero. The system in question was tested by means of an electronic analog. The system was proved to shorten (2-2.5 times) control time as compared with a linear control system.

On Stability and Autonomy of Automatic Control of Single Synchronous Generator Frequency and Voltage, D. P. Petelin. "Avto. i Tel." September 1958. 15 pp. The paper deals with analysis of stability and autonomy of automatic control of single synchronous generator frequency and voltage at any steady accuracy.

Control Based on Principle of Self-Adjusting Program, I. I. Perelman. "Avto. i Tel." September 1958. 11 pp. Control of objects influenced by repeated disturbances is described. The disturbances can be compensated by special input response. Stability conditions are determined. Problem of stabilization of hot-rolled steel is analyzed.

Determination of Parameters of Automatic Control Systems by Using Experimental Frequency Responses, A. A. Kardashov and L. V. Karnushin. "Avto. i Tel." April 1958. 12 pp. Parameters of linear elements and control systems are determined on the basis of approximation of their experimental phase-amplitude characteristics. By means of interpolation approximative coefficients of the analytical expressions of the phase-amplitude characteristics are found. Then those coefficients are corrected with the help of the method of the least squares. The calculation is illustrated by a number of examples.

Determination of Periodic Behaviour of Automatic Control Systems Having Non-Linear Part with Piece-Linear Characteristic, L. A. Gusev. "Avto. i Tel." Oct. 1958. 14 pp. The paper deals with determination of periodic behaviour of control systems having an arbitrary piece-linear characteristic. The said periodic behaviour is determined as a complete Fourier series without neglecting harmonics. The problem is reduced to solving simultaneous transcendental equations that determine motion time in each part of the non-linear characteristic. Some problems of using computers to solve period equations are considered.

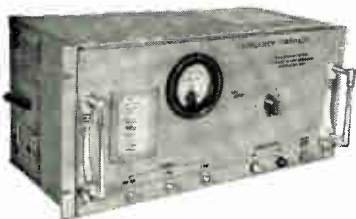
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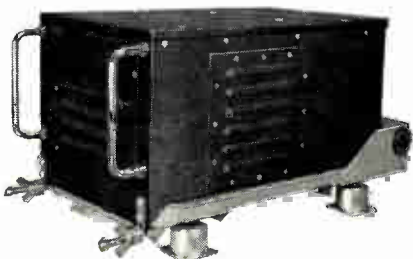


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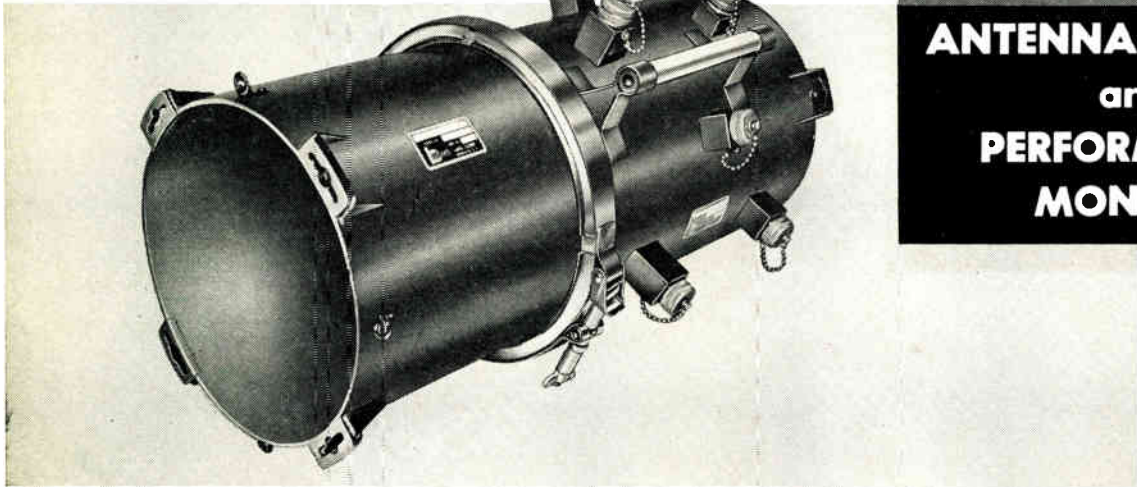
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MODEL NO. 9322

The Bogart Model 9322 Antenna Coupler and Performance Monitor is the outgrowth of a design program to develop a pre-flight check-out device utilizing lossy paint that could be used to monitor an entire system, from magnetron through antenna. Ordinarily, power and frequency checks are made looking into the antenna. Losses in the antenna itself are not checked.

The Bogart Applications Engineering Group developed a lossy paint which could be deposited on the inside of a radome type shield. The carbon-deposited horse-hair materials now in use were found to be unsatisfactory for practical usage. They did not radiate heat, but fed heat back to the antenna, sometimes damaging the antenna itself; they were not suitable for outdoor use; they were suitable only for low-power usage; they were extremely frequency-sensitive; they had a limited life requiring frequent replacement and they were expensive. The Bogart LP* material has the heat conductivity of a

metal, is exceptionally broadband, can be "weathered" indefinitely, will accept high power without deterioration, and is a comparatively inexpensive material.

The Model No. 9322 was designed for a specific radar installation. In this case, it was desired to measure the characteristics of a radar through the antenna, as well as to absorb the RF energy and prevent harmful radiation.

Coupling devices were designed by Bogart to permit measurements of the power out, frequency, spectrum analysis, and sweep rate, from the outside of the aircraft. The foregoing is a simple illustration of a single use of the Bogart Lossy Paint material.

The Bogart Applications Engineering Group would be pleased to discuss the uses of LP* material for your particular requirements. As examples of its current applications, this material has been used for various shapes of antenna couplers, lossy backplates on high power filters, and lossy transmission lines.

ANTENNA COUPLER APPLICATION

Frequency Range (Kmc/s)	Average Power Watts (CW)	VSWR ⁺⁺	Approx. Length (Inches)	Approx. Width (Inches)	Approx. Height (Inches)	Approx. Weight (Inches)
1.00 - 11.00	500	1.15	22-1/2	9-1/2	12	20

PERFORMANCE MONITOR USE

Frequency Range (Kmc/s)**		Coupling (db + 2.5)
1.00	1.50	40
1.50	2.40	40
2.40	3.60	40
3.60	7.30	40
7.00	8.80	40
8.70	10.50	40

(*) Lossy Paint

(++) The VSWR indicated is the difference seen by a circularly polarized antenna when "looking" into free space and into the Bogart Model No. 9322.

(**) Coupler Band Division



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On Improving the Quality of On-Off Control. A. I. Cherepanov. "Avto. i Tel." May 1958. 4 pp. The corrective device for an on-off controller is suggested. Its operation and structure are described. Some data of the analysis are given.

The Effect of the Linear Zone and Saturation Regions on Two-Stage Servomechanism Dynamics. N. S. Gorskaya. "Avto. i Tel." May 1958. 17 pp. Two-stage servomechanism dynamics is considered. The first stage has a relay control element with a loop and a dead zone, the second one has a relay control element with the linear zone and saturation regions. Nonlinear problem of the effect of the linear zone and saturation regions. Nonlinear problem of the effect of the linear zone and saturation regions on servomechanism free motions is analyzed.

Error Coefficients and Phase and Amplitude Characteristics of Linear Reproducing Systems. V. G. Vasiliev. "Avto. i Tel." May 1958. 2 pp. The paper deals with the connection of error coefficients with amplitude and phase characteristics of linear reproducing system with lumped parameters.

Experimental Treatment of Temperature Control. A. A. Kampe-Nemm. "Avto. i Tel." May 1958. 3 pp. The method using thermoelectric corrective device and having properties both of two-position and of proportional-plus-integral control is treated. The corrective device is described in detail. Experimental data show that the device under consideration greatly improves two-position control.

Speed Control of Synchronous Reactive Motor in Magnetic Recording System. L. A. Pusset. "Avto. i Tel." June 1958. 8 pp. The author analyzes the stability of speed control of a synchronous reactive motor of high accuracy in magnetic recording system. The stability conditions are obtained for a case when a phase discriminator of electronic or electro-mechanic type is used as a sensitive element.

The Stability of Periodic Conditions in Control Systems Found Approximately on the Basis of Filter Hypothesis. V. A. Taft. "Avto. i Tel." June 1958. 6 pp. The approximation method of the analysis of the periodic conditions in nonlinear control systems is outlined. A brief comparison of this method is done with the method based on the autoresonance hypothesis.

The Transfer Function of Motor Control by Changing the Exciting Voltage. E. L. Urman. "Avto. i Tel." June 1958. 5 pp. The transfer function of a motor with the additional series excitation winding is deduced.

The Stability of Periodic Conditions in Nonlinear Systems with Piece-Wise Characteristic. M. A. Aizerman and F. R. Gantmakher. "Avto. i Tel." June 1958. 3 pp. The method is described that enable finding the linear approximation equation which solves the problem of the stability of periodic solution in the system with piece-wise characteristic.

About Equivalency of Pulse and Continuous Control Systems. V. A. Rubtsov. "Avto. i Tel." Oct. 1958. 8 pp. Insufficiency of generally used equivalency criterion of pulse and continuous control systems is proved. Sufficient conditions for equivalency of closed loop control systems are determined.

Probability of Element Injury of Automatic Control Systems. S. M. Kuznetsov. "Avto. i Tel." Nov. 1958. 14 pp. Probable change of electric elements parameters of automatic control system when affected by random disturbances is analyzed. Resulted deviation of parameters due to complex disturbances is determined. Approximate equation describing injury probability and probable lifetime of elements at stationary disturbances is deduced.

Concerning a Possibility of Determining an Axial Hydrodynamic Force in a Valve. I. M. Krassov and B. G. Turbin. "Avto. i Tel." March 1958. 4 pp. The paper deals with an axial hydrodynamic force that appears in valve hydraulic amplifier when the working liquid flows through it. The amplifier described may be a meter of the force. The experimental results are presented.

Nonlinear and Computing Devices are Used to Increase High Speed of Some Control Systems. G. M. Ostrowsky. "Avto. i Tel." March 1958. 9 pp. To improve the control quality, nonlinear devices are introduced in some automatic control systems.

The Analysis of the Control and the Synthesis of Automatic Control Systems with Lags. Fan-Chun Wui. 11 pp. "Avto. i Tel." March 1958. The synthesis of corrective devices of servosystems (1) is applied to automatic control systems with lags. Curves to synthesize the systems with lags and to analyze their quality are given.

Electric Control of Stable RC-Generator Frequency. V. P. Demeshin. "Avto. i Tel." July 1958. 13 pp. Electric control of stable RC-generator frequency is considered. This new way of control enables to regulate frequency within wide range. The dependence of frequency on control voltage and on transient process is analyzed, inertial and inertialess nonlinearity being taken into consideration. The circuits of RC-generators in question are given.

Plotting of Root Loci of Automatic Control Systems. N. N. Michaelov. "Avto. i Tel." July 1958. 13 pp. The paper deals with analytical graphical and semigraphical plotting of root loci of automatic control systems. The use of root-finders is suggested to simplify the plotting of root loci. The possibility of the plotting with the help of automatic devices is proved and block-diagrams of these devices are given.

On the Speediest Transient in Servosystems with Power, Torque and Rate Limitations of the Power Unit. E. A. Rozenman. "Avto. i Tel." July 1958. 21 pp and 2 pp of formulae. The problem of the speediest transient process in servosystems with power, torque and rate limitations of the power unit is analyzed. The phase plane of states of the system is divided according to the form of optimum transient at the said limitations. The solution of the variation problem results in the shape of the speediest transient process.

Structure of High-Speed Automatic Control Systems. M. V. Meerov. "Avto. i Tel." July 1958. 12 pp. The paper deals with the synthesis of automatic control systems structure. The structure under consideration permits in principle reproduction of any accuracy. It is shown how to take into account some limitations due to nonlinear characteristics of some units.

Conversion of Output Initial Conditions in a Linear System with Variable Parameters Into an Input Signal. A. V. Solodov. "Avto. i Tel." July 1958. 7 pp. Formulas to convert output initial conditions into an input signal are deduced. The input signal is a combination of various order—functions. The obtained formulas are used to determine the output transient process when pulse transient function is known (the output process is caused by the initial conditions mentioned above).

Logarithmic Method of Plotting a Real Frequency Response of Automatic Control System. V. A. Atsukovsky. "Avto. i Tel." Nov. 1958. 4 pp. Graphic method of plotting real frequency response of a control system is proposed. The method is not cumbersome and permits to find real roots of any order linear algebraic equations.

Improving the Transients in Corrective Elements with Variable Parameters. E. K. Shigin. "Avto. i Tel." April 1958. 6 pp. Some means of improving the transients in the fourth order automatic control systems having two integrators are described. To improve the transient process, introduction of the variable time constant of the integrator is shown to be expedient when there is a differentiator with the variable time constant introduced in the system.

Selective Low-Frequency RC-Amplifier as an Element of a Control System. Yu. G. Kochinev. "Avto. i Tel." April 1958. 5 pp. Dynamic properties of a selective low-frequency RC-amplifier with a double T-circuit are analyzed.

About Reservation Units Number. V. G. Druzhinin. "Avto. i Tel." Nov. 1958. 4 pp. The problem of finding optimal number of reservation units in automatic control system is considered.



GENERAL

On Systems of Units for Electrical and Magnetic Quantities. L. B. Slopian. "Radiotek." Sept. 1958. 9 pp. The MKSA system of units which is widely used in radio engineering and electrical engineering is based on formulas which involve two major defects: 1) formulas expressing the Ampere and Coulomb Laws are written in a physically unjustifiable form; 2) certain other formulas contain the absolute velocity v rather than the ratio v/c . The first defect can easily be removed by replacing the MKSA system by the MKSC system; this is achieved by fixing the quantity ϵ_0 rather than the quantity μ_0 . The elimination of the second defect requires a basic change in the units of all magnetic quantities and is hardly practicable. The basic scientific system of electromagnetic units must be regarded as the CGS (Gaussian) system. In radio engineering and electrical engineering it is desirable to use the MKSC system.

Pulse Servosystems Including Two Pulse Elements with Unequal Repetition Periods. Fan Chun-Wui. "Avto. i Tel." Oct. 1958. 14 pp. Pulse servosystems including two pulse elements with unequal repetition periods are considered. Their equations and transfer functions are determined. Dependence of the system stability on inequality of pulse-repetition periods is analyzed. As to stability rate increasing, the condition $T_1 = T_2$ is proved to be not the best one for a general case.

Universal Pneumatic Multiplication-Division Unit and Device for Automatic Square Rooting. Yu. I. Ivlichev and E. M. Nadzhafov. "Avto. i Tel." Nov. 1958. 13 pp. Block diagrams of a universal pneumatic multiplication-division unit and of a device for automatic square rooting are given. Equations describing operation of universal units are deduced. Accuracy of unit operation is evaluated. Experimental results are exposed.

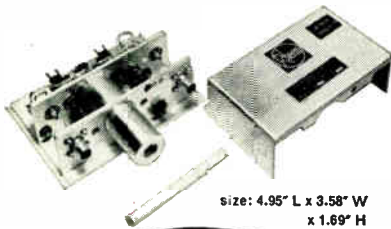
The Effect of the Asymmetry of the Exciting Slot on the Accuracy of a Limiting Attenuator of the Capacitive Type. E. S. Zhavoronkova. "Radiotek." Jan 1958. 11 pp. The paper studies the effect of the mechanical tolerances of the mechanical slot on a limiting capacitive attenuator. It is demonstrated that the amplitude of the E_{01} -wave excited by the slot does not depend on frequency, and that the limiting of the H_{11} -wave is proportional to the square of the frequency. The magnitude of the systematic error is computed for the capacitive attenuator.



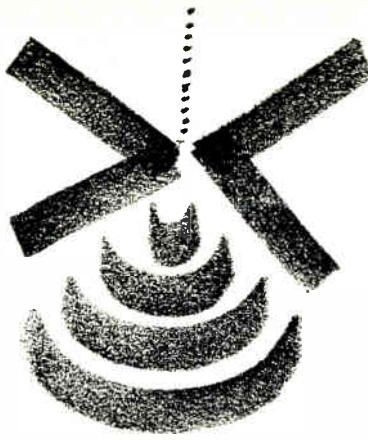
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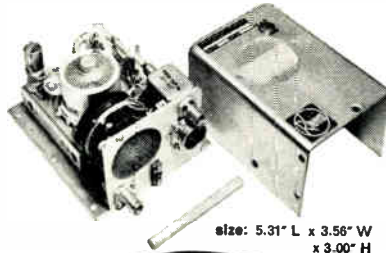
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x 1.69" H



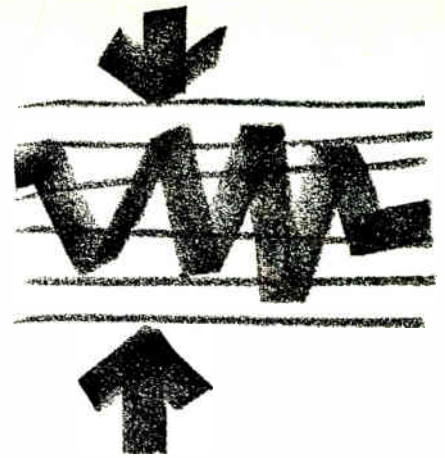
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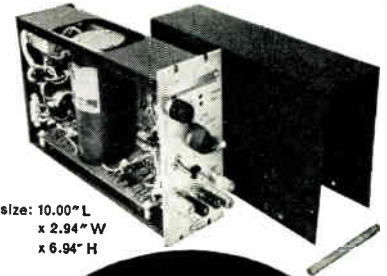
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size: 10.00" L
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The Suppression of Pulse Noise Using a Non-linear Transformation of the Shape of the Noise Frequency Spectrum, A. A. Gorchabev. "Radiotek." Jan. 1958. 6 pp. The paper treats various types of nonlinear transformations for spectra. These transformations precede amplitude limiting. The paper demonstrates the practicality of using converters having a resonant characteristic. Theoretical and experimental results are compared.

The Operation of an Induction Motor with an Asynchronous Frequency Converter, B. K. Basova, V. N. Bogoiavlenskii, A. A. Ianshin. "Iz. Akad." November 1957. 12 pp. The paper studies a stage containing a shorted induction motor operating in a torque mode. A design method for the system is developed for constant power output of the induction motor. The geometric locus for the currents is determined, and the basic energy relationships are derived for various operating modes of the asynchronous frequency converter.

Electrical Devices for Solving Algebraic Equations, N. N. Mikhaelov. "Avto. i Tel." May 1958. 14 pp. The paper deals with the survey and classification of the existent root finders. They are evaluated as to their ability of automatic finding of roots. New devices are proposed for finding roots of characteristic equations.



INDUSTRIAL ELECTRONICS

Automatic Optimizer, A. A. Feldbaum. "Avto. i Tel." Aug. 1958. 18 pp. The paper deals with the problem of constructing a machine minimizing the function of several variables when additional limitations take place. Some ways of solving the problem are considered and a circuit of the machine is proposed.



INFORMATION

Certain Problems Involved in Magnetic Pulse Recording, R. G. Ofengenden. "Radiotek." July 1958. 5 pp. The paper cites a new method for shaping playback pulses. The method makes it possible to achieve reliable operation for memory units when there is appreciable superposition of pulses. A study is made of the dependence of playback pulses on the duration of the recording pulses.

The Transmission Capacity of a Binary Pulse-Code System Which Has Nonidentical Symbol-Distortion Probabilities, L. Z. Klachkin. "Radiotek." Apr. 1958. 4 pp. The paper treats the transmission of information in a pulse code system with a binary code having nonidentical distortion probabilities for the reception of the symbols 0 and 1. The paper analyzes the effect of fluctuating noise on the system from the point of view of its transmission capacity.

Linear-Transformations of Binary Codes, N. Ja. Matyukhin. "Avto. i Tel." Aug. 1958. 12 pp. Linear transformations of binary codes with a fixed number of elements per code symbol, when for each possible symbol there is a reciprocally single valued relation, are considered.

Coder and Decoder in Pulse-Code Telemetry Systems, Ya. A. Kupersmidt. "Avto. i Tel." September 1958. 13 pp. The paper deals with a systematized survey of conversion of voltage and current into binary pulse code and the

method of conversion of pulse code into voltage and current. Various ways of conversion are compared as to their validity for pulse-code telemetry systems. Areas of using normal binary code, sign-changeable binary code and reflected one are pointed out.



MATERIALS

On High-Coercive Tapes, G. S. Veksler, P. S. Tomashevskii. "Radiotek." June 1958. 4 pp. An analysis is made of the practicality of using high-coercive tapes; the results of experimental tests on the magnetic and electroacoustic properties of various types of Soviet tapes are cited.

The Evaporation of Barium from the Surface of Certain Metals, P. M. Marchuk. "Radiotek." December 1957. 12 pp. The paper studies the basic laws governing the evaporation of monoatomic barium films from the polycrystalline surface of pure tungsten, tungsten which is electrolytically coated with rhenium, carbided tungsten and platinum-coated tungsten. Values are computed for the basic parameters characterizing the process: the heat of vaporization, the average lifetime of barium atoms on the investigated surface et al.

The Migration of Barium over the Surface of Certain Metals, G. F. Mitianskii. "Radiotek." December 1957. 6 pp. A cylindrical thermionic electron gun with a high vacuum is used to perform a comparative study of barium migration over the surface of pure tungsten, carbided tungsten, tungsten electrolytically coated with a layer of rhenium, and tungsten coated with a layer of platinum.

Thermochemical Restoration of Barium from Its Oxide by Means of Various Activators, Ju. S. Vedula, V. N. Gavriluk. "Radiotek." December 1957. 6 pp. An experimental study is made of the saturated vapor pressure of barium above the reactions of BaO (a product of the thermal decomposition of BaCO) with Mo, W, Si, Ta, and Ti as functions of temperature.



MEASURE & TESTING

On the Theory of Stroboscopic Oscillographing, V. A. Vol. "Radiotek." Aug. 1958. 8 pp. The paper makes an attempt to delineate the theoretical bases of the stroboscopic method of oscillographing. On the basis of the derived relationships, computations are made for the frequency responses of various types of stroboscopic oscilloscopes.

Computation of Complex Pulse Systems from a Specified Transient Response, S. N. Krize. "Radiotek." Sept. 1958. 3 pp. The paper presents a method of computing the parameters of pulse systems from the transient response: the method assures a maximum ratio between the steady-state transfer coefficient and the rise time of the leading edge of the pulse.

The Analysis of Sampled-Data Systems, Fan Chun-Wui. "Avto. i Tel." April 1958. 10 pp. A well-known method of analyzing continuous linear systems is generalized and applied to the qualitative evaluation of the forced motion of sampled-data systems.

On the Theory of a Superheterodyne Which Operates in a Linear Mode, V. Ia. Khevrolin. "Radiotek." Jan. 1958. 15 pp. The paper treats the theory of the electrical processes that occur in a linearly operating superheterodyne. A simplified method is proposed for computing the gain. Conditions are derived for stability and stable amplification. An error is pointed out in the formulation of this condition in other papers. The conditions for high selectivity are derived.

Graphical Analysis of Thermally Stabilized Emitter Repeaters, V. S. Davydov. "Radiotek." Feb. 1958. 5 pp. A method is given for the graphical analysis of junction-transistor emitter repeaters; the method makes it possible to determine the effect of the circuit elements on the position of the operating point, as well as the variation of the input impedance due to temperature fluctuations, from the family of static characteristics. A comparison is made between the properties of five different types of emitter repeaters, and recommendations are given for the design of thermally stabilized stages with a low noise level.

The Distribution of Electrical Charge on Linear, Plane, Closed-Loop Conductors, L. A. Druzhkin. "Radiotek." March 1958. 5 pp. The paper treats the problem of electric charge distribution on linear conductors by means of a special function λ and parameter ϕ . A criterion is given for checking the selection of the vector-parametric equations for the curves representing the axial lines of linear conductors. It is demonstrated that a solution of the problem leads to a simplified analysis and to the possibility of determining the potentials and fields for the conductors.

Mass-Spectrometer Method for Determining the Composition of Residual Gases in Electronic Instruments Having a Porous Metal-Film Cathode, Iu. G. Ptushinskii and B. A. Chuikov. "Radiotek." December 1957. 5 pp. The paper investigates the qualitative composition of residual gases and its variation over a period of up to 500 hours in laboratory electronic instruments with an operative porous metal-film cathode containing an oxide-barium filler. For an over-all pressure of 10^{-3} mm merc there is an appreciable amount of hydrogen, helium, carbon monoxide, oxygen; there is an insignificant amount of chlorine.

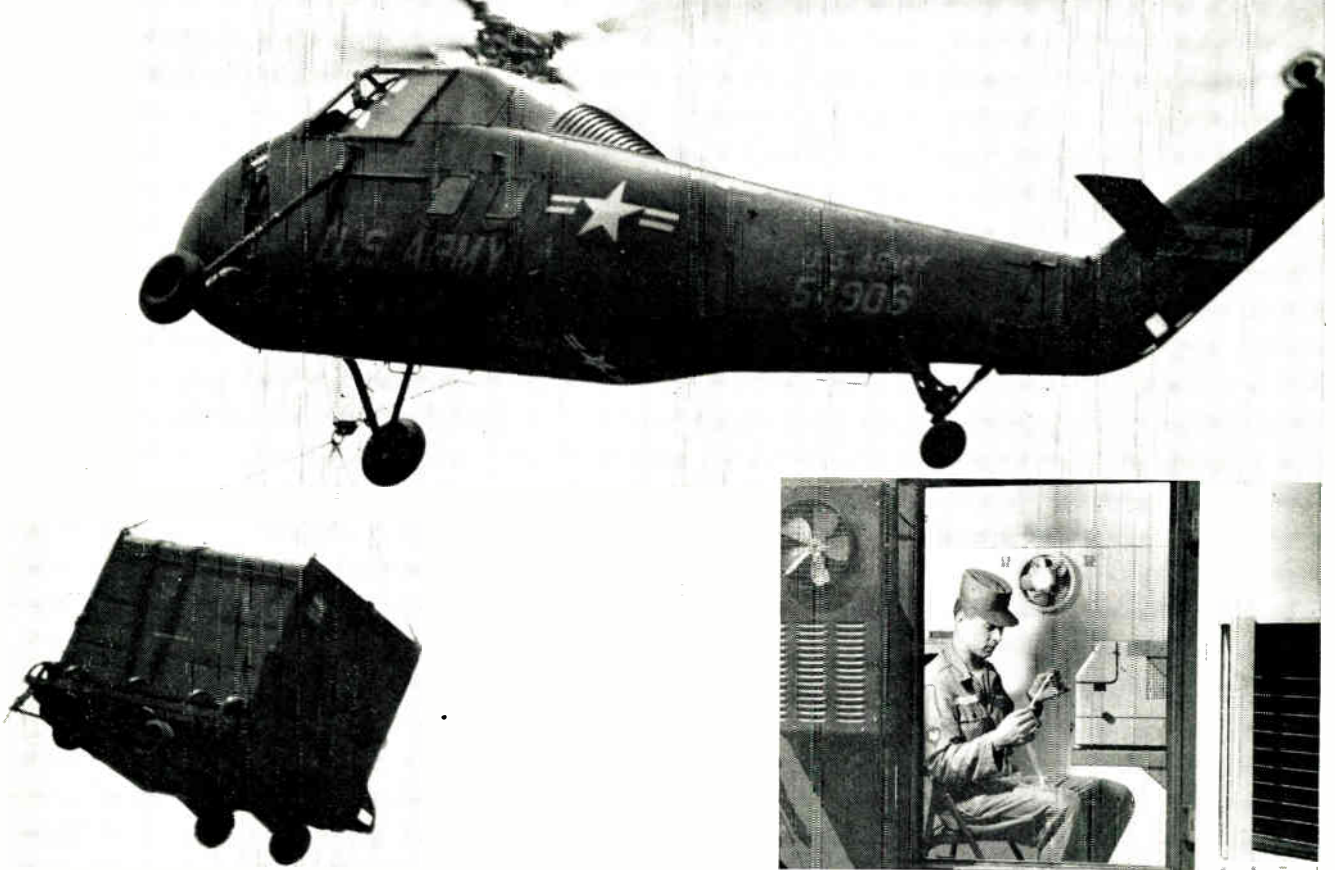
On Measuring Impedances Using a Feeder Reflectometer, S. A. Vakin, I. F. Poletaev. "Radiotek." July 1958. 4 pp. The paper analyzes a method for measuring impedances which is based on using a feeder reflectometer of the type developed by A. A. Pistol'kors and M. S. Neiman (modernized by G. P. Strauss). The impedance is determined on the basis of two measurements of the modulus for the coefficient of reflection from the impedance under study when it is shunted by a certain standard resistance, and when the shunt is removed.

A Wide-Band Decimeter-Wave Noise Generator, A. D. Kuz'min, A. N. Kbvoshchev. "Radiotek." July 1958. 7 pp. The paper describes a noise generator designed for measuring the noise coefficient of radio receivers in the decimeter band; the noise generator covers the frequency range 300-3000 Mc without any retuning. In this band the noise temperature of the generator is constant and equal to $15900 \text{ deg K} \pm 7\%$. The standing-wave coefficient of the generator in the indicated band is less than 1.5.

Fluctuation Action in the Simplest Parametric Systems, V. I. Tichonov. "Avto. i Tel." Aug. 1958. 8 pp. Statistical characteristics of the output random signal of a parametric system are obtained when outer action and variable element are correlated stationary normal random functions. The system under consideration is described by the first-order linear differential equation.

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RADAR, NAVIGATION

Computing the Range of a Pulse Radar According to its Parameters and the Specified Probability of Target Detection, M. M. Gerdov. "Radiotek." July 1958. 8 pp. The paper derives formulas which make it possible to compute the range of a pulse radar. The formulas are derived while taking into account the effect of intrinsic receiver noise and reflected signal fluctuations caused by the motion of the target. The appearances of the useful signal and the noise at the output of the receiver are treated as joint events. The proposed formulas do not take into account the effect of reflection from the earth on the formation of the radiation pattern for the radar antenna, or the attenuation of the radiowaves in the atmosphere.

A New Highly Efficient Pulse Power Amplifier at Audio Frequencies, D. V. Ageev, V. V. Malanov, K. P. Polov. "Radiotek." June 1958. 4 pp. The paper analyzes a new high-efficiency audio-frequency pulse power amplifier. Detailed results are given for preliminary operational tests. A new pulse amplifier circuit is used.

The Effect of Fluctuation on Time Range-Finder Operation, I. N. Amiantov and V. I. Tikhonov. "Avto. i Tel." April 1958. 9 pp. The paper deals with problems of measuring range errors caused by fluctuation and with problems of stability of an automatic tracking system.

Transient Process and Steady State in Automatic Range Scope, F. M. Kilin. "Avto i Tel." Oct. 1958. 16 pp. Transient process and steady state in automatic range scope are considered, provided operation specific peculiarities are taken into account. The peculiarities mentioned include discontinuous processes in some range scope parts, variability of circuit parameters that change in accordance with received pulses.



SEMICONDUCTORS

The Analysis of Transistor Circuits, E. N. Garmash. "Radiotek." July 1958. 8 pp. The paper studies a special method developed by V. P. Sigorskii for the analysis of transistor circuits without the preliminary use of equivalent transistor circuits. The use of this method is illustrated by the example of a two-stage amplifier.

The Relationship Between the Parameters of the Transistor for Different Types of Connections, Kh. I. Cherne. "Radiotek." Feb. 1958. 10 pp. Formulas are derived for determining any transistor parameters for any circuit connections on the basis of four known parameters.

The Correlation Between the Parameters of an Electronic Tube and Those of a Transistor, M. G. Margolin. "Radiotek." Feb. 1958. 7 pp. A universal equivalent circuit and system of parameters is proposed for computing both vacuum-tube and transistor amplifiers. The system of h-parameters is used as the basis for this system.

On the Parameter h_{11}/z_{11} for a Transistor: Generalized Impedance and Gain Characteristics, V. K. Labutin. "Radiotek." Feb. 1958.

10 pp. The paper studies a new transistor parameter on the basis of which new generalized characteristics and diagrams are derived for the impedances and gain coefficients. These characteristics make possible a convenient description of the amplification properties of a transistor for small-signal low-frequency operation. The use of the generalized characteristics and diagrams facilitates the design of transistor amplifiers.

Increasing the Useful Power Output of a Tuned Transistor Amplifier by Increasing Its Efficiency. Part II, L. S. Berman. "Radiotek." March 1958. 4 pp. An additional tank circuit, tuned to the second harmonic, is used to increase the efficiency of a tuned transistor amplifier. As a result the useful output power is increased by a factor of approximately 2.5 without exceeding the allowable power dissipation. The paper demonstrates the possibility of amplitude modulating the tuned amplifier while maintaining constant efficiency.

Determining the Limiting Frequency for the Current Transfer Coefficient of a Transistor, T. M. Agakhanian, L. N. Patrikeev. "Radiotek." Apr. 1958. 8 pp. The paper presents experimental data which verify the possibility of using theoretical derivations for determining the boundary frequency for the current transfer coefficient of ordinary transistors and high-frequency drift transistors; this can be done by using the phase-frequency characteristics of the current gain determined for a common-emitter circuit.

Approximate Transient and Frequency-Phase Responses for the Intrinsic Current Gain of a Junction Transistor, T. M. Agakhanian. "Radiotek." Feb. 1958. 11 pp. Approximate expressions are derived for the transient and frequency-phase responses for the intrinsic current gain of a junction transistor in three different fundamental circuits.

The Conditions Governing Self-Excitation in Junction-Transistor Oscillators; the Oscillation Frequency, P. D. Berestnev. "Radiotek." Feb. 1958. 8 pp. Expressions are derived for the conditions governing both the self-excitation and the frequency of oscillation in oscillators with transformer, autotransformer and capacitive feedback. Suggestions are made for selecting the elements in the phase compensation network as a function of the transistor parameters and the frequency of oscillation.

On the Theory of the Transient Response of a Transistor, A. A. Greenberg. "Radiotek." Feb. 1958. 3 pp. Transient responses are derived for a transistor which is current controlled. Various circuits are treated. The analytical form of the transient responses made it possible to take into account the collector capacitance and the load impedance of the transistor.

The Manner in Which the Dependence of the Frequency Properties of the Transistor on its Electrical Operating Mode Affects the Wave-Front Duration, I. I. Litvinov. "Radiotek." Feb. 1958. 5 pp. The paper treats this effect for the case of pulses generated by relaxation oscillators with a single reactance.



TELEVISION

The Transmission of the Coordinates of Television Picture Elements, I. I. Tsukkerman. "Radiotek." Apr. 1958. 3 pp. The excess of television information can in certain cases be reduced if the brightness and coordinate signals for only the "new" elements of the decorrelated picture are transmitted. It is demonstrated that, depending on the statistics of the television picture, it may be expedient

to transmit directly either both coordinates of the elements or only the line coordinate and the signal for line termination.

On the Average Component of a Television Signal and Methods for Obtaining It, V. A. Novik. "Radiotek." July 1958. 5 pp. The paper studies the problem involved in obtaining and introducing the average component of a television signal when cathode-ray television transmitter tubes with charge storage are used.

A Generator of Triangular Video Pulses, Iu. N. Prozorovskii. "Radiotek." Aug. 1958. 3 pp. A method is proposed for generating triangular video pulses using a two-terminal shaping network. One such network treated as an example is a section of transmission line which delays the signal by an amount less than the duration of the leading edge of the voltage or current pulse applied to the generator. The paper describes the design of a generator which produces triangular video pulses with a duration of 3 to 19 millimicrosec (at a level of 0.5).

$$\Delta G = \Delta G / \epsilon \eta_j \mu \rho \delta$$

THEORY

The Fourier-Series Method Applied to Linear Systems, A. N. Zaezdnyi. "Radiotek." Apr. 1958. 12 pp. The paper shows that when harmonic synthesis tables are available for the study of linear systems which are subjected to a periodic input, it is expedient to use the Fourier-series method to a considerably greater extent than is done at the present time. The paper proposes a new method of harmonic synthesis based on the direct utilization of operational calculus tables. Rules are given which make it possible to find the sums of series from known sums of other series. Two examples are given of the analysis of linear systems based on the operations of harmonic synthesis.

On the Kotel'nikov Theorem, A. A. Kharkevich. "Radiotek." Aug. 1958. 8 pp. The paper is a survey of several of the newest papers written on the Kotel'nikov Theorem. In summarizing, the author states that our contemporary understanding of the sense of the Kotel'nikov Theorem has substantially changed from the initial one. It is now applied to random processes with an unbounded spectrum, whereas initially it was formulated for determinate functions with rigorously bounded spectra; it is treated as an approximate (and not accurate) postulate which permits us to do the following: 1) to derive an approximate expression for the process in the form of a series with delay functions, or 2) to derive an approximate estimate for the number of samplings of a random vector on the basis of the specified accuracy in determining E-entropy.

On The Problem Of Applying The Kotel'nikov Theorem To Time Functions With Unbounded Spectra, I. T. Turbovich. "Radiotek." Aug. 1958. 2 pp. The paper studies the problem of a practical formulation of an approximate Kotel'nikov series for time functions with unbounded spectra.

Statistical Analysis of Nonstationary Processes in Linear Systems by Using Inverse Simulating Devices, A. V. Solodov. "Avto. i Tel." April 1958. 13 pp. The theory of constructing structure circuits called inverse circuits is described. The inverse circuits are used while analyzing nonstationary random processes by means of the simulation method. Conjugation of the inverse circuits with real regulators is shown to be possible. An example is given to illustrate the suggested way of analyzing automatic control systems.

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transducer*



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differential
pressure transducer*



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Analysis of Free Oscillations of Neutral Plane Without Damping of Its Own and With a Relay Autopilot, V. Yu Ruthkowsky. "Avto. i Tel." May 1958. 13 pp. A relay system, the linear part of which is described by the simplest third-order equation, is considered. The control system dynamics are analyzed by means of the method of point transformation of surfaces. The analysis yields the equations of surfaces describing the space of attraction, equilibrium state and stable limit cycle.

The Effect of a Pulse Train Modulated by a Random Process on an Inertial Pulse Detector, G. P. Tartakovskii and Iu. M. Sergienko. "Radiotek." Jan. 1958. 6 pp. The paper demonstrates the equivalence between an inertial pulse detector and a linear pulse circuit with negative feedback. The transfer function is derived for this circuit. The spectral density of the random process is determined at the output of the detector according to the known statistical characteristics of the pulse signal at its input.

On the Problem of Dimensions of Electromagnetic Elements, B. S. Sotskov. "Avto. i Tel." September 1958. 6 pp. The paper treats the basic correlations in connection with the efficiency of an electromagnetic system with its magnetic, electric and heat parameters and its lifetime.

Analytical Method of Synthesis of Linear Control Systems When There Are Noises and Dynamic Precision is Specified, K. I. Kurakin. "Avto. i Tel." May 1958. 10 pp. Analytical method of approximation of transcendental transfer functions of automatic control systems is proposed. The functions were obtained with the help of fraction-rational functions (10, 14). The practical application of the method in question is illustrated by a number of examples.

Determination of Optimum System Using General Criterion, V. S. Pugachev. "Avto. i Tel." June 1958. 21 pp. A method is described which enables determination of the optimum system using general criterion of Bayes' type in the class of all systems possible for which this criterion is available under some general suppositions about signal and noises. The solution of the problem is reduced to finding certain linear operators and minimizing certain function or functional.



TRANSMISSION

Certain Problems Of Synthesizing Nonuniform Transmission Lines, A. L. Fel'dshtein. "Radiotek." Aug. 1958. 11 pp. Based on relationships derived in a first approximation, certain types of nonuniform transmission lines are synthesized. Two types of examples are studied: 1) syntheses according to a specified frequency response, and 2) synthesis according to a specified equivalent LCR circuit.

Certain Special Features of Coaxial Irised Waveguides, G. I. Zhileiko. "Radiotek." Aug. 1958. 6 pp. The paper studies functions which determine the magnitude of the power flux in coaxial irised waveguides. A comparison is made between various types of coaxial waveguides from the point of view of the magnitude of the power flux.

Surface Waves Of The E-Type In A Circular Waveguide, L. N. Loshakov. "Radiotek." Sept. 1958. 5 pp. The paper studies axially symmetrical surface waves of the type E which can be propagated in a circular waveguide whose inside surface is covered with a dielectric layer.

The Effect Of Small Deformations Of The Cross-Section On The Operating Mode Of A

Waveguide, V. Ia. Smorgonskii "Radiotek," Sept. 1958. 3 pp.

Circular Transmission of Remote Control Data When Combinatorial Selecting is Used, K. P. Kurdukov. "Avto. i Tel." May 1958. 8 pp. Various ways of selecting are described when time data separation is used. The possibility of circular transmission of data with combinatorial selecting is proved. The paper includes some recommendations as to how to use interconnected pulse code together with combinatorial selecting. The efficiency of such a code is denoted.

On the Stability of the Field Intensity over Sections of Radio-Relay Lines, A. I. Kalinin. "Radiotek." Jan. 1958. 7 pp. The paper treats the problem of plotting curves for the stability of the field intensity over sections of radio-relay lines; the graphical approach is based on a) the known dependence of the attenuation multiplier on the vertical permittivity gradient, and b) the statistical distribution of the values of this gradient in the region of the specified section of line. Equations are derived for the optimum field intensity stability curves. Numerical results are given for the climatic conditions prevailing in the central band of the European territory of the USSR.

Computing the Critical Wave of Lowest Mode for Rectangular Waveguides with Longitudinal Rectangular Grooves and Projections, A. Ia. Iashkin. "Radiotek." March 1958. 7 pp. A system of equations is derived which correlates the cross-sectional dimensions of a waveguide with the critical wavelength. The derivation is accomplished by interleaving the solutions for the individual rectangular regions into which the entire complex waveguide section can be subdivided. The computed data is given in the form of graphs for waveguides with two longitudinal grooves and projections. The computed results are compared with experimental results.

A Method for the Approximate Computation of Waveguides with Triangular and Trapezoidal Cross-Sections, A. Ia. Iashkin. "Radiotek." Nov. 1958. 6 pp. The paper describes a new method for the approximate computation of the lowest critical wave in triangular and trapezoidal waveguides. The computed data are given graphically for waveguides with cross-sections shaped in the form of right triangles and isosceles triangles, as well as for cross-sections shaped in the form of rectangular and isosceles trapezoids. Certain of the computed data are compared with experimental results.

Evaluating the Error in the Approximate Theory of Inhomogeneous Transmission Lines, S. I. Orlov. "Radiotek." Nov. 1958. 5 pp. The paper describes the similarity conditions for inhomogeneous lines operating at various wavelengths. Simple expressions are derived for evaluating the limiting error in computing the reflection coefficient at the input of a lossless inhomogeneous line.



TUBES

Commercial Gas-Discharge Counter Tube (Decatrons), I. Ia. Breido, G. M. Iankin. "Radiotek." July 1958. 7 pp. The basic parameters and construction data are given for various types of cold-cathode gas-discharge counter tubes manufactured in the USSR. Circuits for control units are analyzed and applications of the decatrons under study are cited.

The Physical Properties and Design Elements of a Porous Barium-Tungsten Cathode, N. D. Morgulis. "Radiotek." December 1957. 8 pp.

The paper treats the complex of physical phenomena which are associated with the operation of a porous or pressed cathode of the barium-tungsten type: the degree of nonuniformity of emission from the cathode surface, the dynamic equilibrium of the active surface film of the heated cathode, ion bombardment and the effect of chemically active gases, the diffusion of barium vapor through the plug of the cathode onto the outer emitting surface, etc. The elements required for computing these phenomena and the degree to which they effect the operation of the cathode are given.

The Effect of Ion Bombardment on the Thermionic Emission of a Porous Metal-Film Cathode, Iu. G. Ptushinskii. "Radiotek." December 1957. 9 pp. The paper studies the effect of ion bombardment on the thermionic emission of a porous metal-film cathode. The sputtering coefficient is determined for a barium surface film. The dependence of this coefficient on ion energy in the 50-1800 eV range is also analyzed. A study is made of the effect of ion current on the nature of cathode deactivation at temperatures close to the working temperature.

The Chemical Effect of Oxygen on the Thermionic Emission of a Porous-Metal-Film Cathode, Ia. P. Zingerman, V. Ia. Soltyk. "Radiotek." December 1957. 7 pp. An experimental study is made of the chemical effect of oxygen, nitrogen and hydrogen on the thermionic emission of a porous metal-film L-cathode with an oxide-barium filler. The experimental data on the effect of oxygen do not contradict the assumption that a barium film is present on the oxide surface of the cathode.

On the Mechanism by Which Activator Vapors Reach the Surface of a Porous Metal-Film Cathode, I. M. Dykman. "Radiotek." December 1957. 5 pp. The paper studies how activator vapors reach the emitting surface of a porous metal-film cathode. Two mechanisms are discussed: a) Knudsen flow through the pores, and b) migration over the surface of the pores. The relative effect of each mechanism is discussed. The magnitude of the flow of atoms (molecules) of the activator through the porous cap of the cathode is determined, and the possibility of determining the pressure differential of activator vapors across the cathode plug is indicated.

Diffusion of Strontium Vapors Through the Plug of a Porous Metal-Film Cathode, Iu. G. Ptushinskii, B. A. Chuikov. "Radiotek." December 1957. 6 pp. The method of radioactive tracers was used to study the diffusion of strontium vapors through the plug of a porous metal-film cathode. It is demonstrated that this diffusion is basically achieved via the migration mechanism. The strontium vapor pressure differential across the plug is determined.

A Small Porous Filamentary Metal-Film Cathode, P. M. Marchuk, E. A. Lozovaia. "Radiotek." December 1957. 4 pp. The paper determines the values for the basic parameters which characterize the thermionic emission and the service life of a small filamentary porous metal-film cathode.

Electron Emission and Rate of Vaporization of Barium from Porous Metal-Film Cathodes with an Oxide-Barium Filler, Ia. P. Zingerman, V. A. Morozovskii. "Radiotek." December 1957. 8 pp. A method is described for using a mixture of oxides of alkali-earth metals and various "activators" (substances which restore barium from its oxide) in the capacity of an original filler for porous metal-film cathodes. Data is cited for an experimental investigation of the dependence of thermionic emission and barium vaporization rate as functions of the tungsten plug density, the type of activator and the continuous operating time of the cathode.



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1959 Roster of Associations Serving the Electronic Industries

A listing of the technical, religious and fraternal organizations functioning for the professionally employed in the electronic arts and sciences. Shown are the name of the organization; the number

of members; mailing address; principal officers; date and location of the prime annual meeting; and summary of the aims and objectives of the group.

ACOUSTICAL SOCIETY OF AMERICA—2600 Members—335 E. 45th St., New York 17, N. Y. MU 5-1940 . . . Wallace Waterfall, Sec. . . . Fall Meeting Oct. 22-24 . . . at Cleveland, Ohio . . . To increase and diffuse the knowledge of acoustics and promote its practical application.

AEROSPACE INDUSTRIES ASSOCIATION OF AMERICA, INC.—123 Members—610 Shoreham Bldg., Washington 5, D. C. DI 7-2315 . . . Orval R. Cook, Pres.; Harrison Brand, Jr., Sec.-Treas. . . . Fall Meeting Nov. 18-20 . . . at Phoenix, Ariz. . . . To advance the aeronautical and astronautical arts and industries.

ALUMINA CERAMICS MANUFACTURERS ASSOCIATION—10 Members—53 Park Place, New York 7, N. Y. BA 7-1937 . . . G. P. Byrne, Jr., Sec.; Robert M. Byrne, Staff Engr. . . . To compile statistical data on total orders, sales, etc.; also work on industry standardizations and specifications program.

AMERICAN ASSOCIATION OF ENGINEERS—5100 Members—8 S. Michigan Ave., Chicago 3, Ill. RA 6-9085 . . . P. J. Lucey, Pres.; M. E. McIver, Sec. . . . Fall Meeting . . . at Chicago, Ill. . . . To further the social and economic welfare of the engineering profession and the professional engineer.

AMERICAN ELECTROPLATERS' SOCIETY, INC.—8000 Members—American Bldg., 443-445 Broad St., Newark 2, N. J. . . . Herberth E. Head, Pres.; John P. Nichols, Nat'l Exec. Sec. . . . Golden Jubilee Conv. June 15-19 . . . at Detroit, Mich. . . . Educational society for the advancement of electroplating, metal finishing and allied arts.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS—54,000 Members—33 W. 39th St., New York 18, N. Y. PE 6-9220 . . . J. H. Foote, Pres.; N. S. Hibshman, Exec. Sec. . . . Annual Meeting June 22 . . . at Seattle, Wash. . . . Advancement of the theory and practice of electrical engineering and the allied arts and sciences and the maintenance of a high professional standing among its members.

AMERICAN INSTITUTE OF PHYSICS—5 Member Societies representing 20,000—335 E. 45th St., New York 17, N. Y. MU 5-1940 . . . Ralph A. Sawyer, Chrm.; Elmer Hutchinson, Dir. . . . Annual conv. none. . . . The advancement and diffusion of knowledge of the science of physics and its application to human welfare.

AMERICAN PHYSICAL SOCIETY—15,000 Members—Pupin Physics Laboratories, Columbia University, New York 27, N. Y. UN 5-4000 Ext. 416 . . . Prof. G. E. Uhlenbeck, Pres.; Dr. K. K. Darrow, Sec. . . . Principal Meeting November . . . at University of Chicago, Chicago, Ill. . . . Promotion of physics.

AMERICAN RADIO RELAY LEAGUE—95,000 Members—38 LaSalle Rd., West Hartford, Conn. AD 6-2535 . . . Goodwin L. Dosland, Pres.; A. L. Budlong, Sec. & Gen. Mgr. . . . Principal Meeting June 19-21 . . . at Galveston, Texas . . . Membership society of amateur radio operators.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS—46,474 Members—29 W. 39th St., New York 18, N. Y. PE 6-9220 . . . Glenn B. Warren, Pres.; O. B. Schier, II, Sec. . . . Annual Meeting Nov. 29-Dec. 4 . . . at Chalfonte-Haddon Hall, Atlantic City, N. J. . . . To promote the art and science of mechanical engineering and the allied arts and sciences.

AMERICAN SOCIETY FOR QUALITY CONTROL—11,500 Members—6197 Plankinton Bldg., 161 W. Wisconsin Ave., Milwaukee 3, Wisc. BR 2-3347 . . . C. E. Fisher, Pres.; David S. Chambers, Sec. . . . Advancement and diffusion of knowledge of the science of quality control and its application to industrial processes.

AMERICAN SOCIETY FOR TESTING MATERIALS—9000 Members—1916 Race St., Phila. 3, Penna. RI 6-5315 . . . F. L. LaQue, Pres.; Robert J. Painter, Exec. Sec. . . . Annual Meeting June 21-26 . . . at Chalfonte-Haddon Hall, Atlantic City, N. J. . . . To promote knowledge of the materials of engineering and the standardization of specifications and methods of testing.

AMERICAN SOCIETY OF TOOL ENGINEERS—40,000 Members—10700 Puritan Ave., Detroit 38, Mich. UN 4-7300 . . . G. A. Goodwin, Pres.; Charles M. Smillie, Sec. . . . Semiannual Meeting Oct. 8-10 . . . at St. Louis, Mo. . . . The dissemination of scientific knowledge in the field of tool engineering.

AMERICAN STANDARDS ASSOCIATION—2000 Members—70 E. 45th St., New York, N. Y. MU 3-3058 . . . J. R. Townsend, Pres.; Vice-Adm. G. F. Hussey, Jr., USN (Ret.) Mgr. Dir. & Sec. . . . 10th Nat'l Conference on Standards Oct. 20-22 . . . at the Sheraton-Cadillac Hotel, Detroit, Mich. . . . Provide an orderly set of voluntary coordinated standards and to promote their knowledge and use.

AMERICAN WOMEN IN RADIO & TV—1500 Members—501 Madison Ave., New York 22, N. Y. EL 5-7281 . . . Annual Nat'l conv. April 30-May 3 . . . at Waldorf-Astoria Hotel, New York City . . . An organization for interchange of information and mutual benefit of women in broadcasting.

ARMED FORCES COMMUNICATIONS & ELECTRONICS ASSOCIATION—9100 Members—1624 Eye St., N.W. Washington 6, D. C. EX 3-3033 . . . RAdm. F. R. Furth, USN (Ret.) Pres.; W. B. Coulett, Exec. V.P. . . . Principal Meeting June 3-5 . . . at Sheraton-Park Hotel, Washington, D. C. . . . A patriotic educational and non-profit communication and electronic society for military, scientific and industrial preparedness.

ASSOCIATION FOR APPLIED SOLAR ENERGY—1100 Members—3424 N. Central Ave., Phoenix, Ariz. CR 7-5401 . . . Jan Oostermeyer, Pres.; E. Lee McLean, Exec. V.P. . . . To gather, compile and disseminate information relating to solar energy.

ASSOCIATION FOR COMPUTING MACHINERY—4000 Members—2 E. 63rd St., New York 21, N. Y. . . . Dr. R. W. Hamming, Pres.; Dr. Jack Moshman, Sec. . . . Nat'l Meeting Sept. 1-3 . . . at Massachusetts Institute of Technology, Cambridge, Mass. . . . Advancement, design and development of modern mathematical machinery for logic, statistics, and kindred fields.

ASSOCIATED POLICE COMMUNICATIONS OFFICERS, INC.—2000 Members—51 Government St., Mobile, Ala. . . . William M. Gamble, Pres.; Howard P. Black, Sec.-Treas. . . . Annual Conference August 3-7 (T) . . . at Denver, Colo. . . . Technical operation and administration of police and public safety communications systems.

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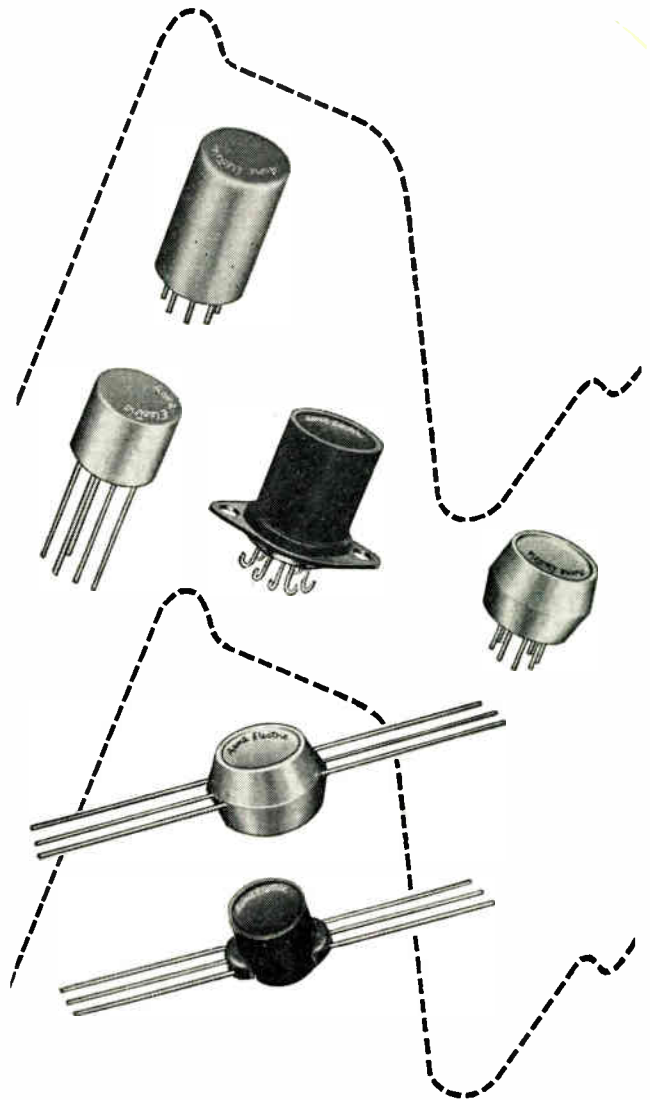
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ASSOCIATION OF ELECTRONIC PARTS AND EQUIPMENT MANUFACTURERS, INC.—140 Members—Suite 1500, 11 S. LaSalle St., Chicago 3, Ill. DE 2-4217 . . . Robert E. Svobda, Pres.; Kenneth C. Prince, Exec.-Sec. . . . March Annual Meeting . . . at Chicago, Ill. . . . To treat all problems relating to sales and distribution of electronic items through distributors.

AUDIO ENGINEERING SOCIETY, INC.—2200 Members—P. O. Box 12, Old Chelsea Sta., New York 11, N. Y. OR 5-7820 . . . Donald J. Plunkett, Pres.; C. J. LeBel, Sec. . . . 11th Annual Conv. & Professional Exhibit Oct. 5-9 . . . Hotel New Yorker, New York City . . . To stimulate and advance audio technology and to make the latest developments promptly and widely known.

BROADCAST PIONEERS—1200 Members—589 5th Ave., New York, N. Y. PL 9-1500 . . . Frank Pellegrin, Pres.; Raymond F. Guy, Sec. . . . Annual Banquet & Business Meeting (during NAB conv.) . . . at Chicago, Ill. . . . Persons with long years of service in radio.

ELECTROCHEMICAL SOCIETY, INC.—3000 Members—1860 Broadway, New York, N. Y. CI 5-6282 . . . Dr. William C. Gardiner, Pres.; Robert K. Shannon, Exec. Sec. . . . Fall Meeting Oct. 18-22 . . . at Columbus, Ohio . . . The advancement of the science and technology of electrochemistry, electronics, electrothermics, electrometallurgy, and allied subjects.

ELECTRONIC INDUSTRIES ASSOCIATION—341 Members—1721 DeSales St., N.W. Washington 6, D. C. NA 8-3902 . . . David R. Hull, Pres.; James D. Secrest, Exec. V.P. & Sec. . . . Fall Conv. Sept. 22-24 . . . at Traymore Hotel, Atlantic City, N. J. . . . A non-profit association of the radio-electronics-TV industry.

ELECTRONICS MANUFACTURERS ASSOCIATION, INC.—30 Members—55 W. 42nd St., New York 36, N. Y. PE 6-4864 . . . Hugh A. McCloskey, Pres.; Arthur Blumenfeld, Sec. . . . Annual Meeting Jan. . . . at New York City . . . To assist members in handling their labor relations problems.

ELECTRONIC REPRESENTATIVES ASSOCIATION—600 Firms—600 S. Michigan, Chicago 5, Ill. HA 7-0100 . . . Burt Porter, Pres.; R. Edward Stemm, Sec. . . . To advance the representative system of selling in the electronics industry, and to increase the contributions of independent representatives to the industry and its welfare.

FERRITE MANUFACTURERS ASSOCIATION—9 Companies—130 W. 42nd St., New York 36, N. Y. WI 7-0645 . . . William Garstang, Pres. . . . Fall Meeting Sept. 17-20 . . . at Williamsburg, Va. . . . Develop and promulgate standards and specifications for the ferrite core and component manufacturing industries.

FM ASSOCIATION OF BROADCASTERS—50 Members—Suite 416 Bowen Bldg., 815 15th St. N.W., Washington 5, D. C. . . . Lawrence Gordon, Pres.; Frank Knorr, Jr., Sec. . . . Principal meeting undetermined . . . Develop and promote FM Broadcasting in any and all facets.

FORESTRY, CONSERVATION COMMUNICATIONS ASSOCIATION—7810 Martin Way, Olympia, Wash. . . . Max Guiberson, Pres.; Earl Cornett, Secy.-Treas. . . . 10th Annual Conf, July 15-17, 1959 . . . Arlington Hotel, Hot Springs, Arkansas . . . To act as liaison between FCC and individual member agencies, foster development of radio communications.

INSTITUTE OF THE AERONAUTICAL SCIENCES—15,000 Members—2 E. 64th St., New York 21, N. Y. TE 8-3800 . . . Wm. Littlewood, Pres.; Robert R. Dexter, Sec. . . . Annual Meeting last week in January (1960) . . . at New York City . . . To facilitate by all means the interchange of technical ideas among aero/space engineers throughout the world.

INSTITUTE OF HIGH FIDELITY MANUFACTURERS, INC.—107 Members—125 E. 23rd St., New York 10, N. Y. AL 4-3532 . . . Joseph N. Benjamin, Pres.; Saul Marantz, Sec. . . . Principal Meeting Oct. 5-10 . . . at New York Trade Show Bldg., New York City . . . To increase the sale of component high fidelity and to serve the industry on every level.

INSTITUTE OF PRINTED CIRCUITS—20 Manufacturers—27 E. Monroe, Chicago, Ill. RA 6-3727 . . . W. J. McGinley, Pres.; R. E. Pritchard, Exec.-Sec. . . . Principal Meeting Oct. 12-13 . . . at Sheraton Hotel, Chicago, Ill. . . . To accelerate growth of printed circuits through technological advancement and through expanding its applications and markets.

INSTITUTE OF RADIO ENGINEERS, INC.—71,910 Members—1 E. 79th St., New York 21, N. Y. LE 5-5100 . . . Ernst Weber, Pres.; George W. Bailey, Exec.-Sec. . . . IRE Nat'l Conv. & Radio Engineering Show March 21-24 . . . Waldorf-Astoria Hotel & New York Coliseum . . . at New York City . . . Advancement of the theory and practice of radio and allied branches of engineering and of the related arts and sciences.

INSTRUMENT SOCIETY OF AMERICA—11,000 Members—313 6th Avenue, Pittsburgh 22, Penna. AT 1-3171 . . . H. C. Frost, Pres.; W. H. Kushmich, Exec.-Dir. . . . Principal Meeting Sept. 21-25 . . . at Chicago, Ill. . . . Dissemination of the developments in instrumentation science and technology

INTERNATIONAL MUNICIPAL SIGNAL ASSOCIATION—1800 Members—130 W. 42nd St., New York 36, N. Y. . . . Irvin Shulsinger, Sec. & Conv. Mgr. . . . Principal Meeting Oct. 19-22 . . . at Las Vegas, Nev. . . . Advancement and improvement of municipal signal and communications systems

JOINT ELECTRON DEVICE ENGINEERING COUNCIL OF EIA & NEMA—Room 650, 11 W. 42nd St., New York 36, N. Y. LO 5-3450 . . . General Conference Nov. 16-18 . . . at Bellevue Stratford Hotel, Philadelphia, Penna. . . . Deals with standards for receiving/transmitting tubes and semiconductors.

JOINT TECHNICAL ADVISORY COMMITTEE—1 E. 79th St., New York 21, N. Y. . . . Philip F. Siling, Chairman; L. G. Cumming, Sec. . . . Annual Conv. none . . . To assist the Federal Government and Industry on electronic engineering matters on an engineering basis.

LONG ISLAND ELECTRONICS MANUFACTURERS COUNCIL—26 members—A. Swanson, Pres.; J. Dempsey, Secy. . . . Mtg, June 18, 1959 . . . Salisbury C. C., Westbury, N. Y. . . . Enhance the prestige of the electronic manufacturer and to attract business.

METAL POWDER CORE ASSOCIATION—8 Companies—130 W. 42nd St., New York 36, N. Y. WI 7-0645 . . . Benjamin Falk, Pres.; Kempton H. Roll, Exec. Sec. . . . A trade association for the powder metallurgy industry.

NATIONAL ALLIANCE OF TV & ELECTRONIC SERVICE ASSOCIATIONS—125 Local Associations—5908 S. Troy St., Chicago 29, Ill. GR 6-6363 . . . Frank J. Moch, Exec. Dir.; Gen. Mac Metoyer, Sec. . . . Principal Meeting Aug. 20-23 . . . at Congress Hotel, Chicago, Ill. . . . Elevation of ethical and professional standards.

NATIONAL APPLIANCE & RADIO-TV DEALERS ASSOCIATION—5193 Members—1141 Merchandise Mart, Chicago 54, Ill. MI 2-5505 . . . Joseph Fleischaker, Pres.; Mort Farr, Chr. of Board . . . Principal Meeting Jan. 11-13 . . . at Conrad Hilton Hotel, Chicago, Ill. . . . To build better appliance-TV dealers within a framework of responsible management and community service.

NATIONAL ASSOCIATION OF BROADCASTERS—2386 Members—1771 N. St., N.W., Washington, D. C. DE 2-9300 . . . Harold E. Fellows, Pres.; Everett E. Revercomb, Sec.-Treas. . . . Annual Conv. April 3-7 (1960) . . . Conrad Hilton Hotel, Chicago, Ill. . . . Advancement of aural and visual broadcasting arts.

NATIONAL ASSOCIATION OF RELAY MANUFACTURERS—21 members—Box 6, Stillwater, Okla. . . . John Pfeffer, Pres.; Prof. Chas Cameron, Coordinator . . . Eighth National Conference on Electromagnetic Relays, May 1960 . . . Oklahoma State Univ., Stillwater, Okla. . . . Promote development and standardization of electromagnetic relays.

NATIONAL AUDIO-VISUAL ASSOCIATION—600 Members—P. O. Box 337, Fairfax, Va. . . . P. H. Jaffarian, Pres.; Don White, Exec. V.P. . . . Principal Meeting July 25-28 . . . at Morrison Hotel, Chicago, Ill. . . . To stimulate more widespread and more effective use of audio-visual materials and equipment.

NATIONAL COMMUNITY TELEVISION ASSOCIATION, INC.—380 Members—612 Perpetual Bldg., 1111 E St., N.W., Washington, D. C. ME 8-1415 . . . Lloyd A. Calhoun, Pres.; W. Randolph Tucker, Sec. . . . Annual Conv. June 23-25 . . . Sheraton Hotel, Philadelphia, Penna. . . . To promote the community television antenna industry.

NATIONAL ASSOCIATION OF ELECTRICAL DISTRIBUTORS—1085 Members—290 Madison Ave., New York 17, N. Y. MU 6-4633 . . . 52d Annual Convention May 1-5 (1960) . . . at Dallas, Texas . . . To disseminate information on industry matters and to promote beneficial relationship among distributors.

NATIONAL ASSOCIATION OF MUSIC MERCHANTS, INC.—1500 Members—222 W. Adams St., Chicago 6, Ill. AN 3-0679 . . . Clay Sherman, Pres. . . . Music Industry Trade Show & Conv. June 22-25 . . . Hotel New Yorker and New York Trade Show Bldg., New York City . . . For mutual advancement of individuals and organizations selling at retail.

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION—532
Member Companies—155 E. 44th St., New York 17, N. Y. MU 2-1500 . . . J. L. Singleton, Pres.; Joseph F. Miller, Mgr. Dir. . . . Annual Meeting Nov. 10-13 . . . at Atlantic City, N. J. . . . To disseminate information and to develop industry standards.

NATIONAL ELECTRONIC DISTRIBUTORS ASSOCIATION—625
Members—Suite 1414, 343 S. Dearborn St., Chicago 4, Ill. HA 7-5526 . . . Merrill W. Applebee, Pres.; Rubin Green, Sec.-Treas. . . . at Conrad Hilton Hotel, Chicago, Ill. . . . The dissemination of information concerning the electronics industry and improvement of business practices.

NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS—48,000
Members—2029 K St., N.W., Washington 6, D. C. FE 7-2211 . . . Harold A. Mosher, Pres.; Paul H. Robbins, Exec. Dir. . . . Annual Meeting June 17-20 . . . at Hotel Commodore, New York City
Promotion of social, professional, economic and ethical aspects of engineering.

PHONOGRAPH MANUFACTURERS ASSOCIATION, INC.—12 Mem-
bers—37 W. 53rd St., New York 19, N. Y. CI 6-2940 . . . Joseph Dworken, Pres.; A. D. Adams, Exec. Sec. . . . To improve product, customer and supplier relationship among manufacturers of phonographs.

PURCHASING AGENTS OF THE RADIO, TV AND ELECTRONICS
INDUSTRY—86 Members—143-30 257th St., Rosedale 22, N. Y.
LA 8-0172 . . . Ben Katz, Pres.; B. Trimboli, Corres. Sec. . . . To promote a better understanding of the purchasing profession.

RADIO CLUB OF AMERICA—375 members—11 West 42 St., New
York 36, N. Y. LO 5-6622 . . . Walter A. Knoop, Pres.; Wm. Morelock, Corres. Secy. . . . 50th Anniversary Banquet Dec. 4 . . . Location undetermined . . . To provide a means for those interested in radio and its allied sciences to describe their accomplishments, inventions, and techniques, emphasizing physical concepts.

RADIO TECHNICAL COMMISSION FOR AERONAUTICS—127
Organizations—16th & Constitution Ave., N. W., Bldg. T-5, Room 1072, Washington, D. C. . . . J. S. Anderson, Chrm.; L. M. Sherer, Exec.-Sec. . . . Joint RTCA/IRE* Symposium July 16-17 (*Los Angeles Sect.) . . . at Ambassador Hotel, Los Angeles, Calif. . . . To advance the art and science of aeronautics through the applications of the telecommunication art.

RADIO TECHNICAL COMMISSION FOR MARINE SERVICES—200
Members—c/o Federal Communications Commission, Washington, D. C. ST 3-5544 . . . Commodore E. M. Webster—Chrm.; R. T. Brown, Exec. Sec. . . . To advance the art and science of marine services through the investigation of the technical phases of all available or potential applications of the telecommunication art.

RADIO AND TELEVISION EXECUTIVES SOCIETY, INC.—1100 Mem-
bers—The Biltmore Hotel, New York 17, N. Y. MU 9-3480 . . . Frank E. Pellegrin, Pres.; Mary McKenna, Sec. . . . Annual Conv. none . . . An organization of persons professionally interested in radio & TV Broadcasting and allied fields for the exchange of ideas.

RECORD INDUSTRY ASSOCIATION OF AMERICA, INC.—65 Mem-
bers—1 E. 57th St., New York 22, N. Y. MU 8-3778 . . . Irving B. Green, Pres.; John W. Griffin, Exec. Sec. . . . Annual Conv. none . . . A non-profit organization for the better development of recorded music and literature.


SCIENTIFIC APPARATUS MAKERS ASSOCIATION—225 Member
Companies—20 N. Wacker Dr., Chicago 6, Ill. ST 2-0277 . . . Dr. G. A. Downsborough, Pres.; Kenneth Andersen, Exec. V.P. . . . To strengthen and back-up the scientific and technological progress of the country.

SOCIETY OF MOTION PICTURE AND TV ENGINEERS—6050
Members—55 W. 42nd St., New York 36, N. Y. LO 5-0172 . . . Dr. Norwood L. Simmons, Pres.; Charles S. Stodter, Exec.-Sec. . . . 86th Semi-Annual Conv. Oct. 5-9 . . . Statler Hilton Hotel, New York City . . . Advancement in the theory and practice of engineering in motion pictures, television and the allied arts and sciences.


SOCIETY OF PLASTICS ENGINEERS, INC.—7000 Members—65
Prospect St., Stamford, Conn. FI 8-7528 . . . F. C. Sutro, Jr., Nat'l Pres.; T. A. Bissell, Exec.-Sec. . . . Annual Technical Conference Jan. 12-15 (1960) . . . Conrad Hilton Hotel, Chicago, Ill. . . . Development and dissemination of technical information in fields of research, design, development, production and utilization of plastics materials.

STANDARDS ENGINEERS SOCIETY—900 Members—1025 Connecti-
cut Ave. N. W., Washington 6, D. C. . . . Franklin E. Powell, Pres.; Jean A. Caffiaux, Sec. . . . 8th Annual Meeting Sept. 21-22 . . . at Hotel Somerset, Boston, Mass. . . . To further standardization as a means of enhancing general welfare.

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ULTRASONIC MANUFACTURERS ASSOCIATION—22 members—271 North Ave., New Rochelle, N. Y.—NE 6-6382 . . . I. T. Welch, Pres.; R. L. Rod, Secy. . . Annual Meeting Nov. 3-4 . . . at Hotel Sheraton, Chicago, Ill. . . Promote development and disseminate information relating to ultrasonic equipment.

WESTERN ASSOCIATION OF CIRCUIT MANUFACTURERS—21 . . . c/o Western Intaglio, Inc., 1710 West Washington Blvd., Los Angeles 7, Calif. . . To further the acceptance and use of printed circuits by developing and publishing standards.

PROFESSIONAL ENGINEERING GROUPS OF I.R.E.

AERONAUTICAL & NAVIGATIONAL ELECTRONICS—Dr. George L. Haller, Chairman . . . IRE Nat'l Conv. March . . . New York City . . . WESCON Aug. 18-21 . . . San Francisco, Calif. . . The application of electronics to operation and traffic control of aircraft and to navigation of all craft.

ANTENNAS & PROPAGATION—Robert L. Mattingly, Chairman—IRE Nat'l Conv. March . . . New York City . . . WESCON Aug. 18-21 . . . San Francisco, Calif. . . Technical advances in antennas and wave propagation theory and the utilization of techniques or products of this field.

AUDIO—Prof. Alexander B. Bereskin, Chairman . . . IRE Nat'l Conv. March . . . New York City . . . WESCON Aug. 18-21 . . . San Francisco, Calif. . . Technology of communication at audio frequencies and of the audio portion of radio frequency systems, including acoustic terminations, recording and reproduction.

AUTOMATIC CONTROL—John E. Ward, Chairman . . . IRE Nat'l Conv. March . . . New York City . . . WESCON Aug. 18-21 . . . San Francisco, Calif. . . The theory and application of automatic control techniques including feedback control systems.

BROADCAST & TELEVISION RECEIVERS—Gilbert C. Larson, Chairman . . . IRE Nat'l Conv. March . . . New York City . . . WESCON Aug. 18-21 . . . San Francisco, Calif. . . The design and manufacture of broadcast and television receivers and components and activities related thereto.

BROADCASTING—Clure H. Owen, Chairman . . . IRE Nat'l Conv. March . . . New York City . . . WESCON Aug. 18-21 . . . San Francisco, Calif. . . Broadcast transmission systems engineering, including the design and utilization of broadcast equipment.

CIRCUIT THEORY—Prof. William H. Huggins, Chairman . . . IRE Nat'l Conv. March . . . New York City . . . WESCON Aug. 18-21 . . . San Francisco, Calif. . . Design and theory of operation of circuits for use in radio and electronic equipment.

COMMUNICATIONS SYSTEMS—E. N. Dingley, Jr., Chairman . . . IRE Nat'l Conv. March . . . New York City . . . WESCON Aug. 18-21 . . . San Francisco, Calif. . . Radio and wire telephone, telegraph and facsimile in marine, aeronautical, radio-relay, coaxial cable and fixed station services.

COMPONENT PARTS—Paul S. Darnell, Chairman . . . IRE Nat'l Conv. March . . . New York City . . . WESCON Aug. 18-21 . . . San Francisco, Calif. . . The characteristics, limitation, applications, development, performance and reliability of component parts.

EDUCATION—Dr. Ronald L. McFarlan, Chairman . . . IRE Nat'l Conv. March . . . New York City . . . WESCON Aug. 18-21 . . . San Francisco, Calif. . . To foster improved relations between the electronic and affiliated industries and schools, colleges and universities.

ELECTRONIC COMPUTERS—Richard O. Endres, Chairman . . . IRE Nat'l Conv. March . . . New York City . . . WESCON Aug. 18-21 . . . San Francisco, Calif. . . Design and operation of electronic computers.

ELECTRON DEVICES—C. Ross Kilgore, Chairman . . . IRE Nat'l Conv. March . . . New York City . . . WESCON Aug. 18-21 . . . San Francisco, Calif. . . Electron Devices, including particularly electron tubes and solid state devices.

ENGINEERING MANAGEMENT—Gerald A. Rosselot, Chairman . . . IRE Nat'l Conv. March . . . New York City . . . WESCON Aug. 18-21 . . . San Francisco, Calif. . . Engineering management and administration as applied to technical, industrial and educational activities in the field of electronics.

ENGINEERING WRITING AND SPEECH—J. D. Chapline, Chairman . . . IRE Nat'l Conv. March . . . New York City . . . WESCON Aug. 18-21 . . . San Francisco, Calif. . . The study, development, improvement and promotion of techniques for collecting and disseminating information in the electronic field.

WESTERN ELECTRONIC MANUFACTURERS ASSOCIATION—300 Electronic Mfrs & R & D Companies—1435 S. LaCienega Blvd., Los Angeles 35, Calif. OL 5-8462 . . . John A. Chartz, Pres.; J. D. McLean, Secy. . . Annual Corp. Meeting Aug. 19 . . . at San Francisco, Calif. . . To encourage and promote the recognition and development of the electronics industry in the 11 Western States.

HUMAN FACTORS IN ELECTRONICS—Henry P. Birmingham, Chairman . . . IRE Nat'l Conv. March . . . New York City . . . WESCON Aug. 18-21 . . . San Francisco, Calif. . . Development and application of human factors knowledge germane to the design of electronic equipments.

INDUSTRIAL ELECTRONICS—William R. Thurston, Chairman . . . IRE Nat'l Conv. March . . . New York City . . . WESCON Aug. 18-21 . . . San Francisco, Calif. . . Electronics pertaining to control, treatment and measurement, specifically in industrial processes.

INFORMATION THEORY—Thomas P. Cheatham, Jr., Chairman . . . IRE Nat'l Conv. March . . . New York City . . . WESCON Aug. 18-21 . . . San Francisco, Calif. . . Information theory and its application in radio circuitry and systems.

INSTRUMENTATION—Lester C. Smith, Chairman . . . IRE Nat'l Conv. March . . . New York City . . . WESCON Aug. 18-21 . . . San Francisco, Calif. . . Measurements and instrumentation utilizing electronic techniques.

MEDICAL ELECTRONICS—Urner Liddel, Chairman . . . IRE Nat'l Conv. March . . . New York City . . . WESCON Aug. 18-21 . . . San Francisco, Calif. . . The use of electronic theory and techniques in problems of medicine and biology.

MICROWAVE THEORY AND TECHNIQUES—Theodore S. Saad, Chairman . . . IRE Nat'l Conv. March . . . New York City . . . WESCON Aug. 18-21 . . . San Francisco, Calif. . . Microwave theory, microwave circuitry and techniques, microwave measurements and the generation and amplification of microwaves.

MILITARY ELECTRONICS—Edwin A. Speakman, Chairman . . . IRE Nat'l Conv. March . . . New York City . . . WESCON Aug. 18-21 . . . San Francisco, Calif. . . Electronic sciences, systems, activities and services germane to the requirements of the Military.

NUCLEAR SCIENCE—Albert B. Van Rennes, Chairman . . . IRE Nat'l Conv. March . . . New York City . . . WESCON Aug. 18-21 . . . San Francisco, Calif. . . Application of electronic techniques and devices to the nuclear field.

PRODUCTION TECHNIQUES—Lewis M. Ewing, Chairman . . . IRE Nat'l Conv. March . . . New York City . . . WESCON Aug. 18-21 . . . San Francisco, Calif. . . New Advances in methods, processes, materials and components in design and manufacture of electronic equipment.

RADIO FREQUENCY INTERFERENCE—Harold R. Schwenk . . . IRE Nat'l Conv. March . . . New York City . . . WESCON Aug. 18-21 . . . San Francisco, Calif. . . Origin, effect, control and measurement of radio frequency interference.

RELIABILITY AND QUALITY CONTROL—Paul K. McElroy, Chairman . . . IRE Nat'l Conv. March . . . New York City . . . WESCON Aug. 18-21 . . . San Francisco, Calif. . . Techniques of determining and controlling the quality of electronic parts and equipment during their manufacture.

SPACE ELECTRONICS AND TELEMETRY—Charles H. Doersam, Jr., Chairman . . . IRE Nat'l Conv. March . . . New York City . . . WESCON Aug. 18-21 . . . San Francisco, Calif. . . The control of devices and the measurement and recording of data from a remote point by radio.

ULTRASONICS ENGINEERING—John E. May, Jr., Chairman . . . IRE Nat'l Conv. March . . . New York City . . . WESCON Aug. 18-21 . . . San Francisco, Calif. . . Ultrasonic measurements and communications, including underwater sound, ultrasonic delay lines, and various chemical and industrial ultrasonic devices.

VEHICULAR COMMUNICATIONS—Angus A. MacDonald, Chairman . . . IRE Nat'l Conv. March . . . New York City . . . WESCON Aug. 18-21 . . . San Francisco, Calif. . . To promote close co-operation among those interested in the field of vehicular communications

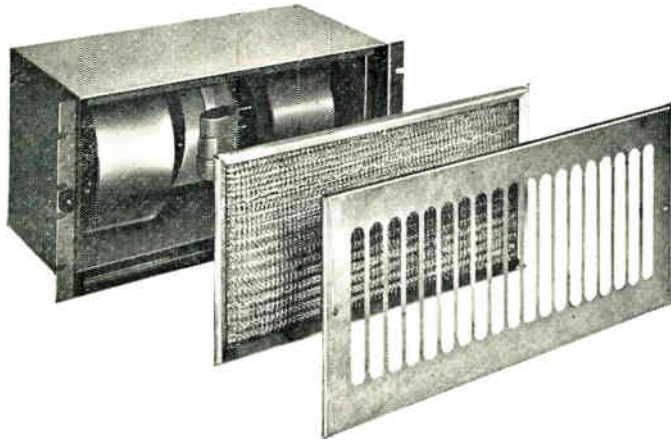
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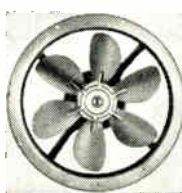
For narrow racks or where space is a problem. Fit half the width of standard 19" racks leaving balance of space for other components. Blower model (5 1/4" high) delivers 100 cfm. Fan model (7" high) delivers 225 cfm. Powered by highly reliable, rubber mounted, 115 volts, 60 cycle motors. Mil. Spec. and DC motors available. Permanent type filter.

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34 page catalog loaded with helpful data. Shows complete line of fans, blowers.

Plastics Glossary

(Continued from page 125)

Oligomer, n—A polymer consisting of only a few monomer units such as a dimer, trimer, tetramer, etc., or their mixtures.

Parallel Laminated—See Laminated, Parallel.

Permanence—The property of a plastic which describes its resistance to appreciable changes in characteristics with time and environment.

Phenolic Plastics—Plastics based on resins made by the condensation of phenols, such as phenol and cresol, with aldehydes.

Plastic, n—A material that contains as an essential ingredient an organic substance of large molecular weight, is solid in its finished state, and, at some stage in its manufacture or in its processing into finished articles, can be shaped by flow.

Plastic, adj—The adjective plastic indicates that the noun modified is made of, consists of, or pertains to plastic.

Note—The above definition may be used as a separate meaning to the definitions contained in the dictionary for the adjective "plastic."

Plasticizer, n—A material incorporated in a plastic to increase its workability and its flexibility or distensibility.

Note—The addition of the plasticizer may lower the melt viscosity, the temperature of the second-order transition, or the elastic modulus of the plastic.

Plastics Welding—The joining of two or more pieces of plastic by fusion of the material in the pieces at adjoining or nearby areas either with or without the addition of plastic from another source.

Polyamide Plastics—See Nylon Plastics.

Polycondensation—See Condensation.

Polyester Plastics—Synonymous with Alkyd Plastics.

Polyethylene, n—A plastic or resin prepared by the polymerization of ethylene as essentially the sole monomer.

Polymethylene, adj—Pertaining to a type of molecular structure consisting of a series of methylene groups.

Polypropylene, n—A plastic or resin prepared by the polymerization of propylene as essentially the sole monomer.

Polystyrene, n—A plastic based on a resin made by polymerization of styrene as the sole monomer. (See Styrene Plastics.)

Note—Polystyrene may contain minor proportions of lubricants, stabilizers, fillers, pigments, and dyes.

Polyvinyl Acetate—A resin prepared by the polymerization of vinyl acetate alone.

Polyvinyl Alcohol—Polymers prepared by the hydrolysis of polyvinyl esters.

Polyvinyl Chloride—A resin prepared by the polymerization of vinyl chloride alone.

Postforming, n—A method of shaping substantially cured thermoset plastic sheets or other forms by heating and stressing into other configurations.

Reinforced Plastic—A plastic with some strength properties greatly superior to those of the base resin, resulting from the presence of high strength fillers imbedded in the composition. (See also Filler.)

Note—The reinforcing fillers are usually fibers, fabrics, or mats made of fibers. The plastic laminates are the most common and strongest type of reinforced plastics.

Resin, n—A solid, semisolid, or pseudosolid organic material which has an indefinite

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and often high molecular weight, exhibits a tendency to flow when subjected to stress, usually has a softening or melting range, and usually fractures conchoidally.

Note. Liquid Resin.—An organic polymeric liquid which when converted to its final state for use becomes a solid.

Resinoid, n—Any of the class of thermosetting synthetic resins, either in their initial temporarily fusible state or in their final infusible state. (See also Novolak and Thermosetting.)

Rigid Plastic—A plastic which has a stiffness or apparent modulus of elasticity greater than 100,000 psi at 23 C when determined in accordance with the Standard Method of Test for Stiffness in Flexure of Plastics (ASTM Designation: D 747).

Rubber, n—A natural or synthetic material that can be or is already vulcanized to a state in which it has high extensibility and forcible quick retraction. (See also Elastomer and Plastic.)

Saran Plastics—Plastics based on resins made by the polymerization of vinylidene chloride or copolymerization of vinylidene chloride with minor amounts (not over 50 per cent) of other unsaturated compounds.

Semirigid Plastic—A plastic which has a stiffness or apparent modulus of elasticity of between 10,000 and 100,000 psi at 23 C when determined in accordance with the Standard Method of Test for Stiffness in Flexure of Plastics (ASTM Designation: D 747).

Sheet, n—A piece of plastic sheeting produced as an individual piece rather than in a continuous length, or cut as an individual piece from a continuous length. (See also Film.)

Sheeting, n—A form of plastic in which the thickness is very small in proportion to length and width and in which the plastic is present as a continuous phase throughout, with or without filler. (See also Film.)

Silicone Plastics—Plastics based on resins in which the main polymer chain consists of alternating silicon and oxygen atoms, with carbon-containing side groups.

Softening Range—The range of temperature in which a plastic changes from a rigid to a soft state.

Note.—Actual values will depend on the method of test. Sometimes referred to as softening point.

Styrene Plastics—Plastics based on resins made by the polymerization of styrene or copolymerization of styrene with other unsaturated compounds.

Styrene-Rubber Plastics—Plastics consisting of at least 50 per cent styrene plastics combined with rubbers and other compounding ingredients.

Syneresis, n—The contraction of a gel.

Note.—This is usually evidenced by the separation of a liquid. (See first definition of Gel.)

Thermoelasticity, n—Rubber-like elasticity by a rigid plastic resulting from an increase in temperature.

Thermoplastic, n—A plastic which is thermoplastic in behavior.

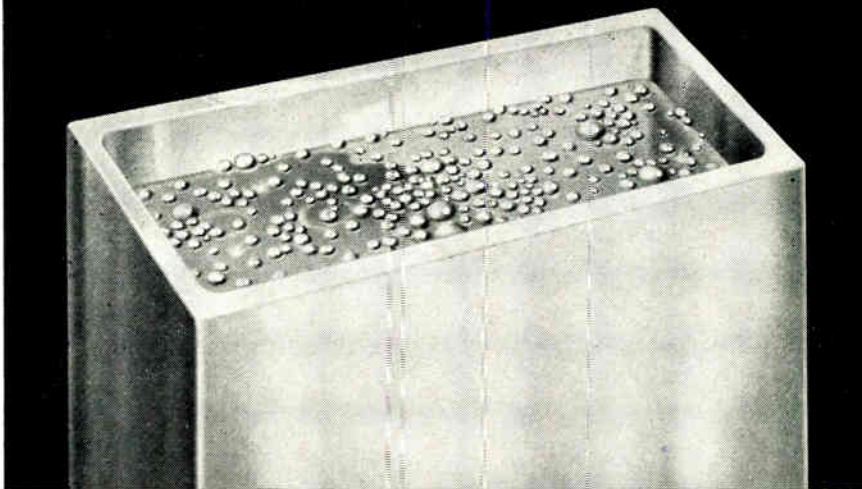
Thermoplastic, adj—Capable of being repeatedly softened by increase of temperature and hardened by decrease of temperature.

Note.—Thermoplastic applies to those materials whose change upon heating is substantially physical.

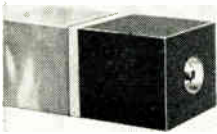
Thermoset, n—A plastic which, when cured by application of heat or chemical means,

(Continued on page 492)

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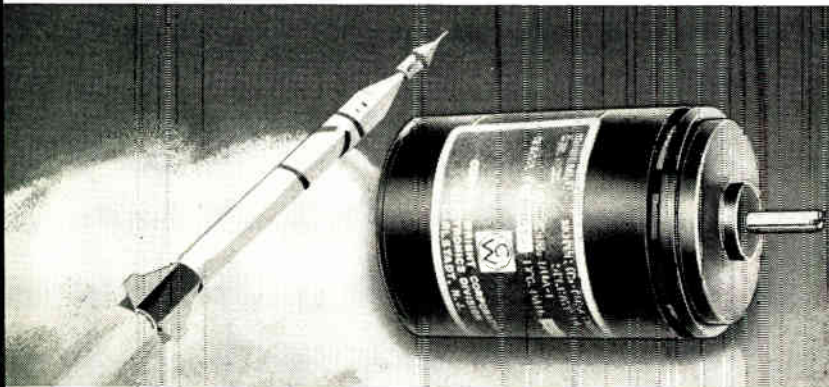
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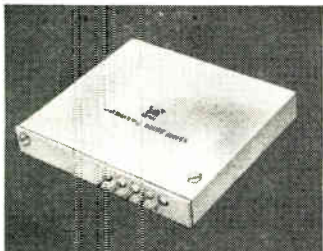
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Delay range... .5 to 6000 microseconds
Meets tolerances of... ± 0.1 microsecond
Signal to noise ratio... Greater than 10 to 1
Input and output impedance... 50-2000 ohms
Carrier frequency... 100 kc — 1 mc
Delay to pulse rise time... Up to 800:1

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Time delay... Preset 20 to 180 seconds
Contact arrangement SPST, SPDT, DPDT
Temperature comp... -65°C to +125°C
Weight... 4½ ounces
Terminals... Hooked solder type
Mounting... Bracket or stud

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ELECTRONICS DIVISION

CURTISS-WRIGHT

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Plastics Glossary

(Continued from page 491)

changes into a substantially infusible and insoluble product.

Thermoset, adj—Pertaining to the state of a resin in which it is relatively infusible.

Thermosetting, adj—Capable of being changed into a substantially infusible or insoluble product when cured under application of heat or chemical means.

Urea Plastics—Plastics based on resins made by the condensation of urea and aldehydes.

Vacuum Forming—A forming process in which a heated plastic sheet is changed to a desired shape by causing it to flow by reducing the air pressure on one side of the sheet.

Vinyl Acetate Plastics—Plastics based on resins made by the polymerization of vinyl acetate or copolymerization of vinyl acetate with minor amounts (not over 50 per cent) of other unsaturated compounds.

Vinyl Alcohol Plastics—Plastics based on resins made by the hydrolysis of polyvinyl esters or copolymers of vinyl esters.

Vinyl Chloride Plastics—Plastics based on resins made by the polymerization of vinyl chloride or copolymerization of vinyl chloride with minor amounts (not over 50 per cent) of other unsaturated compounds.

Vinyl Plastics—Plastics based on resins made from vinyl monomers, except those specifically covered by other classifications such as acrylic and styrene plastics. Typical vinyl plastics are polyvinyl chloride, polyvinyl acetate, polyvinyl alcohol, and polyvinyl butyral, and copolymers of vinyl monomers with unsaturated compounds.

Vinylidene Plastics—See Saran Plastic's.

Volatile Loss—Weight loss by vaporization.

Volatilization, n—The vaporization of a material from the surface of a plastic or plasticizer.

Vinylidene Plastics—See Saran Plastics, which the physical properties of a rubber are changed in the direction of decreased plastic flow, less surface tackiness, and increased tensile strength by reacting it with sulfur or other suitable agents.

New Electronic Textbooks

(Continued from page 245)

Physics and Applications of Secondary Electron Emission

By H. Bruining. Price \$5.50 (PP)

Elementary Statistical Physics

By C. Kittel. 228 pages, ix pages. Price \$8.00 (JW)

The Physics of Electricity and Magnetism

By W. T. Scott. 635 pages. Price \$8.75 (JW)

Principles of Electricity, 3rd Edition

By Leigh Page and Norman Hsley Adams, Jr. 548 pages. Price \$7.50 (DV)

Introduction to the Design of Servomechanisms

By Bower and Schultheiss. 510 pages.
Price \$12.00 (JW)

Linear Feedback Analysis

By J. G. Thomason. Price \$8.50 (PP)

Medical Electrical Equipment

Edited by John Rowland, Illust. Price \$15.00 (PL)

Millimicrosecond Pulse Techniques

By I. A. D. Lewis and F. H. Wells. Price \$7.50 (PP)

Principles of Quantum Electrodynamics

By W. E. Thirring, Translated by J. Bernstein. 234 pages, Illust. Price \$8.00 (AP)

Electrostatics

Edited by A. Schure. 72 pages. Price \$1.35 (JR)

Space Charge Waves and Slow Electromagnetic Waves

By A. H. W. Beck. Price \$15.00 (PP)

Topics in Electromagnetic Theory

By Deon A. Watkins. 118 pages. Price \$6.50 (JW)

Automobile Electrical Equipment (Brit.), 6th Edition

By A. P. Young & L. Griffiths. 398 pages.
Price \$4.35 (IL)

Electronic Communication

By Shrader. Price \$13.00 (MH)

Electrical Measurement Analysis

By Frank. Price \$8.75 (MH)

Servomechanisms and Regulating System Design, Vol. 1

By Chestnut and Mayer. 672 pages.
Price \$13.00 (JW)

Electrical Engineering: Theory and Practice

By W. H. Erickson and N. H. Bryant. 614 pages.
Price \$8.00 (JW)

Principles of Electrical Measurements

By H. Buckingham and E. M. Price. Illust.
Price \$15.00 (PL)

Probability and Information Theory with Applications to Radar

By P. M. Woodward. Price \$5.00 (PP)

INSTRUMENTS

Oscilloscope Techniques

By Alfred Haas. 224 pages. Price \$2.90 (GL)

Signal, Noise, and Resolution in Nuclear Counter Amplifiers, Vol. 1

By A. B. Gillespie. Price \$4.50 (PP)

Scintillation Counters

By J. B. Birks. Price \$4.50 (PP)

Principles of Electronic Instruments

By G. R. Partridge. 432 pages. Price \$11.00 (PH)

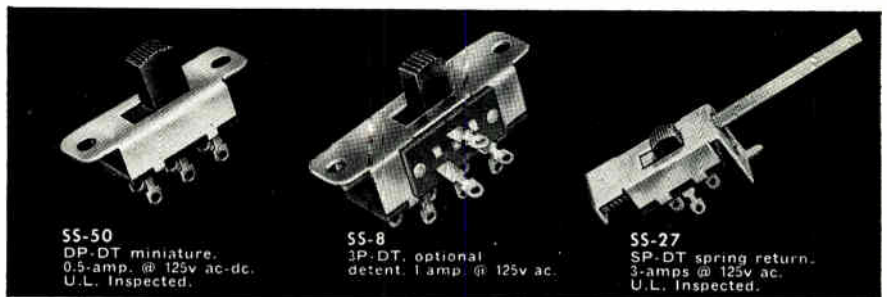
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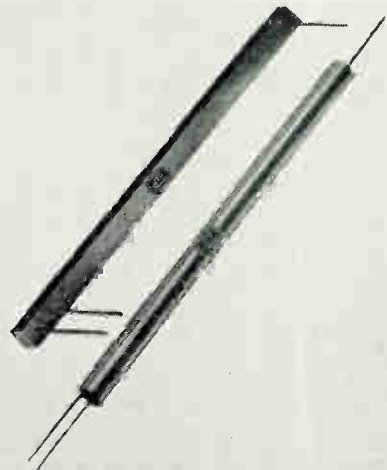
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HOW TO MEASURE ATTENUATION



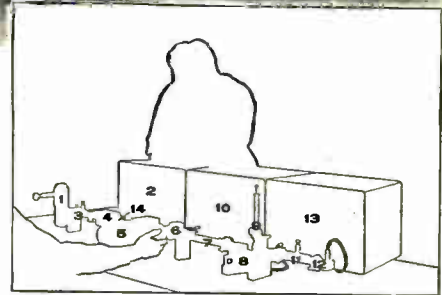
This microwave bench set-up is for the measurement of attenuation by the RF SUBSTITUTION method. Other techniques could have been shown, but this represents one of the simplest, easiest to use methods known.

The one main point we would like to stress is: regardless of the kind of measurements made, the quality of the test equipment used is of the utmost importance. That's why PRD has concentrated on producing the widest range of the most precise microwave test equipment available anywhere in the world.

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Sound Simple? Sure it is, but even more important it's accurate. The PRD 195-B has a guaranteed calibration accuracy of ± 0.2 db.

The precision and ease of operation of all of the products shown in this example are typical of each of over 300 PRD microwave test instruments currently produced. For detailed specifications of the products shown in the measurement bench, write:



TEST INSTRUMENTS USED IN THIS X-BAND ATTENUATION BENCH

- 1—703 Shielded Tube Mount, catalog page F-8
- 2—809 Klystron Power Supply, catalog page F-10
- 3—303-A Slide Screw Tuner, catalog page B-14
- 4—1203 Waveguide Ferrite Isolator, catalog page A-21
- 5—535 Frequency Meter, catalog page D-12
- 6—195-B Precision Gauge Attenuator, catalog page A-5
- 7—UNKNOWN represented by a 140 Fixed Waveguide Attenuator, catalog page A-11
- 8—203-D Slotted Section, catalog page B-11
- 9—250-A Broadband Probe, catalog page B-12
- 10—277-A Standing Wave Amplifier, catalog page E-7
- 11—303-A Slide Screw Tuner, catalog page B-14
- 12—643 Waveguide Thermistor Mount, catalog page E-9
- 13—650-B Power Bridge, catalog page E-13
- 14—159-A Level Set Attenuator, catalog page A-17

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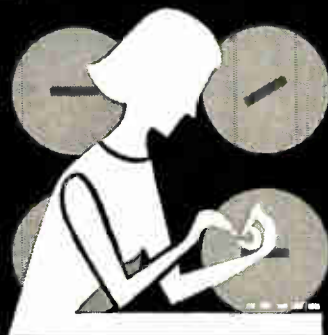
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New Electronic Textbooks

(Continued from page 501)

Principles of Frequency Modulation
(in preparation)

By B. S. Camies. 128 pages. Price \$3.00 (IL)

Television Engineering, 4 volumes

By S. W. Amos & D. C. Bukenshaw. Price \$15.00 (PL)

Foundations of Radio

By M. G. Scroggie, III. 388 pages, 278 diagrams. Price \$10.00 (PL)

Frequency Modulation Receivers

By J. D. Janes. Price \$6.00 (PL)

How to Troubleshoot a TV Receiver, 2nd Edition

By J. Richard Johnson. 160 pages. Price \$2.50 (JR)

Radio Engineering Handbook, 5th Edition

By Henney-Price. Price \$25.00 (MH)

Electronic Communications

By Shrader. Price \$13.00 (MH)

Fundamentals of Radio Telemetry

By Marvin Tepper. 128 pages. Price \$2.95 (JR)

Wave Propagation & Antennas

By G. B. Welch. 288 pages. Price \$5.75 (DV)

Scattering and Diffraction of Radio Waves

By J. R. Mentzer. 288 pages. Price \$5.75 (DV)

Radio Stations—Installation, Design, and Practice

By G. A. Chappel. Price \$9.00 (PP)

SOLID STATE

Materials for Rockets and Missiles

By Frank & Zimmerman. Price \$4.50 (MC)

Solid State Physical Electronics

By A. Van der Ziel. 640 pages. Price \$13.00 (PH)

Solid State Magnetic and Dielectric Devices

By Harold W. Katz. 542 pages. Price \$13.50 (IW)

Physical Acoustics and the Properties of Solids

By W. P. Mason. Price \$9.00 (DV)

Semiconductors

Edited by N. Bruce Hannay. 770 pages. Price \$15.00 (RP)

Transistor Physics and Circuits

By Riddle and Ristenblatt. 448 pages. Price \$10.00 (PH)

Zone Melting

By William G. Tfann. 252 pages. Price \$7.50 (JW)

Addresses of Publishers

- Pergamon Press Inc.
122 E. 55th St., New York 22, N. Y.
- Academic Press Inc.
111 Fifth Ave., New York 3, N. Y.
- Prentice-Hall
Englewood Cliff, N. J.
- Philips Technical Library
Eindhoven, Holland
- McGraw-Hill Book Co., Inc.
330 W. 42nd St., New York 36, N. Y.
- Interscience Publishers, Inc.
250 Fifth Ave., New York 1, N. Y.
- Gernsback Publications Inc.
154 W. 14th St., New York 11, N. Y.
- The Macmillan Co.
60 Fifth Ave., New York 11, N. Y.
- Iliffe & Sons Ltd. & Assoc. Companies
Dorset House, Stamford St., London, England
- D. Van Nostrand Co., Inc.
120 Alexander St., Princeton, N. Y.
- Philosophical Library
15 E. 40th St., New York, N. Y.
- John F. Rider Publisher, Inc.
116 W. 14th St., New York 11, N. Y.
- Reinhold Publishing Corp.
430 Park Ave., New York 22, N. Y.
- John Wiley & Sons, Inc.
440 Fourth Ave., New York 16, N. Y.

**WIRE SIZES
FOR MOTOR CIRCUITS**

(For Amperes for Full Load)

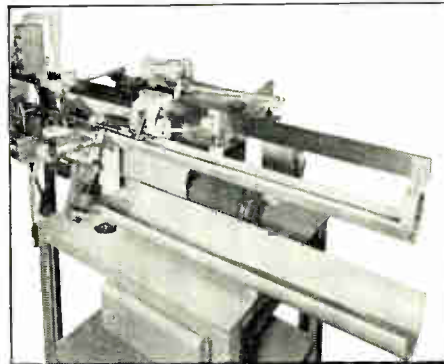
Motor Rating in Amperes	Wire Size Rubber Insulated
1 - 12	No. 14
13 & 14	No. 12
15 & 16	No. 12
17 - 20	No. 10
22 & 24	No. 8
26 & 28	No. 8
30 & 32	No. 6
34 - 40	No. 6
42 & 44	No. 5
46 & 48	No. 4
50 & 52	No. 4
54 & 56	No. 4
58 - 64	No. 3
66 & 68	No. 2
70 & 72	No. 2
74 & 76	No. 1
78 & 80	No. 1
82 - 88	No. 1/0
90 - 96	No. 1/0
98 & 100	No. 1/0
105 - 120	No. 2/0
125 - 140	No. 3/0
145 - 160	No. 200
165	No. 4/0
170 - 180	4/0
185 & 190	250 m.c.m.
195 & 200	250
210	300
220	300
230 & 240	350
250 & 260	400
270 & 280	500
290	500
300	500
320	500
340 & 360	600
380	700
400	700
420	800
440	800
460 & 480	900
500 & 520	1000
540	1100
560	1200
580	1200
600	1300
625	1400

—Courtesy Perkins Engineering Corp.

Another Time and Labor Saver

for finishing wire leads

with ARTOS AUTOMATIC CS-6



A new collecting device is now available for use on the popular Artos CS-6 wire-measuring, cutting and stripping machine. Illustration shows the new collecting trough (AE-478). Upper trough collects wire leads up to 60 inches long, then empties into the lower trough after wire has been cut, thus saving operator time.

Production speeds of 3000 finished wire leads per hour up to 15 inches long. Maximum cutting length is 194 inches . . . stripping up to 2 inches at one or both ends. Artos also makes machines that measure, cut, strip and *attach terminals* automatically at one or both ends.

Operated by unskilled labor. Errors and work spoilage, due to human element, are eliminated. Machines are easily set up and adjusted for different lengths of wire and stripping.

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Technical Data for



These bulletins, data sheets, brochures and catalogs have been selected from more than 500 published by *ELECTRONIC INDUSTRIES* since June 1958. Each of the items listed in this section has proved to be of great industry interest. For your convenience items related to specific technical fields have been grouped together. Copies of each have been reported as being available to interested readers. Included in this section are:

Magnetics—	Electronic Components
Techniques & Products	Connectors & Terminals
Plastics & Materials	Wire & Cable
Industrial TV	Test Equipment
Electron Tubes	Ultrasonics
Microwave	Motors—Gyros
Conversion Tables—Charts	General

MAGNETICS Techniques & Products

Magnetic Recording

Treatise, "The Tape Recorder as an Instrumentation Device" discusses the fundamentals and chief applications of magnetic instrumentation recording, traces the burgeoning need for precise measurement, and points out how magnetic-tape devices are uniquely suited to meet it. Included in the booklet's 74 pages are a discussion of the principles of magnetic recording, the physical elements of instrumentation recorders, and the four major recording processes—direct, frequency modulation, pulse-duration modulation, and digital. Ampex Corp., Instrumentation Div., 934 Charter St., Redwood City, Calif.

Circle 382 on Inquiry Card

Permanent Magnets

A data sheet describing a new precision permanent magnet, Model 104, is available from Schlumberger Well Surveying Corp., Ridgefield Instrumentation Div., Ridgefield, Conn. This bulletin is complete with photographs, electrical and mechanical specifications.

Circle 383 on Inquiry Card

Magnetic Amplifier Manual

Magnetic Amplifier Design Manual, Engineering Bulletin #403-A, has 45 schematic diagrams and graphs describing magnetic amplifier design and application techniques. Covered are: Signal mixing, voltage and current comparators, automatic pilot systems, electrohydraulic valve drives, gyro and position pickoffs, insulation and cable barriers checker, integrators, limiters, sweep generator potentiometric amplifier circuit, relay tester, LaPlace transforms, transform generation, velocity servos, etc. Acromag, Inc., 22519 Telegraph Rd., Detroit 41, Mich.

Circle 384 on Inquiry Card

Magnetic Circuits

"Applied Magnetics," company publication of Indiana Steel Products Co., Valparaiso, Ind., features a detailed discussion of magnetic circuits in its latest edition. A summary of circuits especially suited for tractive applications which utilize the attractive holding, or repelling forces of permanent magnets is presented.

Circle 385 on Inquiry Card

Magnetic Shielding Manual

A 31-page manual considers shielding problems and typical examples of shielding. It contains a glossary of terms, graphs showing B/H curves and curie temperature graph for coatings, saturation point for base metals only using Perfection Anneal-2 cycles, curie temperature graph for base metals without coatings, and saturation curves for dc and ac flux. It also describes the materials used and suggests techniques in the evaluation of magnetic fields. Magnetic Shield Div., Perfection Mica Co., 1322 N. Elston Ave., Chicago, Ill.

Circle 386 on Inquiry Card

Magnetic Toggle Relay

A 4-page, 2-color bulletin issued by the American Electronics Co., 2801 27th Ave., N.E., Minneapolis 18, Minn., describes their new magnetic toggle relay. Relay is a polarized, bi-stable relay with a binary memory. Bulletin contains photographs, circuit diagrams, electrical and mechanical specifications.

Circle 387 on Inquiry Card

Technical Data

for Engineers

COMPONENTS

Phase-Shifting Capacitors

A 36-page handbook of capacitor phase-shifting transducers is available from the Nilsen Mfg. Co., Addison, Ill. The first half of the handbook contains technical information on phase-shifting networks and the use of phase-shifters and the second half describes the various products available under the trade name of Variogon.

Circle 388 on Inquiry Card

Capacitors

Bulletin ME-58, Synchro Corporation, Electronic Division, Hicksville, Ohio, contains information on Dry electrolytic capacitors. Included are specifications, dimensional drawings, and details of mountings.

Circle 389 on Inquiry Card

Capacitors

"The Ultimate in Reliability" is a 6-page folder describing Ceramic Disc Capacitors manufactured by the Electro Motive Mfg. Co., Inc., Willimantic, Conn. The folder describes type TC, temperature-compensating capacitors, type GP, general purpose capacitors and the type TS, temperature stable capacitors. Also included are standard temperature characteristics and curves on all types.

Circle 390 on Inquiry Card

Capacitors

EFCON (Electronic Fabricators, Inc., 682 Broadway, N. Y.) has published Bulletin AT 101 which gives dimensions and prices of its Polystyrene and Mylar tubular and rectangular capacitors in $\pm 5\%$ capacitance tolerances. Included are descriptions, nomenclature, designations, and electrical characteristics of its precision dielectric film capacitors.

Circle 391 on Inquiry Card

R-F Choke Coil

New r-f choke coil technical data sheet released by Essex Electronics, Berkeley Heights, N. J. contains a detailed description of the electrical parameters for a line of chokes available in a 100,000 to 1 inductance range. The standard line is described by the sheet which lists parameters for 123 different units from 0.1 μ h to 10 mh. Logarithmic series is shown as well as the preferred series.

Circle 392 on Inquiry Card

Transformers

A 1959 edition of the Stancor Transformer Catalog has just been published. The 32-page, two-color catalog covers over 750 transformers for industrial, communications, television and radio applications. Chicago Standard Transformer Corp., 3501 Addison St., Chicago 18, Ill.

Circle 393 on Inquiry Card

Coils & Transformers

Inductance values, curves (Q vs freq.), outline drawings, and general information on their line of torroids, transformers, filters, and magnetic amplifiers are contained in Catalog 858 issued by Communication Accessories Co., Lee's Summit, Mo.

Circle 394 on Inquiry Card

Variable Transformer Catalog

The Superior Electric Co., Bristol, Conn. has just issued a 100-page, multi-colored catalog describing their complete line of Powerstat variable transformers. The multi-colored catalog contains photographs, tables, charts, mechanical and electrical specifications, outline drawings, and all other necessary information. It is profusely illustrated.

Circle 395 on Inquiry Card

Pulse Transformers

A technical bulletin describing a series of miniature encapsulated pulse transformers wound on high permeability ferromagnetic cores has just been issued by Technitrol Engineering Co., 1952 E. Allegheny Ave., Philadelphia 34, Pa.

Circle 396 on Inquiry Card

Thermostats

A 4-page, 2-color bulletin describes the Stemco line of bimetal thermostats, with condensed technical information on operating ranges, electrical ratings, optional mountings, and terminal arrangements. A temperature conversion chart—Centigrade to Fahrenheit & vice versa, from -94°F to $+1202^{\circ}\text{F}$ —is included. Stevens Manufacturing Co., Inc., P. O. Box 1007, Mansfield, Ohio.

Circle 397 on Inquiry Card

Precision Cast Components

Airtron, Inc., 1096 W. Elizabeth Ave., Linden, N. J., has available a 2-color, 4-page bulletin which describes their precision cast components and foundry techniques.

Circle 398 on Inquiry Card

Relays

A 20-page handy engineering catalog includes illustrations, specifications, and dimensional diagrams of the latest developments in microminiature rotary relays as well as sensitive telephone type relays which are available. Catalog is complete with photographs, outline drawings, electrical and mechanical specifications. Magnecraft Electric Co., 3350H West Grand Ave., Chicago 51, Ill.

Circle 399 on Inquiry Card

Relays

Engineer's Fact File on Mercury Plunger Relays includes load ratings, contact data, coil characteristics, mounting dimensions, diagrams, illustrations, and technical articles on application engineering. Ebert Electronics Corp., 212-31M Jamaica Ave., Queens Village 28, N. Y.

Circle 400 on Inquiry Card

Potentiometers

A 12-page, 2-color condensed components catalog describes in detail precision potentiometers and pressure transducers and accelerometers which are available from Fairchild Controls Corp., 6111 E. Washington Blvd., Los Angeles, Calif. Catalog contains photographs and technical information in easy-to-follow tabular form.

Circle 401 on Inquiry Card

Electrolytic Capacitors

Engineering bulletin No. 3205 from Sprague Electric Co., North Adams, Mass., has information on their extended-life, miniature, tubular, aluminum, electrolytic capacitors, Type 40D. Included are standard ratings, curves of impedance, capacitance, and equivalent series resistance with temp. R x C product and capacitance change after life test at 85°C , impedance vs frequency, and a list of performance characteristics.

Circle 402 on Inquiry Card

Selenium Rectifiers

Syntron Co., 263 Lexington Ave., Homer City, Pa., has issued an 8-page catalog giving complete description, data and specifications for their full line of high voltage glass or phenolic tube cartridge-type selenium rectifiers. Catalog shows dimensional outlines and circuit diagram and explains Syntron's stack coding.

Circle 403 on Inquiry Card

Now you can specify these popular submins for extra-severe duty — in new Raytheon Reliability-Plus types

CK6021WA

CK6111WA

CK6112WA

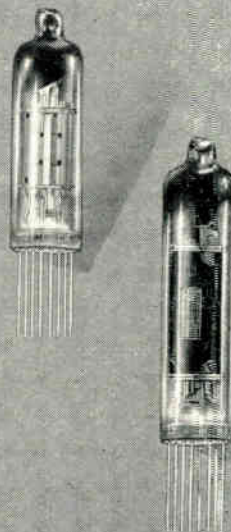
Twin Triodes

CK5639WA

Video & Power Amplifier

CK5902WA

Beam Power Pentode



Only Raytheon produces these improved-reliability button base subminiature tubes — electrically identical to and directly interchangeable with prototypes, and controlled throughout production to meet the following tests above and beyond military specifications:

IMPROVED MECHANICAL STABILITY

15G sweep frequency vibration test to 2000 c.p.s.
10G sweep frequency fatigue test to 2000 c.p.s.
75G, 10 millisecond shock test — in addition to usual 1 millisecond test.

IMPROVED PULSE OPERATION

Triode-connected pulse life test (CK6021WA, CK6111WA)

IMPROVED ELECTRICAL STABILITY

2 hour and 20 hour life tests to guarantee stability of characteristics.

IMPROVED HIGH TEMPERATURE LIFE

Life-test end points now 1000 hours instead of 500 hours.

MAXIMUM RATING LIFE

CONTROLLED WARM-UP TIME

REDUCED HEATER-CATHODE LEAKAGE AT HIGH HEATER VOLTAGES (CK6021WA, CK6111WA, CK6112WA)

EACH TUBE MUST MEET RIGID QUALITY CONTROL STANDARDS

- 0.4% AQL for major characteristics — compared with prototypes' 0.65%.
- High sensitivity thyatron short test.
- X-ray inspection — an original Raytheon safeguard.



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GOVERNMENT SALES • BOSTON: Blgelow 4-7500 • WASHINGTON, D.C.: MEtropolitan 8-5205 • DAYTON: BAldwin 3-8128

Technical Data

for Engineers

Thermistor Catalog

Fifteen different thermistor circuits are described in Fenwal Electronics Inc., Mellen St., Framingham, Mass. new catalog, EMC-2. The 16-page, 2-color brochure also gives specifications for nearly 400 different thermistors, including assemblies, matched pairs, beads, discs, washers, rods, and probes.

Circle 404 on Inquiry Card

Thermocouples

An enlarged data catalog describing AerOpak thermocouples for users in the nuclear, missile, aircraft, industrial and process fields is generously illustrated with data, charts and pictures. Aero Research Instrument Co., 315 N. Aberdeen St., Chicago 7, Ill.

Circle 405 on Inquiry Card

Transducers

Three bulletins, 58-131-135, and 58-140, describe a series of pressure transducers. Model DP-7 measures differential pressures in terms of an electrical output. Models GP-15D and DP-15D convert hydraulic pressure into a proportional electric signal. BJ Electronics, Borg-Warner Corp., 3300 Newport Blvd., Santa Ana, Calif.

Circle 406 on Inquiry Card

Ceramics

Bulletin 116, a 4-page catalog, describes a line of off-the-shelf high temp ceramic tool components including: bushings, washers, discs, plates, rods, and v-blocks. It has: dimensions, tolerances, and mechanical and electrical properties of the hi-temp ceramic components. Duramic Products, Inc., 262-72 Mott St., New York 12, N. Y.

Circle 407 on Inquiry Card

Switching Reactors

Control, a div. of Magnetics, Inc., Butler, Pa. has just issued a 16-page catalog on the company's complete line of standard switching reactors for one-step, low-cost static control.

Circle 408 on Inquiry Card

Converter-Inverters

Spectrol Electronics Corp., 1704 South Del Mar Ave., San Gabriel, Calif., has released a 4-page, 2-color data file describing their Transidyne line of converter-inverters. Has features, specs, and styles of the 4 basic series.

Circle 409 on Inquiry Card

GENERAL

Electronic Hardware

A comprehensive reference manual of standard electronic hardware has been prepared by Amatom Electronic Hardware Co., Inc., 88 Drake Ave., New Rochelle, N. Y., to facilitate the selection and procurement of hardware by electronic equipment manufacturers. Prepared for convenient reference, the 75-page booklet pictures, diagrams, dimensions and lists thousands of sizes of more than a hundred different types of standard parts that are available directly from stock.

Circle 410 on Inquiry Card

Forced Air Cooling

A 6-page technical bulletin on cooling electronic equipment has been published for electronic engineers, physicists and builders of rack-mounted electronic cabinets. Booklet describes supply engineering information on thermal design and survey methods of cooling electronic components. Helpful recommendations are made as to type of cooling to be used for various applications. Tables and charts are included on performance, application, methods, etc. McLean Engineering Labs., P. O. Box 228, Princeton, N. J.

Circle 411 on Inquiry Card

Speakers & Drivers

A new line folder No. SC 504 has been issued by James B. Lansing Sound, Inc., 3249 Casitas Ave., Los Angeles 39, Calif. illustrated with some 40 photographs, drawings and a chart. Data includes speakers, HF and LF drivers, dividing networks and various types of enclosures and horns.

Circle 412 on Inquiry Card

Phone Dial Equipment

An 8-page, illustrated brochure, describing dial equipment for private radio dispatch and common carrier radio telephone systems, clarifies the similarities and differences between dial signaling on private mobile radio systems and radio telephone systems. Included are: requirements for selective or dial signaling, selective or dial signaling requirements for both private and common carrier systems, equipment required, system operation and Secode dial signaling equipment for use with both automatic and manual telephone exchanges. Secode Corp., 555 Minnesota St., San Francisco 7, Calif.

Circle 413 on Inquiry Card

Audio Equipment

An audio equipment bulletin is now available to audio engineers and broadcasters from the General Electric Company's Technical Products Operation Electronics Park, Syracuse, N. Y. The 81-page booklet describes everything in audio equipment from audiomatic limiting amplifiers to zipper-laced custom audio systems.

Circle 414 on Inquiry Card

Electrical Insulation

Bulletin No. 28 issued by Insulation Mfrs. Corp., 565 W. Washington Blvd., Chicago 6, Ill., is a 32-page bulletin describing shaped wood and plastic wedges, formed fibre and polyester film wedges; plain or cuffed, creased or formed slot insulators, fabricated paper, coated fabric and plastic insulating parts and other kinds of specially made insulators. Data and charts as well as pictures and drawings make it easy for the engineer to select the proper size, shape or form of insulator.

Circle 415 on Inquiry Card

Solvents

Non-toxic, non-explosive, non-combustible, non-inflammable, non-corrosive (no inhibitors) solvents which degrease sensitive mechanical and electrical assemblies without damage to delicate parts are described in a booklet available from E. I. duPont de Nemours & Co., Inc., "Freon" Products Division 521, Wilmington 98, Delaware. The solvents can be recovered and reused without re-inhibiting, and cause minimum swelling of plastics or rubber and without crazing or softening paint, wire coatings or insulation.

Circle 416 on Inquiry Card

Sampling Devices

General Devices, Inc., P. O. Box 253, Princeton, N. J. has issued a 16-page bulletin titled "Electronic and Electromechanical Sampling Devices for Multichannel Instrumentation." The booklet contains more than 35 diagrams and photographs to illustrate the subject of selection and application of sampling devices.

Circle 417 on Inquiry Card

Power Supply

Two page, 2-color, bulletin describes the Model 104, transistor regulated power supply for general laboratory applications. Quan-Tech Laboratories, Morristown, N. J.

Circle 418 on Inquiry Card

Technical Data

for Engineers

PLASTIC MATERIALS

Fibre Fabrication

A handy booklet "Why" describes in detail the fabrication of laminated plastics and vulcanized fibre parts. A 12-page illustrated booklet answers a lot of questions covering this area. Taylor Fibre Co., Norristown, Pa.

Circle 419 on Inquiry Card

Silicone Guide

The 1959 illustrated reference guide describes what silicones can best meet the needs of problems ranging from adhesives to release agents, resins to rubbers, dielectrics to water repellents; contains graphic examples showing where they are currently used, and information on how to get specific data on the silicone material best suited to any application. It features an expanded indexing system. Dow Corning Corp., Midland, Mich.

Circle 420 on Inquiry Card

Carbon-Graphite

An 8-page brochure serves as an idea book for carbon-graphite applications. Charts and tables provide data on qualities of scleroscope hardness, density, transverse and compressive strength, oxidizing temperature limitations, performance in sliding contact with bearing metals, thermal conductivity and tensile strength-to-specific gravity. KARAK characteristics and advantages are discussed. Ohio Carbon Co., 12508 Berea Road, Dept. 104, Cleveland 11, Ohio.

Circle 421 on Inquiry Card

Teflon Tubing

The Driver-Harris Co., Harrison, N. J., have issued Bulletin 158, 5 pages, which describes the Surf Chemical Inc.'s line of Teflon tubing. Sizes of the tubing available are in tabular form along with drawings and ordering information. Also extrusions are included such as rods, coaxial cables, cores and aircraft and industrial hose liners.

Circle 422 on Inquiry Card

Teflon Handbook

Halogan Insulator & Seal Corp., 9960 Pacific Ave., Franklin Park, Ill., has made available a 28-page Teflon Stock Catalog and Machine Handbook. The catalog prices 1087 sizes of Teflon tubing and rod available for machining into parts.

Circle 423 on Inquiry Card

Phenolics

An 8-page, illustrated brochure, CDC-358, describes General Electric's complete line of phenolic resins, varnishes and molding powders. It includes product features, special properties, and detailed technical data on phenolic molding powders, laminating varnishes, foundry resins, Methylon coating resins, and industrial resins and varnishes. General Electric Co., Chemical Materials Dept., Pittsfield, Mass.

Circle 424 on Inquiry Card

Ceramic Components

Engineering Bulletin No. 106 from Ceramtronics Inc., 364 Highland Ave., Passaic, N. J., compares, in tabular form, the mechanical and electrical properties of typical high and low alumina ceramics vs. properties of electrical glass and glass bonded mica.

Circle 425 on Inquiry Card

Laminates

Northern Plastics Corp., La Crosse, Wisc., has just issued a 4-page, 2-color brochure which describes their printed circuits, copper-clad laminates, base laminates and fabricated parts. Complete technical information is included.

Circle 426 on Inquiry Card

INDUSTRIAL TV

Closed Circuit TV

A new 12-page bulletin has just been published by the Electronics Div. of Diamond Power Specialty Corp., Lancaster, Ohio. The bulletin describes their major types of industrial TV equipment, gives 5 basic suggestions for equipment selections, and illustrates each with case histories of successful operations.

Circle 427 on Inquiry Card

Industrial TV Equipment

An 8-page illustrated brochure entitled "How Many Jobs" covers a complete line of industrial television equipment for business and industry. It shows different types of cameras, control units, monitors, accessories, and projection systems. General Precision Laboratory, 63 Bedford Rd., Pleasantville, N. Y.

Circle 428 on Inquiry Card

ELECTRON TUBES

Decade Counter Tubes

An 8-page, 2-color booklet has been issued by the Sylvania Electric Products Inc., Special Tube Operations, 1891 E. 3 St., Williamsport, Pa., entitled "Decade Counter Tubes." The booklet contains revised circuits and the latest technical information on these tubes.

Circle 429 on Inquiry Card

Electron Tube Catalog

Litton Industries, 960 Industrial Rd., San Carlos, Calif., has just issued a 90-page catalog listing magnetrons and klystrons that are available from them for use in government equipment. Complete technical information is included along with photographs, tables, and drawings.

Circle 430 on Inquiry Card

SWITCHES

Toggle Switch

An 8-page catalog lists 200 models of toggle and trigger switches by Sargent Electric Corp., 630 Merrick Rd., Lynbrook, N. Y. Ten of the series are treated in detail with dimensional outlines, illustrations, electrical and mechanical specifications and applications.

Circle 431 on Inquiry Card

Switches

Twenty-four-page catalog covers the representative line of precision snap-action and mercury switches manufactured by Micro Switch Div., Minneapolis-Honeywell Regulator Co., Freeport, Ill. Includes data on high-temperature, maintained-contact, explosion-proof, high capacity, proximity, oil-tight, environment-free, and multicircuit types. Has photos, dimensions, electrical ratings, characteristics and application information.

Circle 432 on Inquiry Card

Switches

A 24-page engineering catalog No. G-300 issued by Grayhill, Inc., 561 Hillgrove Ave., La Grange, Ill. covers their complete line of miniature push button switches, rotary switches, binding post, test clips and miscellaneous components. Every part is illus-

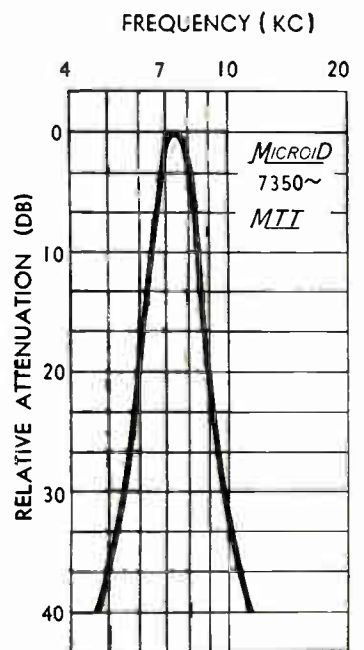
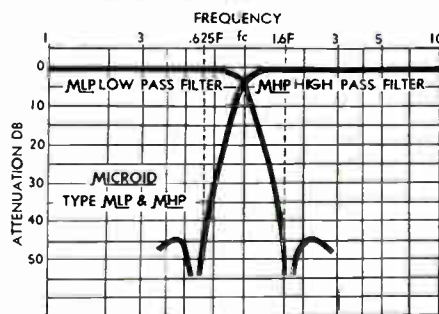
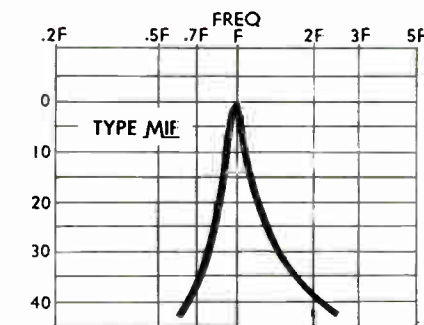


THE SHRINKING MAN'S FILTER

Although worlds apart in purpose, practitioners of the art of head shrinking and Burnell & Co. miniaturization engineers are both expert in reducing to size. For example, Burnell's new microminiature MICROID filters are particularly valuable in transistorized circuitry and only a step away from micro-module use. Range of the new Type MI band pass filter is 7.35 kc to 100 kc, band width 15% at 3 db and +60% -40% at 40 db. Size is 1/2" x 19/32" x 15/16", weight .3 oz. Types MLP and MHP cover 5 kc to 100 kc with a standard impedance of 10K ohms. These are microminiature counterparts of the popular Burnell TCL and TCH low pass and band pass filters. The band pass filter results when cascading a TCL with TCH filter. Size is 3/4" x 1/2" x 1".

Type MI microminiature interstage filters are designed for a wide variety of applications. Input impedance is 10K ohms, output to grid with a voltage gain of approximately 2:1. The 3 db band width is nominally 8%. Ranging from 7.5 kc to 100 kc, these interstage filters are provided in the same case as Type MLP.

Fully encapsulated, the new MICROID filters provide less weight, more reliability and exceed MIL specifications. We'll be glad to design and manufacture to your specifications in any quantity. Write for special filter bulletin to help solve your circuit problems.



Burnell & Co., Inc.

PIONEERS IN microminiaturization OF
TOROIDS, FILTERS AND RELATED NETWORKS

EASTERN DIVISION
DEPT. 1-18
10 PELHAM PARKWAY
PELHAM, N. Y.
PELHAM 8-5000
TELETYPE PELHAM 3633



PACIFIC DIVISION
DEPT. 1-18
720 MISSION ST.
SOUTH PASADENA, CAL.
RYAN 1-2841
TELETYPE: PASACAL 7578

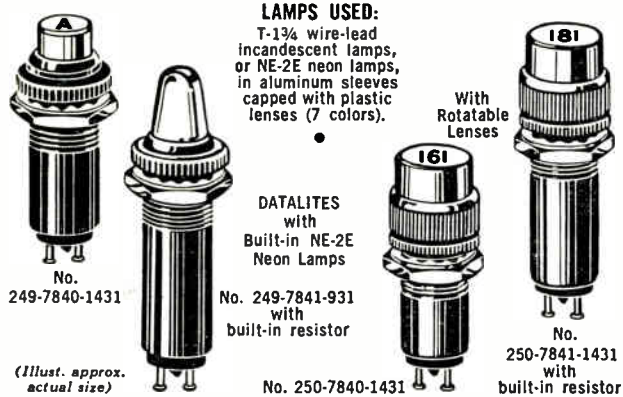


In this brochure—complete facts on DIALCO's

DATALITES®

For the Computer-Automation Industries

DATALITES by DIALCO are ultra-miniature Indicator Lights specially designed to meet the critical requirements of the computer-automation fields. Made in 2 basic styles: Lamp Holders with DIALCO's own replaceable Lamp Cartridges (see above); or integrated DATALITES with Built-in Neon Lamps which are not replaceable (see below). Ultra-compact, single units mount in $\frac{3}{8}$ " clearance hole; the twin-lamp assembly mounts in $\frac{3}{4}$ " clearance hole.



DATALITES have fully insulated terminals and conform to all applicable military specifications. Integrated units are available with or without built-in resistors. The cylindrical lenses can be hot-stamped with digits, letters, etc. Complete details in Brochure L-160. Send for it now.

SAMPLES ON REQUEST—AT ONCE—NO CHARGE



Foremost Manufacturer of Pilot Lights

DIALIGHT CORPORATION

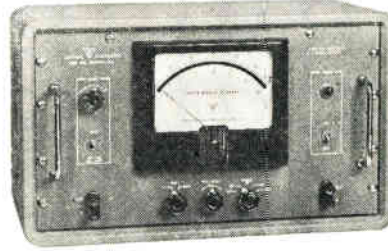
50 STEWART AVE., BROOKLYN 37, N. Y. • HYacinth 7-7500
Circle 195 on Inquiry Card

PHASE METERS

0.0001 cps to 500 mc.
Accuracy 0.5°
Direct Reading in Degrees.

DELAY LINES

Continuously Variable, Step Variable, Tapped and Special, meet MIL specifications.



PHASE METERS

Type 405 Series — 1 cps to 500 kc.
Accuracy — 0.25°.
Type 205A1-A2 — 100 kc to 15 mc.
Accuracy — 0.05°.
Type 205B — 15 mc. to 500 mc.
Accuracy 0.05°.
Type 202 — 20 cps to 150 kc.
1° full scale sensitivity
Accuracy — 0.05° or 2%
Phase Angle Counters: 0.0001 cps to 1000 cps.
Accuracy — 0.5°.

DELAY LINES

Variable up to 1200 μ s, with resolution time 8×10^{-21} sec.
Tapped Delay Lines 5T, 6T, 7T, 8T and 9T series; total delay 0.1 μ s up to 500 μ s; impedance from 50 ohms up to 2500 ohms.
Type 6C Miniature Delay Lines: $\frac{3}{4}$ " dia. x 6" long; delay up to 0.8 μ s.

AD-YU
ELECTRONICS LAB., Inc.
Formerly ADVANCE

249 Terhune Ave., Passaic, N.J.
GRegory 2-5622

Circle 196 on Inquiry Card

NEW non-corrosive HYDRAZINE FLUX* ends residue problems on soldered joints, saves production time

HYDRAZINE FLUX leaves no rosin residue. New flux in water and water-alcohol solutions vaporizes completely at soldering temperature. Leaves no residue which would support growth of fungus. Will not corrode. Conforms to strict military requirements.

HYDRAZINE FLUX permits prefluxing. This means you can hold prefluxed parts before soldering—an efficiency measure

that can increase manhour output substantially.

Ideal for soft-soldering a wide range of copper and copper-based alloys in electronic applications.

Test Hydrazine Flux in your own plant. Write for a sample of Hydrazine Flux and technical literature . . . for name of your nearest distributor.

*U.S. Patent No. 2,612,459

Available only from Fairmount and its sales agents.

Fairmount

CHEMICAL COMPANY, INC.

Dept. EI4-2, 136 Liberty St., N. Y. 6, N. Y. • Plant: Newark, N. J.
Circle 197 on Inquiry Card

Technical Data

for Engineers

trated with most of the products also shown with exploded views. In addition, engineering drawings of all items are included, giving all standard dimensions.

Circle 433 on Inquiry Card

Sensitive Switches

A 4-page catalog-digest which covers a line of miniature snap-acting precision switches; includes photographs, descriptions, actuator types, force-and-movement specifications, and electrical ratings. Types shown are general-purpose, high-sensitivity, immersion-proof, metal-cased, reset, ac/dc, automatic-appliance, and AN-JAN switches, Unimax Switch, Div., The W. L. Maxson Corp., Ives Rd., Wallingford, Conn.

Circle 434 on Inquiry Card

MICROWAVE

Waveguide Components

A loose-leaf folder presenting fittings, bends & miters, twists, waveguide sections, feeds & horns, adaptors, directional couplers, crystal holders, duplexers, and mixers is offered by Aircom Inc., 139 E. First Ave., Roselle, N. J. Folders contain electrical and mechanical specifications, and photographs.

Circle 435 on Inquiry Card

Microwave Silicon Diodes

A 24-page brochure describing microwave silicon diodes has been issued by Microwave Associates, Inc., Burlington, Mass. Catalog includes up-to-date technical data and receiver design information for low noise mixer and video diodes for applications in the 300 MC to 70,000 MC frequency range. A recently developed diode for test equipment applications is also described. Performance curves, nomographs, outline drawings, and photographic illustrations are included.

Circle 436 on Inquiry Card

Variable Delay Lines

Data sheet on 30 MC to 10,000 MC delay lines list 4 specific high frequency delay lines: 1 variable and 3 fixed. The variable has a bandwidth of 125 MC and a time delay of 0 to 50 m μ sec. The fixed have delays of 10, 50, and 200 m μ sec. with bandwidths of 500, 50 and 30 MC respectively. Impedance ranges are from 50 to 120 ohms. Other characteristics are listed. Control Electronics Co., Inc., 10 Stepar Place, Huntington Station, L. I., N. Y.

Circle 437 on Inquiry Card

Instrumentation

A short form brochure of Menlo Park Engineering, 721 Hamilton Ave., Menlo Park, Calif., covering their TWT & BWO solenoids, microwave frequency multipliers, TWT amplifiers, power leveling systems, and oscillators.

Circle 438 on Inquiry Card

Microwave Absorbents

Loose-leaf description sheets on microwave absorbents and an eight-page brochure containing applications and data are offered by the B. F. Goodrich Co., Sponge Products Div., Shelton, Conn.

Circle 439 on Inquiry Card

TABULAR DATA

Temperature-Millivolt Tables

Chart of Temperature - Millivolt Conversion Tables for thermocouples from Thermo Electric Co., Inc., Saddle Brook, N. J. for Fahrenheit-Centigrade temperature conversion, in 5° increments, to mv values for 8 different thermocouple calibrations. The 2-color chart is punched for a 3-ring binder, or may be used as a wall chart. Values based on reference junction temperatures of 75°F and 25°C. Correction factors for other reference junction temperatures are provided. Temperatures are from -320°F to +3270°F and -200°C to +1800°C.

Circle 440 on Inquiry Card

Literature Lists

Two literature lists on fiber research, one on electron microscope work and the other on X-ray diffraction investigations, are offered by Instruments Div., Philips Electronics, Inc., 750 So. Fulton Ave., Mt. Vernon, N. Y. The tabulation of electron microscope papers includes 79 articles which appears in domestic and foreign publications and lists 6 textbooks and reference books. Fifty-eight articles are tabulated in the X-ray diffraction list.

Circle 441 on Inquiry Card

Potentiometer Definitions

Brochure lists functional potentiometer definitions as a guide to users of Clarostat products, and avoids misinterpretation of terminology between supplier and buyer. Clarostat Manufacturing Co., Inc., Dover, New Hampshire.

Circle 442 on Inquiry Card

Information-Conversion Data

A chart of technical information and conversion data including altitude from -5,000 ft. to 1,800,000 ft. with pressure and temperature equivalents in accordance with ARDC model atmosphere. A Centigrade to Fahrenheit conversion chart from absolute zero to 1,000°C is included. A third chart shows wet bulb and dry bulb with equivalents, relative humidity, and Centigrade - Fahrenheit interchange. Also provided is a table of heat and energy equivalents. Conrad, Inc., Conrad Square, Holland, Michigan.

Circle 443 on Inquiry Card

Resistance Decade Table

Texas Instruments Incorporated, P. O. Box 312, Dallas, Texas, is offering the official decade table for determining standard resistance values of Precision Film Resistors. The table, known as the MIL-Bell decade table, is in accordance with Military Standard 90169 and has been adopted by the American resistor industry in cooperation with the Armed Services Electro-Standards Agency.

Circle 444 on Inquiry Card

Phono Needle Wall Chart

A 17½ x 33 in. chart contains a listing of Jensen needles—diamond, sapphire, and durosium—for every brand of cartridge from Astatic to Webster-Chicago and has complete stereo listings. Drawings of needles are included, with a listing of the cartridges they fit. Jensen Industries, Forest Park, Ill.

Circle 445 on Inquiry Card

Thermometer Wire

Brochure on resistance thermometer wire shows graphically resistance vs. temperature from 0° to 500°C with various pure metals and alloys used in thermometry. Included are enamels for wire application from the standard oleoresinous, rated for continuous use to 105°C, up to and including Secon Ceramic Insulation, rated for continuous use to 500°C. Secon Metals Corp., 7 Intervale St., White Plains, N. Y.

Circle 446 on Inquiry Card

Space Talk Guide

A pocket-size, down to earth, glossary of astronomical terms which contains 133 terms used by space scientists and engineers—including technical slang. Republic Aviation Corp., Farmingdale, L. I., New York.

Circle 447 on Inquiry Card

Technical Data

for Engineers

Magnetic Heads

The Applied Magnetics Corp., P. O. Box 425, Santa Barbara Airport, Bldg. 304, Goleta, Calif., has issued a 4-page bulletin describing the methods and materials used in the manufacture of AMCO magnetic recording heads and shows pictures of various types of heads and head assemblies designed for specific applications.

Circle 448 on Inquiry Card

Magnetic Core Testing

A 12-page technical bulletin MM-2, "Testing of Rectangular Hysteresis Loop Magnetic Cores" is available from the General Ceramics Corp., Keasbey, N. J. It describes in detail the system and equipment developed for use in testing magnetic cores. The bulletin includes an analysis of the parameters of core characteristics and the test requirements that must be met to ensure the selection of cores to specific levels of performance.

Circle 449 on Inquiry Card

Automatic Regulators

Tubeless magnetic automatic voltage regulators are the subject of a 12-page, 2-color brochure issued by The Superior Electric Co., Dept. TBM, Bristol, Conn. Booklet contains photographs, outline drawings, electrical and mechanical specifications.

Circle 450 on Inquiry Card

CONNECTORS & TERMINALS

Connectors

Winchester Electronics, Inc., Willard Rd., Norwalk, Conn. has just issued a 12-page catalog which represent up-to-date revisions and additions to their line of connectors. Catalog #359 is complete with photographs, outline drawings, electrical and mechanical specifications.

Circle 451 on Inquiry Card

Aluminum R-F Plugs

A complete new line of lightweight r-f Cannon plugs utilizing aluminum shells is described in a new 17-page catalog, ALRF-1. The "ALRF" line of coaxial plugs and the "ALA" line of cable adaptors are described. Comprising the line are the "ALN" and "ALSC" series of r-f plugs, and the "ALA" series of connector-adaptors for joining Foamflex or Raytherm semi-rigid aluminum coaxial cable to standard RG cable. Cannon Electric Co., 3208 Humboldt St., Los Angeles 31, Calif.

Circle 452 on Inquiry Card

Ceramic to Metal

An 8-page booklet covering the application and description of alumina ceramic-to-metal terminals has been released by the Advanced Vacuum Products, Inc., Stamford, Conn., a division of General Ceramics Corp. Booklet describes improved sealing techniques, advanced sealing techniques, engineering data and contains dimensional drawings.

Circle 453 on Inquiry Card

WIRE & CABLE

High Temperature Wire

The 1959 catalog, 64 pages on Teflon insulated wires and cables has 8 sections of engineering information and prices on high-temperature magnet wire, lead wire, cables, tubing, and Teflon tape, and detailed general information on the products. Also contains mil specs, temperature ranges, wire and cable constructions, colors, tests, and design criteria for high temperature wiring. American Super-Temperature Wires, Inc., Winooski, Vt.

Circle 454 on Inquiry Card

Wiring Devices

Pocket-size, illustrated wiring device catalog issued by Eagle Elec. Mfg. Co., Inc., 23-10 Bridge Plaza South, Long Island City, N. Y., covers 3 wire "U" devices, grounding devices, interchange devices, switches, receptacles, combination devices, wall plates, range and dryer receptacles, Eagalok locking devices, fuses, sockets, armored caps and connectors.

Circle 455 on Inquiry Card

High Frequency Cables

Described in this brochure of General Cable Corp., 420 Lexington Ave., New York 17, N. Y., are two types of high frequency cables in common use, namely: coaxial cables and video pair cables. Physical and electrical data on the cable are arranged in tabular form.

Circle 456 on Inquiry Card

Cable Assemblies

A 12-page catalog covers standard molded-type cable assemblies and field, special, and coaxial types. Thirty four standard types are illustrated utilizing common connector ends and standard molded terminal ends. There are 3 pages of tabular reference data giving types, cable numbers, corona levels and special remarks. H. H. Buggie, Inc., Box 817, Toledo 1, Ohio.

Circle 457 on Inquiry Card

Electronic Wire

Catalog No. 859 groups wire by type and application. Electrical characteristics and construction details are shown. Listings include microphone and shielded power supply cables, TV camera cables, hi-fi, stereo, and phonograph cables, intercom and sound cables, transmission line cables plus a Conduit Capacity Table. Belden Manufacturing Co., 415 S. Kilpatrick St., Chicago, Ill.

Circle 458 on Inquiry Card

Conductor Slide Rule

A handy logarithmic conductor slide rule has been designed by Aluminum Company of America, 1501 Alcoa Bldg., Pittsburgh 19, Pa., to aid customers in selecting dimensions of aluminum foil or sheet for use in strip-wound electrical coils. The rule provides a ready means of converting from standard wire sizes in copper or aluminum to an equivalent aluminum strip conductor. Wire size is set on a reference scale, and a wide range of equivalent strip conductor size combinations of width and thickness are shown on a selector scale.

Circle 459 on Inquiry Card

SEMICONDUCTOR PRODUCTS

Germanium-Germanium Dioxide

A bulletin describing the physical characteristics and purity standards of germanium and germanium dioxide used in the manufacture of semiconductor devices. It lists the minimum resistivity specifications of electronic-grade germanium measured with a 4-point probe at 25°C, and includes the specifications and chemical characteristics of the finished product. Sylvania Electric Products Inc., Towanda, Penna.

Circle 460 on Inquiry Card

Transistor Sockets

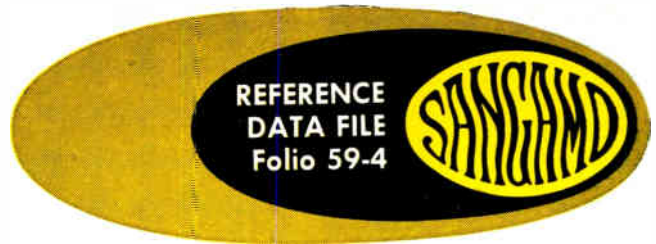
Bulletin 112 contains outline drawings and general specifications for Series 3300 combination transistor sockets. Sockets are designed to accommodate transistors with triangular round or in-line pin configurations. Elco Corp., M St. below Erie Ave., Philadelphia, Penna.

Circle 461 on Inquiry Card

Transistor Batteries

A 4-page, multi-colored bulletin has been issued by the National Carbon Co., 30 E. 42nd St., New York 17, N. Y., which describes their new line of "Eveready" Energizers for use with transistorized circuits.

Circle 462 on Inquiry Card



a continuing series on technical topics of specific interest to engineers

What is the difference between AC and DC capacitors?



A recurrent question confronting the capacitor engineer involves the comparative AC and DC application for chlorinated synthetic oil impregnated and filled paper dielectric capacitors.

Our industry is highly specialized. To realize maximum efficiency and performance of prime equipment and systems, the components utilized must be specifically tailored for the application. Let's see how this concept affects an engineer's decision of capacitor choice.

Although the operations and functions are dissimilar, AC and DC paper capacitors have many similarities. They are almost identical in physical appearance. Both may - - -

- (a) utilize metal containers.
- (b) be hermetically sealed.
- (c) have approximately equivalent case sizes.
- (d) have the same terminal structure.
- (e) have the same container finish.
- (f) be impregnated with chlorinated synthetic oil.

Both are fundamentally a device to store a quantity of electrical energy.

The electrical parameters of AC and DC paper capacitors may appear to be approximately the same. The particular characteristics that are important to their circuit performance are markedly different. Let's now take a look at some of these considerations:

Insulation Resistance. This is a very important characteristic of a capacitor used in most DC applications. It is not comparatively as important in the operation of a AC motor running capacitor. In the motor, the capacitor is shunted across a rather low resistance coil.

Dissipation Factor — The AC motor running capacitor's useful life may depend greatly on the value of dissipation factor at operating voltage, frequency, and ambient conditions of temperature. Internally generated heat in the capacitor body is proportional to the dissipation factor. Life expectancy is, in turn, inversely proportional to the internally generated heat. The dissipation factor of a DC capacitor is only important as an indicator of general quality.

Applied Unidirectional Electrical Stress — This is probably the point of greatest consideration in the comparative rating of DC and AC paper capacitors. Continuous current flow occurs in the dielectric of a DC capacitor upon application of polarized voltage. The magnitude of this current is a function of the insulation resistance at the imposed condition of voltage and temperature. The accumulative effects of these conditions can be insidiously damaging. Eventual capacitor catastrophic failure can occur as a result of progressively accelerated electro-chemical activity. Conductive ions may migrate to one electrode of the capacitor due to the influence of the electrical stress. These ions, primarily acid radicals, may chemically attack the electrode metal, forming metallic salts. The metallic salts may be soluble and may act as a catalyst to

free more conducting ions from the dielectric oil, thus accelerating the destructive action. The capacitor designer combats this condition in a DC capacitor by - - -

- (a) minimizing the initial presence of free acid radicals in all dielectric materials.
- (b) neutralization of trace ions through addition of selected inhibitors.

Such inhibitors are not necessary or desirable in capacitors intended for AC use. The alternating electrical force field does not promote unidirectional migration of mobile ions. We do not infer, however, that the AC capacitor is not subject to chemical deterioration.

Temperature Rise and Chemical Deterioration — Both AC and DC capacitors are subject to chemical deterioration as a function of temperature and voltage stress. Chemical activity is roughly accelerated by a factor of 2 for each 10°C increase in temperature. The reactive current in an AC application will cause generation of internal heat as a result of:

- (a) dielectric loss
- (b) resistance losses in the electrodes
- (c) contact resistance losses

The net result is unit temperature rise above the ambient temperature. The capacitor design engineer accomplishes minimum temperature rise by:

- (1) Careful selection of the impregnating oil.
- (2) Careful choice of paper density, purity, and lamination.
- (3) Proper disposition of the internal current carrying members.
- (4) Efficient arrangement of internal capacitive elements.
- (5) Providing maximum heat radiating area in the can surface.
- (6) Providing an efficient heat radiating finish on the container.

The net result is a capacitor of exemplary performance in many AC applications. Such a capacitor will not necessarily deliver optimum results on a continuous duty DC application.

Frequency Effects — AC capacitor electrical losses are proportional to frequency, dissipation factor remaining constant. If a unit is designed to operate at maximum temperature rise at a frequency of 60 c.p.s., its internally generated heat will be excessive at any higher frequency. A sizable increase in volume and surface area is necessary for satisfactory performance at increased frequencies. The penalty of ignoring the frequency factor may be a ruptured unit.

We have attempted to cover only the most pertinent factors having to do with the two types of components; to emphasize that AC and DC capacitors are not the same devices. To summarize, they may differ in these respects:

- (a) inherent characteristics of the kraft tissue.
- (b) electrical properties of the impregnating oil.
- (c) internal arrangement of the capacitive elements.
- (d) current carrying capabilities of the internal connections.
- (e) heat dissipating capabilities of the enclosure.

Sangamo Sales Engineers are well qualified to provide council and assistance on the difference encountered in DC and AC oil impregnated paper dielectric capacitors. The Sangamo line is complete and offers a wide selection to meet all applications. In addition, specific Engineering Catalogs are available for your files which clearly define and detail rating factor requirements. Write for Engineering Catalog No. TSC-205A.

SC59-4

SANGAMO ELECTRIC COMPANY, Springfield, Illinois

--designing towards the promise of tomorrow

MAINE

has a
**GREAT DEAL
FOR YOU**

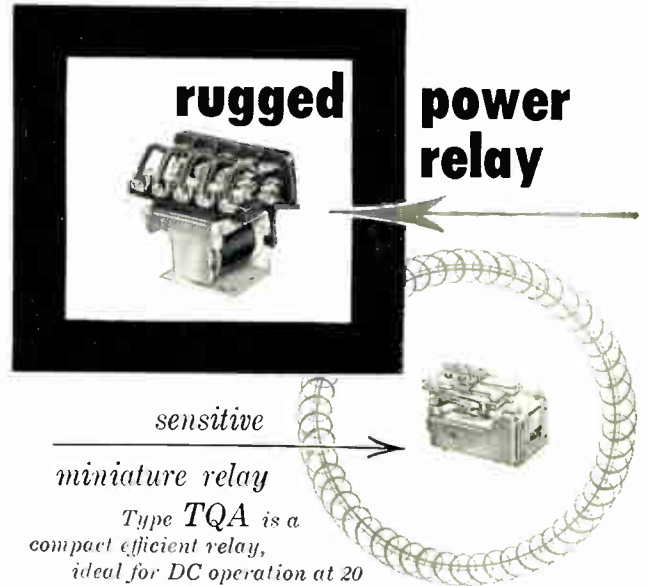
<p>A ♠ PLANT SITES ... Plant sites with ample water, power and transportation facilities.</p>	<p>A ♥ 100% FINANCING ... Up to 100% financing of your industrial project.</p>
<p>A ♦ STABLE LABOR ... A stable labor supply with high output potential.</p>	<p>A ♣ EASY TO REACH MARKETS ... Busiest American and Canadian markets within easy reach.</p>
<p>A ♣ GOOD LIVING ... A wonderful place to live, work and play.</p>	

Your confidential inquiry will be answered with a great deal of additional information from other cards in the Maine pack.

Write, wire or phone

MAINE DEPARTMENT OF ECONOMIC DEVELOPMENT
Fred A. Clough, Jr., Commissioner
State Capitol Augusta, Maine
Circle 199 on Inquiry Card

TYPE U general-purpose low cost power relay. Single coil construction, box-type magnetic field, movable contact springs. Contact forms from 1C to 5C. For AC or DC.

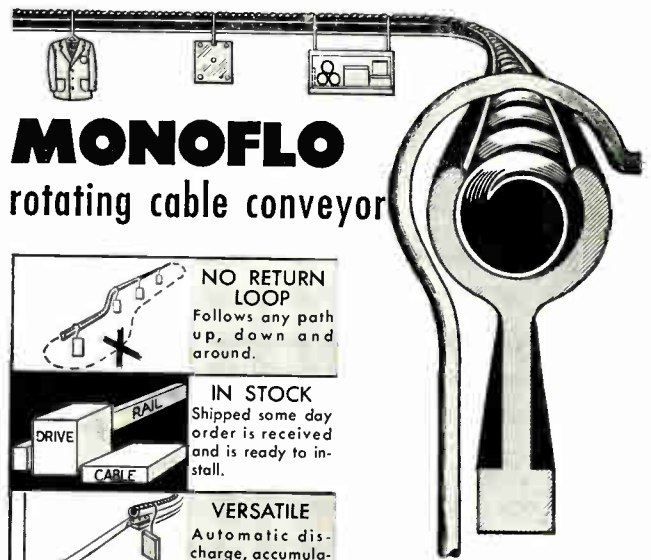


Type TQA is a compact efficient relay, ideal for DC operation at 20 to 100 milliwatt sensitivities. Hermetic sealing available. Send for details and free Comar catalog.

COMAR ELECTRIC COMPANY
3349 ADDISON STREET
CHICAGO 18, ILLINOIS

RELAYS • SOLENOIDS • COILS • SWITCHES • HERMETIC SEALING

Circle 200 on Inquiry Card



MONOFLO
rotating cable conveyor

	<p>NO RETURN LOOP Follows any path up, down and around.</p>
	<p>IN STOCK Shipped some day order is received and is ready to install.</p>
	<p>VERSATILE Automatic discharge, accumulation, or transfer to another conveyor.</p>
<p>INVOICE $\frac{1}{2}$</p>	<p>LOW COST Far under price of any other power conveyor.</p>

Full size section thru MONOFLO CONVEYOR

Hundreds of MONOFLOS working in Electronics, Metal Parts, Autos, Atomics, Missiles, Printed Circuits, Garments, Laundries, Glass, Food, Rubber, Plastics, Instruments.

They deliver parts, return empty jigs, accumulate parts and carry parts thru heating, cooling, painting, baking, etching, drying.



INSTALLED
 $\frac{1}{2}$ DAY

By any mechanic with simple tools.



M-H STANDARD CORPORATION

515 Communipaw Ave., Jersey City 4, N. J.

Circle 201 on Inquiry Card

Technical Data

for Engineers

METERS & MEASURING EQUIPMENT

Measuring Equipment

A 4-page short-form catalog describing Eldorado instrumentation is now available from Eldorado Electronics, 2821 Tenth St., Berkeley, Calif. The new bulletin briefly describes the accelerator current integrator, universal photomultiplier, photometer, milli-microsecond time-to-pulse-height converter, multi-channel pulse height analyzer, non-overloading linear amplifier and milli-microsecond time measuring system. Specifications and prices are included.

Circle 463 on Inquiry Card

Instrumentation

Short Form catalog of Beckman Instruments, Inc., Berkeley Div., 2200 Wright Ave., Richmond, Calif., features: time interval meters, EPUT meters, electronic counters gated by applied signal, totalizing counters, preset counter-controllers, readout devices, transducers, general and special purpose test instruments, standard modifications to electronic counters, and special equipment.

Circle 464 on Inquiry Card

Electronic Instruments

Millivac Instruments, 2315 Second Ave., Carman, Schenectady 3, N. Y., has just issued a series of bulletins describing their latest line of electronic instruments. These new bulletins describe such items as their post-amplifier which is used to increase power signal generators and sweep generators, precision DC VTVM, electronic RMS millivoltmeters and a sensitive DC VTVM microvoltmeter as well as other equipment manufactured by them.

Circle 465 on Inquiry Card

Miniaturized VT VM

Miniaturized electronic voltmeters in four basic styles are described in a 4-page, short-form catalog, No. 10-A just issued by Metronix, Inc., Chesterland, Ohio. Data includes performance specifications, dimensions, photographs and prices.

Circle 466 on Inquiry Card

Speed Measurements

Speed measurements is the subject of a 16-page catalog now available from Sevo-Tek Products Co., 1086 Goffle Rd., Hawthorne, N. J. Catalog introduces many new items in addition

to the established line of dc tachometer generators. A full range of tachometer indicators, tachometer generators, portable testers, and tachometer calibrators are described together with complete specifications and prices.

Circle 467 on Inquiry Card

Components-Instruments

Short-form catalog folder, from Burroughs Corp., Electronic Tube Div., P.O.B. 1226, Plainfield, N. J., contains descriptive information and applications data on Burroughs Beam Switching Tubes, Nixie indicator tubes, decade counters, pulse control instruments, optimeters, beamplifiers, visual decoders, and a listing of over 20 items of available literature.

Circle 468 on Inquiry Card

Electrometer

A four-page bulletin describes the Model 31 Vibrating Reed Electrometer. New bulletin discusses operation, applications, specifications and performance. Applied Physics Corp., 2724 S. Peck Rd., Monrovia, Calif.

Circle 469 on Inquiry Card

Rocket Flight Measurement

How the flights of intermediate range rockets and guided missiles at the White Sands, New Mexico, Missile Range are measured by Univac Scientific Computer is described in an illustrated booklet, U1561, published by Remington Rand Div., Sperry Rand Corp., 315 4th Ave., New York 10, N. Y. The story is illustrated.

Circle 470 on Inquiry Card

ULTRASONICS

Sonic Energy Cleaning

A 3-color report, "How to Appraise Sonic Energy Cleaning," has been published by the Pioneer-Central Div. of Bendix Aviation Corp., Hickory Grove Rd., Davenport, Iowa. Five subjects are covered: what sonic energy is, how it cleans, how its efficiency can be evaluated, an analysis of applications, and an outline of the division's services to potential users.

Circle 471 on Inquiry Card

Ultrasonic Cleaner

Narda Ultrasonics Corp., Westbury, L. I., N. Y., offers a new data sheet on the Series 5000 Ultrasonic Cleaner. It describes Model G-5001, a 40 kc, 500 w. average output SonBlaster generator, and the G-5002, a 20 kc,

500 w. average output generator. The first is used to energize cleaning tanks and the second operates magnetostrictive transducers for drilling, dip soldering and other high-intensity or high-temperature applications.

Circle 472 on Inquiry Card

MOTORS & GYROS

Miniature AC Motors

A 10-page catalog describing 4 basic models and sizes of ac hysteresis synchronous and induction motors and 129 spur and planetary gear reductions is available from Globe Industries, Inc., 1784 Stanley Ave., Dayton 4, Ohio. Performance, MIL Specifications and other technical data is given.

Circle 473 on Inquiry Card

Gyro Information

A new 64-page illustrated Gyro Primer has been prepared that explains how gyros work, gyro terms, and gyro operating principles. Specifications for rate gyros, free gyros, directional gyros and compensated vertical gyros are also included. This easy-to-read booklet is complete with sketches and drawings. Ketay Dept., Norden Div., United Aircraft Corp., Commack, L. I., N. Y.

Circle 474 on Inquiry Card

COMPONENTS

Potentiometers

A 20-page, 2-color catalog from Helipot Div. of Beckman Industries, Inc., 2500 Fullerton, Rd., Fuller, Calif., includes complete details of all production model Helipot precision potentiometers, associated Duodial and Digidial turns-counting dials, Helidel delay lines, Helitrim trimming potentiometers, and lab model pots. Technical data includes: electrical, mechanical and environmental specs. photos, and outline drawings.

Circle 475 on Inquiry Card

Resistors

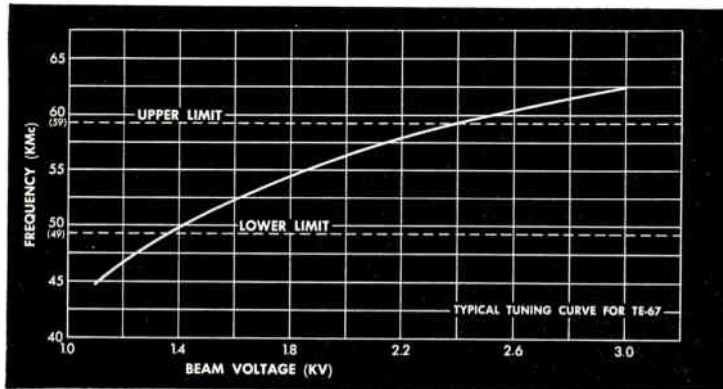
Catalog sheets from International Resistance Co., 401 N. Broad St., Phila., Pa., describes the company's line of Multi-Range resistors and Multi-Range kits. The values in the line include nearly all those adopted as standard by Electronic Industries Association. Included are circuit diagrams and circuit connection instructions.

Circle 476 on Inquiry Card

New Bendix®

BACKWARD-WAVE OSCILLATOR TUBE

for extremely high frequencies



An exclusive Bendix Red Bank product, the Type TE-67 Backward-Wave Oscillator Tube generates microwave energy at extremely high frequencies never before available.

This new tube provides a wide range of usable frequencies for applications in: advanced types of multichannel telephone and television systems, high definition short-range radar, highly directive communications, microwave spectroscopy and other fields where low power, voltage-tuned millimeter wavelength radio frequency energy is required. As the backward-wave tube is voltage tuned, frequency is automatically changed by varying the voltage input. No mechanical tuning adjustment is required.

For more detailed information on the tubes described here, write to: RED BANK DIVISION, BENDIX AVIATION CORPORATION, EATONTOWN, NEW JERSEY.

ELECTRICAL DATA

Frequency Range.....49kmc—59kmc
 Anode Voltage.....1000—3000 volts
 Power Output.....5mw average
 Beam Current.....5ma
 Magnetic Field.....1300 gauss (minimum)
 Heater Voltage.....6.3±10%

MECHANICAL DATA

Output Flange.....Special adapter to RG-98/U
 Maximum Diameter.....0.625"
 Length.....8"
 Mounting Position.....Any
 Weight.....5 oz.*

*Without magnet (tube only). Magnets are available.

Also available:

Type TE-66 with frequency range of 61 kmc to 71 kmc.
 Type TE-71 with frequency range of 65 kmc to 75 kmc.
 Type TE-75 with frequency range of 40 kmc to 50 kmc.

West Coast Sales & Service: 117 E. Providencia Ave., Burbank, Calif. • Export Sales & Service: Bendix International Division, 205 E. 42nd St., New York 17, N. Y. Canadian Distributor: Computing Devices of Canada, Ltd., P.O. Box 508, Ottawa 4, Ontario.

Red Bank Division



Technical Data

for Engineers

Technical Notes

"Technical Notes" is a bi-monthly publication available from G. M. Giannini & Co., Inc., 918 E. Green St., Pasadena, Calif. Free subscriptions to this useful technical publication are available.

Circle 488 on Inquiry Card

Particle Accelerators

Applied Radiation Corp., Walnut Creek, Calif., have issued a technical bulletin which describes particle accelerators and associated apparatus which are available. Technical information and photographs are included in the bulletin.

Circle 489 on Inquiry Card

FM Analysis

Panoramic Radio Products, Inc., 520 S. Fulton Ave., Mt. Vernon, N. Y., has just issued an 8-page bulletin entitled "FM: Theoretical and Practical Analysis." Basic FM theory, complex modulation, FM spectrum measurements, combined AM and FM are discussed.

Circle 490 on Inquiry Card

Design Data

Data sheets, Telehint #7 and #8, from Illumitronic Engineering Co., 680 E. Taylor Ave., Sunnyvale, California, give ways of calculating inductance, determination of Q and complete design of final output circuits.

Circle 491 on Inquiry Card

Antenna System

The Andrew Corp., 363 East 75th St., Chicago 19, Ill., has issued Catalog 22 which is a 96-page product and facility book. It covers fully their complete line of antennas, antenna systems and transmission line products. In addition to complete engineering data on their products, the catalog includes a special 16-page section of general antenna systems engineering information.

Circle 492 on Inquiry Card

Choppers

"The Contact Modulator," a series of new pamphlets on choppers, replaces Bulletin 103. Part 1, "Why Use Choppers" is available from the Airpax, Seminole Div., Fort Lauderdale, Florida.

Circle 493 on Inquiry Card

Kodak
TRADE MARK

Q: What is a Kodak Ektron Detector?

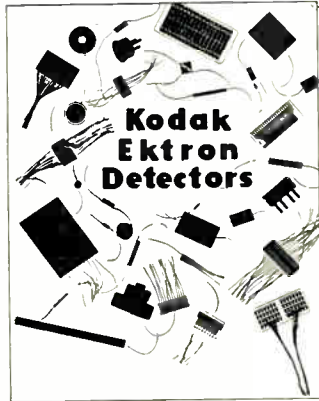
A: It is a semi-conductive resistor. The photosensitive area can be laid down in any pattern. Response extends to 3.5 microns in the infrared. Unaffected by vibration; high signal-to-noise ratio.

Q: What can it be used for?

A: For such applications as an infrared sensor in weapons systems, and in instrumentation for process control, analysis, and safety.

Q: How can I get the facts about spectral response, types, availabilities, and the like?

A: By writing for a new brochure called "Kodak Ektron Detectors."



Write to:

Apparatus and Optical Division
EASTMAN KODAK COMPANY, Rochester 4, N. Y.
Circle 206 on Inquiry Card

WRITE FOR

this useful
informative chart on

MAPICO pure synthetic IRON OXIDES

for ferrites



This handy card gives you details on composition, particle shape and chemical analyses of Mapico's wide range of pure synthetic iron oxides. Unequaled for uniformity . . . Mapico oxides are available in three different particle shapes, each with several ranges of particle size . . . provide controlled electronic characteristics and shrinkage. Ask for this free chart.

Mapico® Iron Oxides Unit

Columbian Carbon Company

380 Madison Avenue, New York 17, N. Y.

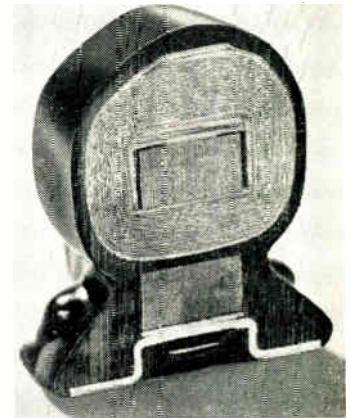
Circle 207 on Inquiry Card

Proven epoxy coating for MIL-T-27A transformers

Flexible dipping resin, "SCOTCHCAST" Brand No. 253, gives smooth, uniform, highly shock-resistant coating with just a single dipping operation.

"SCOTCH" BRAND No. 253—a thixotropic resin—provides the ultimate in quality, appearance, and economy for encapsulating transformers to meet MIL-T-27A specifications. Now almost any configuration of transformer can be successfully impregnated with "SCOTCHCAST" BRAND Resins Nos. 241 or 235, and then encapsulated with No. 253 Dipping Resin with little or no design change.

Units will pass MIL-T-27A without waivers. Processing time can be cut in half.



CUT-AWAY view of transformer meeting MIL-T-27A specifications shows smooth, uniform coating results possible with "SCOTCHCAST" BRAND Resin No. 253.

PRODUCTION ADVANTAGES

"SCOTCHCAST" No. 253 offers these important use features:

1. Separate parts mixed in simple 1-to-2 ratio.
2. Long pot life—4 days or more at room temperatures.
3. Short cure cycle—1 to 2 hours at 250°F.
4. Coating thickness can be controlled.
5. No drip or sag during cure.

USES FOR NO. 253

"SCOTCHCAST" BRAND Resin No. 253 has been used for successful encapsulation of such units as transformers, solenoid coils, motor field coils, printed circuits, capacitors, and other electronic components. In addition, it can be used for specialized applications of brush, spray, or extruded coatings.

We'll be glad to supply complete information and technical data on "SCOTCHCAST" Resin No. 253 upon request. Also available is a newly revised booklet covering impregnating and encapsulating transformers to meet MIL-T-27A specifications. Details all six grades and gives four proven processes. Write to address below.

USE 3M TECHNICAL SERVICE

3M sales engineers are trained and experienced to aid or assist you on any insulation applications. They are backed by 3M's full Technical Service and Research organizations. For complete information, ask your regular 3M Representative, or write: 3M Co., 900 Bush Ave., St. Paul 6, Minn., Dept. TP-69.

REG. U. S. PAT. OFF.

SCOTCHCAST RESINS

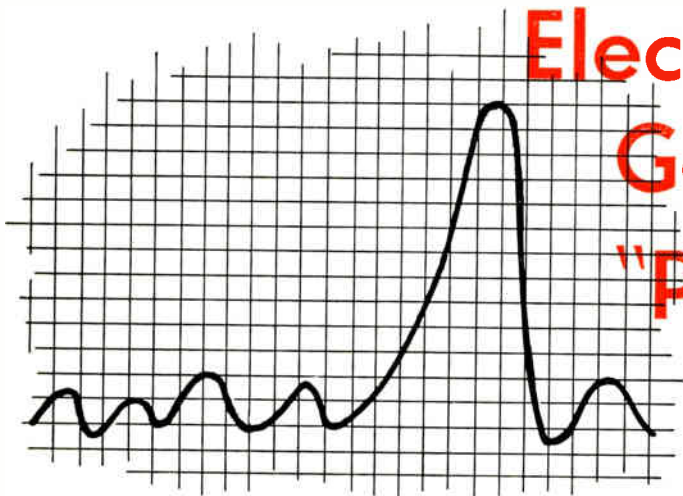
BRAND

"SCOTCH" AND "SCOTCHCAST" ARE REGISTERED TRADEMARKS OF 3M CO., ST. PAUL 6, MINNESOTA. EXPORT: 99 PARK AVENUE, NEW YORK 16, N. Y. CANADA: LONDON, ONTARIO

MINNESOTA MINING AND MANUFACTURING COMPANY
... WHERE RESEARCH IS THE KEY TO TOMORROW



Circle 208 on Inquiry Card



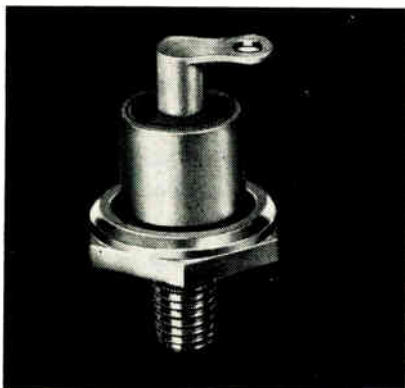
Electronic Products Generating "Peak" Response

The electronic products illustrated in this section have been carefully selected from the hundreds of items which were published in EI during the past year. These are the products in which engineer readers showed the greatest interest as measured by the number of requests received asking for additional information.

Semiconductor Products

SILICON RECTIFIER

Types 6A, a 20 a. silicon power rectifier, is for high temp service at voltages from 50 to 400 v. It will carry a full 20 a. load in half-wave circuits and up to 60 a. in bridge circuits. It may be operated at ambient temperatures up to 165°C and

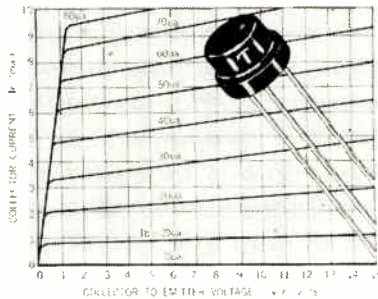


is unaffected by storage temperatures from -65°C to +200°C. It has a standard 14-28 threaded mounting stud and may be mounted in any position. The entire unit is hermetically sealed. Fansteel Metallurgical Corp., Dept. EIP, North Chicago, Illinois.

Circle 301 on Inquiry Card

SILICON TRANSISTOR

A high-beta silicon transistor offers minimum current gain of 80. A useful beta is maintained even at reduced collector current levels and over a wide range of temperatures, from -65° to 150°C. The 2N543, 2N542 and 2N541 operate at 45, 30

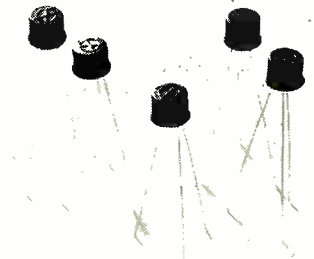


and 15 v. respectively and are good for multistage amplifier applications. Offering more gain per stage, these transistors reduce the number of amplification stages required. Transistron Electronic Corp., Wakefield, Mass.

Circle 302 on Inquiry Card

SILICON TRANSISTORS

Types 2N1131 and 2N1132 are pnp silicon transistors closely matching the 2N696 and 2N697 types. Typical rise time is 80 milli-micro-seconds. Dissipation ratings are 2 watts at



25°C and 1 watt at 100°C. Existence of these closely related devices of opposite polarity affords opportunities for circuit designs based on complementary symmetry. Fairchild Semiconductor Corp., 844 Charleston Rd., Palo Alto, Calif.

Circle 303 on Inquiry Card

Semiconductor Products

SILICON RECTIFIERS

High current silicon power rectifiers provide dc forward currents up to 250 a and max. peak inverse voltage range from 50 v to 500 v. They can be used at high temperatures, can operate at a junction temperature

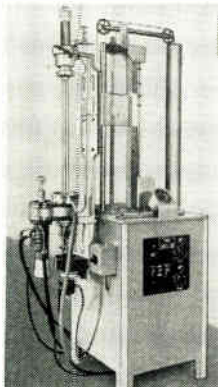


of 190°C, and meet Mil Specs. They are hermetically sealed against environmental extremes of temperature, vibration and shock. To increase reliability and freedom from contamination, no soft solders or fluxes are used in sealing. International Rectifier Corp., 1521 E. Grand Ave., El Segundo, Calif.

Circle 304 on Inquiry Card

FLOATING ZONE FIXTURE

Floating zone fixture for the production of ultra-high purity metals and semi-conductor materials. Purification or crystal growing is achieved by traversing a narrow molten zone along the length of the process bar while it is being supported vertically in vacuum or inert gas. Designed for production, the Model HCP provides flexibility for lab studies. Featured are: Continuously variable up, down, and rota-

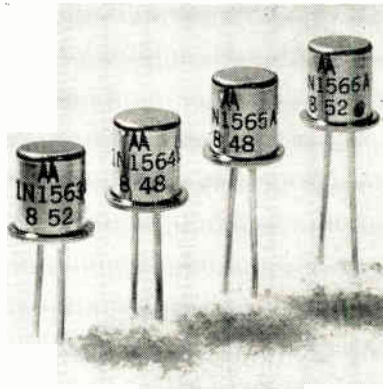


tional speeds, independently controlled, and an arrangement to rapidly center the process bar within a straight walled quartz tube supported between gas-tight, water-cooled end plates. Lepel High Frequency Labs., Inc., Woodside, N. Y.

Circle 305 on Inquiry Card

SILICON RECTIFIERS

Types 1N1563A through 1N1566A offer peak inverse voltages of 100 through 400. One cycle average reverse current is limited to 150 μ a max. when rectified output is 250 ma. and ambient temp. is 150° C. For-



ward rectified currents are 1.5 a. and 250 ma. at 25° C and 150° C ambient temp. Designed for use in magnetic amplifiers, the welded, hermetically sealed, single-ended package can be used with both printed circuit and chassis construction. Motorola, Inc., Semiconductor Products Div., 5005 East McDowell Rd., Phoenix, Arizona.

Circle 306 on Inquiry Card

GERMANIUM TRANSISTOR

Alloy-Junction transistor, 2N647, a germanium npn type along with its pnp counterpart RCA-2N217, is intended for use in class B Complementary-Symmetry power output stages of transformerless, battery-operated portable radio receivers, phonographs, and audio amplifiers, or in conventional class B push-pull or class A audio-amplifier circuits. In a typical class B, the two driven by a 2N217 class A driver provide a

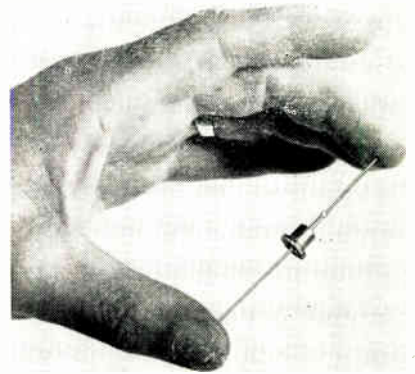


power output of approximately 100 mw at a power gain of 54 db. In a typical push-pull circuit, two 2N647's driven by another 2N647 can provide a power output of 100 mw at a power gain of 66 db. RCA, Semiconductor Div., Somerville, N. J.

Circle 307 on Inquiry Card

SILICON RECTIFIER

The addition of a new member to their low current silicon rectifier family has been announced. Designated as the "H" series, this "top hat" type hermetically sealed silicon rectifier features a welded case and



extra heavy duty junction for high reliability. Ratings range from 100 to 600 peak inverse volts and 750 ma at 55°C. In addition to its small size, the low price resulting from mass production, and availability from stock of many ratings should make this a popular low current rectifier. Sarkes Tarzian, Inc., Bloomington, Indiana.

Circle 308 on Inquiry Card

TRANSISTOR INDEX

The index, used to facilitate selection of transistors, consists of a deck of punched Keysort business cards. Each card describes a particular transistor by means of both sorting slots and data printed on the card. Selection is accomplished manually by means of a keysort needle. Sorting on all ten available parameters is accomplished within two or three minutes. For unique requirements, approximately 40 unused holes are



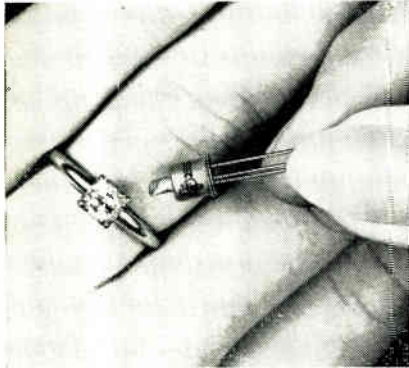
available for insertion of additional data. It contains data on substantially all military and commercial transistors manufactured by 24 major companies. Zeus Engineering Co., 635 South Kenmore Ave., Los Angeles, Calif.

Circle 309 on Inquiry Card

Semiconductor Products

UHF TRANSISTORS

Ultra high frequency, diffused base "mesa" germanium transistors are suited for ultra high speed switching applications. Switching speeds are in the millimicrosecond range and a

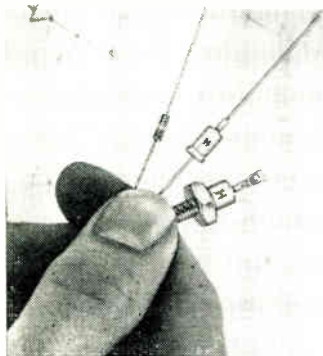


typical alpha cutoff frequency is 250 MC. It is rated to dissipate in excess of 150 mw in free air and will operate at temperatures up to 100°C. It is available in a miniature round-welded case less than 1/2 the size of the standard JETEC-outline TO-5 unit. Case is compatible with the 100-mil grid mounting system. TI-2N559 meets and exceeds reliability specs as outlined in MIL-T-19500A. Texas Instruments Incorporated, P.O. Box 312, Dallas, Texas.

Circle 310 on Inquiry Card

ZENER REGULATORS

A line of silicon diffused junction zener power voltage regulators incorporating 114 type and size combinations is available. The line consists of 38 types in each of three power categories (1/4 w, 1 w, and 10 w). The zener voltage in each power rating ranges from 5.6 v through 200 v in 10% steps. The units are offered in a ±10% zener voltage tolerance and ±5%, up to 56 volts. Dynamic

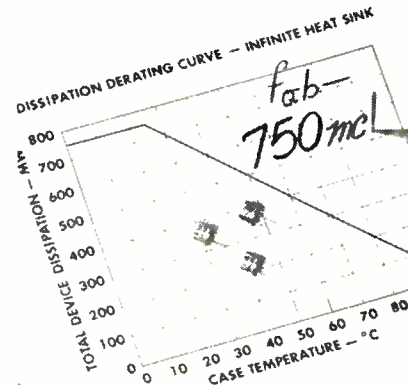


impedance ranges from 1400 ohms for 200 v — 1/4 watt zener regulator type, down to 1 ohm for the 5.6 v — 10 w unit. Hoffman Electronics Corp., Los Angeles, Calif.

Circle 311 on Inquiry Card

GERMANIUM TRANSISTORS

Germanium high frequency, diffused-base "mesa" transistors feature alpha cutoff frequencies up to 750 MC and power dissipations of 750 mw. The npn transistors, 2N1141,

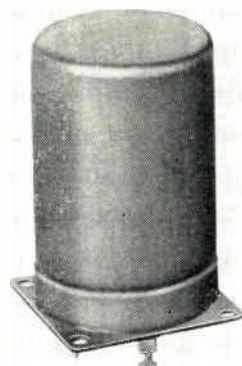


2N1142 and 2N1143 have minimum current gains of 12, 10 and 8 db at 100MC and operate at junction temperatures up to 100° with 750 mw power dissipation at 25°C case temperature. They are enclosed in a welded JETEC TO-5 outline package. Units exceed MIL-T-19500A. High dissipation is realized through direct contact between the header and the active element. Texas Instruments Incorporated, P. O. B. 312, Dallas, Tex.

Circle 312 on Inquiry Card

TRANSISTOR TRANSFORMERS

High power transistor transformers in driver and voice coil types are available. The H-280 driver transformer has a primary impedance of 200 ohms C.T. with secondary 400 ohms split. The H-281 transformer has a 5 w. output from 48 ohms center tapped to 16, 8, 4 ohms. The H-282 has a 10 w. output from 20 ohms center tapped to 16, 8, 4 ohms. All units are wide frequency



range suited to 30-20,000 cycles service. Units are designed to MIL-T-27A Specifications. United Transformer Corporation, 150 Varick Street, New York, N. Y.

Circle 313 on Inquiry Card

TRANSISTOR TESTER

Model TT-205, a general purpose transistor tester for lab, field, and industrial use, measures small signal beta, collector leakage current, and collector resistance on all npn, pnp,

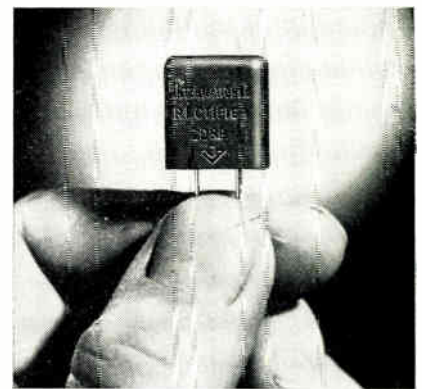


surface barrier, grown or diffused junction transistors. One selector switch selects 11 operating points. It is self calibrating and transistor under test is operated in a temperature stabilized circuit insuring that each unit is tested under identical biasing conditions. It uses 3 transistors; one as a stable oscillator (1000 CPS), and two as a special purpose, low level, synchronous linear detector. Sonex, Inc., 73 S. State Rd., Upper Darby, Pa.

Circle 314 on Inquiry Card

ZENER DIODE

This miniature device, only 0.688 in. in length (excluding leads) provides symmetrical dynamic clipping characteristics on such applications as rate feedback limiting in servo control systems, maintaining the output of a gyro pickoff at a prescribed level, oscilloscope calibration, and similar functions. Its small size and matchbox configuration make it especially suitable for automated insertion



into printed circuit boards. Providing 600 mw dissipation, it is available in zener voltage ranges from 4.3 to 30 v. International Rectifier Corp., 1521 E. Grane Ave., El Segundo, Calif.

Circle 315 on Inquiry Card

Semiconductor Products

PNP TRANSISTORS

Four alloy junction transistors, the JETEC types 2N1024-25-26-27, incorporate "micro-control," a feature that holds input resistance to a uniform value (35 ohms). Collector voltages have been made higher to extend the

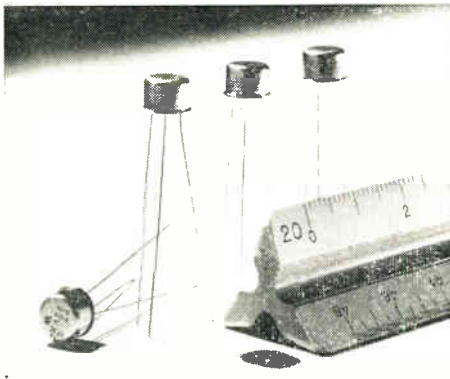


use of these transistors. Other characteristics include low saturation resistance, high gain, and power rating of 150 milliwatts. The transistors are for operation in the 1 to 4 megacycle range. Sperry Semiconductor Division, South Norwalk, Conn.

Circle 316 on Inquiry Card

SWITCHING TRANSISTORS

A new line of germanium high frequency switching transistors are available. Marketed under EIA numbers 2N425, 2N426, 2N427 and 2N428 the line features the standard TO-9 package and is designed to meet or

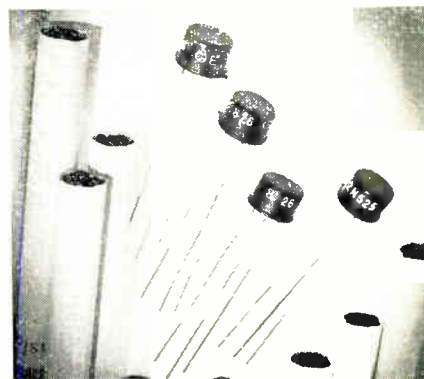


exceed the electrical and mechanical requirements of MIL-T-19500A. These switching transistors assure high reliability and long life even when ordered in large quantities. Motorola Inc., 4545 W. Augusta Blvd., Chicago 51, Ill.

Circle 318 on Inquiry Card

TRANSISTORS

A line of 30 v., 1/2 amp. pnp germanium transistors for use in industrial and data processing equipment are available. They have been designed for medium power amplifier and low frequency, high current

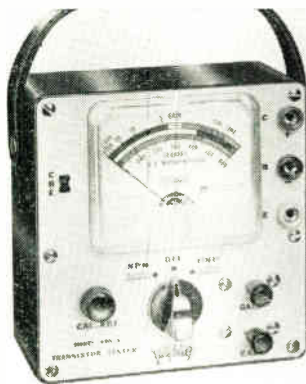


switching applications. The 4 models in this line have received JETEC designations 2N524, 2N525, 2N526, and 2N527. They have a triangular lead arrangement and are housed in the JETEC TO-5 package. General Electric Co., Syracuse, N. Y.

Circle 320 on Inquiry Card

TRANSISTOR TESTER

The Model 690-A provides positive leakage and gain tests for PNP and NPN type transistors. It measures DC Beta from 5 to infinity. A better indication of the degree of quality is made possible by the long GOOD portion of the scale. The tester also tests for shorts, leakage, and forward and

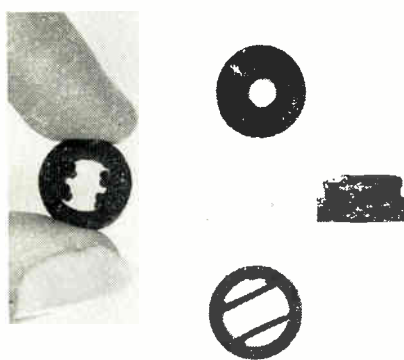


reverse leakage of diodes. Separate "Calibrate" and "Gain" buttons eliminate the possibility of errors in usage. Single switch selection of transistor types gives operational simplicity. Triplett Electrical Instrument Co., Bluffton, Ohio.

Circle 317 on Inquiry Card

TRANSISTOR MOUNTING

The transistor mounting provides a standardized mounting of all transistors regardless of size or shape. It offers shock resistance and prevents movement of the transistor when subjected to severe vibration. Good heat sinking is afforded due to long transistor leads. The quality of low mois-



ture absorption is virtually unaffected by changes in either fresh or salt water. The temperature range is from -60°C to $+99^{\circ}\text{C}$ with a continuous operating temperature of 85°C . Delbert Blinn Co., P. O. Box 757, Pomona, Calif.

Circle 319 on Inquiry Card

DIODE SUBSTITUTION

To aid the design engineer in rapid selection of zener diodes for experimental breadboard circuits, the Zeniac, a diode substitution box offers a selection of 11 basic one watt silicon zener diodes covering the range from 3.6 to 30v. The decade-type substitution box is housed in a com-



pact, easily portable unit which may be inserted into any breadboard circuit. A turn of the selector switch rapidly determines the exact diode required. International Rectifier Corp., 1521 E. Grand Ave., El Segundo, Calif.

Circle 321 on Inquiry Card

Give your products
**MORE RELIABILITY and
 BETTER PERFORMANCE with**

FREED QUALITY

NEW MINIATURE VARIABLE HIGH FREQUENCY INDUCTORS

Continuous Inductance Variation
 Hermetically Sealed Constructions
 Frequency Range 20 KC to 500 KC
 High Q
 Exact Tuning Without Trimmers
 High Self Resonant Frequency



Cat. #	NOMINAL IND. MHY		AVERAGE Q	SELF RES. FREQ. MC
	MIN.	MAX.		
VHI-1	1.1	1.75	95	2.2
VHI-2	1.7	2.5	95	1.9
VHI-3	2.3	3.7	95	1.6
VHI-4	3.	4.5	100	1.4
VHI-5	4.	5.7	100	1.3
VHI-6	5.5	7.5	100	1.
VHI-7	7.	10.5	100	.9
VHI-8	10.	15.	100	.85
VHI-9	14.5	20.5	100	.6
VHI-10	20.	30.	100	.55

MINIATURE PULSE TRANSFORMERS



- Meets all requirements of MIL-T-27A
- Small size and weight
- Ideal for computer applications

CATALOG #	APPLICATION	TURNS RATIO
EPT-1		1:1
EPT-2	Impedance Matching	2:1
EPT-3		2:1
EPT-4		4:1
EPT-5	and	4:1
EPT-6		5:1
EPT-7	Interstage Coupling	7:1:1
EPT-8		5:1
EPT-9		3:1
EPT-11		1:1
EPT-12	Stacking Oscillator	1:1
EPT-13		2:1
EPT-14		1:1.4
EPT-15	Memory core & Current driver	5:5:1PP
EPT-16		3:3:3:1PP
EPT-17	Current driver	6:1
EPT-18	Current Transformer	11:1
EPT-19	Pulse Inversion	6:1:1

*Supplied both molded and cased.

Send for NEW TRANSFORMER AND INSTRUMENT CATALOGS

FREED TRANSFORMER CO., INC.

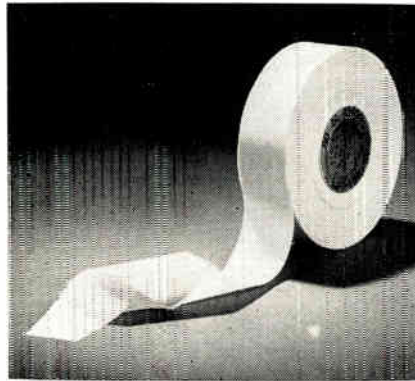
1726 Weirfield Street, Brooklyn (Ridgewood) 27, N.Y.

Circle 275 on Inquiry Card

New Plastic Products

INSULATING TAPE

Tape No. X-1060 is a pressure-sensitive tape for holding and insulating electrically over a broad temperature range. It meets the requirements of MIL-I-18622 and Bu Ships Specification S-6202. It can be used between

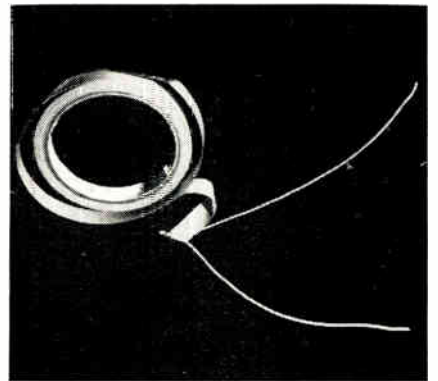


broad functional temperature limits of -50°C to $+180^{\circ}\text{C}$. Dielectric strength is 7000 v, insulation resistance is 7500 megohms and tensile strength is 150 lbs/in. Arc resistance ozone resistance and corona resistance are "good" as measured by 3M. Minnesota Mining and Manufacturing Co., 900 Bush St., St. Paul, Minn.

Circle 324 on Inquiry Card

ELECTRICAL TAPE

A new cast "Teflon" film of high dielectric strength for various electrical-tape applications is available. Dilectrix possesses such advantages as strong dielectric characteristics, performance over a wide thermal

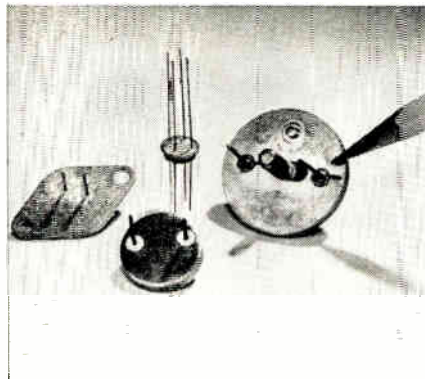


range, negligible water absorption, low rate of moisture vapor permeability, and inertness to chemicals and solvents. Available in lengths of 100 and 500 ft. in widths from $\frac{1}{4}$ to 12 in. in increments of $\frac{1}{32}$ in. Dilectrix Corp., Allen Boulevard, Grand Avenue, Farmingdale, Long Island, New York.

Circle 326 on Inquiry Card

COPPER SEALING GLASS

Code 7295, copper sealing Multi-form glass, can be hermetically fused directly to copper with an expansion-match seal. It has an expansion ($154 \times 10^{-7}/^{\circ}\text{C}$) which closely matches that of copper. Working point of the Multiform glass is 665°C ; annealing point, 366°C ; and strain point, 344°C .

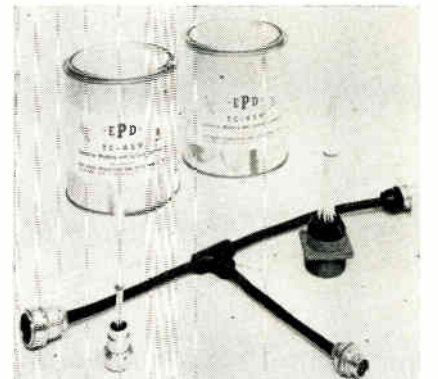


Log volume resistivity (in ohm centimeters) at 250°C is 6.7 and at 350°C is 5.0. The durability of the new glass in water is about the same as Corning's 0080 lime glass. Corning Glass Works, Corning, New York.

Circle 325 on Inquiry Card

EPOXY RESIN

TC-459 is a two-part epoxy resin used for sealing and reinforcing electrical connectors, wiring, cable and other equipment against corrosion, insulation failure, and moisture contamination. It meets or exceeds applicable Military Specifications. Featured are: dielectric constant—



3.2, dielectric strength—1500 v/mil, and insulation resistance 10^{12} - 10^{14} ohms. The change in dielectric properties is negligible from -65° to $+250^{\circ}\text{F}$. Electronic Production & Development, Inc., El Segundo, Calif.

Circle 327 on Inquiry Card

MULTIVERTER CONVERTS "BEEP" TO NUMERAL

The MULTIVERTER is the first solid state, high-speed digital \leftrightarrow analog conversion system accurate to .01%. It is also the first converter to solve various complicated arithmetic problems, including square root, during the process of conversion. A typical MULTIVERTER application is its use in converting analog data received from the orbiting "Explorer." Information telemetered from the satellite and recorded on magnetic tape is converted to numbers by the MULTIVERTER and fed into a digital computer. The result: usable and accurate new knowledge of outer space.

Satellite "Interpreter"

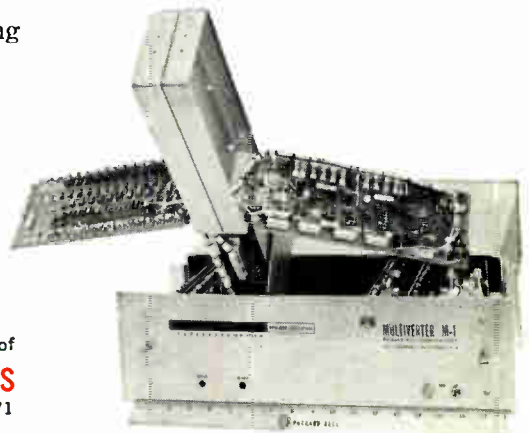
ENGINEERING BEYOND THE EXPECTED

The need for highly accurate measurement in an accelerating technology called for a solid state converter with an accuracy of .01% and a speed of four microseconds per bit. The MULTIVERTER and related accessories resulted. One immediate application has been the interconnection of Packard Bell's TRICE, the first incremental differential analyzer to operate in real time, with various analog systems. Other applications include Missile Impact Prediction, Coordinate Conversion, Orbit Prediction and Solid State Automatic Checkout Systems.

Packard Bell Computer Corp., a subsidiary of

PACKARD BELL ELECTRONICS

12333 W. Olympic Blvd., Los Angeles 64, Calif., BR 2-2171



How Long Does It Take



to find the electronic test instrument you need?

... how can you be sure it's the best available for your needs?

Did you know that there are 4,500 different electronic test instruments manufactured by some 400 different companies?

Think of how many catalogs, spec sheets, and how much bombastic advertising you have to go through to find the instrument best suited to your needs!

Imagine the volume of correspondence and follow-up, the size of your filing system, the many telephone calls and interviews... the hours, days, weeks of valuable time involved!

And when you're all through, you still can't be sure you haven't missed something important - haven't compromised your needs somewhere along the way - or purchased something unnecessarily more elaborate and costly.

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All the headaches, uncertainty, and costly investment of time can be eliminated in *one stroke* through TECHNICAL INFORMATION SERVICE. The FREE brochure describes in detail how TIS works to make electronic test instrument selection swift, easy, and wise! If you don't have the problem, someone in your company does. Get a copy of the brochure for that man. He will be delighted to receive it. Use this convenient coupon. Do it NOW!... it's FREE and there's no obligation.

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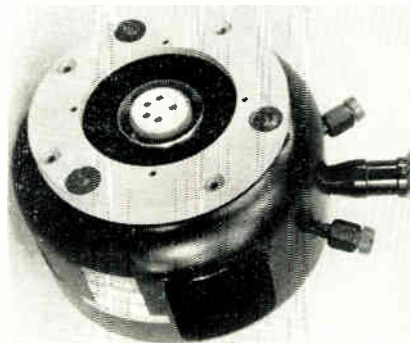
NAME _____ TITLE _____
 DEPT. _____ COMPANY _____
 ADDRESS _____
 CITY _____ ZONE _____ STATE _____

Circle 273 on Inquiry Card

"Peak" Response Products

"M" TYPE BW OSCILLATOR

The QK625 is a voltage tunable wide band (2500-3300 MC) C.W. backward wave oscillator providing a minimum power output of 180 w and a nominal power output of 250-350 w over the band. Tuning sensitivity is

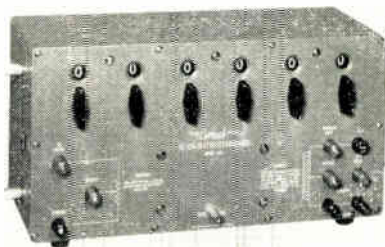


approx. 0.35 MC/v. Tube has an internal permanent magnet. Weight is approx. 25 lbs. The r-f output is standard 7/8 in. coaxial. It is liquid cooled and may be mounted in any position. Applications include countermeasures and FM C.W. operation. It can be amplitude and/or frequency modulated at rates up to and exceeding 10 Mc. Raytheon Mfg. Co., Microwave & Power Tube Div., Waltham 54, Mass.

Circle 494 on Inquiry Card

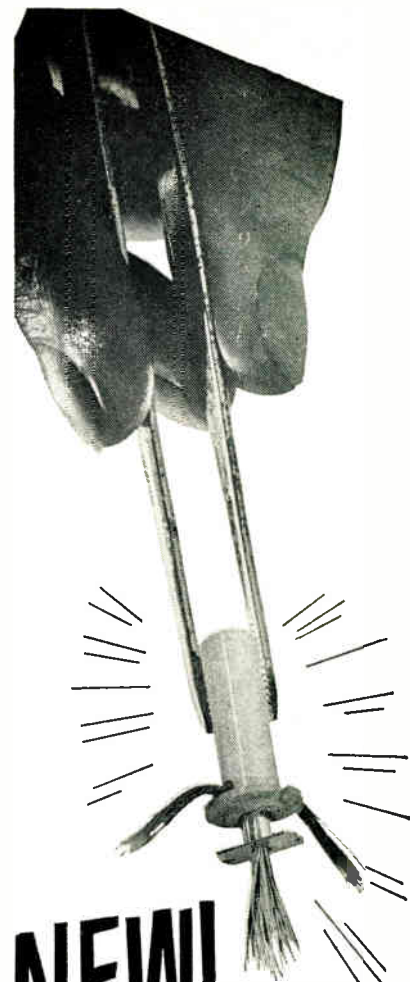
AC/DC RATIO STANDARDS

Models 1001 and 1002 combine both ac and dc requirements of a precision ratio standard in a single instrument. Model 1001 combines a dc divider with a RatioTran capable of accepting input voltages of 0.35f (f in cps) over the frequency range of 50-10,000 cps. Model 1002 accepts ac inputs of 2.5f (f in cps) over the frequency range of 30-1000 cps. Both units have an ac terminal linearity of 0.001% and a dc linearity of 0.001%, with 6



place resolution. Featured are: heavy duty switches, transient suppression, ac ratios up to 1.1111 and extra heavy Standards type construction. Gertsch Products, Inc., 3211 South La Cienega Blvd., Los Angeles, Calif.

Circle 495 on Inquiry Card



NEW!

SUBMINIATURE
50 CIRCUIT
SLIP RING
ASSEMBLY

RELIABILITY
PLUS...

PRECISION ENGINEERING

Proven and tested to meet Mil Specs.

Lowest electrical noise levels.
Signal to noise ratio: 300 - 1.
Break away friction level:
30 GM-CM.

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**SLIP RING CO.
OF AMERICA**

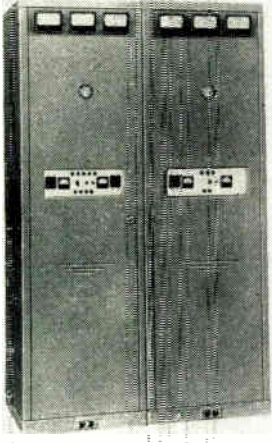
Dept. EI

LOS ANGELES 16, CALIF.
5456 W. WASHINGTON BLVD.
Circle 274 on Inquiry Card

"Peak" Response Products

FM TRANSMITTERS

A line of FM broadcast transmitters for FM/FM stereo and other multiplex services as well as simplex operation. Featured is the "Patch-over" system which permits connecting the driver directly to the

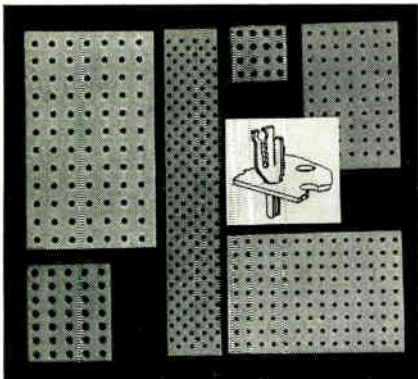


antenna with minimum loss of air time in the event of trouble in the amplifier. "Add-A-Unit" design permits starting with an economical transmitter and adding an amplifier later to boost power. "Serrasoid" crystal-controlled modulators give stability, low noise and distortion, simple design and operation, and economy. Standard Electronics, 20-01 Borden Ave., Long Island City 1, New York.

Circle 496 on Inquiry Card

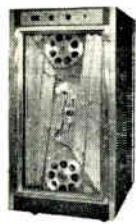

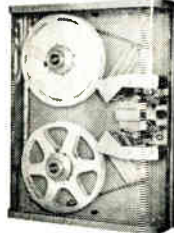
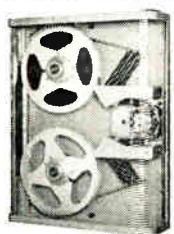


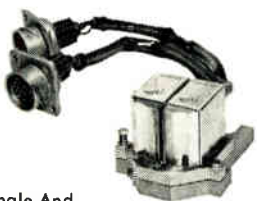

TERMINAL BOARDS

Pre-punched terminal boards are for use in the fast, easy mounting of circuitry in breadboarding and permanent installations. Component wires and Vector Push-in Terminals are quickly inserted where desired. The terminal boards, Vectorboard, are



available in 6 different patterns with 0.062 and 0.093 holes, in XXXP Phenolic, G-7 Glass Silicone, G-10 Glass Epoxy, and Paper Epoxy. Vector Electronic Company, 1100 Flower St., Glendale 1, Calif.

Circle 497 on Inquiry Card

 <p>M908 Magnetic Tape Transport With Complete Program Freedom</p>	 <p>M3260 High Speed Alphanumeric Printer</p>
 <p>M907 Perforated Tape Reader</p>	<p>ALL SOLID STATE DESIGNS</p>
 <p>M906 General Purpose Magnetic Tape Transport</p>	<p>DATA PROCESSING COMPONENTS AND SYSTEMS</p>
 <p>M909 Perforated Strip Reader</p>	<p>By</p>
 <p>M3269 Tape Loop Buffer</p>	<p>POTTER</p>
 <p>Single And Dual Gap Read/Write Heads</p>	<p>Potter designed data processing equipments have an established reputation for unexcelled performance and reliability. Maintaining or exceeding the "State of the Art" is the company's philosophy in this fast moving technology.</p> <p>Custom designs are offered to satisfy military or commercial specifications.</p>  <p>Integrated Systems For Data Processing</p>

Write for literature describing these and other Potter special application products. For detailed technical specifications on any of the Potter Products listed above, call or write your Potter Representative or the plant.



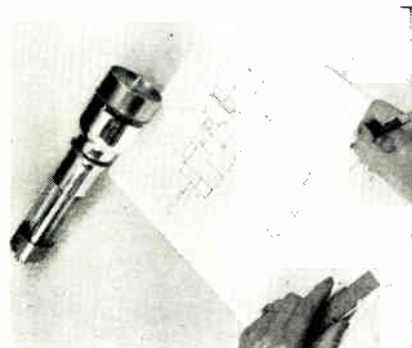
POTTER INSTRUMENT COMPANY, INC.

Sunnyside Boulevard, Plainview, N. Y.
Overbrook 1-3200

Special Electron Tubes

STORAGE TUBE

This three-inch tube (WL-7225) is used for storing information in computers. The tube receives information in the form of electrical impulses, stores it, and when signalled to do so, reads back the accumulated informa-



tion. Features are: ruggedness, 2.6 inch diameter of useful target, increased resolution, electron gun beam focusing to a fine spot, and a convenient coaxial connector for the output terminations. Erasure occurs simultaneously with the reading cycle. Westinghouse Electric Corporation, Box 2278, Pittsburgh, Penna.

Circle 376 on Inquiry Card

TRAVELING WAVE TUBE

The Type 7072 is an amplifier capable of providing greater than 1 w CW power output across the 2 to 4 KMC frequency octave, with a 1 milliwatt input. The tube utilizes an integral periodic-permanent-magnet fo-



cusing structure to focus the electron beam. Heater requirement is 6.3 v at 1.1a. The ability to operate equally well with small signal or at saturation increases the utility of the tube. The tube is also usable as a phase shifter and phase modulator. Sylvania Electric Products, Inc. 1740 Broadway, New York, N. Y.

Circle 378 on Inquiry Card

MULTIPLIER PHOTOTUBE

The RCA 7264 is intended for use in scintillation counters and in the measurement of low-level light sources. Its fast response, high current gain, high peak-current capability, small spread in electron-transit

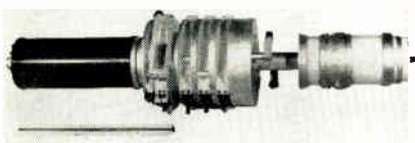


time and typical pulse-height resolution of about 8% make it useful in fast coincidence scintillation counting. When operated at a supply voltage of 2000 volts, the 7264 has a median luminous sensitivity of 875 amperes per lumen and a median current amplification of 12,500,000. RCA Tube Division, Harrison, New Jersey.

Circle 380 on Inquiry Card

POWER KLYSTRON

An external-cavity power amplifier klystron covering the 1700 to 2400 MC range is available. Designated the 4KM50, 000SG, it is rated at 10 kw CW power output with less than 1 watt drive—a power gain of 10,000 times at an efficiency of 35-40%. It incorporates a modulating anode

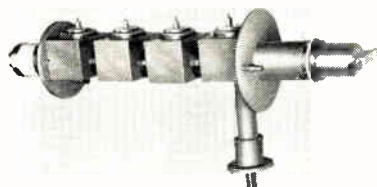


which allows simple, continuously variable control of power applied to the tube, and which permits shaped-pulse and amplitude modulation as well as CW operation. Eitel-McCullough, Inc., San Bruno, Calif.

Circle 377 on Inquiry Card

10 KW KLYSTRON

A wide-tuning range 10 kw amplifier klystron suitable for forward scatter communications and UHF television is available. The VA-833A delivers in excess of 10 kws over a 1.4/1 range of frequencies from 685 to 985 MC. It is a 4 cavity amplifier klystron requiring about 1 w of drive

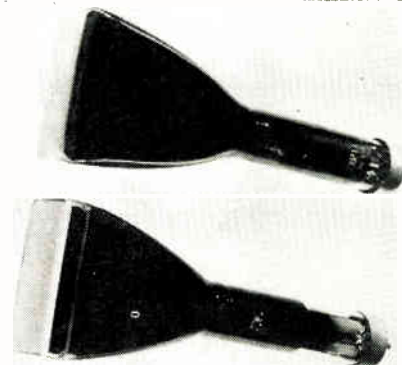


power. The 4 internal cavities tune with individual drive shafts. It needs only a dc power supply, cooling and mounting magnet to form a complete microwave amplifier unit. Varian Associates, Palo Alto, Calif.

Circle 379 on Inquiry Card

CATHODE-RAY TUBE

Direct replacement for the Type 3XP cathode-ray tube, the three-inch screen, flat-face rectangular tube is available with P1, P2, P5, P7, and P11 phosphors. The 3 in. x 1½ in. rectangular screen tube is 8¾ in. long and has electrostatic deflection and focus. It is designed to operate with

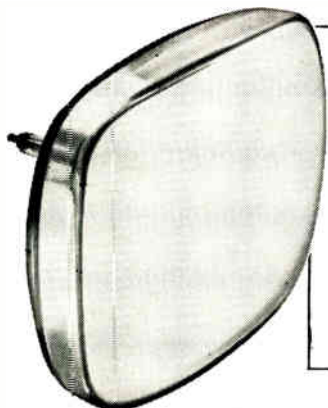


an accelerating voltage of 1000 to 2000 v dc. Deflection factors in the y direction with 1000 v are 12.5 to 17.5 v d-c to move 1 in., and 25 to 35 v d-c with 2000 v accelerating voltage. DuMont Labs., Inc., Clifton, N. J.

Circle 381 on Inquiry Card

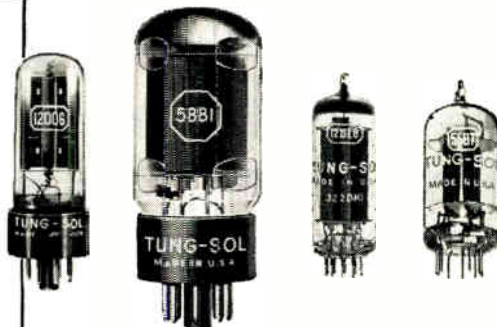
TUNG-SOL

ELECTRON TUBES



TUNG-SOL ENTERTAINMENT TUBES

Tung-Sol makes a Blue Chip Quality tube for every entertainment need. This includes picture tubes, series-string, hybrid auto radio, television, high-fidelity and radio.



TUNG-SOL/CHATHAM SPECIAL-PURPOSE TUBES



VACUUM SWITCH

Used in high-voltage test equipment and airborne radar units.

Types available: 1S22



HYDROGEN THYRATONS

Used in radar modulators and missile tracking beacons. Miniatures in airborne units.

Types available: 1258, 5948, 5949, 7190, 7191, VC1257, 7192, 7240, 7454, 5948A, 5949A.



PENTODES

Used in military and other communications equipment.

Types available: 1AD4, 6AJ5, 6AK5WB, 6AS6, 6AU6WA, 5636; 5636A, 5639, 5654/6AK5W, 5654/6AK5W/6096, 5672, 5678, 5725/6AS6W, 5725/6AS6W/6187, 5749/6BA6W, 5875.



VOLTAGE REGULATORS

Used in Radio and other electronic equipment with regulated power supplies.

Types available: OB2WA, OB2, OC3W, OD3W, 6542, 6627/OB2WA, 6074, 7099.



VHF TRIODES

Used in military VHF radio and test equipment.

Types available: 5676



POWER PENTODES

Used in public address systems, hi-fi amplifiers, radio transmitters and receivers.

Types available: 2E22, 3A4, 5A6, 6AR6, 6L6WGB, 5881, 26E6WGB, 6098/6AR6WA, 6146, 6550, 6883.



POWER TRIODES

Used in high current regulated power supplies and radio and industrial gear with built-in power supplies.

Types available: 6AS7G, 5996, 6080, 6080WA, 6082, 6336, 6336A, 6394A, 6520, 7105, 6528, 7241, 7242.



THYRATONS

Used in power supplies, radio transmitters, motor controllers and spot welders.

Types available: 2A4G, 2D21W, 3C23, 6D4, 323B, 393A, 394A, 395A, 885, 2050W, 5594, 5696, 2D21, 2050, 5727/2D21W, 5643, 6012, 6901.



INDICATOR THYRATONS

Used in relay service wherever a small, lightweight, self-indicating tube is needed.

Types available: 7400, 7401, 7323.



RECTIFIERS

Used throughout industrial electronic equipment and broadcasting operations—AM, FM and TV.

Types available: 1Z2, 3B25, 3B28, 4B32, 5AT4, 5R4GY, 5R4WGA, 5R4WGB, 6H6WGT, 6X4W, 25Z6WGT, 26Z5W, 83, 583, 5517, 5726/6AL5W, 5726/6AL5W/6097, 5829WA, 3B29, 576A.



VOLTAGE REFERENCE TUBES

Used in radios and other electronic gear with regulated power supplies. Especially in high-accuracy units.

Types available: 5651, 5651WA, 5783, 5783WA, 5783WB.



TELEPHONE TUBES

Used in hand sets and carrier equipment.

Types available: 313C, 338A, 407A, 426A, 5842/417A, 5847/404A, 6028/408A.



TWIN TRIODES

Used widely in equipment handling frequencies from the audio level through the frequency band.

Types available: 5670, 5670WA, 6SU7GT, 12AT7WA, 12AY7, 53, 6SC7GT, 5687, 5687WA, 2C51, 6188/6SU7WGT, 5814, 5814WA, 5751, 5751WA, 6SN7WGT, 6021.

Write for complete data! For detailed information on specific types... to fill any specialized needs with a high quality tube made to your specifications, contact: Tung-Sol Electric Inc., Newark 4, New Jersey.



TUNG-SOL®

FULL-LOAD MOTOR CURRENT

Motors* (Full Load)	CURRENT	
	230V	550V
1.5	2.3	1.4
2.0	3.3	1.8
2.5	4.3	2.6
3.0	6.3	3.4
4.0	8.2	5.0
5.0	12	8.3
6.0	20	12.0
7.5	29	16.0
10	38	23.0
15	56	31.
20	74	38.
25	92	46
30	110	61
40	146	75
50	180	90
60	215	111
75	268	148
100	355	184
125	443	220
150	534	295
200	712	

* These values for full-load current are average for all speeds.

Single-Phase, AC Motors* (Amperes at Full Load)

HP	115V	230V	440V
1/6	3.2	1.6	
1/4	4.6	2.3	
1/2	7.4	3.7	
3/4	10.2	5.1	
1	13.	6.5	
1 1/2	18.4	9.2	
2	24.	12.	
3	34.	17.	
5	56.	28.	
7 1/2	80.	40.	21.
10	100.	50.	26.

For full-load currents of 208 and 200-volt motors, increase corresponding 230-volt motor full-load current by 10 and 15 per cent, respectively.

* These values of full-load current are for motors running at speeds usual for belted motors and motors with normal torque characteristics. Motors built for especially low speeds or high torques may require more running current, in which case the name plate current rating should be used.

—Courtesy Perkins Engineering Corp.



With CECO
Remote Pan & Tilt Head
ONE CLOSED CIRCUIT
TV CAMERA DOES
THE WORK OF SEVERAL

Mounted on the highest tower or crammed into a tiny crevice, your Vidicon TV camera is always at your finger-tip control when you have it mounted on CECO's full circular Pan & Tilt head. Moreover, the operator can manipulate as many cameras as required through a control box located far from the installation.

New "Dialastop" limiting switches on the head permit any degree of pre-setting within full 360° for both pan and tilt movements.

Made of high tensile strength aluminum alloy with grey crackle finish. Ball and needle bearing construction, micro limit switches, high torque motors, non-slip worm gear drives. Mounts on PRO JR. Remote Tripod or Hi-Hat low mount. Airplane clamp bracket available.

In jobs where camera installations are too inconvenient or dangerous for an operator to remain, be sure to use the new CECO Remote. Write for more information today.

SPECIFICATIONS:

SIZE: 10" x 9". WEIGHT: 14 1/2 lbs. CAPACITY: 20 lbs. MOUNTING: Tripod or base, ceiling, wall or in any desired angle. MOTOR REQUIREMENTS: 110 volt, 60 cycle AC. (DC and other voltage available). CONNECTORS: Cannon, 6 leads, one wire. **PRICE: \$400.00**

FRANK C. ZUCKER

CAMERA EQUIPMENT CO., INC.

Dept. F, 315 W. 43rd St., N. Y. 36, N. Y. JUdson 6-1420

Specify
LIFSCHULTZ ... and be sure!

Our 60th Year of Dependable Freight Forwarding Service at Low Cost!

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LIFSCHULTZ FAST FREIGHT
FASTEST TO BOTH COASTS!

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ELECTRONIC INDUSTRIES • June 1959

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WHY ENCAPSULATED?

Up to 250 KVA and no bulky case! Electro builds high reliability high power into half the size...half the weight. But this is no ordinary open coil construction—the coils are thin and solid...100% encapsulated with epoxy inside and out...sealed completely against dirt, damp and damage. One result: Fast cooling with high overload capacity for built-in reliability... temperature rise is 50% less! Another: Less size and weight simplifies equipment packaging...permits smaller cabinets and more efficient layout. Get the whole story of *Electro* encapsulateds for heavy-duty industrial applications (Class A or B); or on *HR/Epsal* ultracapsulateds for extreme environments (Mil-T-27A Grade 5 Class T). Electro engineers to your requirements... from microwatt to megawatt.



ENCAPSULATED HIGH POWER TRANSFORMERS

Opportunities for Experienced Transformer Engineers. Write to Personnel Manager.

ELECTRO
high reliability transformers

ELECTRO ENGINEERING WORKS, 401 PREDA STREET, SAN LEANDRO, CALIFORNIA

ECHORASER

This device removes from valuable "echo-riden" recordings. It needs no power. It consists of an upright chromium-plated brass bar 1½ inches

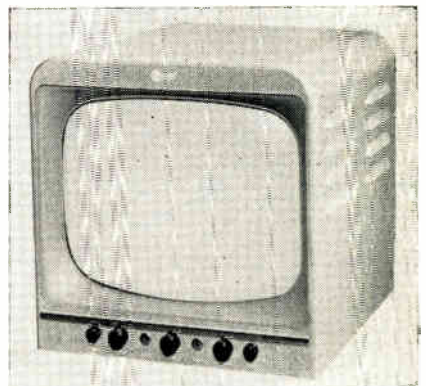


¾ inches by ¼ inch in size with a small energized area. The bar fits over a ¾ inch base plate permanently installed on a tape transport over which passes the moving tape. The package consists of two erasers each with a different power of energized area. Audio Devices, Incorporated, 444 Madison Avenue, New York 22, N. Y.

Circle 498 on Inquiry Card

VIDEO MONITOR

Model L59B designed for the educational, industrial, and broadcast field, featured a metal cabinet finished in gray hammer, front controls, and 90 degree aluminized kine. It has a



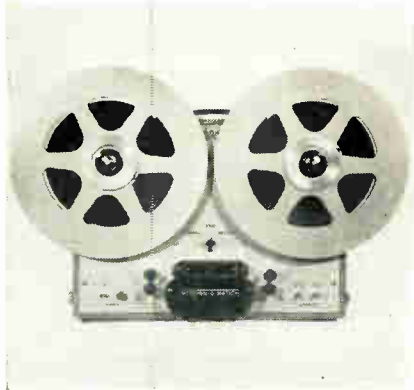
removable front for ease of cleaning safety glass and picture tube, and gives better than 500 line resolution with stable vertical hold circuitry for use with industrial cameras. Video input is high impedance looping for signal levels of 0.5 to 1.5 v. Power input, 115 vac, 60cps, 200 w. Unit is 16 in. high x 16¾ in. wide x 16½ in. deep. Miratel, Inc., 1080 Dionne St., St. Paul, Minn.

Circle 499 on Inquiry Card

"Peak" Response Products

TAPE PLAYER

This machine will play up to 16 hours of unrepeat time with a 14 in. reel at 3¾ ips, and 8 hours at 7½ ips with "Hi-Fi" reproduction. Featured are: Silver satin anodized alu-



minum construction, play light operation for long life of tape, synchronous motor, fast forward and reverse, automatic release with power failure, remote reversing controls, low wow and high quality, forced air cooling, magnetic brakes and playback preamplifiers. International Radio & Electronics Corporation, Elkhart, Indiana.

Circle 500 on Inquiry Card

TAPE READER

Photo-electric paper tape reader, Model PR-2, operates at 400 characters per sec and will stop or start on 1 character. Any 5, 6 or 7 channel numeric code can be read and translated to G-15 code. In addition to positive and negative numbers, the external code may include control characters and certain special characters. It will accept up to 500 ft. rolls of tape. While the G-15 computer is equipped with its own searchable, magazine loaded, photo-electric reader



for data and program input, the PR-2 accessory extends input versatility by allowing entry of data from a wide range of recorders. Bendix Computer Div., 5630 Arbor Vitae St., Los Angeles 45, Calif.

Circle 501 on Inquiry Card

SENSITIVE RESEARCH...

TRUE RMS RESPONDING .5% ACCURATE AC-DC RADIO FREQUENCY VOLTMETERS



TRUE RMS RESPONDING RADIO FREQUENCY VOLTMETERS. Direct-reading, thermocouple-type voltmeters particularly suitable for the accurate calibration of oscillators, signal generators, vacuum tube voltmeters and similar apparatus. The model RFV may also be used as an AC-DC transfer standard where maximum accuracy at high frequency is desired.

Multi-range instruments from 1 v. to 300 v. full scale. Accuracy .5% on DC and from 7 cps to 5 megacycles on 1 v. range and to 150 kilocycles on 300 v. range. Higher frequencies at reduced accuracy. Formica cases available.

DIAMOND PIVOTS and shock-mounted jewels of course!



Symbol of Quality

**SENSITIVE RESEARCH
INSTRUMENT CORPORATION**

NEW ROCHELLE, N. Y.

ELECTRICAL INSTRUMENTS OF PRECISION SINCE 1927



This new miniature toggle switch meets the most exacting requirements of the electronics industry and the military. Write today for Pub. ED20-L219.

Cutler-Hammer Inc.
Milwaukee 1, Wisconsin

CUTLER-HAMMER

Cutler-Hammer Inc., Milwaukee, Wis. • Division: Airborne Instruments Laboratory. • Subsidiary: Cutler-Hammer International, C. A.
Associates: Canadian Cutler-Hammer, Ltd.; Cutler-Hammer Mexicana, S. A.; Intercontinental Electronics Corporation.

NEW! Miniature Toggle Switch

An extremely compact power or dry circuit switch... usable as a pre-set switch in aircraft recognition systems... for walkie-talkies... electronic instruments and communications.

NEW design concept... the toggle lever works directly on the movable contact member insuring positive make and break action.

NEW gold-plated contacts open and close with a wiping action for good contact even on low energy circuits. Contact bounce is extremely low.

NEW positive detent switching action for improved operator "feel".

NEW silicone rubber lever seal stops sand, dust, and moisture.

NEW molded body has new high arc-tracking resistance and excellent recovery voltage.

DIMENSIONS VOLUME WEIGHT

Single Pole W-9/16" D-3/8" H-3/4" .145 cu. in. 5.0 grams
Double Pole W-9/16" D-9/16" H-3/4" .230 cu. in. 6.5 grams

RATINGS: 2 amps @ 28 volts D-c, 1 amp @ 50 volts D-c, 2 amps @ 115 volts A-c. Minimum rating: 30 microamps @ 50 millivolts.

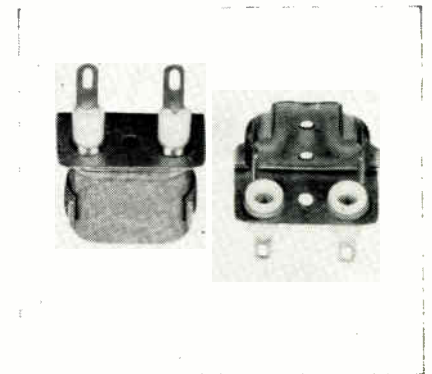
TYPES: 2 and 3 position switches with maintained or momentary switch action.

Circle 217 on Inquiry Card

"Peak" Response Products

CRYSTAL HOLDER

Socket assembly is designed for military-type HC-6/U and HC-13/U standard size crystal cans. It features compact unit construction that eliminates use of separate socket and



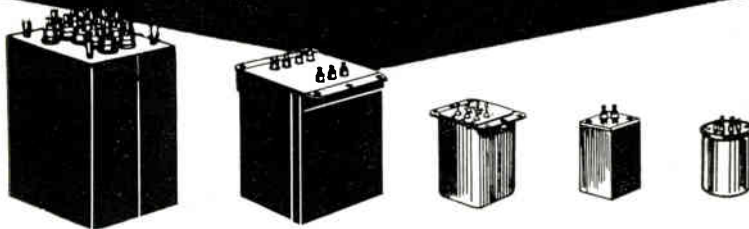
holder. The clip is fabricated of beryllium copper, alloy 25 per QQ-C-533 and cadmium-plated per QQ-P-416A, type II, class 2. Two teflon insulated jacks with phosphor bronze, silver-plated, gold flashed contacts are press fitted into the assembly to receive the crystal pins. Designed for horizontal or vertical mounting. Augat Bros., Inc., 33 Perry Ave., Attleboro, Mass.

Circle 502 on Inquiry Card

NO HIGHER STANDARD...



TRANSFORMERS



POWER • PULSE • AUDIO • CHOKES • VIBRATORS • PLATE & FILAMENT
HI-VOLTAGE FILAMENT • OIL-FILLED • OPEN • CASED • ENCAPSULED

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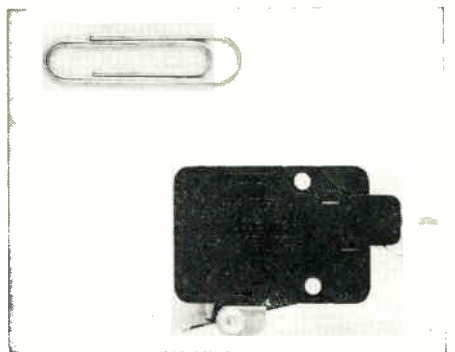
EPCO PRODUCTS, INC.

2500 ATLANTIC AVE. • BROOKLYN 7, N. Y.

Circle 218 on Inquiry Card

TAPE RECORDER SWITCH

This switch, about the size of a standard paper clip, automatically shuts off a tape recorder if the tape should break. The device incorporates a non-magnetic nylon leaf with rounded surfaces over which the tape passes. In the event of tape breakage, pressure upon the leaf is released, shutting off the recorder. The main body of the switch is less than 1½ inches in length. It is UL



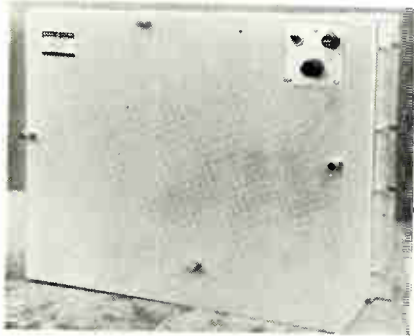
approved at 3 a and 250 vac. Movement differential is 0.233 inch maximum, and operating force is as low as 6 grams. Acro Division, Robertshaw-Fulton Controls Co., P.O. Box 449, Columbus 16, Ohio.

Circle 503 on Inquiry Card

"Peak" Response Products

SYNCHRONIZING GENERATOR

Type PG-4-B Synchronizing Generator provides standard EIA synchronizing, vertical drive, horizontal drive and blanking pulses for picture generation at the studio and picture



reformation at the receiver. It requires only two operating controls and has built-in medium and low voltage dc power supplies employing germanium rectifiers. Adjustable output levels are amplitude stabilized by AGC. Reflections are minimized—75 ohm source impedance. General Electric Co., Technical Products Dept., Electronics Park, Syracuse, N. Y.

Circle 504 on Inquiry Card

MICROPHONES

The Model 649A Miniature Lavalier weighs two ounces and is ideal where a concealed or unobtrusive placement is desirable. The unit is nondirectional and has a frequency response of 60 to 12,000 cps. The Model 727 Slim Ceramic has a frequency response of 60 to 8,000 cps, it is for P. A., recording, and general use. The Model 718 Ceramic Microphone was designed as



a replacement for home recording microphones. It may be used on a flat surface or held in the hand. A phono-plug is provided as an accessory. Electro-Voice, Inc., Buchanan, Mich.

Circle 505 on Inquiry Card

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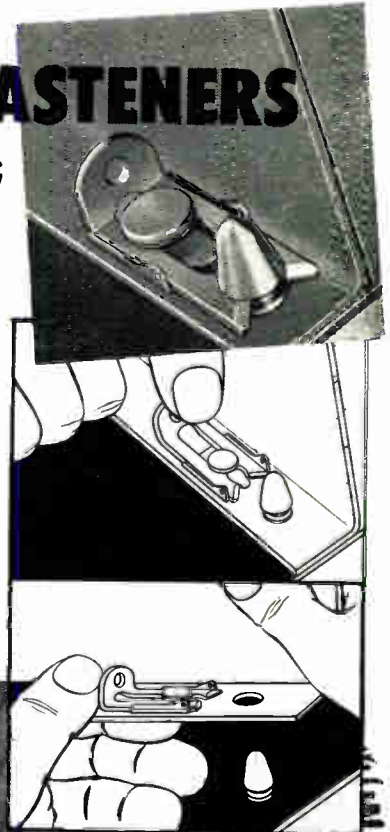
Here's a simple, easy means of securely fastening assemblies to withstand shock or vibration, and yet allow quick removal for inspection or repair. Instant snap action engages or releases fastener . . . no tools are required! After installation, fasteners never need adjustment . . . even with repeated use.

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Calibrator & Time-Mark Generator

The first compact, plug-in unit of its kind. Combines a stable, square-wave calibrator and a crystal-controlled time-mark generator. Interchangeable with a second plug-in sweep generator.



Plug-in SWEEP GENERATORS

One or two identical plug-in sweeps may be used on each instrument for common or separate calibrated time bases as needed. Second sweep interchangeable with Cali-Marker.



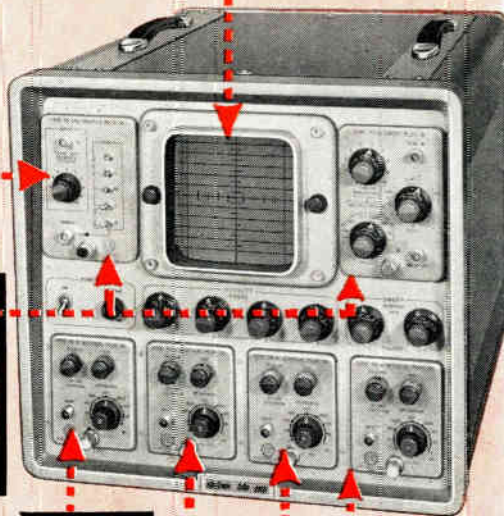
Plug-in PRE-AMPLIFIERS

Choice of 5 types for each channel. Matches sensitivity and response requirements from 50 mv/cm to 50 μ v/cm, dc to 50 kc to 5 mc. Any combination of pre-amplifiers may be used simultaneously on all channels.

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2- and 4-Gun Tubes

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All Needed Features . . . No Obsolescence.

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Models K-270
and K-470 . . .

Display multiple, high-speed signals without switching. From DC to 5 megacycle bandwidths.

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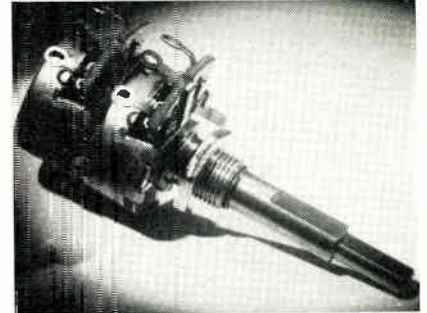
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PIONEERS IN MULTI-GUN C-R TUBES AND MULTI-CHANNEL OSCILLOGRAPHY.

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STEREO CONTROLS

For the individual or combined control of volume in dual-channel amplifiers, dual concentrics featuring a positive clutching and declutching arrangement are available. The 2 sec-

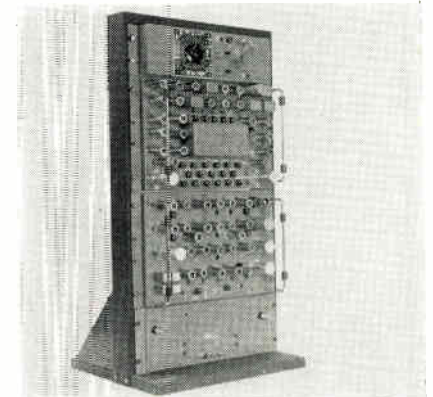


tions of control can be operated either simultaneously or, by pulling out the rear shaft $\frac{1}{8}$ in., individually. The sections are operated individually while adjusting for desired balance between the 2 amplifier channels; then, pushing in the shaft, the 2 sections become locked together for simultaneous and balanced operation. Clarostat Mfg. Co., Inc., Dover, N. H.

Circle 506 on Inquiry Card

EFFECTS GENERATOR

Model 490A, special effects generator, is designed for use in color or monochrome TV studios to wipe from one scene to another in unusual ways or to remove a portion of one scene



and insert a portion of another. The unit generates 24 basic effects with variation to produce 72 different wipes. The selection of pattern and wipe speed is manually controlled by switches and levers on a Remote Control Unit. It may be used for insert camera keying and camera control effect. Telechrome Manufacturing Corp., 28 Ranick Drive, Amityville, N. Y.

Circle 507 on Inquiry Card

"Peak" Response Products

SENSITIVE DC VTVM

The MV-27D DC microvoltmeter has 250 μv full scale sensitivity, its highest range being 0-1 kv. On its three lowest ranges, 250 μv , 1 mv and 2.5 mv, it uses mid-zero scales to fa-

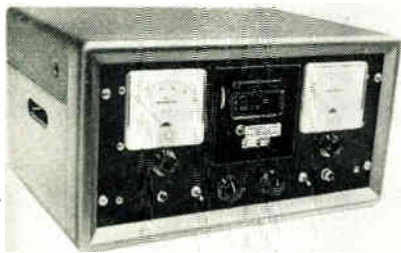


ilitate null-indicator operation in bridge circuits. All other ranges are left-zero for maximum scale length and highest reading accuracy and convenience. Housed in a modernized cabinet with recessed front panel, it has a larger indicating meter and is polarized, thereby eliminating "needle fold-over" under negative overloads on the mid-zero ranges. Millivac Instruments, 2315 Secord Ave., Carman, Schenectady 3, N. Y.

Circle 328 on Inquiry Card

RADIATION DOSAGE METER

Model AEI-101 determines the total number of electrons or positive ions in a process or reaction. Specs: input current range (\pm) 500 micro-microamp to 1 ma. 6 decade ranges from 100 to 0.001 microamp and 5 meter scales from 0.5 to 10.0; Integrator range is 1 millimicro-coulomb to 10 coulombs; accuracy: current $\pm 0.5\%$; Charge $+0.5\%$; Input voltage is 0 ± 2 mv; Integrating rate: 1 unit/sec for max. signal, 1 unit/min for min. signal for total of 9999 units. Integra-



tor drift: 1/10 unit/hr. Output signals: 0-10 mv for full scale, 0-50 v on charge increments, Applied Radiation Corp., 2404 N. Main St., Walnut Creek, Calif.

Circle 329 on Inquiry Card



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NEW WIL-LOK® Tapered Terminals

developed by Erie to speed assembly to printed circuit boards, provide maximum contact, and remain upright during soldering, reduce assembly time, and cut production costs.

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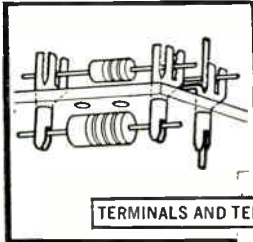
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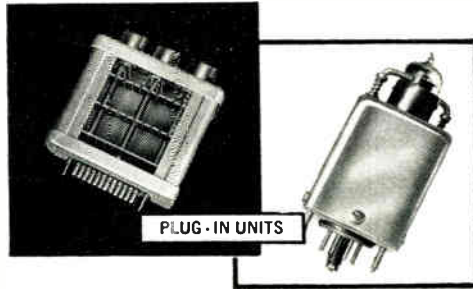
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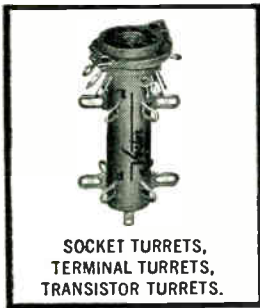
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"Peak" Response Products

FREQUENCY METER

The transistorized Type 5890-B Frequency Meter is for use with land-mobile communications equipment designed to latest FCC split channel specifications as well as adjacent

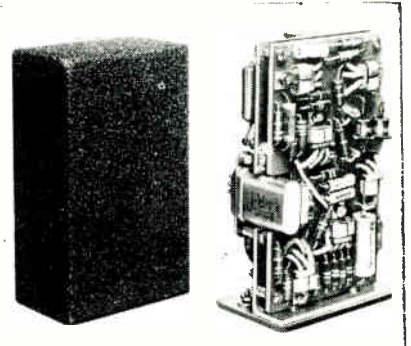


channel requirements. With a built-in thermometer, the crystal controlled instrument covers any r-f channel within the 25 MC to 470 MC communications spectrum, accurate to ± 0.00025 percent. It is also a precision instrument for i-f channels in the 100 KC to 100 MC range. Allen B. Dumont Laboratories, Inc., 750 Bloomfield Ave., Clifton, N. J.

Circle 330 on Inquiry Card

VOLTAGE COMPARATOR

Test module, 200 Series Voltage Comparator, trips a DPDT relay output when the unknown signal input exceeds the value of the reference input. Using direct voltage comparison, it has applications in military ground support equipment, airborne instrumentation, modular test equipment, alarm/control systems and data gathering and processing systems. Transistorized, it features high sensitivity. Output relay contact ratings are 2a at 28vdc. Repeatability of



trip point is ± 1 mv. and overload capacity is 1000 times rated sensitivity. Meets MIL-E-5400A and MIL-E-5272. Trio Laboratories, Inc., Plainview, L. I., N. Y.

Circle 331 on Inquiry Card

TEMPERATURE

CONTROL

FOR

COMPONENTS



For temperature stabilization of diodes, the new Bliley BCO-10 oven will hold $\pm 1^\circ\text{C}$ with ambient temperature variation from 10°C to $+50^\circ\text{C}$. Stability is better than $\pm 4^\circ\text{C}$ from -55°C to $+70^\circ\text{C}$.

Compact unit has multiple contacts (20 terminals) for mounting up to 10 diodes. Dimensions, less brackets, are $1\frac{1}{2} \times 1\frac{1}{4} \times 1\frac{3}{32}$ ". Design features an hermetically sealed snap-action thermostat and non inductive heater winding to minimize noise and interference in low level circuitry.

Standard models are available for operation at 50°C or 75°C with 12.6 volt, 26.5 volt or 115 volt heaters as required.

Request Bulletin 517 for Complete Information.

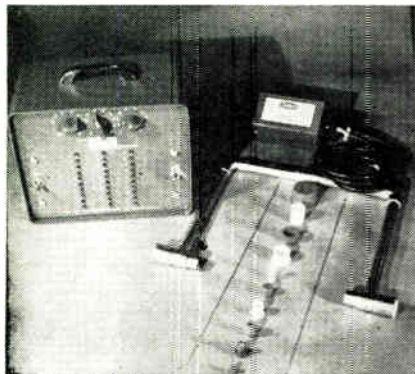
Bliley

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SOLID STATE COUNTERS

Totalizing and predetermined electronic counters for laboratory or production control. Solid state and cold cathode components in the circuitry eliminate warm-up time and tube re-

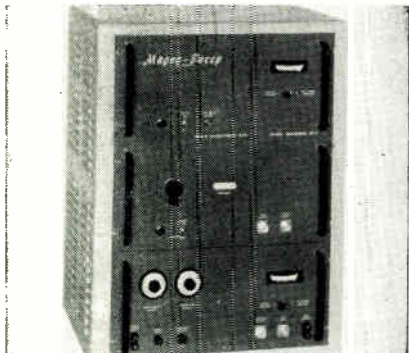


placement. Unit has no moving parts. The 3, 4, or 5-decade counters measure 9 x 7 x 6 in.; weight about 7 lbs. Available accessories include: magnetic pick-ups, infra-red beam pick-ups, stylus pick-ups and impulse shaping pre-amplifiers. These accessories obtain operating power from the counter itself. Instrument Div., Redford Corp., Lake Luzerne, N. Y.

Circle 332 on Inquiry Card

SWEEP OSCILLATOR

Magna - Sweep, an all - electronic sweeping oscillator, has sweep widths of 1000 MC and wider. Frequency range is 5 MC to 1000 MC. It may be used for standard frequency alignment procedures for TV, radar, or communications systems. Specs include: Sweep width, 1000 MC, continuously variable over frequency range; Center frequency, variable through frequency range; Sweep rate, variable around 30 CPS; r-f output, 0.1 v. across 50 ohms (min.); Sweep



output, regular sawtooth, amplitude approx. 20 v.; Frequency markers, frequency marks plus a precision wavemeter. Kay Electric Co., Dept. E.I., Maple Ave., Pine Brook, N. J.

Circle 333 on Inquiry Card

MEASUREMENTS'

NEW

VACUUM TUBE

VOLTMETER



Provides RANDOM ACCESS to all functions and ranges through the use of push-button switches.

- For voltage and current measurements in laboratories, service shops and on production lines.
- For accurate rf and ac voltage measurements from 0.1 to 300 volts on electronic equipment from the low audio range through the VHF range.
- For dc voltage measurements from 0.01 to 1000 volts without disturbing circuit performance.
- For direct current measurements as low as 0.001 microampere.

MODEL 162

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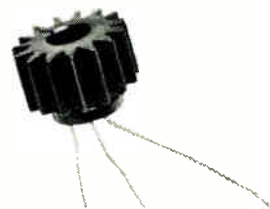


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Keep transistors at or below maximum operating temperatures with these new Birtcher Transistor Radiators. Provides the transistor with its own heat sink and a greatly increased radiating surface. Easy to install in new or existing equipment. Modifications to fit hundreds of popularly used transistors.



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ACCURATE,
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RELAYS

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- Exact Measurement of Contact Make and Break Time
- Accurate Evaluation of Contact Bounce
- Overlap Time on Make Before Break and Break Before Make Contacts
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AUTOMATIC MODELS AVAILABLE — Call or write for complete information on standard and automatic models, today!

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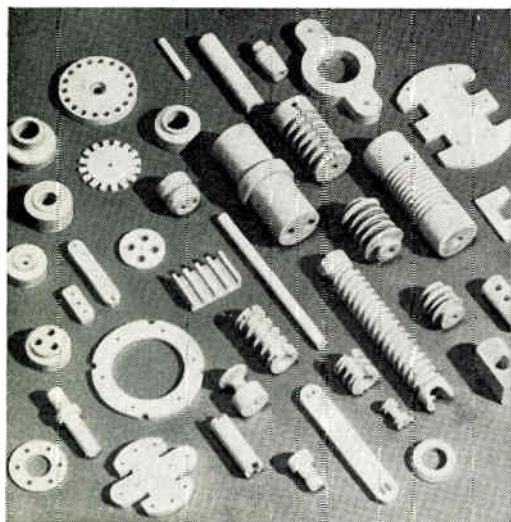
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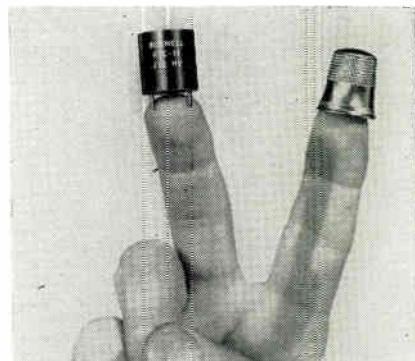
West Coast Representative:

Yarbrough Sales Co., 2646 Mission St., San Marino, Calif.

"Peak" Response Products

VARIABLE TOROID

New development in the toroidal coil field offers a sub-miniature encapsulated variable toroid. Developed especially for printed circuit and similar light weight applications, it is

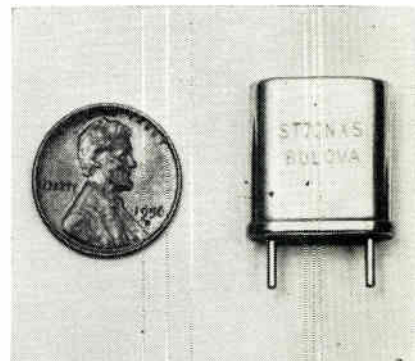


completely hermetically sealed. Stepless adjustment of inductance over a 10% range is provided and torque adjustment is such as to preclude possible strain on printed circuit mounting. Weighing approximately 1/2 oz. the ATE-11 and ATE-12 will find wide application in the guided missile and similar miniaturization fields. Burnell & Co., Inc., 10 Pelham Pkwy., Pelham Manor, N. Y.

Circle 334 on Inquiry Card

CRYSTALS

A new concept of small size with good stability in miniature low frequency shock mounted crystals is incorporated in the ST-70NXS series now available. Hermetically sealed and mounted in the miniature HC-6/U Military type holder, the series covers a range of 100kc to 250kc, with a tolerance of $\pm 0.015\%$ over a -50°C to $+90^{\circ}\text{C}$ range. Crystals can withstand initial shocks up to 100



G's and meet all environmental specifications of MIL-E-5272, MIL-E-5400 and MIL Std. 202. Bulova Watch Co., Electronics Div., P1059, Woodside 77, N. Y.

Circle 335 on Inquiry Card

"Peak" Response Products

INPUT TRANSFORMER

This in-line microphone input transformer is designed to be inserted in cable circuits and is built to withstand mechanical abuse. The Mu-Metal and electrostatic shielding im-

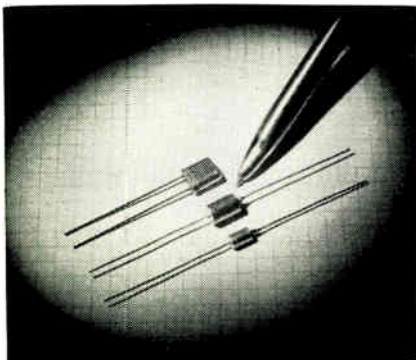


prove signal to noise ratio. The unit's 20 to 20,000 cycle, plus or minus 2 db response assures broadcast quality. The input transformer is 1 1/8 inches in diameter and 2 3/8 inches long. It weighs 11 ounces, and is supplied with a 6 inch shielded microphone cable which mates with Amphenol 91-PC-4F plug. Microtran Co., Inc., 145 East Mineola Ave., Valley Stream, N. Y.

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TANTALUM CAPACITOR

The S-T-A type solid tantalum capacitor, which contains no liquid electrolyte, has been redesigned to smaller sizes. Illustration shows the 100 Series, rated at 1.0 mfd, 35 wvdc, contrasted with two earlier models of the same rating. The length of capacitor (excluding leads) is 0.250 in.; diameter is 0.175 in. Leakage current at 25°C does not exceed 3 μ a. or 9.93 μ a./mf/v, which ever is larger. Leak-



age at 85°C does not exceed 8 times the 25°C value. Available in 20 ratings among 4 case sizes. Fansteel Metallurgical Corp., 2200 Sheridan Rd., N. Chicago, Ill.

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United's **SAFE-GUARD** SERVICE



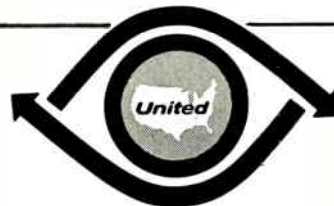
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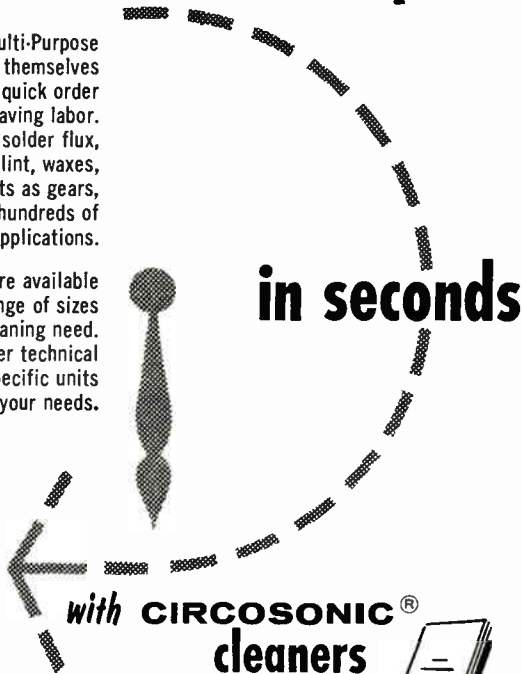
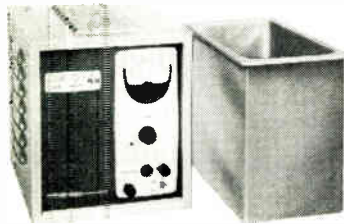
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"Peak" Response Products

WIRE WOUND RESISTORS

A new line of bobbinless precision wire wound resistors are available. Packaged in two case styles, R-2 and R-5, these units are ideally suited for printed circuit boards, and subminiature

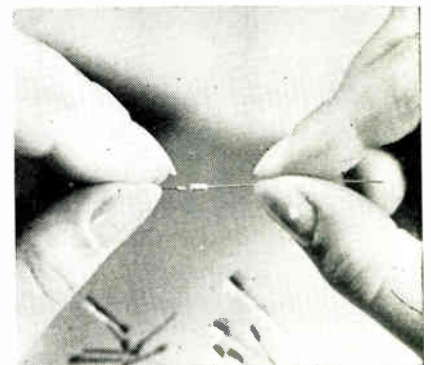


assemblies for airborne and missile applications. Some features are: Welded case construction insures a hermetic seal; welded terminations practically eliminate noise in the resistor; bobbinless construction eliminates strain and stress on wire under extreme environmental conditions; tolerances can be controlled to $\pm 0.05\%$. General Transistor Corp., 91-27 138th Place, Jamaica 35, N. Y.

Circle 338 on Inquiry Card

CAPACITOR

The Type HAT sintered anode electrolytic capacitor was designed to replace tantalum wire anode capacitors of comparable ratings. The low dc leakage current of the unit lessens drain on power supply batteries. Leads are welded for extra strength and units sealed with color coded epoxy. They may be used for by-pass coupling and filter applications requiring relatively high capacitance in



a minimum of space. Available in ratings of 1 to 10 microfarads and ratings of 1 to 10 volts. P. R. Mallory & Co., Inc., 3029 E. Wash. St., Indianapolis, Indiana.

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To meet specific and exacting requirements — from subminiature to 5 K.V.A. output — up to 200° C. temp., 50 K.C. freq. in accordance with MIL-T-27A, Grades 4 and 5.

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Low pass, high pass, band pass and band eliminator — custom engineered to exacting requirements and specifications.

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Custom engineered A.C., D.C., high voltage . . . with tolerances to $\frac{1}{2}\%$ — regulated transistorized with tolerances is low as 0.1%.

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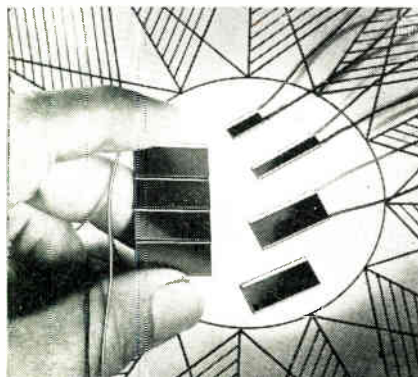
And saturable reactors for two-phase servo motors and electronic controls from microwatts to 3 K.V.A.

New York Ave., Westbury, L. I., N. Y.

"Peak" Response Products

SILICON SOLAR CELLS

These cells can convert 10% and higher of the radiant energy falling on their surface. Designed to military specifications, they are available for both commercial and military



applications, and can provide an output of approximately 9 w per sq ft of active cell area in bright sunlight. The contact is permanently bonded to the silicon wafer. Individual cells are obtainable, with or without color coded pigtail leads, in sizes 1/2 x 1 cm—1/2 x 2 cm—1 x 2 cm. International Rectifier Corp., 1521 E. Grand Ave., El Segundo, Calif.

Circle 340 on Inquiry Card

ELECTROLYTIC CAPACITORS

These Type QE, computer-grade, electrolytic capacitors are engineered for high reliability and long operating life. Applications include: power supply filters, telephone networks, industrial electronic equipment and precision laboratory and commercial test equipment. They have a useful life expectancy of greater than 10 years when operated within ratings. Oper-



ating life will further improve when the ambient temperature is below 65°C. Units are rated for operation at temperatures from 20°C. to +85°C. AeroVox Corp., New Bedford, Mass.

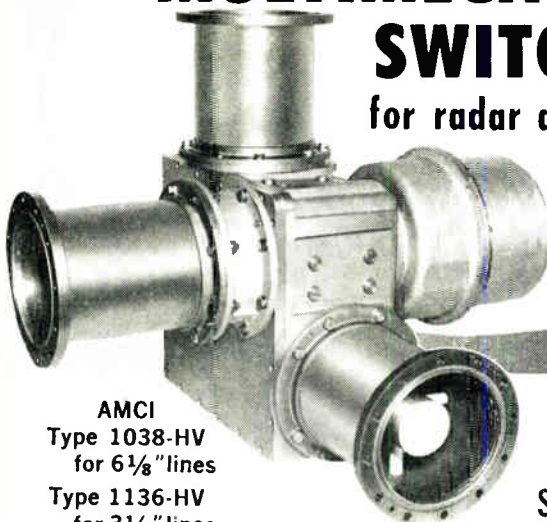
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NEW

NEW

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for radar applications



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Type 1038-HV
for 6 1/8" lines
Type 1136-HV
for 3 1/8" lines

For use in Rigid Coaxial
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Originators of

ENGINEERED ECONOMY IRON CORES

Get even, smooth-running, satisfactory torque control in application of threaded cores to coil forms with EQUI-TORQUE PROCESS # 25!

- ★ Specially processed tacky wax
- ★ Impregnated in cores
- ★ Covers all thread form
- ★ Wax withstands 200°F.
- ★ Recycling excellent
- ★ Lubricates to ease torque
- ★ Compensates for low torque
- ★ Uniform running torque
- ★ Equalizes initial and running torque
- ★ No deterrent in function with aging

Operational tested and now being used by leading television, radio and coil manufacturers.

Write for samples and further information today!

Radio Cores, Inc.

Phone:

Garden 2-3353



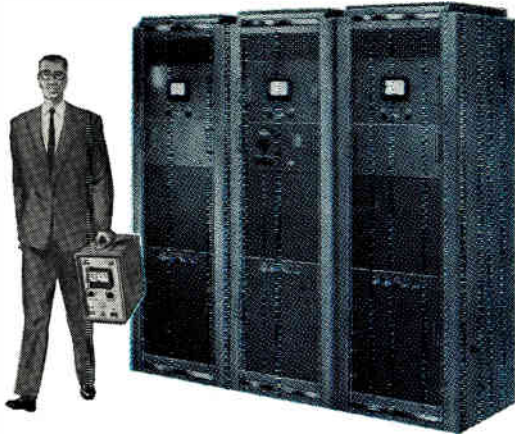
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AC POWER

COMPLETELY ELECTRONIC

The Behlman INVERTRON®

is available
in a choice of
power and
frequency ranges . . .



FROM PORTABLE TO MULTI-KVA MODELS

The Behlman Invertron is a completely electronic A.C. Power Source widely used in research and development, production testing, test consoles, electronic systems or wherever A.C. Power other than that obtainable from the 60 cycle line is required.

INVERTRON®

Models are available with single phase, two phase or three phase output and with either fixed and variable frequencies.

INVERTRON®

A wide range of power ratings are available in standard models with other power ratings on special order.

INVERTRON®

The Invertron features extreme frequency accuracy and stability, exceptional regulation against both line and load, and low harmonic distortion and noise.

INVERTRON®

Specifications for all standard models include 1% maximum distortion, 1% regulation no load to full load, extremely low output impedance, and essentially zero response time.

For further information
write or call

Modular construction techniques
employed to provide low cost
custom as well as standard units.

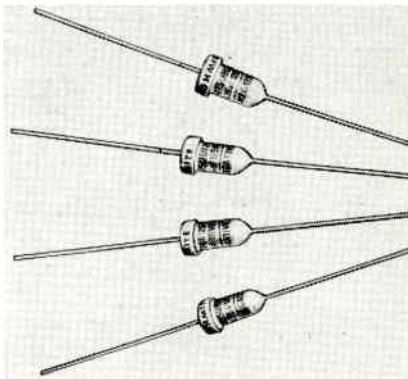


Representatives in all principal cities and Canada

"Peak" Response Products

TANTALUM CAPACITORS

Tan-O-Mite brand, Series TS capacitors constitute the third type of tantalum electrolytic capacitor to be announced. This type employs a porous slug of sintered tantalum for

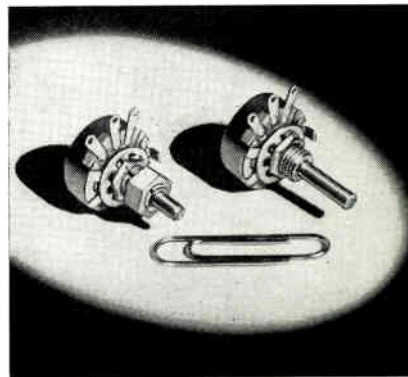


the anode in contrast to tantalum foil (TF) and tantalum wire (TW) types. Series TS slug capacitors feature good shelf and operating life, stability and wide operating temperature range. Supplied in silver cases, their capacitance range is 1.75 to 30 μ F—working voltages to 125 are available. Ohmite Manufacturing Co., 3693 Howard St., Skokie, Ill.

Circle 344 on Inquiry Card

VARIABLE RESISTOR

The Model 3 Radiohm, a sub-miniature variable resistor redesigned to increase its rating from $\frac{1}{4}$ to $\frac{1}{2}$ w., is to be used for high temperature operation in military and commercial equipment. The $\frac{1}{2}$ w. Model 3 is available in values from 25 K to 500 K, linear taper. It meets MIL-R-94B resistance change requirements, and also meets or exceeds MIL-R-94B for



moisture resistance, thermal cycling, etc. The completely enclosed case can be sealed or potted. Centralab, A Div. of Globe-Union, Inc., 900 E. Keefe Ave., Milwaukee 1, Wis.

Circle 345 on Inquiry Card

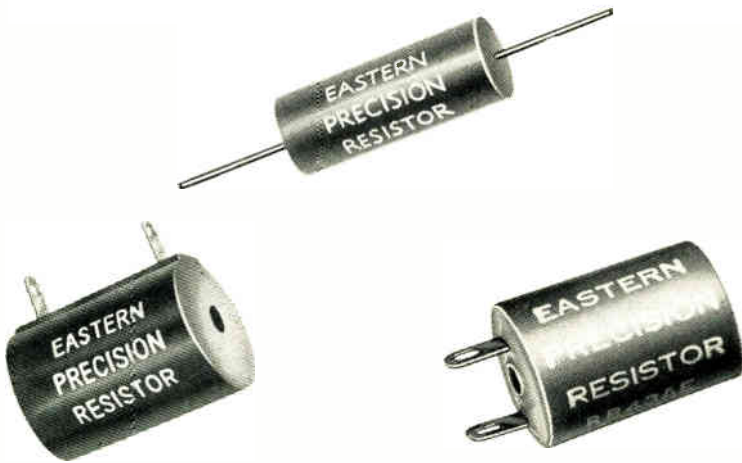
EPR

Our principal product —

RELIABILITY

One of the countries leading producers of precision wire wound components, Eastern Precision Resistor Corporation prides itself on the reliability factor built into each component.

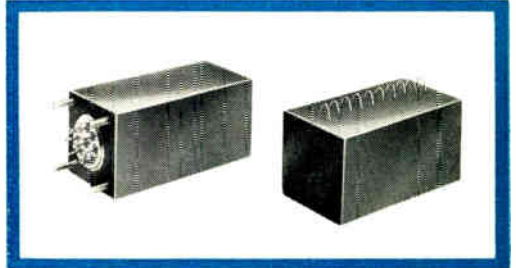
Maintaining one of the largest production facilities in the industry, nevertheless Eastern Precision Resistor Corporation utilizes the benefit of their production control system to assure prompt and immediate delivery.



Long recognized as the leader in the field of encapsulated precision wire-wound resistors, Eastern Precision Resistor Corp. offers the widest range of components designed to surpass the requirements of MIL-R-93B characteristics "A and C."

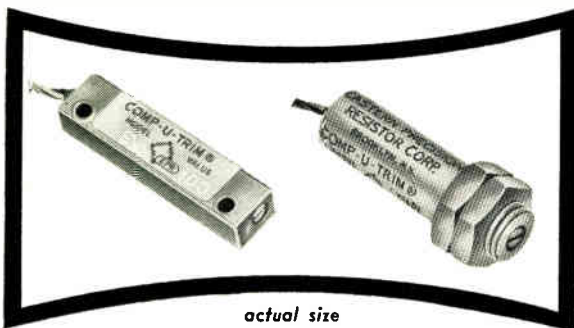
Manufactured under the rigid supervision of our Quality Control Dept. each component is thoroughly inspected at numerous points during its manufacturing cycle to assure the maximum in reliability.

Eastern Precision Resistor Corporation invites inquiries regarding its ability to produce networks, assemblies, plug-in systems and other special sub-systems designed or produced to your specific requirements.



PRECISION DELAY LINES

Having recently acquired the Delay Line manufacturing facilities and engineering personnel of EpSCO, Inc., and the Digitronics Corp., Eastern Precision Resistor Corp. presents a line of lumped type constant precision delay lines second to none. Offering a wide range of standard lines of both the open and encapsulated types and units designed to customer specifications, Eastern Precision Resistor Corp. brings to the industry for the first time mass production methods, engineering know-how and lowered costs.



actual size

COMP-U-TRIM[®]

Precision wire-wound TRIMMING POTENTIOMETERS

Radically different in design, EPR's Comp-U-Trim[®] is the only trimming potentiometer that has the wiper contact inside of the resistance element . . . the only trimming potentiometer that is completely encapsulated . . . the only trimming potentiometer with zero percent end resistance . . . the only trimming potentiometer employing a one-piece metallic housing . . . the only trimming potentiometer that is designed with positive end stops, that ends seeking for minimum and maximum settings.

Massed produced in CLEAN areas these revolutionary trimming potentiometers are stocked by leading distributors everywhere.

Eastern Precision Resistor Corp. also invites inquiries regarding our line of Infinite Resolution wire-wound potentiometers.

Technical literature available upon request

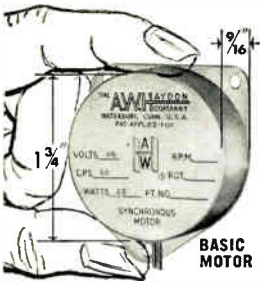


EPR

EASTERN PRECISION RESISTOR CORP.

675 Barbey St., Brooklyn 7, New York Tel. HYacinth 5-0133

ANOTHER FIRST...



THE ONLY *Electro-Reliable* A.C. TIMING MOTOR

*Thinner... Quieter...
More Reliable... More Versatile*

FINGER-THIN...

Only 9/16 Inches Short... Only 1 3/4 Inches in Diameter... very compact... reduces the size of your equipment.

WHISPER-QUIET...

Strictly an electrical motor... practically noiseless... no rattling of gears or ratchets.

HIGH TORQUE...

1/4 oz. inch at the rotor with an instantaneous start and stop... requires only 2 1/2 watts... can replace larger motors in recorders, controls and telemetering equipment.

HIGHEST RELIABILITY...

Longer life... no one-way gears or ratchets to fail... provides millions of operations without any trouble.

SPECIFICATIONS

Standard Voltage Ratings:
6, 12, 24, 115, 230 Volts
Frequency:
60 CPS Standard
25, 50 CPS Available
Power Input: 2.5 Watts
Maximum (60 CPS)

BASIC MOTOR

Weight: 4 ounces
Speed: 300 RPM
Torque: 1/4 oz.-in.
Length: 9/16 inch

WITH INTEGRAL GEAR TRAIN

Weight: 5 ounces
Speed: 300 RPM to 1/6 RPH
Torque: 30 oz.-in. @ 1 RPM
Length: 7/8 inch



WITH INTEGRAL GEAR TRAIN

© 1959



Send for Special Illustrated Bulletin AWH MO-806
The A.W. HAYDON Company

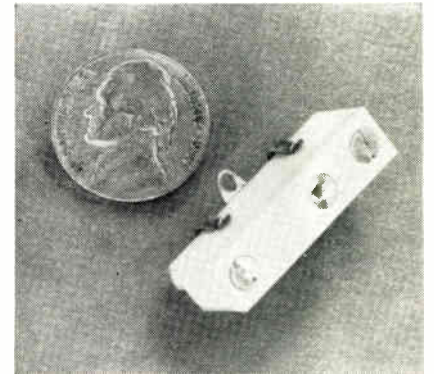
219 NORTH ELM STREET
WATERBURY 20, CONNECTICUT
Custom Design & Manufacture Of Electronic
And Electro-Mechanical Timing Devices

Circle 236 on Inquiry Card

"Peak" Response Products

MINIATURE SWITCH

This miniature high temperature snap action switch, known as the Melex switch, operates in temperatures from -300° to +500°F. and will withstand a shock of 40 to 50 G's



at vibrations of 50 to 2000 cps. Switch is housed in a glass bonded mica case which incorporates a glass plunger that permits the switch to withstand severe humidity and temperature variations. The switch is 1 1/4 in. long, 5/16 in. wide and 7/16 in. high. Leaf and roller actuators are available for this switch. Meletron Corp., 950 N. Highland Ave., Los Angeles 38, Calif.

Circle 342 on Inquiry Card

ILLINOIS CAPACITORS KNOWN THE WORLD OVER
for their TIME TESTED QUALITY!

there is an Illinois Electrolytic Capacitor
for every Electronic Requirement!

Single Anode SMT
Dual Anode or Cathode SMT
Tubular SMT
UMP Twist Prong
UMS Molded Terminal
UMC Energy Storage and Photo Flash
LN Flexible Lead Types, Screw Neck Mounting
IHC Replacement Types
UMT Clamp Mount
IHT Tubular Pigtails
MS Motor Starting
ITC Ceramic Cased Paper
BT Electrolytic and Paper
Illini "300" Bantam and "300"

More than a quarter century of research and development is backed by the production facilities of four factories to produce electrolytic capacitors of any and every type to meet your requirements. Whether you need a small quantity of highly specialized types... or, large production quantities, you will find that we can offer you better service, PLUS many other advantages worthy of your consideration.

Catalog Literature Upon Request

ILLINOIS CONDENSER COMPANY

1616 N. Throop Street • Chicago 22, Illinois • Phone EVERglade 4-1300 • TWX: CG 3149
Export Department, 15 Moore Street, New York City, New York. Cable, Minthorne, New York

FERRITE SLUGS

A full line of threaded ferrite slugs for permeability tuning of inductors, filters and transformers used over the frequency range of 1 KC to several megacycles is available. These cores are designed for use where a high Q, high permeability core is desired and space is at a premium. The screw driver slot runs completely through the core, permitting easy as-



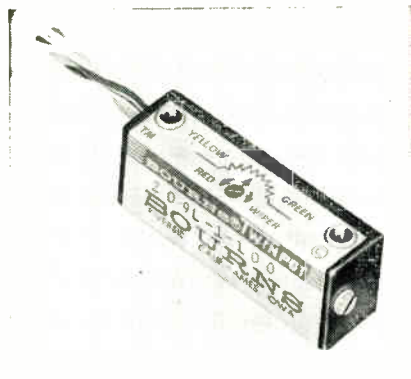
sembly and adjustment at either end. All slugs are furnished complete with self-threading Resinite TruTork coil forms. Ferroxcube Corp. of America, 50 E. Bridge St., Saugerties, N. Y.

Circle 343 on Inquiry Card

"Peak" Response Products

POTENTIOMETER

A new version of the Model 209 TWINPOT lead screw actuated potentiometer is a dual arrangement of two potentiometers in one unit that provides simultaneous control of two

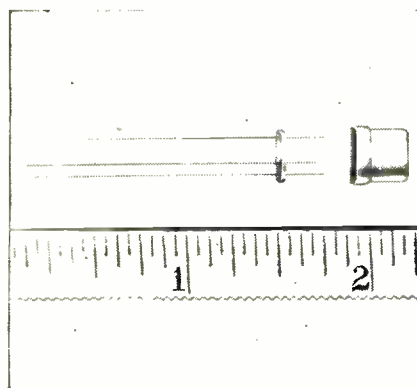


circuits by a single adjustment of the slotted shaft. Featured is the Silverweld termination, a metal-to-metal bond. This model provides virtually a 100% usable potentiometer range plus stability and reliability. It measures 5/16 in. x 1/2 in. x 1 1/4 in. and mounts individually or in stocked assemblies using 2-56 screws through body eyelets. Bourns Laboratories, Inc., P. O. Box 2112, Riverside, Calif.

Circle 346 on Inquiry Card

TRANSISTOR BASES

The E-I standard line of transistor closures includes strain-free solderable types, compression weldable types and compression solderable types. Two, three and four lead types are available. Diode closures are supplied in a wide range of shapes and sizes. Custom types of miniaturized transistors and diode bases and other



miniature sealed components, for special requirements can be supplied to exact specifications. Electrical Industries, 691 Central Ave., Murray Hill, N. J.

Circle 347 on Inquiry Card

FILTERS DELAY LINES TOROIDS MAG-AMPS RF COILS

FUGLE-MILLER LABORATORIES • INC

CLARK
NEW JERSEY



Tel. FUlton
1-2727

Circle 238 on Inquiry Card



PROTECT YOUR PRODUCT

at point of strain

Protect product saleability too—by insuring long life for cords, cables and conductors. Genuine "GRIPMASTER" Strain Reliefs provide these vital features—

- ★ Anchor cords to housing
- ★ Eliminate taping or threading
- ★ Prevent unraveling
- ★ Prevent cord pull damage
- ★ All sizes and styles
- ★ Easy to apply
- ★ Inexpensive

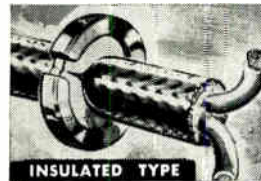
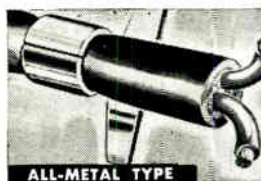
Gripmaster Strain Reliefs are "tremendous trifles" that make good products better!

Ask for samples.

4 WAYS TO END ALL CORD AND CABLE SERVICE FAILURES

Economically

GRIPMASTER STRAIN RELIEFS



WIRE BINDING SLEEVES—Preventing fraying of cord ends, these specially-treated rubber tubes are available in five sizes to fit wires to .790

Interruptions due to cable and cord connection failures are eliminated because they anchor the cord to the product at the point of strain. GRIPMASTER Strain Reliefs can withstand pulls up to 100 lbs., and are acceptable to Underwriters Laboratories. All types Reg. U. S. Pat. Off.



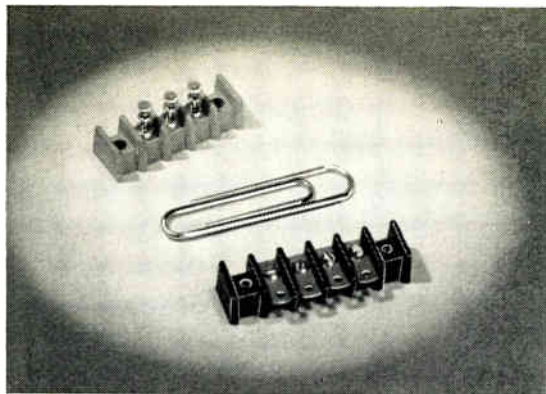
WRITE FOR SAMPLES AND LITERATURE TODAY!

GEORGE WALKER COMPANY

STRAIN RELIEF SPECIALISTS

118 AMSTERDAM AVE., PASSAIC, NEW JERSEY

the
TINIEST!



KULKA Barrier-Type TERMINAL BLOCKS

For that miniaturization program, there's nothing as tiny yet dependable as the Kulka Series 409 barrier-type terminal blocks. Available with as many as 21 terminals, for a maximum length of 4 3/8". Only 3/16" wide, including barriers. Two mounting holes. In four versions—with screw terminals, with turret terminals, with solder lugs on one side, with solder lugs on both sides. Also in a choice of different molded insulating materials.

Write for detailed literature on these tiny terminal blocks as well as other types in the complete KULKA line.

KULKA ELECTRIC CORP.

633-643 So. Fulton Avenue
Mount Vernon, N.Y.

KULKA

Circle 240 on Inquiry Card

MICA TRANSISTOR MOUNTING WASHERS



and VACUUM TUBE SPACERS



Better performance at less cost where washer insulation and durability are critical, Reliance offers an excellent quality MICA—the perfect dielectric that does a better job for less! Reliance MICA keeps its shape, strength and heat-resistant qualities far beyond the capacities of other insulators. Standard shapes available for immediate delivery . . . also custom jobs.

RELIANCE

Write for details and price list.

RELIANCE MICA CO., INC.

341 39th Street • Brooklyn 32, New York

Circle 241 on Inquiry Card

"Peak" Response Products

SUBMINIATURE POTS

Three new series of rugged subminiature potentiometers will help solve application problems involving severe environmental conditions, such as encountered in high-performance



aircraft and missiles. The Series 314 high-temperature 1-turn potentiometers provide resistances from 50 to 25 K at -55°C to $+250^{\circ}\text{C}$ in $\frac{1}{2} \times \frac{3}{8}$ in. The Series 341 offers the smallest ten-turn potentiometers available. The Series 319 is comprised of wire-wound, gangable potentiometers $\frac{7}{8}$ in. in diameter. Daystrom Pacific, 9320 Lincoln Blvd., Los Angeles 45, Calif.

Circle 348 on Inquiry Card

FOCUS COIL

Type F20 electromagnetic focus coil is designed for photographic, flying spot, military and other special purpose $1\frac{1}{2}$ in. neck diameter CRT requiring short focal lengths at high (up to 25 kv) accelerating potential without overheating. Minimum spot distortion is assured by machining coil case to close dimensional tolerances. It mea-



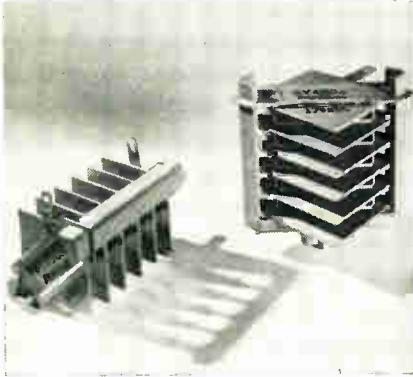
sures $1\frac{9}{16}$ in. ID, $3\frac{1}{2}$ in. OD, $1\frac{7}{8}$ in. long and $\frac{5}{16}$ in. front to gap center. Available in a wide range of coil resistances. Syntronic Instruments, Inc., 100 Industrial Rd., Addison, Ill.

Circle 349 on Inquiry Card

"Peak" Response Products

SELENIUM RECTIFIERS

A new line of selenium rectifiers for the electronic home entertainment products industry is available. The line presently consists of 2 sizes which cover the range from 150 to 450 ma.

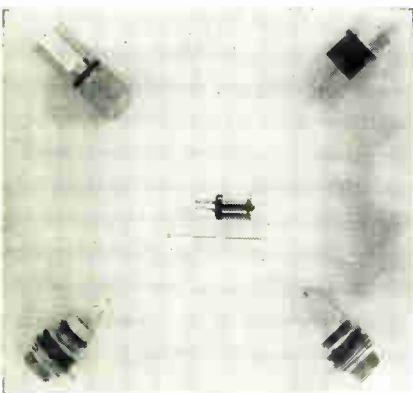


for half-wave rectifier applications and for B-plus supplied in voltage doubler circuits. The "Federal Slim-Line" rectifiers are designed to meet rigid requirements. They feature a sturdy yoke-type construction which engages the corners of the selenium cells eliminating center holes and permitting the full area of the plate to be utilized. International Telephone & Telegraph Corp., Clifton, N. J.

Circle 350 on Inquiry Card

SUBMINIATURE LAMP

The NE2R subminiature neon lamp eliminates the need for a series resistor or for external ballast of any kind. This is accomplished by incorporating current control as an integral part of the internal lamp structure. The new lamp is diminutive in size, measuring only 1/4 in. in diameter by less than an inch in



length. It has a midget flange base and will be interchangeable in many assemblies and sockets. Circon Component Corp., Santa Barbara Municipal Airport, Goleta, Calif.

Circle 351 on Inquiry Card

IMC PRECISIONEERED MOTORS



700 FRAME SERVO MOTOR

INPUT: 6-57 volts; 2 phase at 400 cps
 FREQUENCY RANGE: 400-1000 cps
 NUMBER OF POLES: 2, 4 and 6 poles
 TYPICAL PERFORMANCE: 26/26 at 400 cps; No Load Speed: 6,200 rpm; Stall Torque: 0.30 oz. in.; Power: 3 watts; Inertia: 0.65 gm cm²; Acceleration: 33,000 rad/sec²; Impedance: 133 + j117 ohms
 WEIGHT: 1.6 ounces
 DIMENSIONS: 0.750 Dia. x 1.062 Length

Bulletin 7F3



900 FRAME AC MOTOR

FREQUENCY: 320-1000 cps
 AIR DELIVERY: (1 1/2" Blower)*; 10 cfm @ 0"sp;
 8 cfm @ 0.2"sp
 RPM: 7000 @ 400 cps
 WEIGHT OZ.: 7
 *Also available in 1" blower size

Bulletin 9F4



1600 FRAME MOTOR

HORSEPOWER: 1/300-1/10
 FREQUENCY: 25-1000 cycles—var. 50-1000 cycles
 VOLTAGE: 26-208
 POLES: 2, 4, and 6 poles
 PHASES: 1, 2, or 3
 TYPES: Induction or Synchronous
 BEARINGS: Ball or Sleeve
 Available non-cooled or self-cooled
 APPLICATIONS: Blower, Fan, Gear, Recording and Control



2000 FRAME DC MOTOR

INPUT: 6-115 volts DC
 OUTPUT POWER: 1/75 to 1/10 hp depending on speed, duty cycle and cooling
 LIFE: 1000 hr brush life; 250 hrs at high altitude.
 Available with gear speed reducer and/or speed governor, shunt, series, or compound wound.

Bulletin 20F2



2900 FRAME HYSTERESIS MOTOR

VOLTS:	115	T.P.I. (oz.in.):	4.5
CPS:	60	T.P.O. (oz.in.):	5.0
WATTS INPUT:	24	T.St. (oz.in.):	4.0
AMPERES:	.22	CAPACITOR (mfd):	} 2.5
NUMBER OF POLES:	4	220 VOLTS A.C.:	
RPM:	1800	WEIGHT:	1 lb.
H.P.:	1/125		

Hysteresis Catalog



3800 FRAME AC MOTOR

INPUT: 26-230 volts AC; 1, 2 and 3 phase
 INPUT FREQUENCY: 25-400 cycles
 NUMBER OF POLES: 2, 4, 6, 8 and 12 poles
 OUTPUT POWER: Induction motors—to 1 hp; Torque motors—10 to 200 oz. in. stall torque; Hysteresis synchronous motors—1/200 to 3/4 hp (can be wound for single, dual or three speed.)
 BEARINGS: Ball or Sleeve
 WEIGHT: 8-11 lbs.
 MOUNTING: Round or square flange and/or base

Bulletin 38F6

IMC's versatile engineering staff is available to meet your specific design requirements.

imc Magnetics Corp. 
 Formerly: Induction Motors Corp.
 570 MAIN STREET/WESTBURY, L.I., N.Y./EDGEWOOD 4-7070 • 6058 WALKER AVE./MAYWOOD/CALIF.



MINIATURE TRANSISTOR TRANSFORMERS from stock!



DC TO DC CONVERTER

Converts low volts DC to high voltage DC. Available with 13.6 or 28 volts input. Ratings to 125 VA.



HERMETIC (M-H)

High compression glass terminals. Drawn hermetic case $1\frac{1}{8}$ " slot mtg. $\frac{1}{16}$ " dia. x $1\frac{1}{16}$ " H. Wt. $1\frac{1}{4}$ oz. Baked grey enamel.



LOW LEVEL CHOPPER

Efficiently transfers 30 to 500 CPS transducer or thermocouple signal to instrument amplifier. Triple mu-metal shielding.



POTTED (M-A)

Aluminum case. Lug terminal board, $1\frac{1}{8}$ " mtg. with 2-56 screws, $\frac{7}{8}$ " dia. x $1\frac{3}{16}$ " H. Wt. $1\frac{1}{4}$ oz.

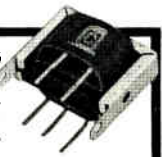


PLUG-IN (M-P)

Octal plug base. Sealed plastic housing $1\frac{1}{32}$ " dia. x $1\frac{1}{32}$ " H. Wt. 2 oz.

OPEN FRAME TAB MTG (M-FPB)

Miniature size. Resin impregnation, 4" color coded vinyl leads, $1\frac{3}{16}$ " x $1\frac{3}{16}$ " x $2\frac{1}{32}$ " H. Wt. $1\frac{1}{8}$ oz.



OPEN FRAME (VM-F)

Veri-miniature size. Resin impregnation, 4" color coded leads for dip soldering. $\frac{7}{16}$ " x $\frac{1}{2}$ " x $\frac{7}{16}$ " H. Wt. .16 oz.

SILICON RECTIFIER POWER SUPPLY

Designed for optimum usage of rectifier ratings, 105/115/125V, 60 and 400 ~ input. 18, 35, 70 V.C.T. @ 1 and 3 amps. outputs.



FRANCHISED STOCKING DISTRIBUTORS

CALIF., Inglewood—Newark Electric Co.
CALIF., Los Angeles—Graybar Electric
CALIF., Oakland—CONNEX Corp.
CALIF., San Diego—Telrad Electronic Supply
CANADA, Montreal—Atlas Wholesale Radio
COLO., Denver—Ward, Terry & Co.
D.C., Wash.—Electronic Industrial Sales
ILL., Chicago—Newark Electric Co.
MASS., Boston—Sager Electrical Supply
MINN., Minneapolis—Stark Radio Supply
N. Y., Jamaica—Peerless Radio
N. Y., Mineola—Arrow Electronics
OHIO, Cincinnati—United Radio
OHIO, Cleveland—Main Line Cleveland
TEXAS, Dallas—Central Electronics

Write TODAY for catalog and price list of the complete MICROTRAN line.



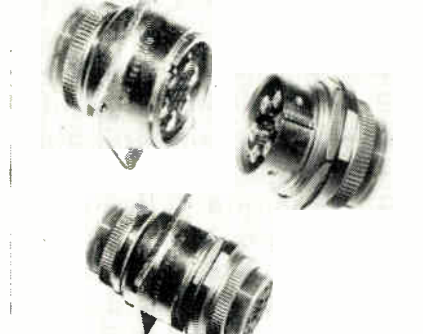
MICROTRAN
company, inc.
145 E. MINEOLA AVE.,
VALLEY STREAM, N. Y.

Circle 243 on Inquiry Card

"Peak" Response Products

MINIATURE CONNECTORS

A specially designed, environmental connector utilizing 6 coax contacts and thirteen #20 contacts is available. Available in 6 alternate insert positions, the push-pull, quick dis-

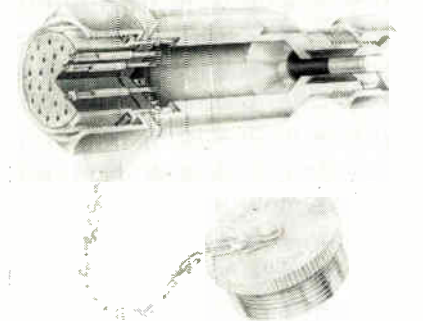


connect connector features either standard or special coupling rings that lock and unlock in the direction of plug travel without lockwiring or twisting, without bayonet or coupling-nut. Coax contacts will accept RG-196/U cable. Pins or sockets are available in either the plug or the receptacle. The Deutsch Co., 7000 Avalon Blvd., Los Angeles 3, Calif.

Circle 354 on Inquiry Card

CONNECTORS

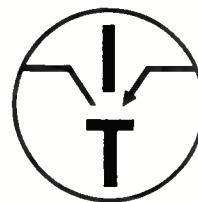
The series LR and MR, weather-proof connectors can withstand extreme conditions of mud, ice and water. Used on arctic radar warning systems, such as the "DEW" Line, they feature clear and black anodic coating for maximum corrosion resistance built-in rubber gland and gland nut for moisture sealing around the cable; and chain-attached



caps for sealing off the connector faces when plugs and receptacles are unmated. Coupling threads and sizes are standard to MIL-C-5015. Cannon Electric Co., 3208 Humbolt St., Los Angeles, Calif.

Circle 355 on Inquiry Card

COMPUTER and SWITCHING TRANSISTORS



2N425

2N426

2N427

2N428

This series of Germanium PNP alloy junction transistors, rated at a 200 mw Collector Power Dissipation, are designed and 100% tested to close parameters for computer and switching applications where medium or high-speed as well as high current switching are required.

The reliability and stability of these transistors are assured by closely controlled techniques of manufacture. The mechanical design and hermetic seal of the TO-9 case enables these Industro transistors to meet or exceed the mechanical and environmental requirements of military standard MIL-T-19500A.

We specialize in fulfilling requirements for specially selected parameters.

Write for full information on the more than 80 types in our line.



TRANSISTOR CORPORATION

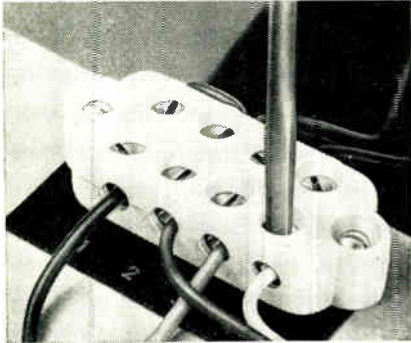
35-10 36th Ave.
Long Island City 6, N. Y.

Circle 244 on Inquiry Card

"Peak" Response Products

TERMINAL BLOCK

A quarter turn with a screwdriver is all it takes to connect a new type of terminal block. The Camblock makes positive connections without solder, lugs, or crimping, in a fraction of the

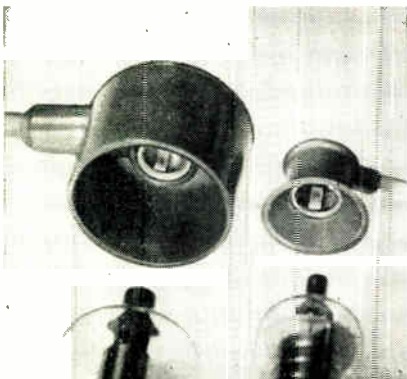


time required by older methods. Available with any number of stations from 2 through 20, these terminal blocks take wire sizes up to #18, handle up to 15 amps and withstand heat up to 220° F. Dielectric strength is 2500 v between terminals, 3000 v from terminal to base. Camblock Corp., 825 Bronx River Ave., New York, N. Y.

Circle 352 on Inquiry Card

TUBE CAP CONNECTORS

A tube cap connector series having the thermo, electrical, and mechanical characteristics of silicone molding compounds is available. Included are: glass filled silicone for highest temperature application from -65° F to 750° F and will withstand up to 1000° F for a short time (meets MIL-M-14E specifications), and silicone rubber for flexibility and resiliency



under special applications. Silicone rubber insulated connectors are available for high voltage applications, temperatures from -70° F up to 500° F. Alden Products Co., Brockton, Mass.

Circle 353 on Inquiry Card

NETIC CO-NETIC MAGNETIC SHIELDING

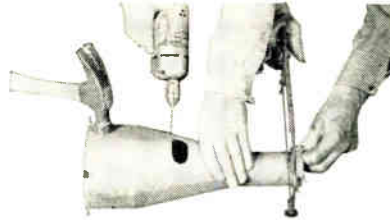
Non-Shock Sensitive, Non-Retentive, No Periodic Annealing, Shaped to Your Application

Permanently unaffected by shock or vibration from usage, drilling, cutting, punching, bending, etc. For maximum effectiveness, all possible joints are heliarc welded. Sheds magnetic forces like a duck's back sheds water. Will not become magnetized.

Permanently non-retentive—negligible residual magnetism. No periodic annealing required.

Provides simultaneous high and low intensity shielding as well as high and low frequency shielding or any one of them. Aids miniaturization by making possible placing components close together, even mounted on the shield itself. Can be furnished tinned, ready for soldering—without affecting shielding qualities. Available as raw material if desired for fabricating parts in your own plant.

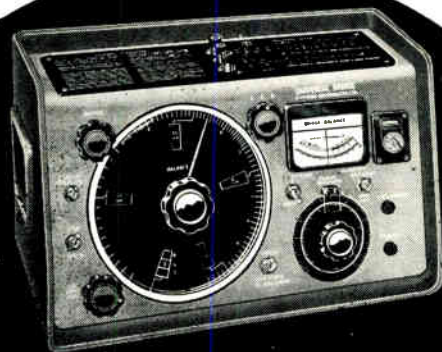
Typical applications include tape container shields to protect broadcasting, military and automation tapes, cathode ray tube shields, photomultiplier tube shields, transformer shields, magnetron shielding, 7 & 9 pin tube shields, portable measuring chambers for simulated pressure, vacuum, altitude and non-pressurized testing of delicate instruments in laboratory or field, shields for motors, tape heads, submin. encap. uses.



MAGNETIC SHIELD DIVISION PERFECTION MICA CO.
1322 No. Elston Avenue • Chicago 22, Illinois

NOW! Wrappable Foil 15" wide (Co-Netic) and 19³/₈" wide (Netic) simply, quickly shaped to enclose any component, insuring immunity from any interfering magnetic fields. Also aids miniaturization, increases your market.

Circle 245 on Inquiry Card



\$475

MAKE NO MISTAKE...

...this New Universal Bridge is DIRECT READING on all 21 ranges. Results are obtained without calculation, the balance is sharp but easily found, the design is functional. Mistakes are almost impossible with Model 868A—a bridge you will enjoy using.

21 Ranges:
1 μ H to 100H. 1 μ F to 100 μ F. 0.1 Ω to 10M Ω .
Dual Frequency, 1kc & 10kc. 400 cps to order.
Built-in Oscillator and tuned VTVM Detector.
Variable Bridge Voltage, meter-monitored.



MARCONI
INSTRUMENTS



111 CEDAR LANE • ENGLEWOOD, NEW JERSEY

If you produce
FERRITES
ELECTRONIC CORES
MAGNETIC RECORDING
MEDIA

... then let **WILLIAMS**
 help by supplying you
 with latest, authoritative
 technical data on

PURE FERRIC
OXIDES
MAGNETIC IRON
OXIDES
MAGNETIC IRON
POWDERS

Since final quality of your production of ferrites, electronic cores, and magnetic recording media depends on proper use of 3 specialized groups of magnetic materials... you'll find it mighty helpful to have all the latest, authoritative technical data describing the physical and chemical characteristics of each. This information is available to you just for the asking. So send today. Meanwhile, here are highlights of each product group.

Pure Ferric Oxides: For the production of ferrite bodies, we manufacture a complete range of high purity ferric oxide powders. These are available in both the spheroidal and acicular shapes, with average particle diameters from 0.2 to 0.8 microns. Impurities such as soluble salts, silica, alumina and calcium are at a minimum.

Magnetic Iron Oxides: For magnetic recording—audio, video, instrumentation etc.—we produce a group of special magnetic oxides with a range of controlled magnetic properties. Both the black ferrosulfuric and brown gamma ferric oxides are available.

Magnetic Iron Powders: For the fabrication of magnetic cores in high-frequency, tele-communication, and other magnetic applications, we make a series of high purity iron powders.

These materials are products of Williams research facilities. For your convenience, we maintain fully equipped laboratories for the development of new and better inorganic materials. We also investigate new fields of application. Please write, stating your problem. We'll be glad to cooperate. Address Dept. 30, C. K. Williams & Co., 640 N. 13th St., Easton, Pa.

WILLIAMS
 COLORS & PIGMENTS

C. K. WILLIAMS & CO.
 East St. Louis, Ill.

Easton, Penna. • Emeryville, Calif.

Circle 247 on Inquiry Card

"Peak" Response
Products

TERMINAL KIT

Intended for limited distribution, this kit contains a sampling of solderless electrical terminals and matching application tooling, designed to meet the needs of development and research

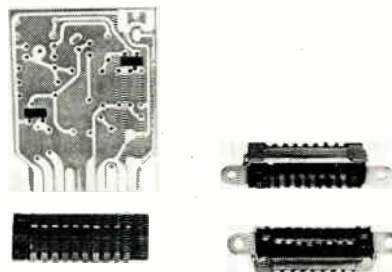


laboratories. Special terminals to meet unusual requirements may be obtained to supplement the standard designs of pre-insulated terminals and taper pins contained in the kit. The kit is also stocked with catalogs and instruction pamphlets. It is not intended for use in mass production departments. Amp Inc., Harrisburg, Pennsylvania.

Circle 356 on Inquiry Card

MODULAR CONNECTORS

Uno-Link modular connectors are available for standard wire harness arrangements, the firm's Plyo-Duct film insulated multiconductor cable and printed circuit card receptacles. Multiple unit construction permits the designer to specify the exact number of connection links desired. Available with melamine-phenolic and diallyl phthalate insulation, brass,



phosphor bronze and beryllium copper terminals, and cadmium, silver and gold finishes. Methode Mfg. Corp., 7447 W. Wilson Ave., Chicago 31, Ill.

Circle 357 on Inquiry Card

STROMBERG-CARLSON
TELEPHONE
HANDSETS



... for your voice communication needs.

These "push-to-talk" handsets are of the most modern design available.

If your applications are in • mobile radio • intercom systems • carrier and microwave • aircraft and railroad — specify Stromberg-Carlson handsets.

No. 26: short, lightweight, sturdy. Comes with capsule-type receiver and transmitter.

No. 28: "push-to-talk" handset. Rocker-bar switch; various spring combinations.

Both models available with standard or high-gain transmitters and receivers. Superior to any other handset on the market.

Modern handset cradle for mobile or panel use



Holds handset firmly; is strong and resilient; fits any Stromberg-Carlson handset. Switch combinations with two or four Form C con-

tacts. Space for your company name is provided. Send for Handset Bulletin T-5005 and Cradle Bulletin T-5013. Write:

STROMBERG-CARLSON

A DIVISION OF GENERAL DYNAMICS CORPORATION

Telecommunication Industrial Sales
 126 Carlson Rd. • Rochester 3, N.Y.



Circle 248 on Inquiry Card

Varian STRIP CHART Recorders



Unique combination of performance, size and price

OVER 1000 TIMES AS SENSITIVE as galvanometer recorders... and Varian's null-balance potentiometer needs no power from the source being measured. Rugged, stable mechanism allows ink or inkless recording—easy-to-read rectilinear chart—source impedances of up to 100,000 ohms.

LESS THAN HALF AS WIDE as a standard 19-inch rack. Two Varian G-11A's mount side by side on a rack panel 10 $\frac{3}{4}$ inches high. Or as a portable, the G-11A is an easy-to-handle 15 pounds. The G-10 sits on less than one square foot; its horizontal chart is handy for jotting notes.

MORE VERSATILE AND ADAPTABLE than any similar recorder—adjustable zero, adjustable span (from 9 to 100 mv on the G-11A), multiple chart speeds (up to four on the G-11A), and plug-in input chassis for different recording requirements.

PRICES THAT BEGIN AT \$365 for the G-10 and \$470 for the G-11A. Because unneeded performance costs money, Varian has intentionally designed for 1% limit of error and 1-second balancing time. Thus, Varian provides needed ruggedness, dependability and operating features at moderate cost.

WRITE TODAY FOR COMPLETE SPECIFICATIONS AND STANDARD OPTIONS

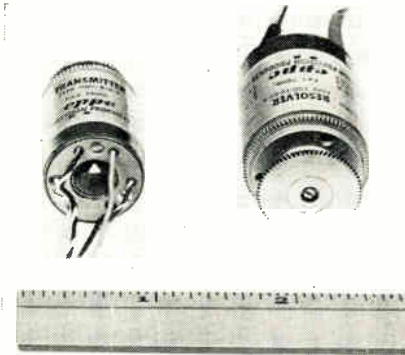


Circle 249 on Inquiry Card

"Peak" Response Products

SYNCHROS WITH POINTER

To aid the design engineer in breadboarding synchro systems, synchros and resolvers with a pointer visible through a small window at the rear of the shaft are available.

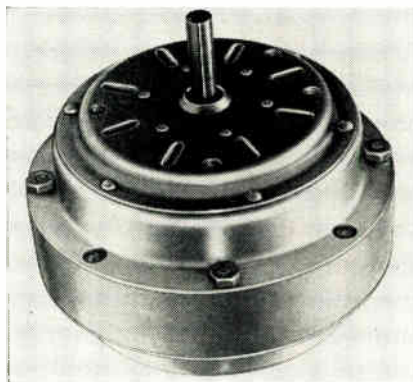


The engineer can tell at a glance if his system is properly phased by watching rotation of the pointers. When used with a dial, the pointers can also be utilized for system calibration. Synchros are provided with an integrally cut gear on the mounting flange for setting electrical zero while the synchro is clamped in the system. They are available in sizes 8, 10, 11, and 15. Clifton Precision Products Co., Inc., 9014 West Chester Pike, Upper Darby, Pa.

Circle 360 on Inquiry Card

MINIATURE MOTOR

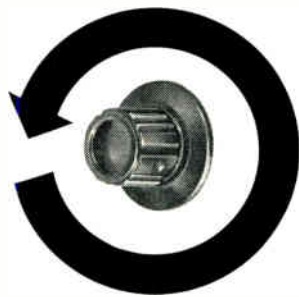
A sub-fractional horsepower hysteresis motor, although small in size, has a good low heat rise of only 20°C to 38°C depending on horsepower rating. Other features assure high performance with long-life reliability. Horsepower ratings are from 1/200th to 1/20th, with a running torque of 2.8 in.-oz. to 28-in.-oz. Dif-



ferent rpm's can be selected by varying input frequency. It reaches full speed in 1 revolution and maintains synchronous speed at rated load. Motor is totally encased. Dale Products, Inc., Box 135, Columbus, Nebr.

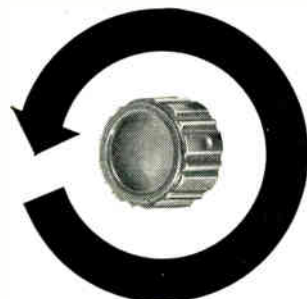
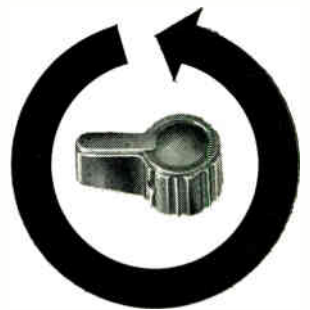
Circle 361 on Inquiry Card

A complete new line of quality instrument control knobs from Lerco, the quality source for terminals and electronic hardware... designed to mil-spec standards... high impact styrene with anodized aluminum inserts... two set screws... available in warm grey, midnight blue or black with mirror or matte finish... all standard sizes in stock!



NEW KNOBS

...to use where quality counts!



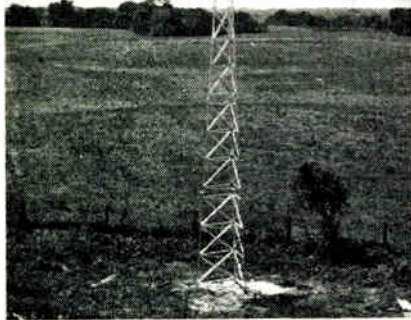
Circle 250 on Inquiry Card

LERCO

WRITE FOR COMPLETE DATA SHEET TODAY! LERCO ELECTRONICS, INC., 501 S. VARNEY STREET, BURBANK, CALIFORNIA

New ROHN

SELF SUPPORTING COMMUNICATION TOWER



- ★ 120 ft. in height, fully self-supporting!
- ★ Rated a true HEAVY-DUTY steel tower, suitable for communication purposes, such as radio, telephone, broadcasting, etc.
- ★ Complete hot-dipped galvanizing after fabrication.
- ★ Low in cost—does your job with BIG savings—yet has excellent construction and unexcelled design! Easily shipped and quickly installed.

FREE details gladly sent on request.
Representatives coast-to-coast.

ROHN Manufacturing Co.

116 Limestone, Bellevue,
Peoria, Illinois

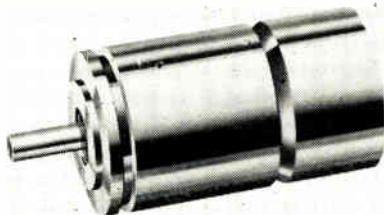
“Pioneer Manufacturers of
Towers of All Kinds”

Circle 251 on Inquiry Card

“Peak” Response Products

SERVOMOTOR

Model 8 VM 420, velocity-damped servomotor, has the same transfer function as a motor-generator. An adjustability feature permits up to 50 dyne-centimeter-seconds per radian

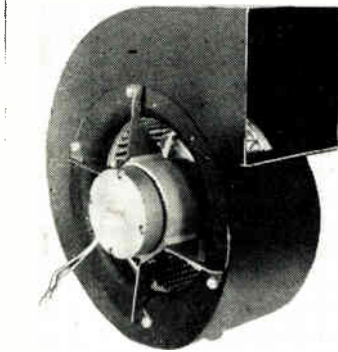


of additional damping if required. It has an undersized rotor with an inertia of 0.24 gm.cm.², and a stall torque of 0.25 oz-in. producing 73,000 rad/sec², acceleration at stall. No-load speed is 5,000 RPM. Power input 2.6 w, length—1.395 in., weight—1.9 oz. Meets MIL-E-5272A. Ambient temperature range is from -55° to 130°C. It has a 26 v fixed phase and 40 v CT control phase windings. Helipot Div. of Beckman Instruments, Inc., Fullerton, Calif.

Circle 358 on Inquiry Card

BLOWER

F frame blowers are presently being used in large commercial computers to maintain normal power supply temperatures. These motors are mounted inside the impeller to reduce overall size and to obtain a cooling effect on the motor itself. The units can be supplied for military or commercial use in 115 to 220 v, 1 or 3 ϕ ,



60 or 400 cps applications. The motor shown is 3 13/16 in. diameter and is driving an 8 1/2 in. squirrel cage impeller. Air-Marine Motors, Inc., 369 Bayview Ave., Amityville, L. I., N. Y.

Circle 359 on Inquiry Card

Deflection

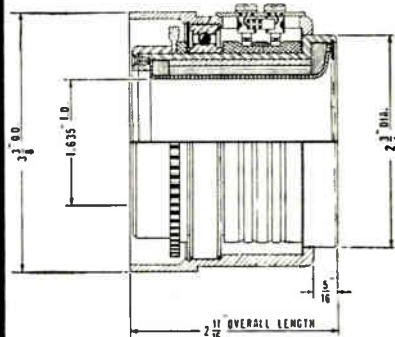
YOKE

specialists

COMPLETE LINE for every Military and Special purpose . . . in PRODUCTION QUANTITIES . . . or CUSTOM DESIGNED to your specific requirement.

FOR PPI DISPLAYS

Compact Rotating Coil Yoke



Stock Type Y25 illustrated



OTHER ROTATING TYPES available with fixed off-centering or rotating off-centering. Many mechanical and electrical variations.

FIXED TYPES with push-pull windings. Low current coils for slower sweep speeds. Low impedance coils for transistor drives.

Neck diameter, core material, configuration, deflection angle and electrical design to your precise spec. For engineering help, contact Dr. Henry Marcy today.

syntronic

INSTRUMENTS, INC.

100 Industrial Road, Addison, Illinois
Phone: Kingswood 3-6444

Circle 252 on Inquiry Card

5-WAY RELIABILITY

IN YOUR CIRCUIT DESIGN

WITH
Vitramon[®]
CAPACITORS

The latest additions to the growing line of "Vitramon" Capacitors feature smaller mounting area, lower inductance, and more versatility of application — plus all the phenomenal electrical characteristics for which "Vitramon" Capacitors are noted — fine silver electrodes fused to pure porcelain enamel, perfectly bonded to provide *stability, wide temperature range, humidity immunity, low loss, low noise.*

RADIAL SERIES

- Thin design — 5/64" to 7/64"
- Versatile mounting — can be used axially, radially, or on edge
- Ideal for minute circuit assemblies
- 0.5 to 1200 mmf; 500 to 50 vdc



PARALLEL SERIES

- Tiny mounting area — 11/64" x 9/32"
- Designed for automatic insertion
- Packed for cartridge feeding
- Capacitance through 1000 mmf. at 100 vdc



CO-AXIAL SERIES

- Compatible with MIL-C-10950B
- Very low inductance
- Flexible leads
- Maximum height from mounting surface 1/4"
- To 1000 mmf at 300 vdc



AXIAL SERIES

- Extremely rugged
- 4 case sizes from 3/8" to 29/32"
- 0.5 to 6800 mmf; 500 to 300 vdc



AXIAL-RADIAL SERIES

- Mounted axially or radially
- 4 case sizes from 3/8" to 27/32"
- 0.5 to 5600 mmf; 500 to 300 vdc



Vitramon[®]
Incorporated

BOX 544 • BRIDGEPORT 1, CONN.

Circle 253 on Inquiry Card

"Peak" Response Products

SERVO MOTOR

The Type 23-5251-01 a continuous duty, hi-temp, size 23 servo motor conforms to BuOrd Mark 21 Mod 0 specifications. It meets requirements of MIL-S-17087 and environmental

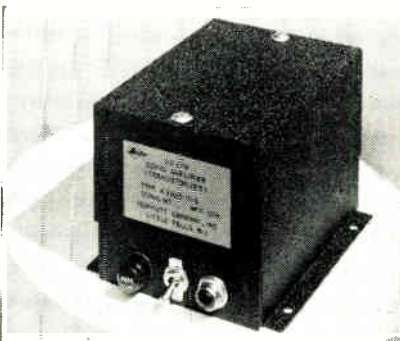


requirements of MIL-E-5272A. No load speed is 5000 rpm; stall torque, 6.5 oz in.; rotor moment of inertia, 15.5 gm cm²; ambient temperature range, 54°C to +125°C, and weight, 32 oz. Rating is 115 v on phase 1 and 115/57.5 v on phase 2, with power input 22 w/phase at stall. Bearings and housing are stainless steel. John Oster Manufacturing Co., Avionic Division, 1 Main St., Racine, Wis.

Circle 362 on Inquiry Card

SERVO AMPLIFIER

Transistorized Model A3300-01 has an internal dc power supply and provides 90° phase shift. Power supplied to the load is in pulse form of constant amplitude, and width, or time duration of the pulse is proportional to the amplitude of the input signal. Gain is established at values between 80 and 1600, with external resistors. It may be modified for 400



CPS where max. power input is 16 w. Input impedance is 5 K-100 K ohms; signal frequency, 60 CPS; max. signal input, 30 v. RMS; voltage output, 40 v., 60 CPS. Kearfott Co., Inc., 1500 Main Ave., Clifton, N. J.

Circle 363 on Inquiry Card

STANPAT SOLVES THE GHOSTING PROBLEM

NEW resin-base STANPAT ELIMINATES GHOSTING, offers better adhesion qualities on specific drafting papers!

THE PROBLEM

Some of our longtime customers first called our attention to the "ghosting" problem. Certain tracing papers contain an oil which could be leached out by the STANPAT adhesive (green back) causing a ghost.

THE SOLUTION

A new STANPAT was developed (red back), utilizing a resin base which did not disturb the oils and eliminates the ghost. However, for many specific drafting papers where there is no ghosting problem, the original (green back) STANPAT is still preferred.

WHICH ONE IS BEST FOR YOU?

Send samples of your drawing paper and we will help you specify. Remember, STANPAT is the remarkable tri-acetate pre-printed with your standard and repetitive blueprint items—designed to save you hundreds of hours of expensive drafting time.

SO SIMPLE TO USE



1. PEEL
the tri-acetate adhesive from its backing.

2. PLACE
the tri-acetate in position on the tracing.

3. PRESS
into position, will not wrinkle or come off.

STANPAT CO.

WHITESTONE 57, N. Y., Dept. 114
Phone: Flushing 9-1693-1611



Enclosed are samples of the drafting paper(s) I use (identify manufacturer). Please specify whether Rubber Base or Resin Base STANPAT is most compatible with these samples.

Send literature and samples of STANPAT.

Please quote price on our enclosed sketches which we are considering to have pre-printed.

NAME _____

FIRM _____

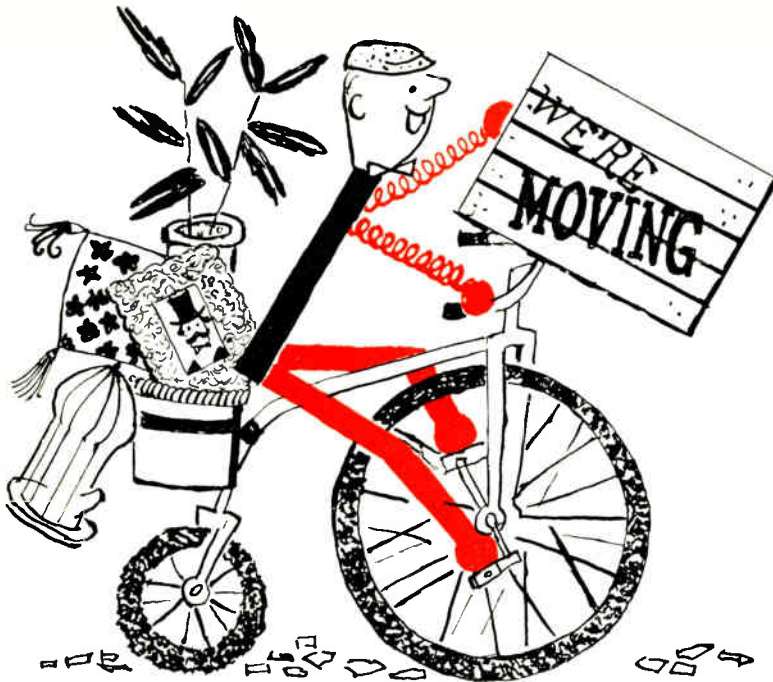
ADDRESS _____

CITY _____

ZONE _____ STATE _____

Circle 254 on Inquiry Card

©
PHIL A. MENT—along with many engineers in the electronic industries is moving. If you are, and—like them—want **ELECTRONIC INDUSTRIES** to follow, please do this: (1) Send us a wrapper imprint of old address; if not available, write down completely your former location. (2) Tell us your new company, its address, specific nature of business and your title. Missing any of these components will delay and cause you to miss issues. So please remember—complete old address and new will speed-up delivery of your **ELECTRONIC INDUSTRIES**.



"Peak" Response Products

POWER SUPPLIES

A new line of miniaturized power supplies for dc is available. These hermetically sealed units are light-weight and compact. They are available with 5 ma. output at the follow-



ing voltages: 2, 5, 10, and 15kVdc. High quality selenium rectifiers and capacitors are used. The line is engineered for reliability and oil impregnated for stability. Ripple is 1%. Positive or negative terminal can be grounded to case, standoff high voltage terminals are designed for safe operation. The heavy steel cases are plated and painted. Chicago Condenser Corp., 3255 W. Armitage Ave., Chicago 47, Ill.

Circle 364 on Inquiry Card

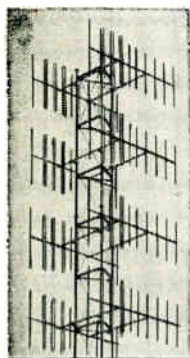
POWER SUPPLY

A transistorized power supply for use as a replacement for mobile transmitter-receiver power supplies of the vibrator and/or dynamotor type has been introduced. Designated as Type QU-051, it is a lightweight, compact dc-to-dc conversion unit. It requires 12.6 v. at 9.0 a. It will operate on voltages as low as 6 vdc with reduced output. Output is (1) 200 v at 80 ma.,



adjustable between 150 and 250 v.; (2) 400 v at 250 ma.; (3) —25 v at 10 ma. International Telephone & Telegraph Corp., 15191 Bledsoe St., San Fernando, Calif.

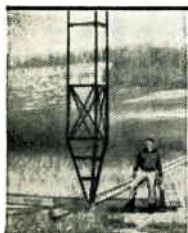
Circle 365 on Inquiry Card



RUGGEDIZED YAGIS

For reliable, high-performance communications operations...

...such as off-the-air pickup, military transmit and/or receive, meteor burst communications, low-frequency microwave. Featuring up to 16-bay stacking with gain up to 24 db. and flexible spacing of bays for specific needs. Frequency range from 30 mcs. through 500 mcs.



Write for complete technical data... on standard and special antenna systems...

TACO
TECHNICAL APPLIANCE CORPORATION
 SHERBURNE, N. Y.

Circle 255 on Inquiry Card

NORTH HILL'S MODEL CG-1



Constant Current 1ma to 30 amps

- ▶ Rapid manual or automatic switching to desired current levels.
- ▶ High accuracy and stability.
- ▶ Current can be electronically switched, pulsed, swept, modulated and programmed.

Ideal for Rapid Testing of:

- ▶ Semiconductors
- ▶ Electromagnetic Components
- ▶ Other Current-Sensitive Devices

- Model CG-1 1 ma — 600 ma
- Model CG-11 Transistorized .05 — 5 amps
- Model CG-12 Transistorized .5 — 30 amps

For further data, write for Bulletin E-1M

nh **NORTH HILLS ELECTRIC CO., INC.**
 402 Sagamore Ave., Mineola, N.Y., PI 7-0555

Circle 256 on Inquiry Card



**pick the
best pilot light
for your application
in seconds!**

Johnson pilot lights
*immediately available
for original equipment
or in-the-field replacement!*

Choose your next group of panel indicators from E. F. Johnson's "preferred" line—over 47 separate assemblies carefully selected from Johnson's standard line by many of the nation's top design and development engineers. Available in a wide variety of types, these "preferred" units may be obtained from stock at parts distributors throughout the country for original equipment or in-the-field replacement. Write for your free copy of Johnson's newest pilot light specification catalog—see how easy it is to select the *right* pilot light . . . fast!

**Select the right
pilot light...fast!**

Complete pilot light catalog 750a contains detailed specifications, prices, and technical data . . . everything you need to select the best unit for your particular application. Write for your free copy of Catalog 750a today!



Available types include: continuous indication neon types; models for high and low voltage incandescent bulbs; standard or wide angle glass; and lucite jewels in clear, red, green, amber, blue, or opal. Specials, including those meeting military specifications, also available in production quantities.



E. F. Johnson Company

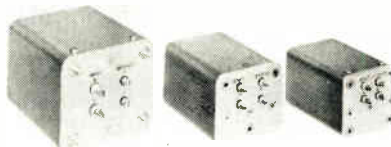
2111 Second Ave. S.W. • Waseco, Minnesota

Circle 257 on Inquiry Card

"Peak" Response Products

DC-DC CONVERTERS

Transistorized dc to dc converters, QC series, provide an economical means of obtaining higher voltages from standard 6, 12, or 28 vdc sources. Standard output voltages

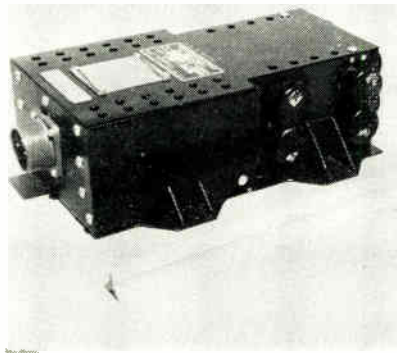


range from 50 vdc to 1000 vdc. Powers to 200 w in 12 v models, 150 w in 28 v models, and 90 w in 6 v models. They feature tubeless circuitry, instantaneous starting, and low noise levels. Applications include: radio receivers, mobile telephone equipment, PA amplifiers, telemetering equipment and radiation measuring equipment. Sorensen & Company Inc., Richards Ave., South Norwalk, Conn.

Circle 366 on Inquiry Card

INVERTER

The Model W-1347 100 va static inverter converts dc to ac without moving parts. The 400 cps output frequency is regulated to ± 1 cps; output voltage, nominally 115 v, is regulated to $\pm 2\%$. It is designed to meet MIL-E-5272A. No special cooling is required. Input voltage can vary from zero to 40 vdc. without damage to the equipment. Also, the output cir-



cuit will sustain direct short circuits, and will recover to full normal operation in 10 milliseconds after short removal. ElectroSolids Corp., 13745 Satcoy St., Panorama City, Calif.

Circle 367 on Inquiry Card



**True
Hermetic
Sealing!**

GASEAL®

Pressurized metal hermetic seals for easy installation anywhere without special tools. Withstand more than 850 degrees F., high pressures and altitudes. For any sealing configuration.

Best Insurance for Component and Systems Reliability!

Corrosion...dust...fungus...altitude...humidity...pressures. True hermetic sealing completely eliminates their usually disastrous effects on electronic and mechanical apparatus.

GHS offers uniquely qualified techniques and specially developed facilities in the field of hermetic sealing. They are guaranteed to add a permanent plus to your product reliability.

For inert gas filling, 100% mass spectrometer leak testing of any assembly, and every phase of true hermetic sealing to meet military or industrial specs, GHS in-plant services are unequalled.

The GHS Megpot®



Quickly, efficiently tests your components, insulation. Features 10 million megohms, 100, 200 or 500V DC, automatic "charge" and safety controls, non-destructive (as high as 5000V AC) high-potential test set with current limiting and automatic shut-off circuit. Portable.

Write for Specific Information . . . and use the GHS Advisory Services without obligation.



Circle 258 on Inquiry Card

CRYSTAL FILTERS

10.7 Megacycles (EB-1)



An economical standard filter family for mobile and light aircraft transceivers. Sharpen selectivity—increase stability. Put your equipment in the deluxe performance class by using crystal filters. Let us help you design the 10.7 MC filter into your receiver. Send for your copy of the EB-1 crystal filter specifications.

Available also is a filter requirements bulletin (ME-100), containing comprehensive definitions of nomenclatures and parameters of all types of crystal filters.

CRYSTAL OVENS



1. Standard octal base.
2. Holds two ML-6 (HC-6/U) crystals.
3. Snap action thermostat.
4. Ambient temperature range—50°C to operating temperature.
5. Temperature stability $\pm 1^\circ\text{C}$.
6. Power consumption 5 watts.

MINIATURE CRYSTALS

Dimensions

- .500 high: 1.5 wide
- .172 deep
- Wire pin diameter: .017 \pm .001
- Wire pin length: 1.500 \pm .062
- Fixed pin diameter: .040 \pm .002
- Fixed pin length: .234 \pm .030

Type ML-18 and ML-18J (HC-18/U holder) frequency range 5.0 MC to 175.0 MC. The ML-18J is a ruggedized unit designed to withstand 100 G shock and in excess of 2000 cycles per second vibration.

Midland Manufacturing Co., Inc. produces crystals designed for every use and calibration from 2.0 KC to 175.0 MC.

Check with us on all your crystal needs ... and any special requirements.

Midland

MANUFACTURING COMPANY

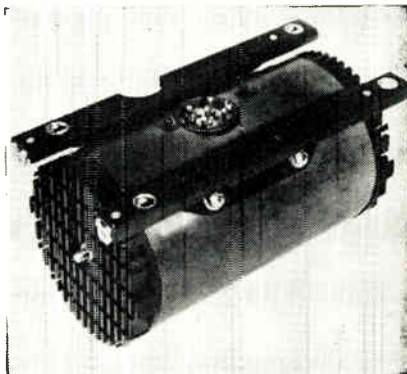
3155 Fiberglas Rd., Kansas City 15, Kan.

Circle 259 on Inquiry Card

"Peak" Response Products

POWER SUPPLIES

Transistorized power supplies for communications and navigation applications provide built-in protection against the spikes and transients disturbing system voltages in air-ground



systems as described in MIL-E-7894A. Model #6073 features protection against input polarity reversal and short circuits as well as control of over-voltage. Operating efficiency 87%. Size $6\frac{1}{4} \times 3\frac{1}{2}$ in. in dia. Weight 2 lb. 12 oz. It produces 300 v and 100 v from 27 vdc input. It operates in temperatures from -40°C to $+80^\circ\text{C}$. Other models available have inputs from 6-110 vdc and outputs to 2000 w. Universal Transistor Products Corp., 17 Brooklyn Ave., Westbury, L. I., New York.

Circle 368 on Inquiry Card

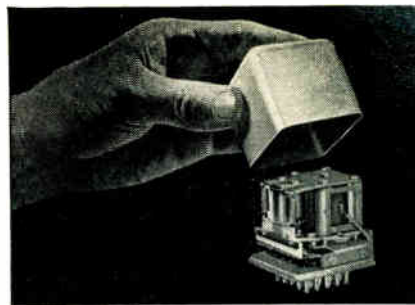
DC-DC CONVERTER

Transistorized dc to dc converters are designed for heavy duty, maximum reliability and service under the maximum adverse conditions. They convert 28 vdc to 500 vdc. They have 100 watts output at 40,000 ft. and operate at 71°C ambient temperature with no heat sink required. Convert-



ers are capable of output power up to 200 watts dc continuous. Operating range is from -55° to 71°C . Unit weighs only 2.7 lbs. Communication Accessories Co., Lee's Summit, Mo.

Circle 369 on Inquiry Card



HOW TO USE REGOHM

the plug-in device that regulates input voltage down to $\pm 0.05\%$

Wherever system performance requires precision regulation of input voltage, REGOHM earns a place. And wherever circuitry includes vacuum tubes, REGOHM will substantially extend tube life. The REGOHM is a voltage regulator of great sensitivity and stability, providing stepless continuous control over a wide frequency range. Light in weight, low in cost, its applications are almost unlimited. Here are typical applications:

- General Electric Co.—for Halogen Leak Detectors
- Empire Devices Products Corp.—for Noise & Field Intensity Meters
- Consolidated Electro-dynamics — for Diatron Mass Spectrometers
- Stoddard Aircraft Radio — for Power Supplies
- Hevi-Duty Electric Company — for Airport Lighting Brightness Control

How you may use REGOHM in your own applications will become clear to you from design data, performance specs and case histories, available to you on request.

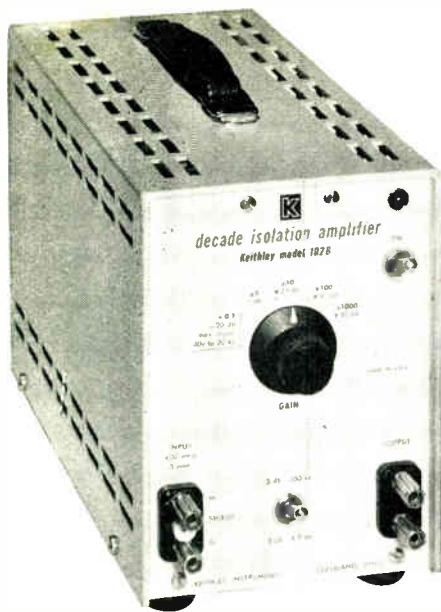


REGOHM



ELECTRIC REGULATOR CORPORATION
NORWALK CONNECTICUT

Circle 260 on Inquiry Card



how to see high impedance ac signals

The Keithley Model 102B Amplifier combines a 400-megohm input with high gain and low noise. It sharply reduces circuit loading errors when measuring outputs from accelerometers and other piezo-electric devices. It also has many uses in studies on hearing aids, phonograph pick-ups, and microphones.

Features of the Model 102B are: decade gains from 0.1 to 1000, selectable bandwidths of 2 cps to 150 kc and 2 cps to 1.7 mc, and a 5-volt, 50-ohm output for scopes and recorders. Other features include:

- **input impedance** of 400 megohms, shunted by $3 \mu\text{f}$.
- **low noise level**, below $10 \mu\text{v}$ from 10 cps to 150 kc at maximum gain.
- **gain accuracy** of 1% at midband for all gain settings.
- **rise time** of $0.3 \mu\text{sec}$ at highest gain.
- **two accessory** low capacitance probes available.
- **Price** — \$325.00

Write today for Catalog B, containing detailed information on the Model 102B.



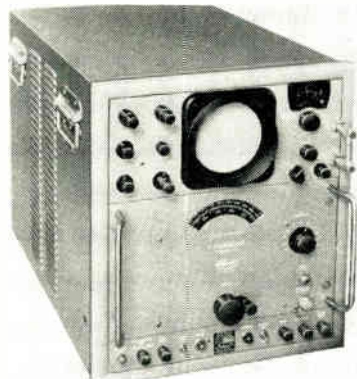
**KEITHLEY
INSTRUMENTS, INC.**
12415 Euclid Ave., Cleveland 6, Ohio

Circle 261 on Inquiry Card

"Peak" Response Products

SPECTRUM ANALYZER

A new microwave analyzer having wide dispersion has been developed. The Model TSA-W permits visual analysis of microwave pulse signals in the 10 to 44,000 MC range. It



analyzes pulses as short as 0.1 microseconds. The instrument provides frequency dispersion up to 70 MC. It may be used for all microwave spectrum analysis work. For wide pulse analysis the instrument provides a narrower display bandwidth with 7 KC resolution. It features a logarithmic amplitude display. Polarad Electronics Corp., 43-20 34th St., Long Island City, N. Y.

Circle 370 on Inquiry Card

DIGITAL VOLTMETER

This instrument has an accuracy of 0.1% with infinite resolution slidewire. It is a continuous null-balance, servo-driven, slidewire potentiometer with transistorized amplifier and Zener referenced power supply. The tape-slidewire is formed by bonding a resistance wire within the edge of a



laminated Mylar tape. The slidewire, 144 in. long, is calibrated by comparing it to a master tape 60 ft long. Shown is the BH180B AutoTemp calibrated as a pyrometer. B & H Instrument Co., Inc., Fort Worth, Tex.

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jettron

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TO PRODUCTION

Jettron is fully-equipped to design and manufacture your precision electronic components including connectors, sockets and cable assemblies. Call or write Jettron for quotations on "specials" for all commercial and military applications.



**Ultra High Frequency
Socket Type CD-7620**

For the 2C39 family of tubes, including the General Electric GL-6897 and the Eimac 3CX100A5, features very low capacitance from cathode or anode to ground.



**Input Connector
Type CD-7700**

For the Western Electric 6280/416B planar type triode. Has 18 spring fingers making contact with the RF cathode; specially designed beryllium copper contacts.



**Ultra High Frequency
Socket Type CD-8210**

Designed by Jettron for use with the General Electric GL-6442 and similar lighthouse tubes. Features very low capacitance from cathode or anode to ground.

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Sales Engineers in Principal Cities
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SONIC ENERGY CLEANING SYSTEM

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6 months!*

If you've heard people say that the results of Sonic Energy Cleaning can be spectacular, here's an example of what they mean:

A nationally known aircraft parts manufacturer had to remove dirt, grease, sludge, metal chips and abrasives from assembly components of a 4-stage aircraft compressor. Optimum cleanliness was vital. Previous methods were costly and unreliable.

Using the Bendix Sonic Energy Cleaning System with an inexpensive, non-flammable, nontoxic detergent solution, in a one-minute cleaning cycle—all traces of contamination—including both soluble and insoluble soils—were removed, even from blind holes, interstices, crevices, screw-threads, porous surfaces.

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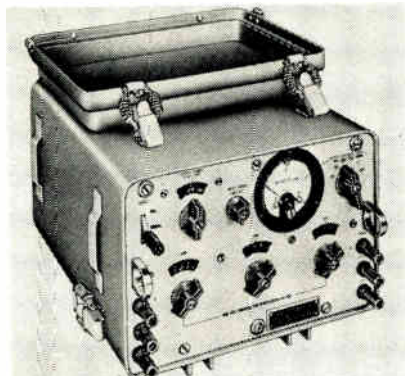
SONIC ENERGY CLEANING

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"Peak" Response Products

PORTABLE TEST SET

Model 87 (TS-913()/U) adjusts signal power to calibrate transmission measuring instruments and test circuits in wire transmission and related equipment. Frequency range is



10 CPS to 1 MC. Input impedance, balanced or unbalanced circuit, is approx. 700 ohms; output impedance, balanced or unbalanced circuit, is 135, 150 and 600 ohms. Input power range is from 0 dbm to +30 dbm. Output power is 0 to -70 dbm, +10 to -60 dbm, and +20 to -50 dbm. Accuracy of the output signal is ± 0.05 db of the setting of the output attenuators. The Daven Co., Livingston, N. J.

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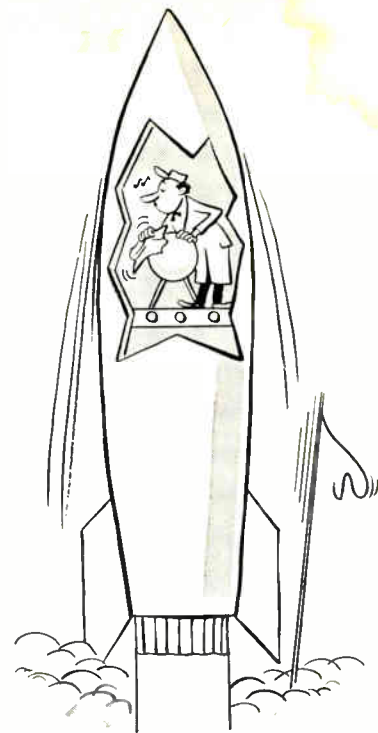


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Clean precision parts more safely

New Freon* solvents
by Du Pont minimize
cleaning hazards

- **Low toxicity**—"Freon" solvents are odorless and much less toxic than ordinary solvents—vapors won't cause nausea or headaches.
- **Won't burn or explode**—Underwriters' Laboratories report "Freon" solvents non-explosive, non-combustible and non-flammable.
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- **Leaves no residue**—"Freon" solvents evaporate completely, leave no deposit.

New "Freon" solvents by Du Pont degrease sensitive mechanical and electronic assemblies without damage to delicate parts. Since no inhibitors are needed, no residue is left on the parts, and "Freon" solvents can be recovered and reused without re-inhibiting. Write for free "Freon" solvents booklet. E. I. du Pont de Nemours & Co. (Inc.), "Freon" Products Division 556, Wilmington 98, Delaware.

*Freon is Du Pont's registered trademark for its fluorinated hydrocarbon solvents.

FREE BOOKLET!

No obligation—write for booklet which tells how new "Freon" solvents by Du Pont minimize cleaning hazards.



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HUGHEY and PHILLIPS, INC.

Specialists in Obstruction Lighting Equipment and Controls

BEACON and OBSTRUCTION LIGHTS, designed to meet specifications of CAA, FCC, and Canadian DOT.



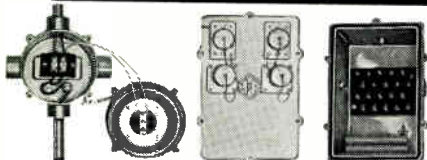
300MM Beacon

Single Obstruction Light

Double Obstruction Light

You'll find Hughey & Phillips have obstruction lights for every job. The engineering of each light offers maximum efficiency and simplified installation and maintenance. Whether you need bottom or side entrance conduit fitting types, there is a model to meet your requirements.

SPECIAL CAST ALUMINUM WATERTIGHT JUNCTION BOXES, offering a wide choice in types of terminals, cable support, and factory installed screw cap receptacles.



Box with terminals, cable support, and receptacle in cover.

Box with factory installed screw cap receptacles.

Box with special terminals and cable support.

Hughey & Phillips have pioneered in the use of adequate junction boxes with proper terminals, and built-in cable support to meet NEC requirements.

SPECIAL CONTROL UNITS, designed for both indoor and outdoor installation.



- Photo-Electric Control Units
- Beacon Flashers
- Combination Photo Control & Beacon Flashers
- Lamp Failure Indicator System
- Controls with Autotransformer system . . . pioneered by Hughey and Phillips for tall towers . . . increases lamp life.

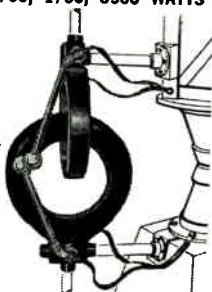
Photo control, flasher and Lamp Failure Alarm

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THREE SIZES . . . 750, 1750, 3500 WATTS

FEATURING:

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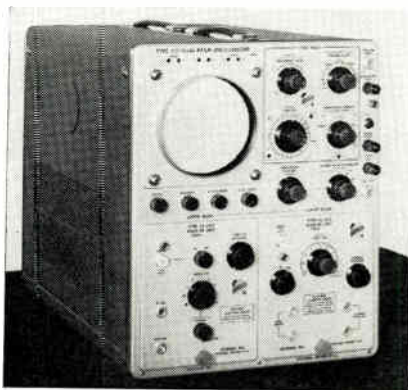
3200 N. San Fernando Blvd. Burbank, Calif.

Circle 266 on Inquiry Card

"Peak" Response Products

DUAL-BEAM SCOPE

The Type 551 is a dc-to-25 MC dual-beam oscilloscope with a Plug-In Feature. All Type 53/54 plug-in units can be used in both vertical channels, providing a high degree of signal-handling versatility. Risettime of the two main vertical amplifiers is 0.012 μ sec, and both have 0.2 μ sec signal-

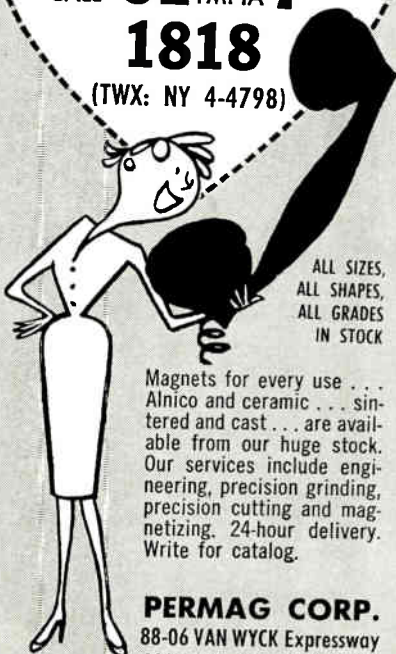


delay networks. The Type 551 sweep is common to both beams. It has 22 calibrated direct-reading sweep rates. Amplitude calibrator has 18 fixed steps. Tektronix, Inc., P. O. Box 831, Portland 7, Ore.

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ELECTRONIC TEST EQUIPMENT

PHASE SHIFTER

Models P560 & P5400

For measurement and comparison of phase angles or as a secondary phase standard



SPECIFICATIONS

RANGE..... 0-360° (continuously variable)
ACCURACY..... ± 1 degree
(Higher accuracies available)
FREQUENCY..... 60 CPS for PS 60
400 CPS for PS 400
(other frequencies available)

FREQUENCY STANDARD

A SELF-CONTAINED FORK STABILIZED FREQUENCY SOURCE

- Accurate
- Stable
- Low Distortion
- Variable output voltage
- Compact



Model 1400

SPECIFICATIONS

ACCURACY..... Available to .005%
DISTORTION..... Less Than 1%
FREQUENCY..... 400 CPS or 1000 CPS
(Other Freq. Avail.)
Dimension..... 6x9x6 inches
Power Supply..... 115 volts, 60 CPS

OTHER MODELS AVAILABLE

MODEL 600
LOW FREQUENCY
STANDARD

DESCRIPTION: Utilizes scaling circuits to provide tuning fork accuracies at frequencies below the range of precision tuning forks.

AUTOMATIC HI-POT TESTER

Model A

FAST, ACCURATE, DIELECTRIC TESTING FOR MULTI-CONDUCTOR DEVICES



DESCRIPTION: The function of this instrument is to apply in programmed sequence a known voltage between the various conductors under test for a specific period of time and to indicate breakdowns when and where they occur.

SPECIFICATIONS

TEST VOLTAGE..... 0-2000 Volts RMS
TEST TIME..... 2-120 seconds
NUMBER OF TEST TERMINALS..... 11

NULL DETECTOR

Model 60B



A sensitive battery operated null detector ideal for shering bridges or other applications where complete isolation from power lines is desirable.

- Long Battery Life
- High Harmonic Rejection
- Shielded against external fields

SENSITIVITY: 1 microvolt for 1% deflection



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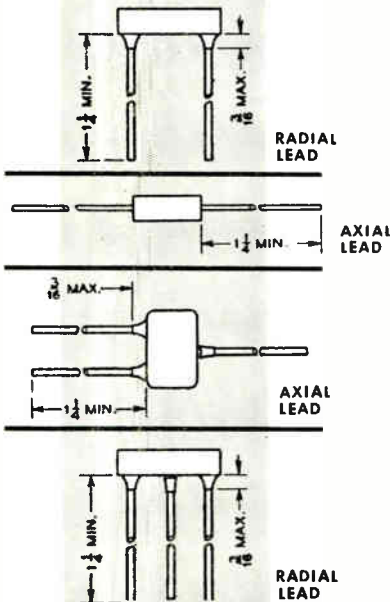


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3000 mmfd as small as 1/8" Sq.

AVAILABLE LEAD CONSTRUCTIONS



COMPLETE ENGINEERING & DESIGN SERVICE for CUSTOM MANUFACTURING

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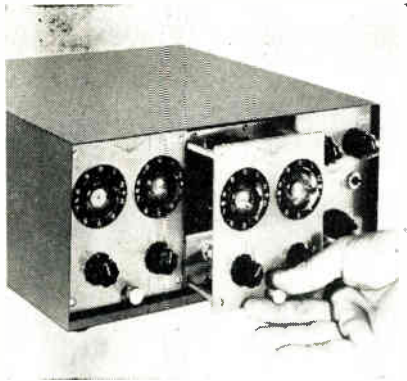
ELECTRO-CERAMICS, INC.
 120 STATE STREET
 NEW HAVEN 11, CONN.

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"Peak" Response Products

MODULAR COUNTERS

The Model 320 series Pre-set Electronic Counters is available in every size from 2 to 6 digits in the standard line. Each standard instrument consists of one pluggable amplifier and



control unit plus any combination of pluggable 2 and 3 decade modules. Designed for industrial counting, sorting, batching winding, packaging and other control functions, it will count at a maximum rate of 5000 counts per sec., accepting any standard waveform. Either ac or dc coupled inputs may be selected from the front panel. Erie Resistor Corp., 644 W. 12th St., Erie, Pa.

Circle 374 on Inquiry Card

DISTORTION METER

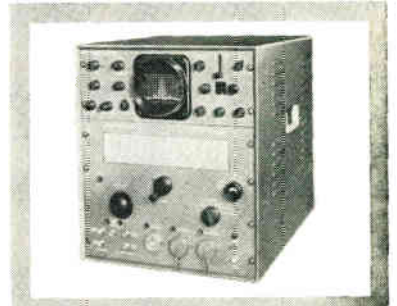
This distortion meter may be used for accurate measurements of residual noise and harmonic content in the audio frequency ranges, as in FCC Proof-of-Performance tests. The meter requires only 0.3 for noise and distortion measurements, and measures fundamentals from 30 to 15,000 CPS and harmonics to 45,000 CPS. For measurements of low level audio volt-



ages in determining noise and harmonic content, full scale readings of 0.3, 0.1, 0.03, 0.01, 0.003 are provided. Barker & Williamson, Inc., Bristol, Pa.

Circle 375 on Inquiry Card

10 mc to 44,000 mc with ONE tuning head



PANORAMIC'S SPA-4 SPECTRUM ANALYZER

high sensitivity
 . . . low cost

* Better sensitivity in one compact, low cost unit than with typical multi-tuning head spectrum analyzer!

- Resolution continuously variable from 1 kc to 80 kc for analysis of wide and narrow pulsed RF signals
- 70 mc wide sweep width continuously adjustable down to 0 mc
- Careful shielding to avoid interference
- Calibrated power, voltage and log amplitude scales
- Constructed to MIL specifications

* Embodying new design techniques for high reliability the Model SPA-4 features in one compact low cost unit.

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Galileo Meets the Martians

One memorable day in 1633, 5 space ships suddenly materialized in the sunny Italian sky over Pisa and landed directly under the nose of Galileo's telescope. Three creatures alighted from the lead ship and made straight for Galileo.

"Good morning Signor Galilei," they chorused in unison. "We are . . ."

"Don't tell me, let me guess," interrupted the scientist. "The Mars Brothers?"

"In the flesh, more or less," leered the green one in the middle, brandishing a cigar. "I'm Sloncho. Sorry about the accident. We seem to have knocked off a Pisa the Tower."

"Good for the tourist trade," Galileo smiled.

"Now for business," went on Sloncho. "The boys upstairs are fascinated with your radar.* They sent us down here to find out how you make it work without Bomac tubes."

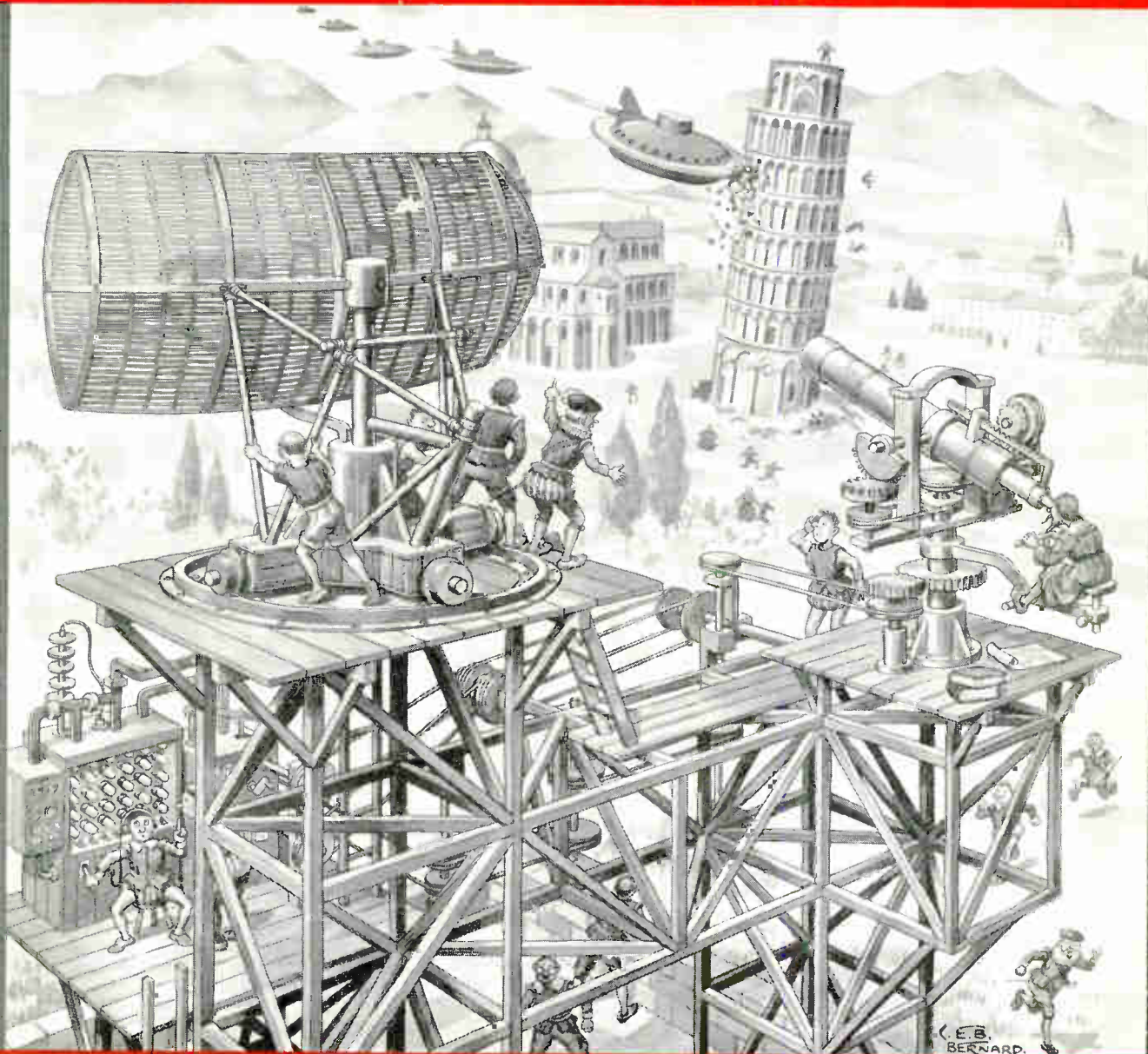
"I'm sorry to say it doesn't work at all," Galileo answered. "Or rather — it didn't, until the instant your ship hit the tower."

Sloncho's cigar was a quiver with excitement. "What happened then?" he asked.

"See for yourself," Galileo said, pointing a bony finger at the radar console. There, blinking crazily, like so many overstimulated lightning bugs, the tubes were actually spelling out a single, sure-enough word.

The word was "TILT."

No. 13 of a series . . . BOMAC LOOKS AT RADAR THROUGH THE AGES



* Bomac makes the finest microwave tubes and components this side of the leaning tower.

Bomac

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Seven Feet, Beverly, Massachusetts

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RCA DRIFT Transistors offer low feedback capacitance and exceptional uniformity of characteristics, making feasible the design of circuits having:

- high input-circuit efficiency
- good signal-to-noise ratio
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- excellent high-frequency operating stability.

RCA DRIFT types—2N373, 2N374, 2N544, feature a fourth lead, connected to the case internally, to minimize interlead capacitance and reduce coupling to adjacent circuit components. For additional information, contact your RCA Field Representative. For a description of the DRIFT principle, and for technical data on other RCA Semiconductor Devices, write RCA Commercial Engineering, Section F-107-NN, Somerville, N. J.



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