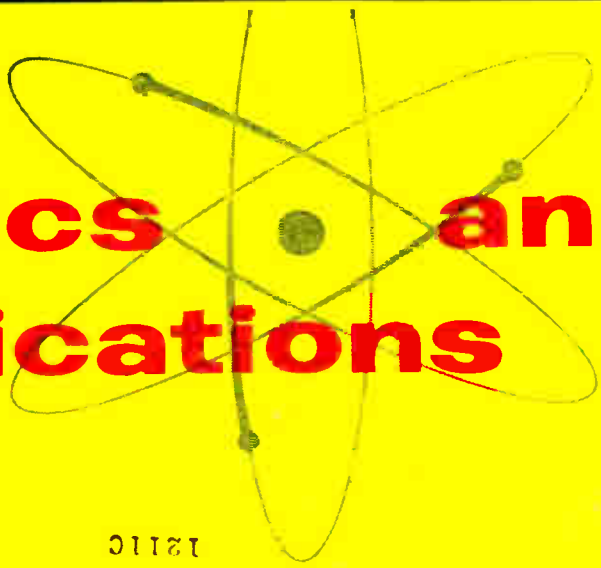


*components  
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material*

# electronic *product* preview

1960

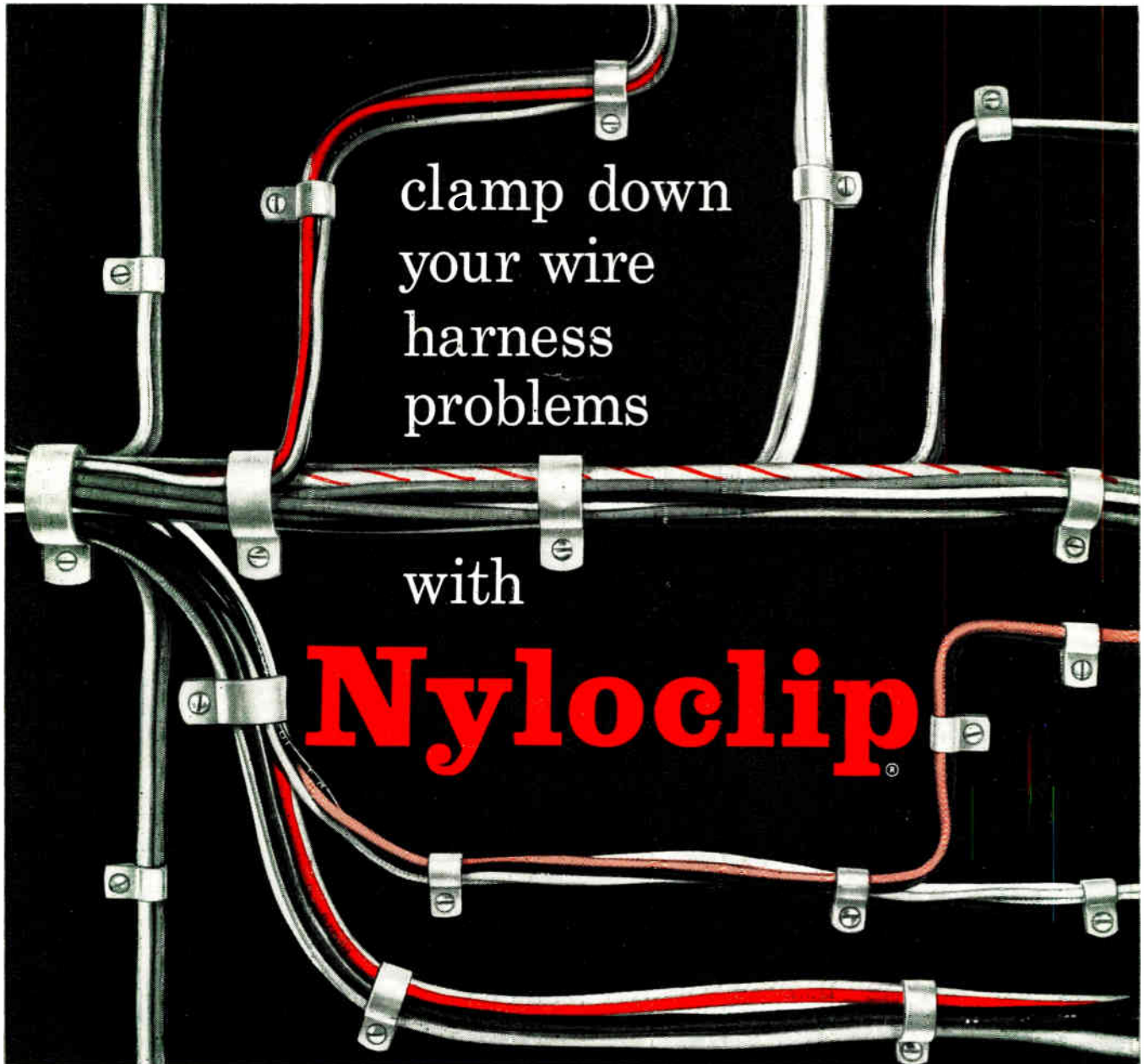
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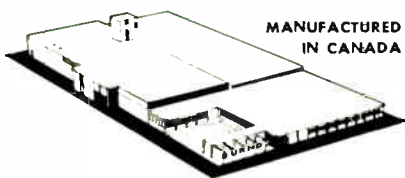
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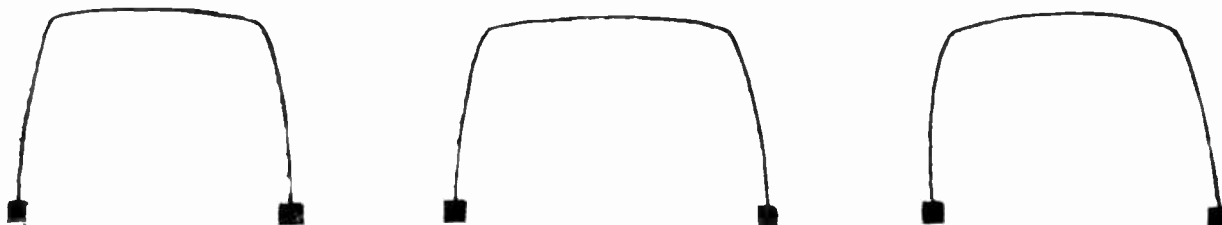
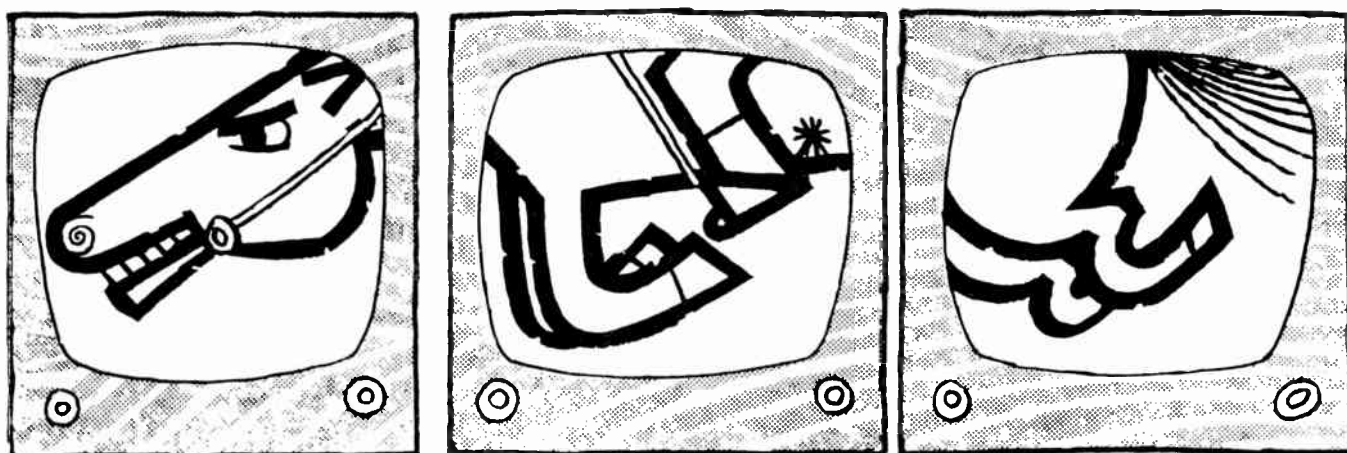
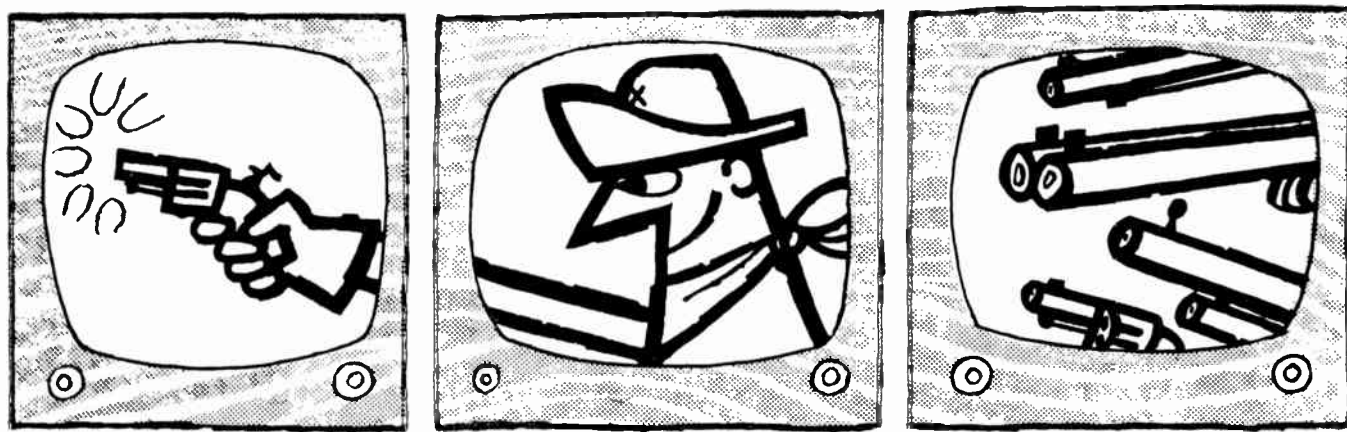
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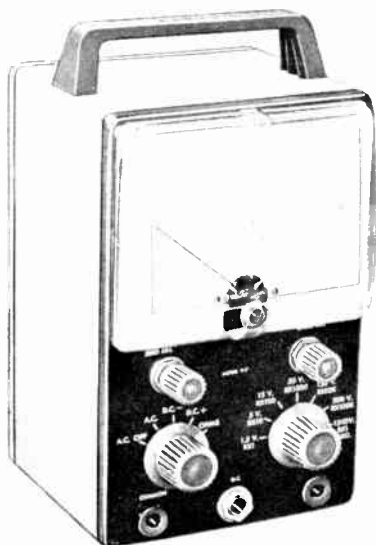
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## HEATHKIT VACUUM TUBE VOLTMETER

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No. 309C



## ETCHED CIRCUIT RF PROBE KIT

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*Advanced circuitry permits instrument improvement*  
By Max Schneiderman

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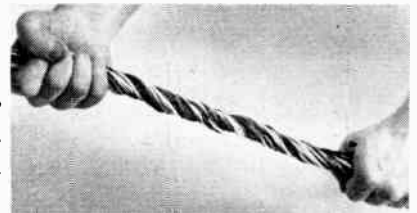
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Series: 1N91-93 1N151-153, 1N158, 1N315 1N368

Series 1N91-93, 1N93 Alloyed-junction types combining very low forward resistance with high back resistance to give almost 100% efficiency. 1N151-153, 1N158—Single- and two-fin versions of 1N91-93 series cells. 1N315—Designed for high operating temp. (to 85 °C.) and low reverse current. 1N368—Features a very low reverse current at a high d-c reverse voltage. For magnetic-amplifier applications.

## SILICON LOW CURRENT

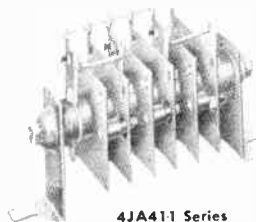


Series: 1N536-540, 1N547, 1N560-561, 1N1095-1096, 1N440(B)-445(B), 1N1100-1103, 1N1487-1492, 1N599(A)-606(A), 1N1692-1695.

Series: 1N536-540, 1N547, 1N1095-96 Provide maximum forward conductance at high operating temperatures (165°C.). 1N440-445, 1N440B-445B—Similar to 1N536-540 series, but with extremely low reverse current. Ideal for magnetic-amplifier applications. 1N1100-1103—Similar to 1N440B-445B series. 1N1487-1492 Essentially the same as 1N536-540 series, except provides lower-cost units for lower-temperature requirements (140°C.). 1N599-606, 1N599A-606A—Similar to 1N536-540 and 1N440B-445B series, respectively, except for somewhat lower forward-current ratings. 1N1692-1695—Provides lower current and temperature operation (115°C.) than any of above series—very economical.

Series: 1N1115-1120, 1N253-256, 1N550-555, 1N332-349, 1N607(A)-614(A), 1N562-563

Series: 1N1115-1120—Available for stud mounting direct to chassis, or finned. Similar, in characteristics, to 1N536-540 lead-mounted series. Provide maximum forward conductance at high operating temperatures. 1N253-256—High power-handling ability. Primarily for power supply and magnetic-amplifier applications. Type 1N256 meets JAN spec. 1N550-555—Similar to 1N440B series, except for stud mounting. Extremely low reverse current, particularly suited for magnetic-amplifier applications. 1N332-349—Industry-popular series. For applications requiring high reliability at moderate currents operating up to 170 °C. 1N607-614, 1N607A-614A—Another widely-used industrial line. Ideal for applications requiring high currents at up to 150°C.



4JA411 Series

4JA411 Stacks: Combine high temperature operation (up to 150°C.) with increased ratings (up to 18 amps d-c). Hundreds of stack combinations to meet a variety of circuit conditions. High efficiency plus excellent regulation.

## GERMANIUM MEDIUM CURRENT



Single-fin Mounting

4JA3011 Series

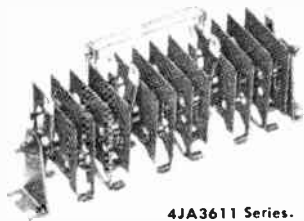
4JA3011 Series: For general-purpose power supplies, control devices, blocking circuits, and many other applications. Extremely low power dissipation and forward voltage drop provide excellent regulation and efficiency. Available in stacks up to 12 fins, providing ratings in thousands of watts, depending upon the circuit design, with operation to 85 °C. Also, available in single-fin mounting. Transient PIV's up to 600 volts per cell.

## SILICON MEDIUM CURRENT

Series: 1N2154-2160



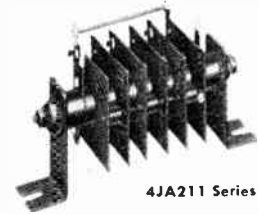
1N2154-2160 Series: First series of silicon medium current rectifiers to be made free from thermal fatigue. Designed for individual cell applications in the 2-to-25 amp range. High junction-temperature ratings. Extremely low forward voltage drop and thermal impedance. May be mounted directly, or electrically insulated from heat sink with mica-washer mounting kit provided with each unit.



4JA3611 Series.

4JA3611 Stacks: Provide a wide-range of power applications with d-c outputs up to 65 amps.

## GERMANIUM STACKS



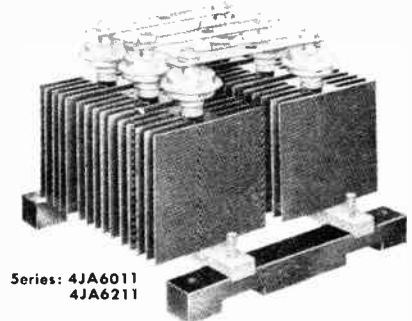
4JA211 Series.

4JA211 Stacks: The industry's most widely-used semiconductor rectifier series. Hundreds of thousands in use. May be arranged in stacks up to 12 fins to produce more than 160 various circuit configurations. Small, lightweight, excellent regulation.

## SILICON HIGH CURRENT



Series: 4JA60, 4JA61, 4JA62, 4JA63



Series: 4JA6011, 4JA6211

4JA60, 4JA61, 4JA62, 4JA63 Series: Large-area junction stud-mounted rectifiers. Operating temperatures to 200°C. D-c outputs as high as 85 amps per rectifying element. Lower-cost 4JA62, 4JA63 units are for applications which do not require the full-current ratings of 4JA60 line. Reverse polarities provided in 4JA61 and 4JA63 units. 4JA6011, 4JA6211 Stacks: Hundreds of combinations available in various circuit configurations. D-c outputs up to 573 amps. The 4JA6211 series for lower-current, lower-cost operation.

## SILICON CONTROLLED RECTIFIER

### CONTROLLED RECTIFIER RATING CHART

G-E Type No.	PIV* and V <sub>BO</sub>	Max. I <sub>DC</sub> at Temp. °C.	Max. Temp. °C.		Max. Reg'd Gate Signal
			Oper.	Storage	
C35U	25	Up to 16A at 87°C. stud	125	150	3V, 40ma at 25°C.
C35F	50	Up to 16A at 87°C. stud	125	150	3V, 40ma at 25°C.
C35A	100	Up to 16A at 87°C. stud	125	150	3V, 40ma at 25°C.
C35G	150	Up to 16A at 87°C. stud	125	150	3V, 40ma at 25°C.
C35B	200	Up to 16A at 87°C. stud	125	150	3V, 40ma at 25°C.
C35H	250	Up to 16A at 87°C. stud	125	150	3V, 40ma at 25°C.
C35C	300	Up to 16A at 87°C. stud	125	150	3V, 40ma at 25°C.
C35D	400	Up to 16A at 87°C. stud	125	150	3V, 40ma at 25°C.

\*Max. PIV and Min. V<sub>BO</sub>.



Series: C35 C36

C35 Series: Revolutionary silicon control device introduced by General Electric. Can do jobs of thyratrons, ignitrons, magnetic amplifiers, power transistors, relays, switches, contactors, circuit breakers, in many power-control and power-switching applications. Medium-current C35 series provides blocking voltages to 400V and load currents to 16 amperes. Low-temperature, lower-cost C36 series also available. Provides blocking voltages to 400V and load currents to 10 amperes. High-current, developmental-type ZJ50 series is now available on a prototype-sample basis.

FOR ADDITIONAL INFORMATION on G-E Semiconductors, or the name of your nearest G E authorized distributor, write or contact Canadian General Electric, 189 Dufferin Street, Toronto.



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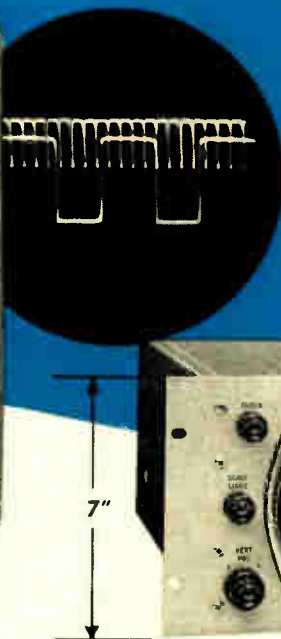
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ELECTRONICS AND COMMUNICATIONS, February, 1960

# AT LAST! A Precision 200 KC Scope with Dual Trace Presentation!



NEW MODEL 122A



Here at last is a 200 KC oscilloscope—priced at just \$625—giving you “big-scope” versatility and the time-saving convenience of simultaneous two-phenomena presentation.

Engineered to speed industrial, mechanical, medical and geophysical measurements in the 200 KC range, the new  $\odot$  122A has two identical vertical amplifiers and a vertical function selector.

*The amplifiers may be operated independently, differentially on all ranges, alternately on successive sweeps, or chopped at a 40 KC rate.*

Other significant features include universal optimum automatic triggering, high maximum sensitivity of 10 mv/cm, 15 calibrated sweeps with vernier, sweep accuracy of  $\pm 5\%$  and a “times-5” expansion giving maximum speed of 1  $\mu$ sec/cm on the 5  $\mu$ sec/cm range. Trace normally runs free, syncing automatically on 0.5 cm vertical deflection, but a knob adjustment eliminates free-run and sets trigger level as desired between  $-10$  and  $+10$  volts. Rack or cabinet mount; rack mount model only 7” high.

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**Sweep:** 15 calibrated sweeps, 1-2-5 sequence, 5  $\mu$ sec/cm to 0.2 sec/cm, accuracy  $\pm 5\%$ . “Times-5” expander, all ranges. Vernier extends 0.2 sec/cm range to 0.5 sec/cm.

**Trigger selector:** Internal + or -, external or line. Triggers automatically on 0.5 cm internal or 2.5 v peak external. Displays base line in absence of signal. Trigger level selection  $-10$  to  $+10$  v available when automatic trigger defeated.

**Vertical Amplifiers:** Identical A and B amplifiers, 4 calibrated sensitivities of 10 mv/cm, 100 mv/cm, 1 v/cm and 10 v/cm;  $\pm 5\%$  accuracy. Vernier 10 to 1. Balanced (differential) input available on all input ranges. With dual trace, balanced input on 10 mv/cm range. Input impedance 1 megohm with less than 60  $\mu$ mf shunt. Bandwidth DC to 200 KC or 2 cps to 200 KC when AC coupled. Internal amplitude calibrator provided.

**Function Selector:** A only, B only, B-A, Alternate and Chopped (at approx. 40 KC).

**Horizontal Amplifier:** 3 calibrated sensitivities, 0.1 v/cm, 1 v/cm, 10 v/cm. Accuracy  $\pm 5\%$ . Vernier 10 to 1.

Bandwidth DC to 200 KC or 2 cps to 200 KC, AC coupled.

**General:** 5AQP1 CRT, intensity modulation terminals at rear, power input approximately 150 watts, all DC power supplies regulated.

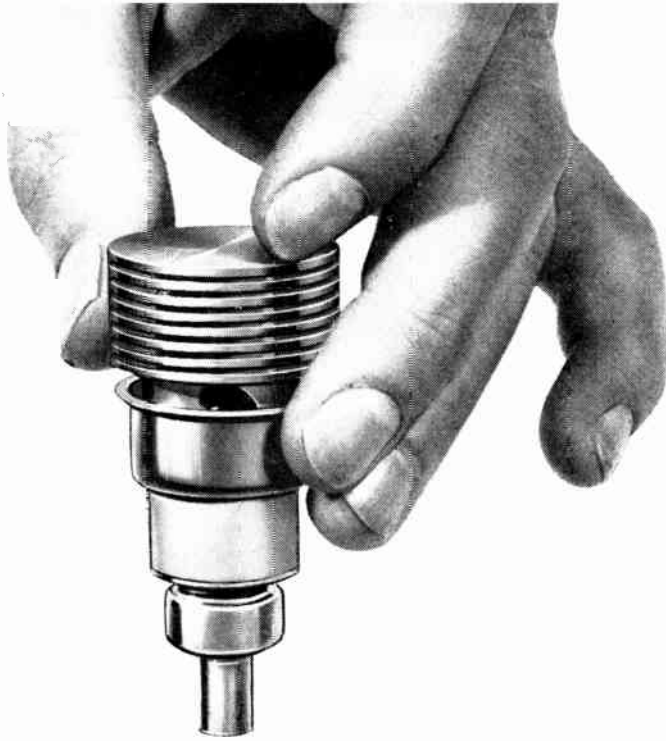
**Price:** (Cabinet or rack mount) \$625.00.

Data subject to change without notice. Prices f.o.b. factory.

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The Marconi DQ58B is a long haul line-of-sight relay equipment with a tuning range of 1700 to 2400 Mcs.

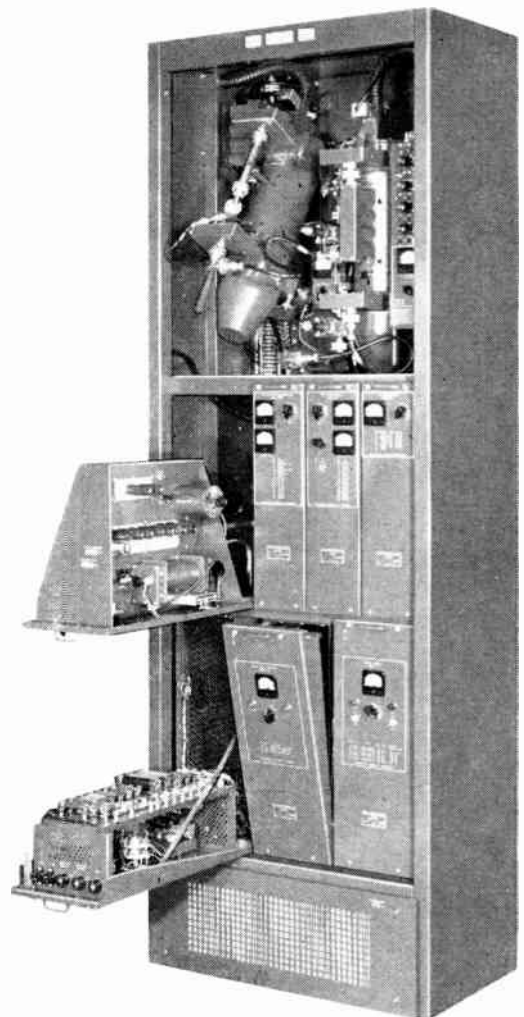
In the design of this new equipment the Canadian Marconi Company had taken every precaution to ensure utmost reliability and easy maintenance so vitally necessary in such systems as the large Canadian air defence network. The reliability and easy maintenance of the DQ58B now offer the common carrier and telephone authorities a modern and proven means for long haul toll quality telecommunications.

Among the many high quality components used are, two Eimac type 3CX100A5 Triodes per set, as quadruple frequency multipliers.

These triodes are planar premium quality ceramic type and withstand extraordinary thermal and physical shock. They feature long life and consequently lowest cost per operating hour of any 2C39 type tube. The long pulse cathode evaluation test guarantees electrical uniformity as well as longevity.

The 3CX100A5 is available in quantity today for new designs and replacements. It is unilaterally inter-changeable in nearly all cases with the 2C39A and supersedes the 2C39B. The Canadian Marconi designers have made the right choice—have you?

Call or write for full information.



Six hundred simultaneous toll-quality telephone channels are ready to carry vital defense data in an emergency, thanks to the Marconi new DQ58B equipment shown here. It was chosen for a large military system after careful evaluation by the Royal Canadian Air Force.



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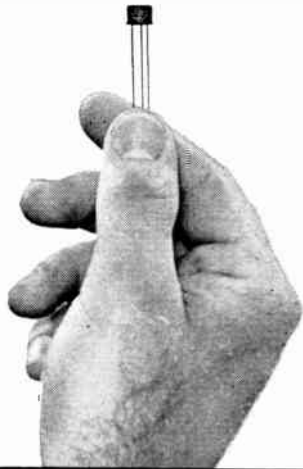
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## EIA REPORT by Basil Jackson

"For the long pull, there is only one way your business can go, and that is up," said F. W. Radcliffe, General Manager of the Electronic Industries Association of Canada, in an address to the Quebec Radio-Television Distributors Association in Montreal.

Mr. Radcliffe's optimism for the electronics industry and for the distributors and retailers in it was prompted by an industry leader's statement that more than 80 per cent of the current business in the industry was due to the production and sales of products and services which did not even exist commercially ten years ago. With research and development always progressing, in another ten years, regardless of the size of the industry, he believed a comparable percentage of the volume would be attributable to products not now on the market.

The speaker also mentioned that whenever a new product was introduced by the electronics industry, history showed that the existing products did not become obsolete.

"Radio did not replace the record business in the 1920's," said Mr. Radcliffe. "The record business has probably never been better and the quality of the product has been greatly improved by electronic advances. The advent of television in the late 1940's did not replace the radio business. Radio sales increased in 1959 while television sales decreased slightly. Radio development has been helped by television techniques in improved quality, lower production costs and now offers better value than ever. This industry, therefore has had the happy experience of having its products pyramid and improved rather than being displaced by new products. This has made a substantial contribution to higher production and sales at all levels."

Mr. Radcliffe mentioned the serious situation in the radio segment of the industry due to importation of radios, particularly from countries having low-wage rates.

"Many Canadian manufacturers now believe the best way to meet this situation is to concentrate on producing transistorized personal sets which would equal or outperform and offer better value than the products from countries having low-wage labor rates. Two manufacturers have already taken such action, and it is reasonable to predict that others will take similar steps."

In dealing with the prospects for the industry in 1960, the speaker said that television sales would improve. The replacement market will slowly make itself felt and it was expected that there would be a continuation of last year's upgrading of products. Radio would continue to increase in total demand as more homes were built, more family units formed and more cars sold. FM radio should encounter a substantial increase again due to the introduction of better music through various media.

"Stereophonic radio is certainly on its way," said Mr. Radcliffe. "When standards are established, it will see the regular operation of both AM and FM stereo radio stations. Then the stereo radio receivers will really sell. We will have something new and improved to offer to complement the seven and three-quarter million radio receivers now estimated to be in use in Canada."

In looking further into the future, the EIA General Manager mentioned some of the products and services which will come into existence and increase the volume and range of the electronic merchandiser. He mentioned the advent of color television which depended upon progress being made in Canada in color telecasting. Also, micro-miniaturization of components and circuits, now largely developed for military purposes, would hold tremendous possibilities for future use in consumer products. Flat-screen television was already in the laboratory stages and it would eventually open up another expansion of the home television market. World-wide television would be a real possibility by relaying programs from earth satellites.

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### TOBIAS JENSEN Capacity Standards for Computer and Laboratory Work

Capacity range: 0.01 Mfd to 1.0 Mfd.

Capacity tolerance: ± 0.1%, 0.25%, 0.5% and 1.0%.

Working voltage: 100VDC or 200VDC.

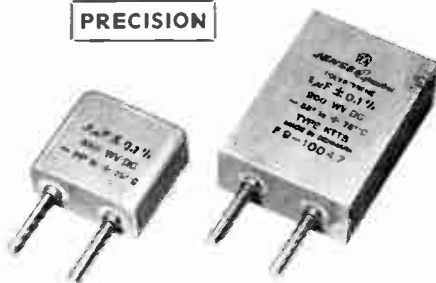
Temperature coefficient of capacity: Neg. 100 p.p.m.

Insulations resistance minimum 500,000 Meg ohms/Mfd.

Q : 2500 minimum.

Request Engineering Bulletin KTTS.

PRECISION



BE SWITCHED BETTER

Maximum dependability — minimum size and cost.

2 — 12 keys with 6-pole double throw.

Depth 1 7/8" — width 1 1/8" per key — height 3/4".

Low Loss insulation.

Inter-section shielding available.

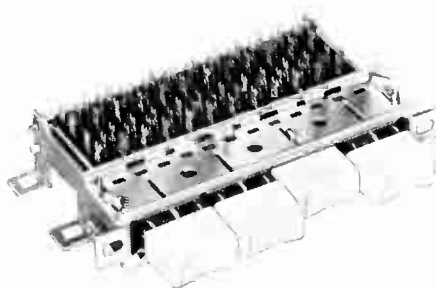
Standard solder lugs or "specials" for printed circuit.

2-p.s.t. Power switch available.

Type OEA unit shown in sample lots \$2.40 ea. S.T.I.

Many special OE variations available in quantity.

OE surpasses other switches in its price range.



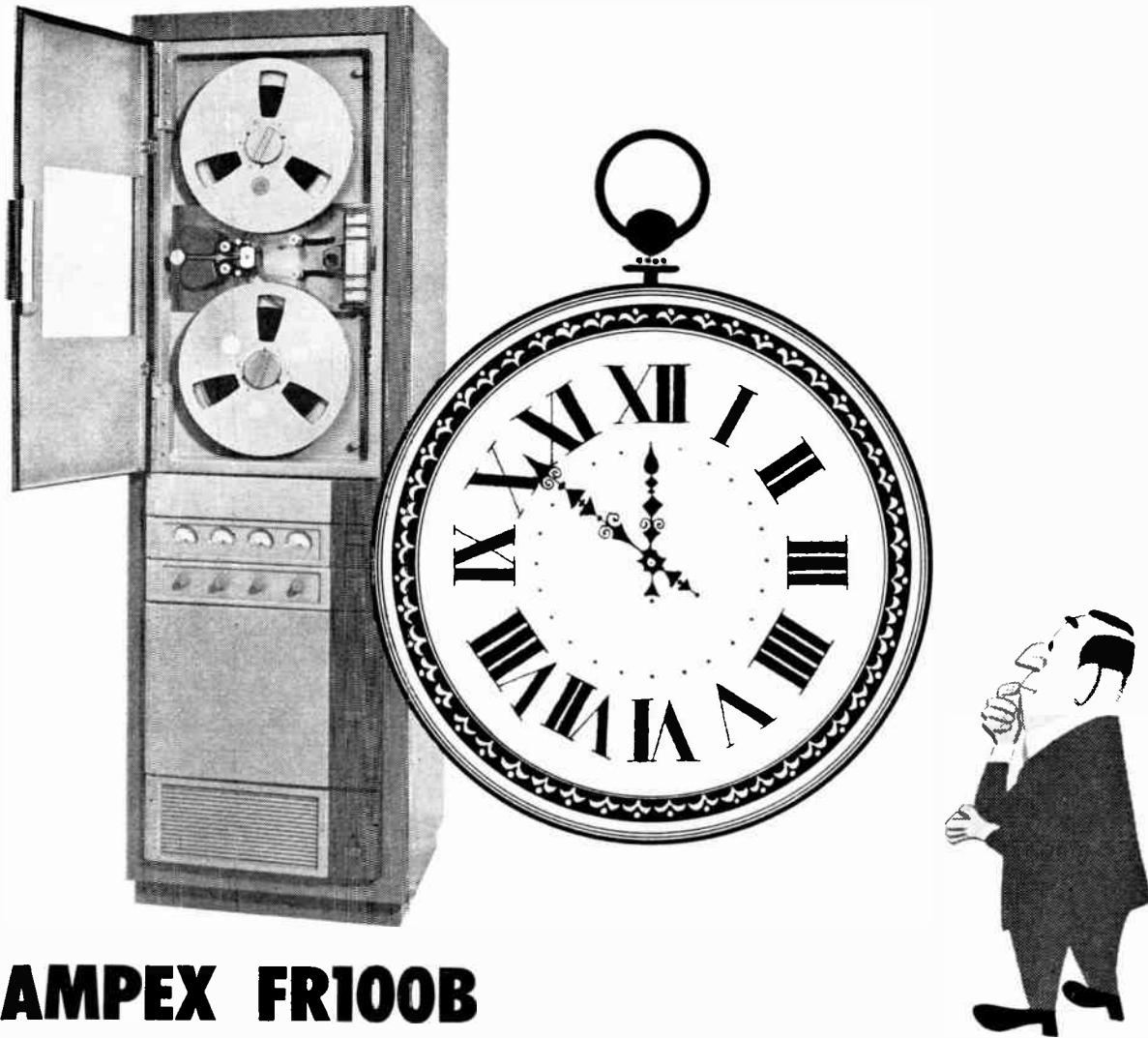
BY TOROTOR

# Associated Electronic Components Ltd.

37 ROSELAWN AVE., TORONTO 12, ONT.

For complete details check No. 8 on handy card, page 83





# AMPEX FR100B

## magnetic tape recorder gives you a 5-minute hour • or a 300-second minute

*The FR100B is the workhorse of the laboratory, with versatile time base expansion and compression which enables you to accommodate any speed for accurate data storage.*

*It presents your data in "live" electrical form that allows an unlimited variety of techniques for read-out, analysis and control-signal use. For example, it permits you to re-run costly, often unrepeatable test procedures, thousands of times.*

*The FR100B is a third generation machine, backed by more than 12 years of Ampex experience in manufacturing thousands of individual pieces of magnetic tape recording equipment. It features a plug-in modular design, with interchangeable plug-in amplifiers, which allows accessibility of all electronic components and sub-assemblies.*

*All tape guiding elements are referenced to a precision plate casting. A single equipment can record up to 14 tracks of direct FM or PDM data, or up to 32 tracks of serial or parallel digital data.*

*The standard equipment offers six speeds ranging from 60 to 1 7/8 ips, electrically switchable in two overlapping ranges using a four position switch and unique speed range dial. Broader speed ranges can be incorporated into the tape transport as required.*

*Write or phone for an illustrated brochure and specifications on the FR100B, or technical assistance with any data storage problem.*

AMPEX

**AMPEX OF CANADA LTD. / Instrumentation Division**

607A COMMONWEALTH BUILDING, OTTAWA, ONTARIO •

CEntral 6-9763

## The Industry's Business



Signing a contract for Canadian distribution and servicing of telecast equipment manufactured by the E.M.I. Electronics Limited of Hayes, England is R. M. Robinson, vice-president of Canadian General Electric Company Limited. Representing E.M.I. at the signing were K. E. Owens (seated left), manager of its Broadcast Equipment Division, and the firm's Montreal representative, Peter Macfarlane (seated right). Canadian General Electric Broadcast Sales Manager, C. E. Spence (standing left), and H. E. J. Holloway—CGE Product Planner—look on.

## Canadian IRE to skip Toronto show for 1960

The fifth Institute of Radio Engineers' Canadian Convention and Exposition will be held in Toronto in October 1961, Fred Heath, Chairman, IRE Convention Committee, announced recently.

Postponement for a year will pave the way for an expanded Technical Program and increased industry participation in an exposition featuring more new electronic and nucleonic developments, he stated.

The decision to hold the fifth IRE Canadian Convention in 1961 instead of 1960 followed a study of replies to questionnaires sent to previous exhibitors and a meeting in Toronto of IRE and Electronic Industries Association officials. A contributing factor, cited by A. P. Barclay, Director IRE Canadian Region, was a lack of unanimity among exhibitors on the wisdom of holding a 1960 Convention. Eighty-four of 134 exhibitors who returned questionnaires were in favor but a stronger showing was considered necessary to guarantee success of a 1960 meeting, Mr. Barclay stated.

Another factor in the decision was the conflict of dates with the National Electronics Convention in Chicago. This could not be avoided in 1960.

Thirty-two of the exhibitors thought the place of the conventions should alternate between Toronto and Montreal but a substantial proportion of the remaining respondents recognized the problem of finding a suitable

## CGE and EMI announce marketing arrangement

Two of the leading manufacturers of radio and television broadcast equipment have announced a marketing arrangement that will make available to the Canadian telecaster British equipment of the most up-to-date design.

The announcement was made jointly by R. M. Robinson, vice-president of the Canadian General Electric Company Limited and general manager of its Electronic Equipment and Tube Department, and K. E. Owens, manager of the broadcast equipment division of EMI Electronics Limited of Hayes, Middlesex, England.

The EMI telecasting equipment will be distributed and serviced in Canada by Canadian General Electric to supplement its existing line of broadcast equipment.

The new arrangement is expected to greatly strengthen the British company's export of broadcast equipment to the fast expanding Canadian market.

location in the latter city for a Convention of this magnitude.

In making the announcement, Mr. Heath said that the appointment of the Convention Committee responsible for organizing the 1961 Canadian Convention would be announced shortly. With 18, instead of nine months for planning, the Committee should be able to arrange for more participation by scientific agencies of overseas governments and for a convention of still greater interest and significance for all delegates and visitors, he said.

## D&P Contracts Awarded

Following is a list of unclassified defense contracts awarded to Canadian firms by the Department of Defense Production during the period November 16-30, 1959, that are \$10,000 or over and have reference to the electronics industry in Canada.

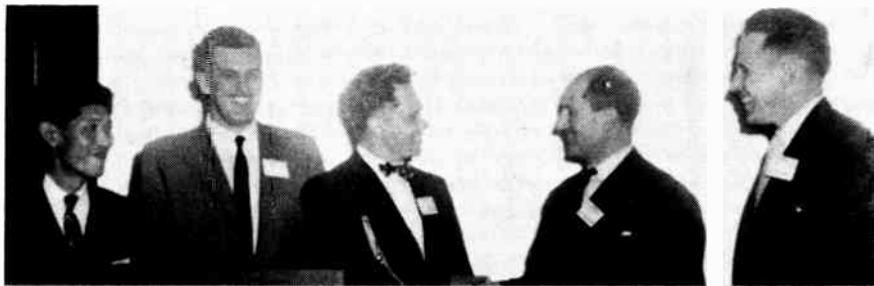
Ahearn & Soper Co. Ltd., Ottawa, Ont., radiac equipment, \$56,232; Alpha Aracon Radio Co. Ltd., Downsview, Ont., electronic tubes, \$18,365; Aviation Electric Ltd., Montreal, Que., accelerometers, \$35,000; Cannon Electric Canada Ltd., Toronto, electrical connector assemblies, \$18,069; Fleet Manufacturing Ltd., Fort Erie, Ont., repair of sonar domes, \$17,508; Northern Electric Co. Ltd., Ottawa, spares for teletypewriters, \$11,703; Philips Electronics Industries Ltd., Toronto, liquid nitrogen generator, \$13,800; RCA Victor Co. Ltd.,

Montreal, electronic tubes, \$23,291; Redifon Canada, Montreal, installation and testing of action speed tactical teacher, \$74,257; R-O-R Associates Ltd., Don Mills, electronic equipment, \$12,735; Sperry Gyroscope Co. of Canada Ltd., Montreal, electronic tubes, \$19,324, aircraft navigational equipment totalling \$275,392; Sylvania Electric (Canada) Ltd., Montreal, electronic tubes, \$10,840; Technical Enterprises Ltd., Toronto, electronic components, \$10,945.

## The Industry's Business

### A. P. H. Barclay at NEREM session

D. B. Sinclair (center), General Radio Company vice-president and director, who served as chairman of the recent international session at NEREM in Boston, is shown being congratulated in the accompanying picture by panel member R. Aubert of the Compagnie Generale Telegraphie Sans Fils, Paris, France, upon presentation of a report on his recent trip to Budapest, Hungary, where he attended a Colloquium on Microwave Communication, at the invitation of the Hungarian



Academy of Sciences. Looking on are other panel members (left to right): T. Isobe, University of Tokyo; A. P. H. Barclay, Philips Electronic Industries, Ltd., Toronto, Canada; and C. H.

Zierdt, Jr., General Electric Company, Syracuse, N.Y. The session featured progress reports on electronic developments in France, Japan, Canada, Russia and Hungary.

### G.E. sponsors Toronto seminar to facilitate defense sharing

Considered to be one of the most progressive steps yet taken by any firm in complementing the defense sharing agreement between Canada and the United States was a recent seminar sponsored by the General Electric Company of the United States. The seminar held in the Royal York Hotel, Toronto, on January 11 and 12 was for the purpose of placing before Canadian electronic manufacturers first hand knowledge of the many components that are available for manufacture to Canadian firms under the defense sharing agreement.

An estimated 131 people representing management and engineering from 61 Canadian electronic manufacturing firms attended the seminar to examine plans, specifications and actual components open for competitive bidding

to Canadian companies.

In attendance at the seminar to discuss the manufacture of such material with the Canadian businessmen were purchasing officials, quality control personnel and engineers from GE's Defense Systems Department, Heavy Military Electronics Department, Missile and Space Vehicle Department, Ordnance Department, Light Military Electronics Department and Purchasing Services.

In addition to the exchange of first hand knowledge of the many components exhibited at the seminar the occasion provided the means for Canadian businessmen to acquaint themselves with responsible personnel of GE in the United States to whom future enquiries regarding defense sharing may be addressed.

### Acoustica rep for Eastern Canada

Acoustica Associates, Inc., manufacturers of ultrasonic cleaning systems, with plants at Plainview, L.I., N.Y., and Los Angeles, has recently appointed five district representatives.

The representative for the North-eastern district, which covers New England, New York State and Eastern Canada, is Maurice Howell.

### Electro Sonic appointment

Stark Electronic Sales Company of Ajax, Ontario, announces the appointment of Electro Sonic Supply Company Limited, 543 Yonge Street, Toronto, as distributors of the Stark Gold Brand line of meters.

The territory covered in this arrangement is Metropolitan Toronto, through to Brockville and Ottawa, as well as the City of Hamilton.

### Mathias Klein appoints Western Canada rep

Mathias Klein & Sons, Chicago, Ill., manufacturer of pliers and equipment for linemen and electricians, has announced the appointment of F. D. Bolton, Ltd., of Winnipeg, Edmonton and Vancouver, as manufacturer's sales representative for the complete Klein line in Canada from the Lake Head west. This appointment became effective January 2, 1960.

### W. M. Hummel to rep for Marsland

As previously announced, William M. Hummel has renamed his sales agency Prime Electronic Components Ltd., and his office is at 868 Dundas Highway East, Dixie, Ontario.

Mr. Hummel reports that he has relinquished his representation of Bradford Components, Inc., of Sala-

### Union Carbide Canada university awards

Sixty-four Canadian university students will receive approximately \$45,000 in scholarships and fellowships during 1960 from Union Carbide Canada Limited, according to A. A. Cumming, company president.

Although the grants are under the sponsorship of Union Carbide, the selection of students and the administration of the program is entirely the responsibility of the universities.

The purpose of the scholarship program is to assist deserving students interested in a business career, to obtain a university education and to assure a larger number of university trained men and women for future executive and administrative careers in business and industry.

Pure science and engineering are the major courses being pursued by Union Carbide scholars this year.

manca, N.Y., and has taken on another account, namely, Marsland Engineering Limited, of 154 Victoria Street South, Kitchener, Ontario.

### Filtors, Inc. signs Canadian licensee

Lloyd Aspinwall, president of Filtors, Inc., announces that its licensee in Canada, Marsland Engineering Company, is now in volume production of Filtors' relays under the terms of a license agreement signed some time ago. The Filtors Division of Marsland Engineering Company will make the complete line of Filtors' relays and will sell them in Canada, Great Britain and other "soft money" nations.



## Students Speak Up

On Thursday, February 18, 1960, four students from the Ryerson Institute of Technology and the University of Toronto will participate in the annual competition for student speakers at a joint meeting of the Toronto Sections of the American Institute of Electrical Engineers and the Institute of Radio Engineers. Prizes will be awarded the three best speakers chosen by a panel of judges.

The speaker's ability will be judged not only on the technical content of his paper but also on his ability to communicate intelligibly the contents of his paper to the audience.

This meeting will be held at Cody Hall, 50 St. George St., Toronto.

## First link completed in Maritimes microwave network

The first section of a new \$4 million microwave communications system covering the provinces of New Brunswick and Nova Scotia, was officially opened recently.



## CDC awarded sizeable order

Award of a contract to develop and manufacture an advanced automatic dead reckoning navigation system for the new RCAF CF-104G fighters to Computing Devices of Canada Limited was announced recently by C. F. Hembery, CDC president.

To be known as the Position and Homing Indicator Mk. 5 (PHI 5), the system will be similar to that already in production by the Ottawa firm for the West German Air Force. The order calls for in excess of 200 units,

with a total value of about \$4 million, Mr. Hembery stated.

Reviewing the history of the PHI, Mr. Hembery explained that it was originally developed for the RCAF, and the first prototype was test flown in 1952. "The PHI is entirely a Canadian concept and achievement," said Mr. Hembery, "and I would like to pay tribute to the foresight of the RCAF and the Department of Defense Production in sponsoring the advanced development of dead reckoning navigation equipment in Canada."

## Central Dynamics equipment order

Central Dynamics Ltd. announces receipt of an order from the Quebec Hydro Electric Commission for an automatic Data Logger for their Charland Substation.

Central Dynamics is the first Canadian company to design and completely manufacture this type of equipment in Canada.

The completed section extends from Saint John to Moncton, N.B., a distance of some 100 miles. When other links are completed from Saint John to Halifax and Sydney, N.S., and from Moncton north to Campbellton, the microwave network will stretch a distance of approximately 1,000 miles.

It is expected the system will be completed and in operation by early 1961.

## R.O.R. to handle Varian products

Varian Associates of Canada Ltd. announce that R-O-R Associates have been appointed the Canadian Representative on all Varian Associates of Canada Ltd. products. They feel that they can now offer improved customer liaison and service.

R-O-R Associates are already representing our affiliate Bomac Laboratories Inc., Subsidiary of Varian Associates, Palo Alto.

*Repeater station and antenna tower located at Scotch Mountain, some 30 miles out of Saint John, N.B., is one of several built for the Saint John-Moncton section of the new C.G.E. built Maritimes microwave communications system. At right are New Brunswick Telephone Co. chief engineer G. E. Graham (left) and executive vice-president K. V. Cox.*

## New Maritime location for Pye

Sales offices and service depots of Pye Canada Limited have been moved to new locations in Halifax, N.S. and Moncton, N.B. According to A. J. Capstick, general manager, these moves have been made in order to provide better services for Pye's many customers in the Maritimes.

The Halifax office is located in the Bayers Road Shopping Center, on Desmond Avenue. In Moncton, the address is Pacific Avenue between 9th and 10th Streets (near the Moncton Stadium).

## Glendon Instrument Co. moves to Scarborough

The Glendon Instrument Company Ltd., formerly at 44 Wellington St. East, Toronto, has moved to 46 Crockford Boulevard, Scarborough, Ontario.

The Glendon Instrument Company represents the following companies: Electronic Instruments Ltd., Richmond, Surrey, England; Evans Electro-selenium Ltd., Halstead, Essex, England; Wayne Kerr Laboratories Ltd., Chessington, Surrey, England; Croydon Precision Instruments Ltd., West Croydon, Surrey, England; and Servomex Controls Ltd., Crowborough Hill, Jarvis Brook, Sussex, England.

## Pointon represents Sterling

Charles W. Pointon Limited have announced their appointment as Canadian Sales representatives for Sterling Precision Inc., Instrument Division, Port Washington, New York, manufacturers of a complete line of standard precision electro-mechanical servo components. Sterling's component line is comprised of over 20,000 stock electronic, mechanical and electro-mechanical items essential to the electronic industry. For further information and a copy of the comprehensive Sterling catalog, write the Pointon organization at 66 Racine Road, Rexdale, Ontario.

# Industry Personnel

## Re-elections at Sparton of Canada

Year-end re-elections and new appointments of personnel at Sparton of Canada were announced on January 4 by John J. Smith, chairman of the board, following the company's annual meeting.

Re-elected as officers along with Mr. Smith were G. A. Holmes, president, and Burwell Graham, vice-president in charge of engineering.

Messrs. Smith and Holmes were re-elected to the board of directors along with Harold M. Johnston and R. G. Ivey. A new director is C. V. Lyons.

Newly elected officers include Mr. Lyons, vice-president and treasurer; W. L. Page, vice-president of sales; and Kenneth R. Hollins, assistant secretary and assistant treasurer.

## Astral Electric names rep

P. B. Gooderham, general manager, Astral Electric Co. Ltd., has recently announced the appointment of Jack Bastow as western sales representative, in their program of expansion.



J. Bastow

Mr. Bastow was formerly in charge of the hi-fidelity component sales of J. J. H. McLean & Co., Ltd., Winnipeg.

Mr. Bastow will also be western sales representative for Astral's industrial lines including Belling & Lee Ltd., Dubilier Condenser Co., Ltd., Jones Stroud & Co. Ltd., Hellerman (Canada) Ltd., Ungar Electric Tool Co. of Canada. All of the Western Canada territory will be regularly serviced from the Vancouver office of the company.

## U.K. officer to Edmonton

James Potter, who is attached to the Toronto office of the United Kingdom Information Service, has been temporarily moved to Edmonton to act as Regional Information Officer there pending the arrival of a successor to the late James Thomson.

Mr. Potter has served the Toronto office for the past two and one half years.

## Caldwell appointment

President Spence Caldwell announced recently the appointment of Vice-President and Executive Pro-

ducer Sydney Banks to the Board of Directors of S. W. Caldwell Ltd.

With Caldwell's since 1954, Banks heads up the Company's Queensway Film Studio, laboratory, and closed-circuit staging divisions.

Following Caldwell's successful 1959 expansion of film production facilities into the industrial and documentary field, the appointment coincides with the establishment of a TV programming unit to produce new programs on film and video-tape.

## Assistant to Honeywell president

Norman K. Smith has been appointed to the position of assistant to the president of Honeywell Controls



Norman K. Smith

Ltd., announces W. H. Evans, president of Honeywell.

Mr. Smith joined Honeywell in 1946. He was appointed Calgary branch manager in 1948 and Montreal branch manager in 1952. Since

1953 he has been manager of the company's Eastern Region.

Mr. Smith is a native of Toronto and he studied electrical engineering at the University of Toronto.

## More trade for the Canadian electronics industry

J. A. Bourcier, managing director of The Newspaper Service Ltd. of Great Britain, undertook a goodwill trip to Canada recently to meet with leading bankers, financiers and industrialists. The field of leading firms covered by Mr. Bourcier was extensive and included meeting key personnel in many industries including scientific instruments and electronic engineering.

Mr. Bourcier described the purpose of his visit as fostering and improving Anglo-Canadian trade relations on both sides of the Atlantic. "The better known are the heads of Canadian companies in Britain, and vice versa," said Mr. Bourcier, "the more trade will result between our two countries."

## Wraps taken off Canadian gradiometer

The world's first airborne gravity gradiometer, a Canadian development, was recently unveiled at Calgary before the public and leading scientists from all over the world.

A classified instrument which is closely guarded, the gradiometer has already proved effective in hitherto unannounced major aerial surveys throughout North and South America and Africa.

The gravity gradiometer was developed in the Toronto research laboratory of Lundberg Explorations Ltd. who intend to operate it around the world.

The gravity gradiometer will be a vital aid in: (1) the search for essential oil, gas and minerals by providing fundamental gravity data revealing geological structure; and (2) the determination of the true shape of planet earth necessary for the navigation of nuclear submarines, intercontinental ballistic missiles, rockets and "space ships".

## STAG

The Annual Stag Night of the Toronto Section of the Institute of Radio Engineers will be held on Monday, March 7, 1960 at the Four Winds Dining Room.

Fred Davis, a well known CBC Television commentator will give his impressions of this modern medium of communication as well as describing a number of anecdotes from behind the scenes of television.

An invitation is extended to all members of IRE and their friends to come and enjoy a social evening with others in the field of radio and to hear an outstanding speaker.

Sandwiches and coffee will be served. Tickets are now available at \$2.50 each.

## Jerrold Electronics sales appointment

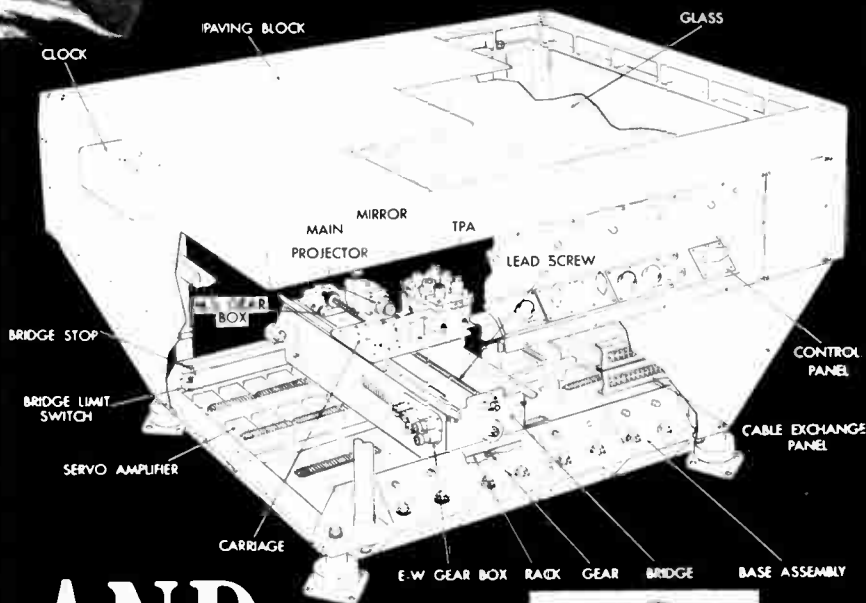


A. T. Keenan

A. E. Dworkin, general manager of Jerrold Electronics Canada Ltd., and Watkins Electronics Ltd. has announced the appointment of A. T. (Terry) Keenan to the Ontario sales division of these organizations.

Prior to this appointment Mr. Keenan was with Atlas Radio Corporation Ltd. He will continue to represent them in Northern Ontario.

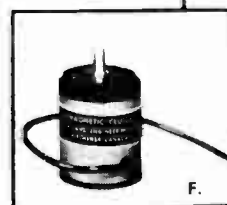
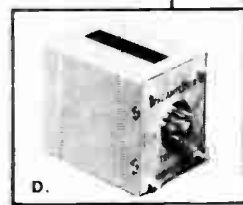
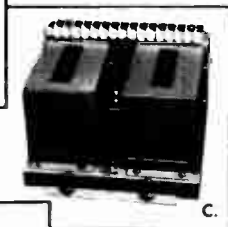
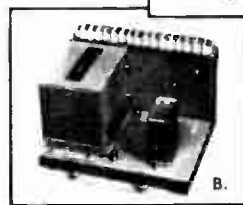
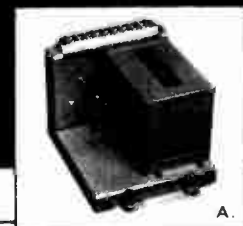
# A good name in SERVO SYSTEMS and COMPONENTS is MARSLAND



This precision electro-mechanical-optical computer, used to display the geographical position of a ship and its target satellites, is a current system design by Marsland. From a statement of requirement to a design concept, to a working prototype and to approved production assemblies, Marsland engineers servo-systems meeting the most rigid specifications.

Wide experience and comprehensive facilities enable Marsland to manufacture most of the various system components.

- A. Transistor Servo Amplifier, Mod. AM-103. *Application:* Single channel, 400 c. synchronous positioning servo loop. Up to size 18 Bu. Ord. motor, with built-in 400 c. power supply and feed-back damping control.
- B. Transistor Servo Amplifier, Mod. AM-102. *Application:* Two channels, 400 c. precision positioning servo loop, (i.e. Resolver). Up to size 18 Bu. Ord. motor, built-in 400 c. power supply, transfer input network, feed-back damping and stick-off voltage controls.
- C. Transistor Servo Amplifier, Mod. AM-101 (AM-104 + AM-105). *Application:* High gain, 400 c. synchronous amplifier for highest accuracy velocity integrating servo-loop, using up to size 18 Bu. Ord. motor/tachometer generator. *Built-in:* power supplies, null voltage suppressor, tachometer generator phasing network, speed adjustment and quadrature rejection circuit.
- D. Transistor Amplifier. (Pre-Amplifier) Mod. AM-104. *Class A,* all transistor voltage and low power amplifier combined. Voltage gain between rated impedances is adjustable between 50 and 150 V. *Built-in* power supply, 400 c. (Power Amplifier AM-105 packages in same manner: *Class E,* all transistor synchronous power amplifier-application as positioning and integrating servo amplifier.)
- E. Differential, Model M-134. *Body and Mounting:* Similar to size 18 Bu. Ord. motor. All ball bearings. *Application:* Servo mechanisms and computers. *Speed/Torque:* symmetrical mechanical differential max. speed of any shaft 4000 r.p.m.; max. torque output 10 oz. inch.
- F. Magnetic Clutch, Model M-133. *Body and Mounting:* Similar to size 18 Bu. Ord. motor. All ball bearings. Max. speed 4000 r.p.m. *Application:* Servo mechanisms and computers. Energizing Power: 24 V.D.C., 3 watts. *Min. Torque:* 35 oz. inch.

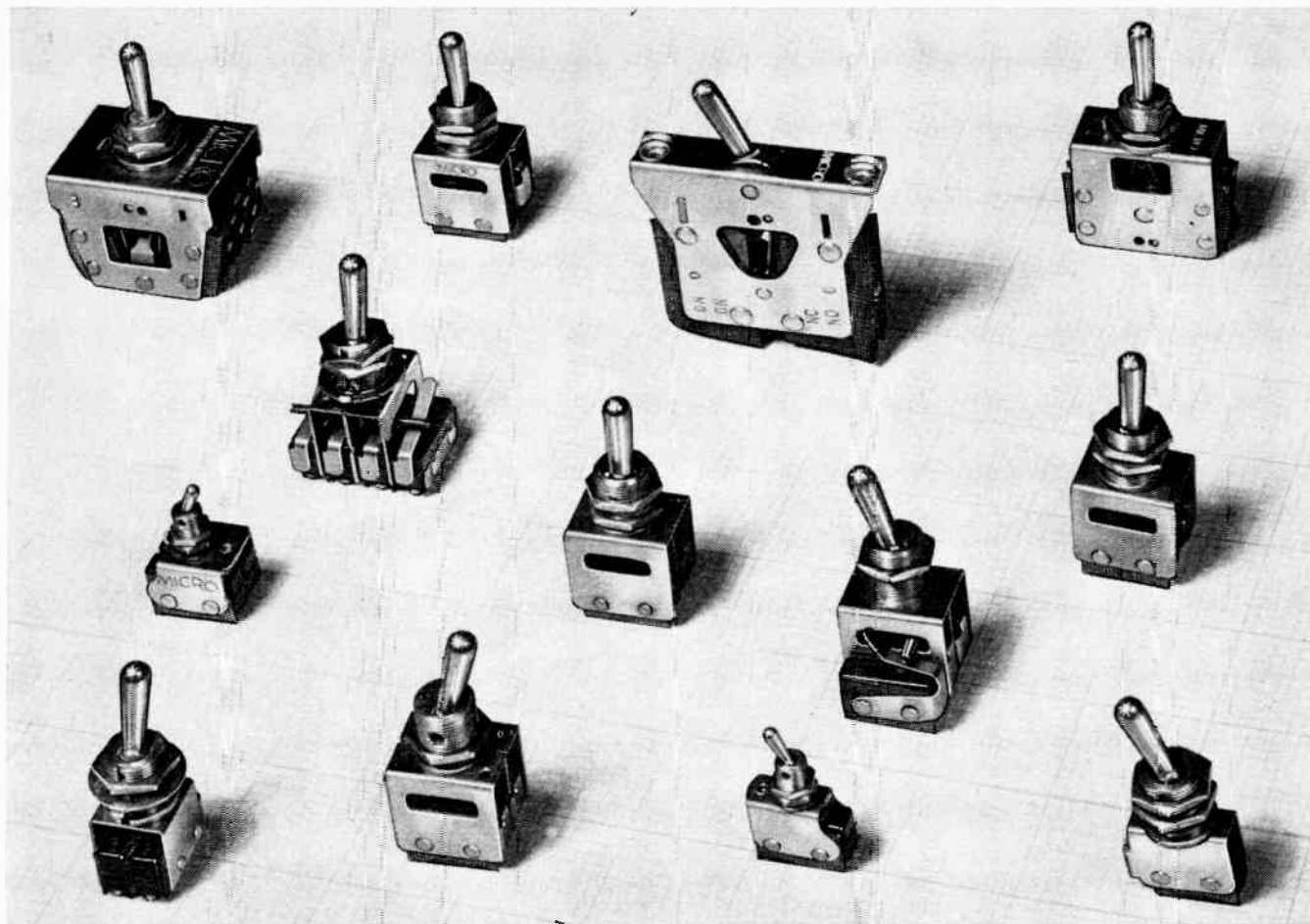


## MARSLAND ENGINEERING LIMITED

KITCHENER, ONTARIO, CANADA

For complete details check No. 40 on handy card, page 83





## Compact "AT" toggle switch assemblies meet wide range of requirements in small space

The 13 toggle switch assemblies illustrated above represent a group of more than 100 similar compact assemblies designed to actuate from one to as many as a dozen miniature precision basic switching units. They find wide use in aircraft, mobile, marine, electronic, and all panel applications.

In this group are 2- and 3-position switches, in all combinations of contact arrangements . . . with either maintained or momentary lever positions. Within the group are switches for special requirements. For example, the switch at upper right includes an "electric memory" unit that indicates by a light or buzzer which circuit was last actuated. Other assemblies in the line fea-

ture pull-to-unlock levers, sealed levers, and hermetically-sealed basic switches.

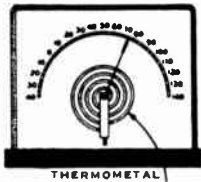
All are manufactured with utmost precision, with consideration given to such important details as rigidity, positive "feel" and positive action, ease of mounting, good appearance, and long life.

"AT" toggle switch assemblies are described fully in Catalog 73C. Assistance in switch application is available from your nearest Honeywell office or, write Honeywell Controls Limited, *Precision Components Division*, Toronto 17, Ont.

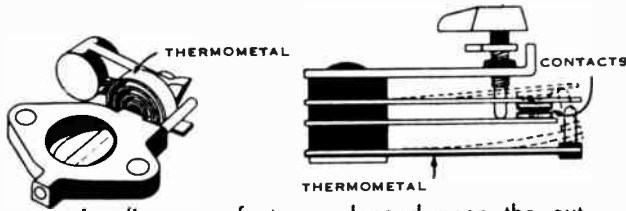


**Honeywell**  
M I C R O S W I T C H P r e c i s i o n S w i t c h e s

For complete details check No. 33 on handy card, page 83



## THERMOMETAL® for dependable control applications.



Leading manufacturers depend upon the outstanding performance of Thermometal in electrical appliances, thermal cutouts, heating controls and many other applications involving the indication and accurate control of temperatures, electrical currents, voltages, etc. Thermometal is supplied in strip form, rolled and slit to close tolerances and tempered to specification. Thermometal elements and sub-assemblies are also supplied to specifications, with or without contacts attached. Send for literature.

## precious metal contacts for high-reliability



For high-reliability and long operating life, precious metal contacts in pure or alloyed forms of silver, platinum, palladium and gold are very definitely indicated. These contacts provide unmatched high resistance to atmospheric corrosion, deformation, arc erosion, binding and metal transfer. Baker precious metal contacts are supplied as wire, rod, sheet and in a complete line of fabricated forms. Facilities are also available for manufacture to your specifications.



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CATALOG MATERIAL  
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1255 University Street • Montreal 2, Quebec

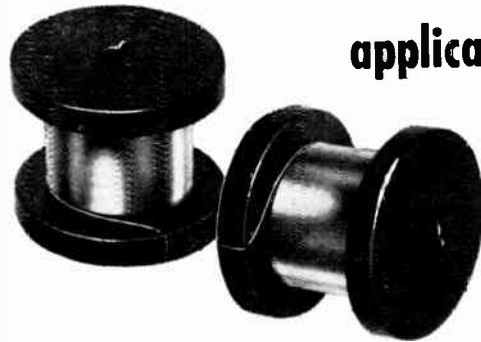
LEADING IN  
PRECIOUS METAL  
RESEARCH

DIVISIONS IN U.S.A.: AMERICAN PLATINUM & SILVER DIVISION, AMERSIL QUARTZ DIVISION, BAKER CONTACT DIVISION, BAKER DENTAL DIVISION, BAKER SETTING DIVISION, BAKER PLATINUM DIVISION, CHEMICAL DIVISION, EAST NEWARK INDUSTRIAL CENTER, HANOVIA LAMP DIVISION, HANOVIA LIQUID GOLD DIVISION, IRVINGTON-BAKER REFINING DIVISION, D. E. MAKEPEACE DIVISION, NATIONAL ELECTRIC INSTRUMENT DIVISION, RESEARCH AND DEVELOPMENT DIVISION, H. A. WILSON DIVISION. COMPANIES ABROAD: ENGELHARD INDUSTRIES OF CANADA, LTD., TORONTO, ENGELHARD INDUSTRIES OF QUEBEC, LTD., MONTREAL, ENGELHARD INDUSTRIES, LTD., LONDON, ENGELHARD INDUSTRIES A. G. ZURICH, ENGELHARD INDUSTRIES PTY., LTD., MELBOURNE, SOCIEDAD SURAMERICANA DE METALES PRECIOSOS S. A. BOGOTA, INDUSTRIE ENGELHARD S. P. A. ROME, ENGELHARD INDUSTRIES OF SOUTHERN AFRICA, LTD., JOHANNESBURG. ASSOCIATED COMPANIES: ACME TIMBER INDUSTRIES LTD., SOUTH AFRICAN FOREST INVESTMENTS LTD., SOUTH AFRICA, AZOPLATE CORPORATION, CHARLES ENGELHARD, INC., NUCLEAR CORP. OF AMERICA, INC., U.S.A.

For complete details check No. 27 on handy card, page 83

ELECTRONICS AND COMMUNICATIONS, February, 1960

## fine wire for every application

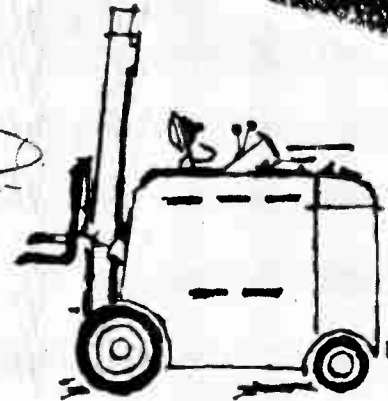
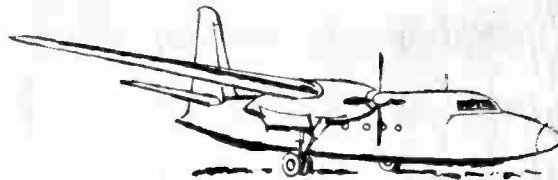
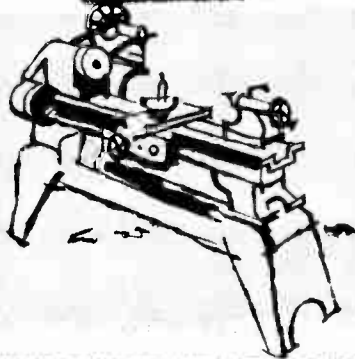
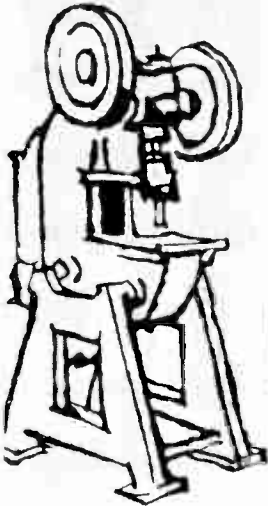
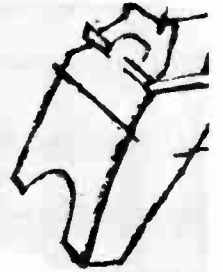
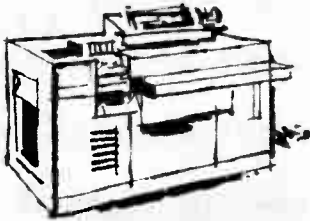


Here, you will find a thoroughly dependable source for fine wire of ductile and non-ductile materials for every application. Special processes have been developed for bare drawing wire as fine as .0004". Where smaller fine wire is required, the Wollaston Process for ductile metals and the Taylor and Extrusion methods for non-ductile materials are employed. All standard wire requirements are stocked for prompt delivery.

## gold and rhodium plating for corrosion-resistant surfaces

ATOMEX® is a 24k gold immersion solution that permits the deposition of a thin, dense, uniform layer of 24k gold on printed circuits and metallized plastics by means of a simple bath. The Atomex procedure is more permanent and less expensive than electroplating of comparable thickness. Costly analytical control is unnecessary. **RHODIUM**—a complete line of Rhodium plating solutions are also available. Rhodium plating is indicated when a low-resistance, long-wearing, oxide-free contact is required.





why buy ?

## lease your equipment

### ...and free capital for other uses

One of the great challenges facing Canadian business today is the need for *expansion* and *modernization* to meet competition. The practical means of acquiring equipment today, without cutting into capital or raising new money, is *leasing*.

Leasing provides the plant and facilities you need to realize greater operating profits, stay competitive.

Leasing frees capital for other profitable uses. Leasing avoids obsolescence. Machines that were ultra-modern ten years ago are now, in many cases, out of date and costly.

Leasing conserves credit lines. Costs are met on a "pay-as-you-earn" basis, enabling you to derive profits from both equipment *and* capital.

What can you lease? Practically any non-expendable item, from an office typewriter to an aircraft.

Let a CDL representative explain how leasing can help you in *your* business.

For full information write for CDL's free brochure "Leasing".



*"Profits are earned through the use — not the ownership — of assets"*



# CANADIAN-DOMINION LEASING

CORPORATION LIMITED

Canada Permanent Bldg., 320 Bay St., Toronto, Ontario. Telephone — EM. 3-4021  
For complete details check No. 17 on handy card, page 83



### Use Philips Tube Type 5842/417A for Special Quality Applications

For special quality equipment you should use special quality tubes and components assembled by highly skilled personnel and machines. The Philips tube type 5842/417A has been designed for grounded grid applications in HF and IF broadband amplifiers where peak performance and long life is a basic requirement. The 5842/417A is a miniature triode featuring high transconductance, low microphony and high gain. It is also shock and vibration resistant.



#### TECHNICAL DATA

##### MECHANICAL

Cathode	coated, unipotential
Bulb	T 6 <sup>1</sup> / <sub>2</sub>
Outline	6-1
Base	E9-1
Mounting position	any

##### ELECTRICAL

Heater voltage	6.3 volts
Heater current	300 mA

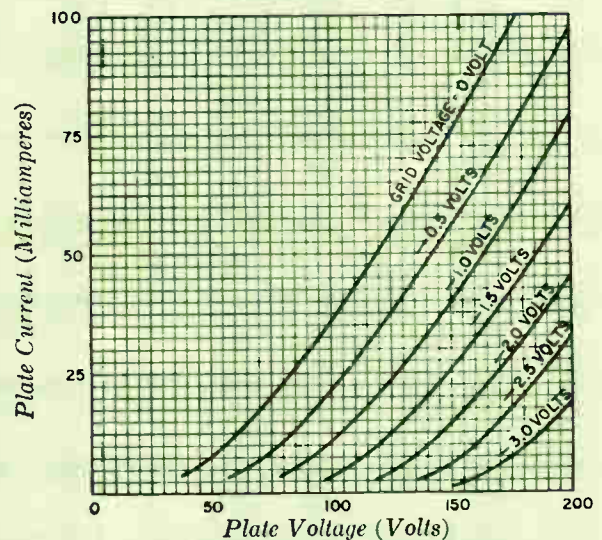
##### Direct Interelectrode Capacitances (without external shield) (Grounded Grid)

Input (K to g + h)	9.0 $\mu$ f
Output (p to g + h)	1.8 $\mu$ f
Plate to cathode and heater	0.55 $\mu$ f
Transconductance	26,000 micromhos
Amplification factor	43

##### Maximum Ratings, Absolute Values

Heater voltage (ac or dc)	6.3 $\pm$ 10% volts max
Heater to cathode voltage	55 volts max
Plate voltage	200 volts max
Cathode current	38 mA max
Plate dissipation	4.5 watts max
Bulb temperature	160°C max

Plate Characteristics



##### Typical Operation

Plate voltage	150	130 volts
Grid voltage	0	9 volts
Plate current	25	27 mA
Cathode bias resistance	60	360 ohms
Plate resistance	1700	1600 ohms
Transconductance	25,000	27,000 micromhos
Amplification factor	43	43

This reference sheet is one of a series from Rogers to keep you fully informed of electronic developments. A specially designed file folder for these bulletins is available from Rogers on request.

You are invited to make full use of Rogers Application Engineering Service at any time, on any problem. Just phone or drop us a line.

# ROGERS

electronic tubes & components

A DIVISION OF PHILIPS ELECTRONICS INDUSTRIES LTD.  
116 VANDERHOOF AVE., TORONTO 17, ONTARIO



Illustration at the left shows a general view of the Pulse Generator.

*Advanced circuit design opens the field to*

## **An improved concept in pulse generation**

by Max Schneiderman

Exacting pulse trains had been difficult to obtain for too long. The generation of sharp-edged pulses at high repetition rates without guesswork had been a problem plaguing engineers almost since the introduction of the hydrogen thyratron. The need for a versatile, reliable pulse generator that would minimize the undesirable characteristics of other generators was so great that Du Mont initiated an extensive research and development program to produce such a unit. The result was a new concept in pulse generation — hard tube circuitry. Here is why it was used.

### **Problems of other methods**

Primarily the deficiencies of existing equipment were in their use of thyratrons or mechanical switching systems for pulse generation. A brief discussion of these methods will help clarify the objectives in the development of the Type 404 Pulse Generator.

The spark discharge method provides rise times in the region of one millimicrosecond, and has comparatively simple requirements for power supply. This method has limitations that must be considered however. Among them is the fact that the spark gap cannot be reliably triggered by an external signal; it also has low and unstable repetition rates, and the spark gaps require constant maintenance.

The characteristics of mechanical-switch types of pulse generators are similar to those of the spark

discharge method. The main disadvantage of this system — that of maintaining the switch points — is mushroomed by the resulting high cost of frequent relay replacements.

Thyratron pulse generators also have limitations that can be bothersome. Among their major limitations are their inherent jitter between initiating triggers and output pulses, and their inability to operate at repetition rates beyond about 15 kilocycles.

### **Hard tube circuitry in pulse generation**

The Type 404 Pulse Generator was designed with hardtube circuitry to overcome these deficiencies. It features (1) 100 kilocycle repetition rates, (2) pulse widths from 0.05 to 100 usec — continuously variable, (3) approximately 18 milli-usec rise times and (4) a 50 volt output into 50 ohms load with provision for accurate control in one-half db increments, up to 60 db.

Figure 2 is a combined overall block and timing diagram. The internal rate generator (V101-A & B) is a free running multivibrator whose output is differentiated and clipped, resulting in the main internal trigger ( $T_{\text{int}}$ , Figure 2b). When the rate selector switch is in either of the external sync positions (+ EXT/MAN, -EXT), this multivibrator is converted to a two stage trigger amplifier. Triggers from the internal rate generator are coupled into the Trigger Delay multivibrator (V104) which has a fixed delay duration of approximately 5 usec.

The trailing edge of the gate waveform generated in this stage ( $T_1$ , Figure 2d) is used to trigger a blocking oscillator (V105 and T101) whose output constitutes the external trigger at the front panel ( $T_1$ , Figure 2c).

The main initiating trigger, ( $T_0$ , Figure 2c) an output of V103-A & B, simultaneously drives the Variable Trigger Position Multivibrator (V201). This circuit controls the pulse delay. The duration of the pulse delay is variable from 2 to 12 usec. ( $T_1$ -3 to  $T_2$ , Figure 2f). The trailing edge of the delayed pulse is differentiated, then amplified by the Trigger Buffer (V202) whose function it is to generate  $T_2$  (Figure 2g), an isolated low-impedance trigger source, for subsequent stages. At time  $T_2$  the Residual Pulse Delay multivibrator (V203) is initiated along with the Pulse Width multivibrator (V207). The residual pulse delay is inserted to enable the minimum width of the Pulse Width multivibrator to be set at 1.05 usec ( $T_2$ - $T_3$ ). This is much simpler than trying to build a multivibrator that must be varied over the required range with a 0.05 usec minimum.

The trailing edge of the residual multivibrator is  $T_3$  and is used to fire Pulse Turn-on BTO #1 (Blocking Tube Oscillator, V204 & T201) which in turn fires BTO #2 (V205 & V202). The purpose of the cascaded blocking oscillator stages is to create a very sharp, narrow trigger ( $T_4$ , Figure 2i) to turn on the initial pulse generator (V206 & V210). Some time after the initial pulse generator is turned on, the output ( $T_5$ , Figure 2k) from a similar pair of cascaded blocking oscillators (V208 & T203, V209 & T204) is used to turn off the main pulse. The time of turn off is determined by the trailing edge of the pulse width delay multivibrator

( $T_1$ , Figure 2j), whose duration is controlled from the front panel pulse width controls.

At this point, the action of the timing and initial pulse generating phase is complete. The net result consists of a negative pulse with fast transitions and controllable duration, taken from the initial pulse generator. From this point on, the function of the remaining circuitry is to process the initial pulse by speeding up, clipping, and impedance transformation. The first step in this process takes place in the driver stage, which consists of a pair of power pentodes (V302 & V303) whose control grids are clamped to zero bias and whose screen grids are adjusted so that the plates are drawing maximum allowable current. When the negative pulse from the initial pulse generator appears at the grids, plate current is abruptly cut off resulting in a large positive pulse at the plate.

### Unique features of the Type 404

The unique feature of the Type 404 is the manner in which the pulse is treated from this point on. The driver plate load consists of the input end of a lumped constant transmission line terminated in its characteristic impedance of 300 ohms. The line serves a dual function of separating the input capacitance of the output stage from the driver plates, thereby preserving rise time and also making possible the use of three low cost tubes in parallel for the output stage.

Figure 3 is a simplified block and timing diagram showing the action of the output stage. Each of the grids of the three output follower tubes is connected to a different point on the line, in sequence and

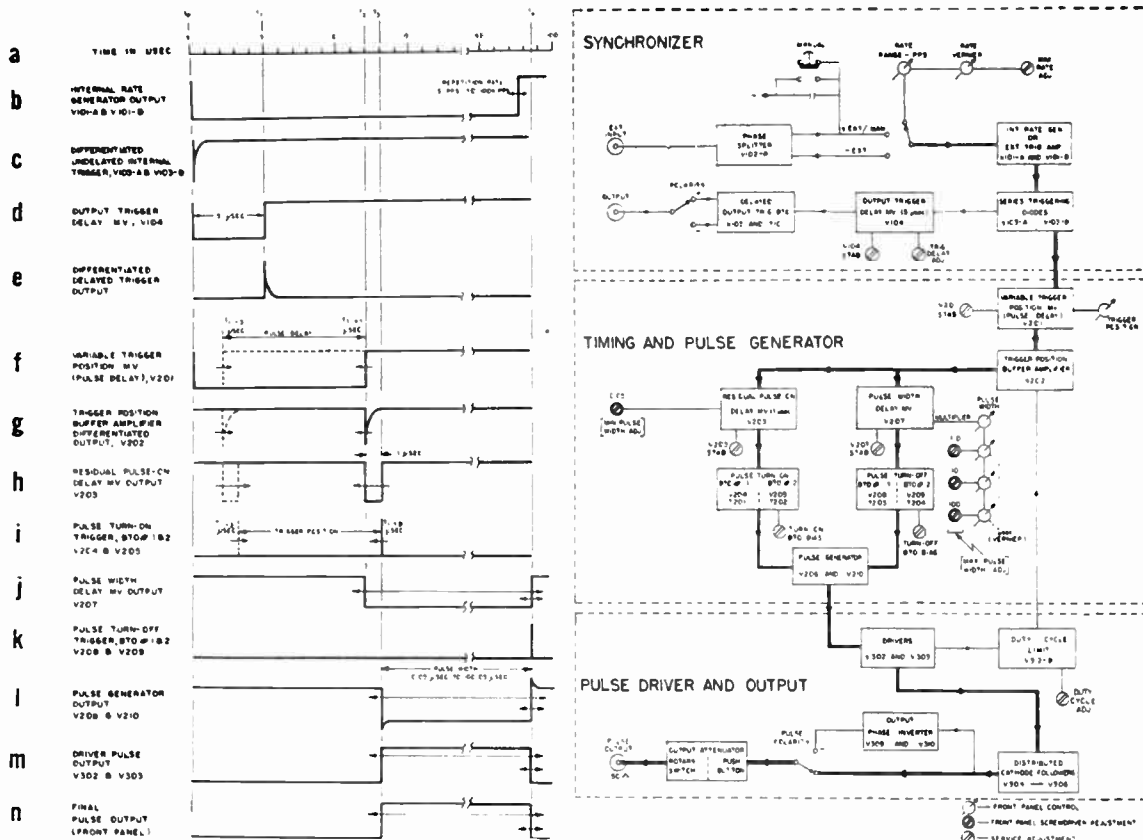


Figure 2: Combined overall block and timing diagram showing the development of a pulse by hard tube circuitry.



uniformly spaced, so that the signal at each grid arrives slightly later than that of its predecessor. Correction for this difference is made by lengths of coaxial cable. Since the first tube on the line sees the signal first, it has the largest delay correction in its cathode. The second tube has only half as much while the third tube has none. When the three outputs meet at a common output point, all three signals combine and are additive. The parameters of each cathode follower are adjusted for an average source impedance of 150

ohms so that the three cathodes in parallel result in the universally accepted 50 ohm source impedance

Additional refinements for the preservation of pulse waveform are incorporated. The limit resistors in each cathode follow grid, for example, enable a clipping action — thereby serving to maintain a uniformly flat pulse top. Also, each screen is made to follow the cathode waveform by means of screen-to-cathode by-pass capacitors. By holding screen voltage constant with respect to input signal in this manner, Miller capacitance is held at a minimum — serving to further reduce any increases in rise time caused by capacitive loading.

Provision for negative output pulses is made via an inverter stage, consisting of a pair of high perveance dual triodes in parallel driven from the cathode-follower output stage. Part of the inverter plate load consists of a group of ordinary 6.3 volt pilot light bulbs which act as nonlinear plate loads. Their function is to provide an increase in plate load as average current increases at high repetition rates, thereby serving to maintain constant amplitude negative pulses. Since the inverter grids are driven hard into conduction, changes of bias would result due to charging of the input coupling capacitor. This is prevented by means of the inverter grid bias regulator whose function is to maintain a constant, low impedance bias source for the inverter tubes.

### Safety features

Some circuits in the Type 404 operate with very high peak currents, in the neighborhood of 2 amperes. As a result, it then becomes necessary to limit the duty cycle to a point where the average power dissipation does not exceed safe tube and component ratings. A positive safety feature therefore has been incorporated to prevent operation beyond safe limits. This consists of an integrator circuit which compares pulse width to repetition rate. When the duty cycle reaches 10%, a relay is actuated which disables the sync system, thereby momentarily terminating operation. The operator is made physically aware of the danger

*Continued on page 63*

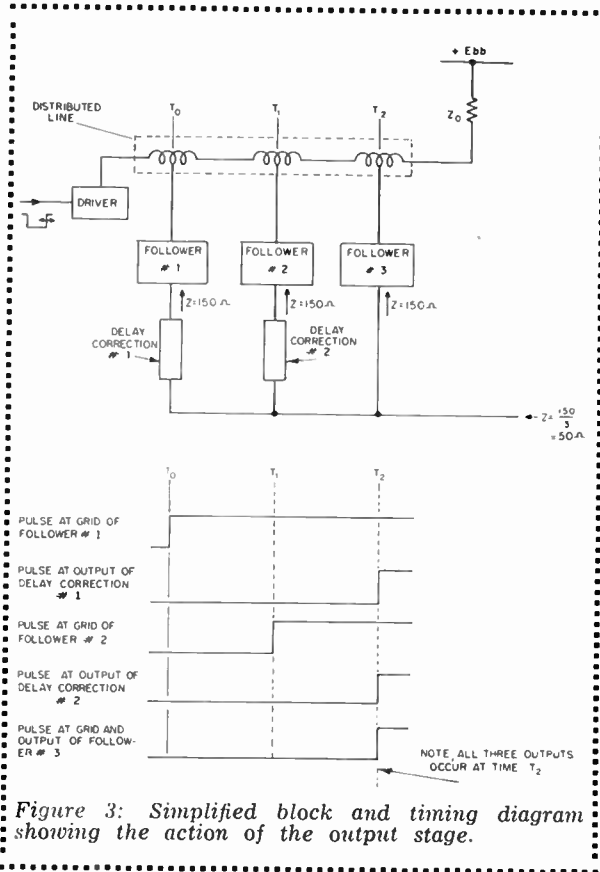


Figure 3: Simplified block and timing diagram showing the action of the output stage.

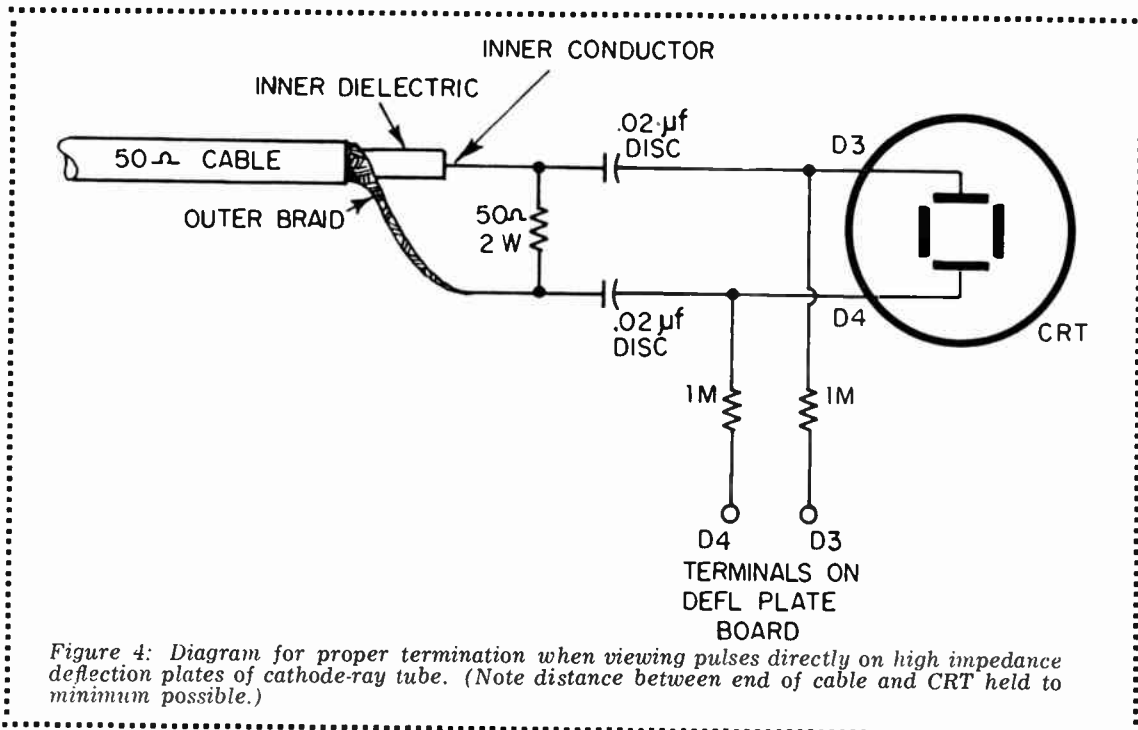


Figure 4: Diagram for proper termination when viewing pulses directly on high impedance deflection plates of cathode-ray tube. (Note distance between end of cable and CRT held to minimum possible.)

# 1960 Product Preview Catalog

Your guide to new  
electronic products —

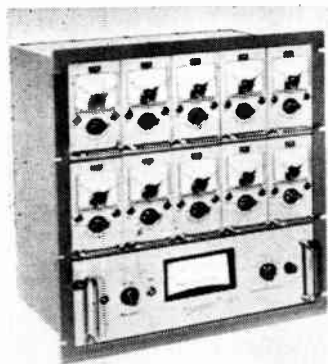
- equipment
- instruments
- components
- sub-assemblies
- materials
- hardware.

For further information on new products use coupon cards on page 81

## EQUIPMENT AND INSTRUMENTS

### Remote area monitors Item 22

This equipment for detecting gamma radiation features a new ionization chamber designed to operate in temperature ranges up to 250°F. Monitors are capable of multi-channel operation with alarm and recorder outputs available at each channel.



Units are AC as well as battery-powered and come equipped with interconnecting cable. Ranges can be selected from .01 mr/hr to 10<sup>6</sup> R/hr having logarithmic scales in 3 to 6 decades. Special self-contained and underwater equipment is available on special order.

For further information on Riggs AMS-11 Remote Area Monitors write to: Allan Crawford Associates, P.O. Box 214, Willowdale, Ontario.

### Airborne transistor inverter Item 23

Using modern power transistor technique and applying packaging experience gained in guided missile engineering, Canadian Westinghouse has developed a rugged, lightweight, 300 V.A. transistor inverter power supply.

It is maintenance free and designed specifically for airborne electronics and highly mobile equipment.

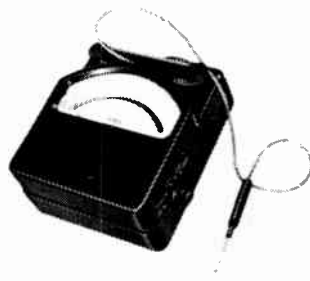
The transistor inverter may be used as a direct replacement for mechanical inverters employed extensively in the past as a source of high tension voltage from low voltage direct-current supplies. It is rated 300 V.A., 3 phase, 400 cycle, 115 volt.

The absence of moving parts eliminates breakdowns due to mechanical failure. The conservative design rating of electrical components has resulted in a product of high reliability and consequently lower cost of maintenance and upkeep. For further details please write Information Department, Canadian Westinghouse Company, Hamilton, Ont.

### Flux density meter Item 24

A truly new and unique instrument for the measurement of magnetic flux density is the Conway Gausmet, fitted with a very minute germanium probe. The instrument is based on the galvanic magnetic Hall effect.

The unit is battery energized to ensure the highest degree of portability and stability. The measuring probe is stored in the upper part of the instrument case. The sensing element consists of a germanium cut, located in the extreme end of the probe tip. This sensing element is protected by a separate scale is provided for each measuring range, each scale being calibrated in gauss. The instrument scale calibrated in gauss for magnetic flux density, also holds good for magnetic field strength in oersteds. Due to



the very small size of the tip (only the extreme tip of the probe is sensitive), very little if any inter-

ference with the magnetic field pattern results.

The instrument possesses 3 measuring ranges, 0-2,000 gauss — 0-5,000 gauss — 0-20,000 gauss.

Accuracy of reading  $\pm 2.5\%$ . Probe working temperature 0  $\pm$  50°C. Life of battery source is 50 working hours.

For further information contact — Conway Electronic Enterprises Reg'd, 1514 Eglinton Ave. W., Toronto 10, Ont.

### L-band parametric amplifiers Item 25

Microwave Associates, Inc., announces availability of two new Parametric Amplifier mixer, down-converter units for very low noise signal reception.

Model MA2-1000 is used for the 950-1250 Mc frequency range and a second model, MA2-1000L is designed for use in radar receivers in the 1250-1350 Mc range.

Both models exhibit noise figures below 2 db with bandwidth of 1/4 per cent. Image rejection is better than 50 db down, and dynamic range is 80 db or better.

The amplifiers comprise a single stage of parametric preamplification using a suitable Varactor diode, a low noise mixer, down-converter stage with a 1N21E or MA-421B (1N21F) diode, and a third stage for convenient coupling of the injected local Oscillator RF input. The basic amplifier chassis dimensions are 6" long x 3" wide x 2" high.

Complete MA-2 amplifiers consist of the basic unit, pump oscillator, power supply and waveguide accessories.

A Radar range improvement of 30-50% has been reported as a result of field tests with the amplifier.

Specifications are available on request from E. G. Lom's, 227 Laurier Avenue West, Ottawa 4, Canada.

### Oscilloscope camera Item 26

A convenient, easy-to-use oscilloscope camera which records full-sized oscilloscope patterns without distortion on Polaroid® Land film is now available from Hewlett-Packard Company.

The camera, Model 196A, uses a standard camera bellows to eliminate light leakage. Its object to image size ratio is 1 to 0.9 to show a full 10 cm graticule

width. Lens adjustments may be made without removing the camera from the scope.

Model 196A simplifies multiple exposure procedures since a convenient knob moves the lens through 11 detented positions while the camera back remains fixed. The stationary camera back also simplifies tab pulling.



The new camera is rugged, compact and weighs only 9 pounds. It is equipped with a special "quick-lock" tab for easy one-hand mounting on the scope. While making an exposure, the operator can observe the pattern with both eyes.

The Model 196A Oscilloscope Camera is manufactured by Hewlett-Packard Company, distributed by Atlas Instrument Corp. Ltd., 50 Wingold Avenue, Toronto 19, Ont.

### Electric Telmeter Item 27

The TM-16 Electric Telmeter is a fast, accurate data processing and handling telemeter system for use on wire circuits, carrier, radio and microwave channels. The equipment can be supplied to operate from either 115 volts, 60 cycles or 129 volts d.c.

The TM-16 System, basically, consists of:

One or more Storage Units to collect the digital representation of the quantity being measured.

A Scanning Unit which interrogates each Storage Unit, as required or at timed intervals, and transmits this information to the Receiver, via the channelling equipment.

A Receiver which accepts the



information from the Scanning Unit.

One or more Display Units that provide an illuminated, digital presentation of each quantity as it is scanned.

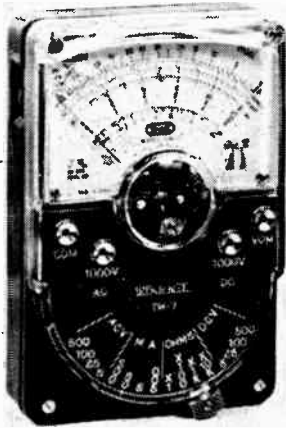
All Storage Units may be "locked" at the same instant and scanned in sequence to provide readings at an equivalent instant for all quantities. During lock-up, built-in Auxiliary Storage Units gather information and this is fed into the main Storage Unit when it is released.

R. H. Nichols Limited, P.O. Box 500, Downsview, Ontario.

### Pocket multimeter

Item 28

New from Starkit, the Model TM-7 is only 4 1/2" x 3" x 1 1/4", weighs 14 ounces and has a sensitivity of 20,000 ohms per volt DC and 10,000 ohms per volt AC. It measures AC volts from .1 to 1000 volts; DC volts from



.1 to 1000 volts; DC current from 1 UA to 500 MA, and resistance from 1 ohm to 60 megohms. The unit incorporates a printed circuit lever wiper switch; 3" meter; movement magnifier; recessed ohms adjust and printed circuit throughout. Available in wired and calibrated form only. Details from Stark Electronic Sales Co., Ajax, Ontario.

### Spectrometer amplifier

Item 29

Recently designed Model 51A Mass Spectrometer Amplifier is a precise and versatile instrument for amplifying and measuring the very small beam currents encountered in modern mass spectrometry.

The instrument has a fast response so that the measurement can be made before instability of either the spectrometer or the mass species being examined can introduce serious errors.

The instrument consists of two units, a converter unit suitable for mounting directly over the collector terminal of the mass spectrometer and an indicator unit suitable for mounting in a standard 19 inch rack. The con-



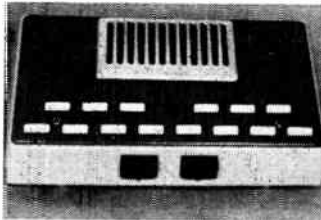
verter unit contains the Vibron vibrating capacitor modulator together with a pre-amplifier. The indicator unit contains the main amplifier and rectifier circuits together with a four inch mirror scale indicating meter and all normal operating controls.

Additional information available from The Glendon Instrument Company Limited, 46 Crockford Blvd., Scarborough, Ontario.

### "Loudspeaker" intercoms

Item 30

Engineered Sound Systems Limited are offering a compact line of transistorized intercom systems which answer the needs of any size and type of office or factory.



The new intercom system, developed by AB Gylling & Co., Stockholm, is of the "free-hand" type using amplifiers with electronic voice switching.

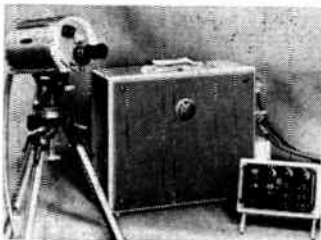
Centrum Intercom gives immediate contact, saves wasted time. There are three models for small businesses, all with battery operated transistor amplifiers. GB Simplex-Duplex models have a range of 5 to 20 stations. For large organizations requiring anywhere from 20 to 100 or more fully interconnected outlets, the Centrum "Telefon" systems are available.

Full particulars may be obtained from Engineered Sound Systems Limited, 169 Kipling Avenue S., Toronto 18, Ontario.

### Industrial TV camera

Item 31

The Pye type 2048 Industrial Television camera has been designed for maximum reliability with simplicity of operation. By using the "Meccano" principle it is possible to add additional facilities, such as remote iris, pan/tilt/zoom/optical focus lens change, without any further cable runs to the control unit, the single camera cable employed having the necessary wires already incorporated.



One additional feature is that by using a 5 way switcher, 5 cameras may be utilized with one control unit. The maximum distance between each camera and the switcher being 1000 ft.

Additional data may be had by writing Pye Canada Limited, Transmission Division, McMaster Avenue, Ajax, Ontario.

### Mass spectrometer leak detector

Item 32

New features for reduced maintenance downtime and improved performance are incorporated in a redesigned mass spectrometer leak detector now available from Canadian General Electric.

Among improvements in the new model, are a quick-change self-aligning filament, a new automatic balance measurement circuit, enlarged capacity vacuum pumps, new easy-to-read panel meters, and general maintenance improvements.

The M-60 mass spectrometer leak detector locates leaks as small as 1 x 10<sup>-10</sup> cubic centimeters of air per second, so small that less than one cubic inch of air at atmospheric pressure would pass through in 5,000 years. It is used to check out vacuum

tubes, transistors, valves, connectors, missile devices, nuclear systems, and other products where extremely small leaks may seriously impair quality.

Leaks are located by applying helium tracer gas to one side of the enclosure while the leak detector draws a sample of air from the other. If helium is present in the gas analyzed by the detector, an alarm is given.

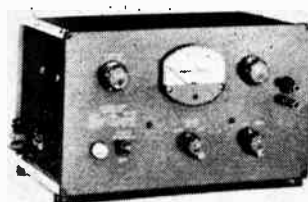
Canadian General Electric Company Limited, 940 Lansdowne Ave., Toronto.

### Random noise generator

Item 33

An extremely versatile instrument, capable of generating wide-band noise of a uniform spectrum level, suitable for many types of electrical and mechanical testing, has been announced by the General Radio Company.

Known as the Random-Noise Generator (Type 1390-B), it has many applications for electrical and acoustical laboratories. As a noise source it is useful for: Measurement of loudspeakers; intermodulation and crosstalk tests



on multichannel-communication systems; simulating pulse noise in telephone line tests; noise-interference tests; tests on servo amplifiers; radar tests; radar target simulation; filter tests; dynamic range determination; and meter response tests. With suitable amplification, this instrument can drive shake tables for vibration testing and loudspeakers to produce high-intensity sound field tests.

The instrument also features a built-in 80-db attenuator to provide metered outputs from over 3 volts down to below 30 uv. Another instrument improvement is an automatic thermal time-delay relay.

General Radio Company (Canadian Branch Office), 99 Floral Parkway, Toronto 15, Ontario.

### Mobile communications

Item 34

A new SY line of FM mobile radiotelephone equipment has been developed by International Systems Limited. The equipment features extremely compact construction permitting underdash mounting of all mobile



models. The main mobile unit, comprising transmitter, receiver and all operating controls, mounts under the vehicle dashboard. The transistorized power supply mounts on the vehicle firewall.

The 30 watt mobile unit is claimed to be the smallest and lightest unit of that power rating now available. The main unit is only 11 inches wide by 4 inches high by 12 inches deep and weighs 15 pounds. The transistor power supply is 6 inches by 6 inches by 3 inches and weighs 3 1/2 pounds.

The unit is produced in 30 and

10 watt versions and in wide band and split channel models. Simple field conversion can be made from wide band to split channel operation.

The underdash mounting feature, made possible by the compact design, reduces installation and maintenance costs. The lower temperatures due to underdash mounting is claimed to improve reliability.

This line of mobile equipments is designed and manufactured in Canada and is claimed to meet all relevant DOT and EIA specifications.

International Systems Limited, 8235 Mountain Sights Avenue, Montreal, Quebec.

### Synchronous timing motors

Item 35

Philips Electronics Industries Ltd. representing the A. W. Haydon Company has just announced the introduction of a new line of extremely thin synchronous timing motors for 25, 50 or 60 cycle operation in five standard voltage ratings.

Only 3/8" thick, these motors were designed to occupy considerable less space than other available motors. Mounting dimensions conform to the A. W. Haydon Company's standardized dimensions for timing motors, and those of the industry in general.

The progressive design of these motors has completely eliminated the need for mechanical devices to control the direction of rotation of the motor. Although mechanical devices have been used in the industry for years, they have many troublesome disadvantages such as being noisy and offering only limited life.

Over 125 standard output speeds from 300 rpm down to one revolution in six hours can be supplied with either standard or heavy duty gear trains. With a nominal 30 oz-in Running torque at 1 rpm, these motors can be used in a wide variety of applications.

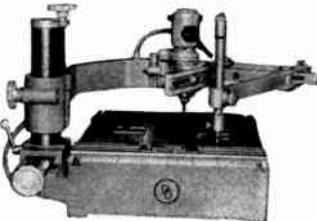
Available from Philips Electronics Industries Ltd., Aviation and Electronic Components Group, 116 Vanderhoof Avenue, Toronto 17, Ontario.

### Bench engraving machine

Item 36

In the design of the David Dowling bench engraving machine, emphasis has been placed on speed and simplicity in its operation, together with convenient visual positioning of workpiece and template.

The Pantograph unit, comprising the Cutter Spindle, the Pantograph and the Tracer, is carried on a support arm, which can be raised or lowered for workpieces of varying heights — and movement from front to rear of the machine is also provided. The whole Pantograph unit is balanced with adjustable tension to give a vertical upwards movement, thus withdrawing itself clear of the table when the tracer is released by the operator, thus ensuring that the engraving cutter does not damage the workpiece.



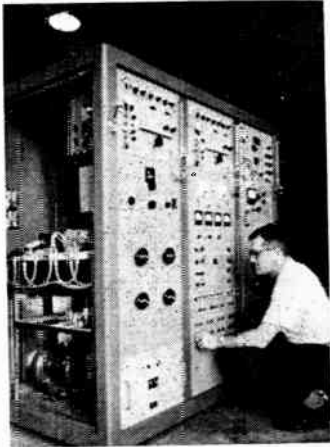
Complete information available from Empire Engineering Company, 738 Dundas Street East, Toronto, Ontario.



## Combination 10-watt signal source

### Item 37

Designed to fill the needs of component laboratories and antenna ranges, the Model 229T Levinthal Signal Source is a composite instrument covering the entire spectrum from 1 to 11 mc in four segments: 1 to 2, 2 to 4, 4 to 8, and 8 to 11 mc. The individual signal sources represented by these ranges are all contained in a single housing with common power supplies, regulators, etc.



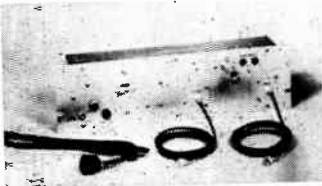
Features of the instrument are c-w operation plus internal modulation for pulse, square-wave, and f-m output. There are also provisions for external modulation. Special attention has been paid to voltage regulation and filtering to minimize incidental f-m and a-m. Each section includes a signal generator followed by a low-level travelling-wave-tube amplifier driving a high-level travelling-wave-tube output stage. Levinthal Electronic Products, Palo Alto, Calif., or Electromechanical Products, Markham Road, Agincourt, Ontario.

## Loop test set

### Item 38

By means of a control mechanism (either tone or DC) an operator at a terminal station can carry out the following tests remotely on any duplex station equipped with the LP-2 Loop Test Set:

- turn the remote station on,
- check that transmitter output and receiver sensitivity exceed present minimum standards,
- check transmission levels,
- check noise and interference,
- check station signalling facilities.



The Loop Test Set LP-2 is specially engineered to facilitate making these checks. When the set is operated, the transmitter is turned on and a portion of the transmitter output is heterodyned through the loop test set into the receiver. A special feature, found only in the LP-2, is that the overall loss from transmitter to receiver can be factory set and is maintained indefinitely. Any degradation of performance through the test loop is therefore in the R.F. equipment.

Warm-up time is less than 2 seconds, and the remote checks are easily made, permitting a great increase in the frequency of checking. Actual field experience shows that progressive fail-

ures are detected before they have reached the stage of affecting service. Catastrophic failures are minimized, and the few that occur are often located in time to avoid service reaction. Maintenance costs are reduced and at the same time a higher grade of service is upheld.

For further information write to: Pylon Electronic Development Company Limited, 161 Clement Street, LaSalle, Montreal 32.

## Log electrometer

### Item 39

A new log electrometer for precision measurement of small currents over a wide dynamic range is announced by The Victoreen Instrument Company.

Designed by Tullamore Electronics, new subsidiary of Victoreen, the Model LE-1 Log Electrometer is particularly well suited for use as a reactor control instrument. It can be rack, panel or console mounted.

The manufacturer states that the Model LE-1, in addition to being stable and reliable, provides an inexpensive method of measuring 8 decades of current in the range of  $10^{-6}$  to  $10^{-3}$  amperes. Trip circuits can be incorporated on special order.

Logarithmic measurement of current is obtained by utilizing the log characteristic of screen-feed back to the input of the electrometer tube, which eliminates the necessity for a separate diode device. The CK 5886 electrometer tube uses an extremely



low input grid current. DC operation of the tube filament from a double regulated supply provides excellent stability.

Full specification data on the Victoreen Model LE-1 Log Electrometer is available on request to Radionics Limited, 8230 Mayrand Street, Montreal 9, Quebec.

## Lintran

### Item 40

This new instrument in the "Allscott" Electronics range is the culmination of several years development effort.

The Lintran is one of the family of instruments termed transducers. In general, a transducer converts some physical quantity such as distance, pressure, temperature, etc., into an electrical signal. The advantage obtained from this is that firstly it is easier to transmit electrical signals over a long distance and secondly, the signals can be displayed on meters. In the basic Lintran instrument the input is the movement of a shaft and the electrical output is accurately proportional to this movement. However, it is not limited to this function only, since by the addition of calibrated bellows it becomes a pressure measuring



gauge and so on. In fact, any quantity in which a change can be translated into movement can

be accurately measured by this device.

Further information from: James Scott & Co. (Electrical Engineers) Ltd., Manufacturing & Electronics Division, Carntyne Industrial Estate, 68 Brookville St., Glasgow, E.2, Scotland.

## Air navigation system

### Item 41

A new lightweight and highly reliable self-contained doppler radar navigation system for commercial aircraft has been announced by GPL Division of General Precision, Inc.

The RADAN 500 doppler radar and TNC .50 track navigation computer, backed by GPL's 13 years of experience in the design and manufacture of self-contained navigation systems, represent third generation equipment developments. Engineered to airline requirements and ARINC



characteristics 540 and 543, the new system offers the airlines and business aircraft owners the operational advantages of improved block-to-block time, reduced fuel consumption, and optimum use of continuously measured winds.

GPL Division, General Precision, Inc., 63 Bedford Rd., Pleasantville, New York.

## Hot-stick tester

### Item 42

A device for testing insulated tools, that can be carried and operated by one man, has been developed by The A. B. Chance Co. Designed for 110-volt, 60-cycle AC circuits, the Hot-Stick Tester can be plugged into standard electrical outlets or used on the job by running an extension



cord to the secondary. Other than an extension cord, this compact, lightweight unit does not require auxiliary equipment of any kind.

The Hot-Stick Tester requires no special skill to operate, is not dangerous to the user, and will not damage a Hot Stick that has absorbed excessive moisture.

All types and sizes of Hot Sticks, regardless of insulated material, can be tested on this unit. It measures true leakage, independent of stray capacitance currents, and operates at ambient temperatures up to 105°F. Since transistors are used, no warmup is required. Calibration standard, instruction sheet, and sturdy case are included with each unit. Refer to A. B. Chance Company of Canada Ltd., Box 10, Toronto 13.

## Direct-reading counter

### Item 43

Veeder-Roof announces the development of a Direct Reading High Speed Mechanical Counter that can operate continuously at 6,000 rpm. It features a directly-gear second wheel which reduces the wear usually resulting from conventional transfer-pinion methods. Counter also features a means of providing an instantaneously corrected direct-reading in the event that the second wheel is not fully within the window.

Counter has been exhaustively tested and is found to be highly resistant to corrosion, humidity, vibration; to have substantial life and low torques. Features .250 in. high white figures on black background. Case approximately 2 3/4" long, 2" high, 1 1/2" deep. Contact Veeder-Roof Inc., Hartford 2, Connecticut for complete specifications and price information.

## Meter tester

### Item 44

A versatile, multi-range meter tester which is a precise, self-contained unit for laboratory and production use, has been introduced to Canada by Honeywell Controls Limited through its Marion division. The meter tester is suitable for DC instrument calibration from 25 ua full-scale to 10 ma full-scale and 0-100 VDC;



sensitivity and resistance measurement; DC current-voltage source; and limit or bridge measurements from 0-5000 ohms. It has a regulated power supply and stepless vacuum tube voltage control. Its accuracy exceeds 1/4 per cent (current) 1/2 ohm or 1/2 per cent (resistance). It can be used for 115V and 60 cycle AC. This meter tester is complete in itself and requires no accessories.

For further information write B. Colwell, Honeywell Controls Limited, Toronto 17, Ont.

## Thermocouple welder

### Item 45

A new miniature resistance welder has been developed for use primarily in welding thermocouple junctions and leads and for use as a tacking welder to secure thermocouples, strain-gauges, thermistors, etc. to large bodies, including those at high temperatures.

The welder has a built-in power supply which can be connected to any 115 V AC line. Two types of power supplies are available. The stored energy type, model PW6, has a line drain of only 50 watts, yet delivers a welding pulse of 5,000 Amps. peak. It has a capacity of .0008 dia. wire up to .020 dia. (24 Ga) in most thermocouple materials including Platinum-Rhodium wire.

The units are mounted in a sturdy carrying case with a compartment for cables and tools.

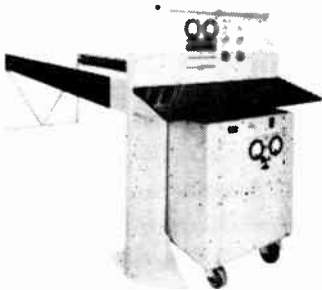
For catalog contact: Thermovolt Instruments Ltd., 70 Advance Rd., P.O. Box 43, Toronto 18, Ont.



## Battery charger

Item 46

Sorensen & Company, Inc., Norwalk, Connecticut, U.S.A. has designed and built a special 12 station battery charging system for the United States Signal Corp. The system is capable of charging up to 12-24 volt batteries or 48-6 volt batteries. It is powered by a Sorensen Nobatron Model MIL 28-200.



The Model MIL 28-200 power supply operates on an input range of 200 to 253 volts AC, 3 phase, 60 cycles, with an output of 24-32 volts DC at 0-200 amps.

The Nobatron was designed, according to Military specifications, for this system. It is similar in design to Sorensen's standard High Current Tubeless DC Power Supplies.

Further information from Bayly Engineering Limited, Ajax, Ont.

## Field strength meter

Item 47

Introduction of a portable, transistorized field strength meter designed especially for TV servicemen and system technicians has been announced by Jerrold Electronics Corp., Philadelphia.

Described as the "serviceman's stethoscope", the TMT enables the TV serviceman for the first time to check, with a truly portable field strength meter, the effect of aging on the performance of antennas to better determine for the TV set owner if his antenna needs repair or replacement. By using the TMT, the TV serviceman can accurately measure the TV signal and actually show his customer the exact performance rating of his present antenna as it compares with that of new antenna installations in the area.



The new Jerrold field strength meter is ideal for antenna probing and orienting and for distribution system measurements. With the TMT, the serviceman can distinguish between tuner troubles and antenna troubles. Jerrold Electronics Canada Limited, 50 Wingold Ave., Toronto, Ontario.

## Duplex recorder

Item 48

A compact, general-purpose recorder for plotting two related electrical quantities side-by-side on a single chart has been announced by Canadian General Electric Company Limited.

A member of the Company's CH recorder family, the unit is known as the CH-37 Duplex recorder.

The Duplex brings new convenience to utility, steel mill, laboratory and other measurement applications where accurate data comparison is important.

The double record on a single roll permits faster reading and helps eliminate possible reading errors associated with matching separate charts when correlating quantities such as watts and vars, volts and frequency, or wind direction and speed.

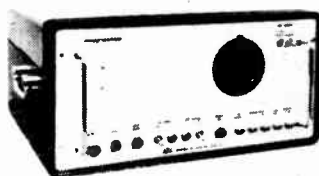
The Duplex is available with a complete set of rate gears and either a single speed synchronous motor giving 11 charts speeds ranging from 1/4 to 30 inches per hour or a double speed synchronous motor offering 28 speeds from 1/4 inch per hour to 120 inches per minute.

Canadian General Electric Company Limited, 940 Lansdowne Avenue, Toronto 4, Ontario.

## Sweep generators

Item 49

RF Sweep Generators are now available that will produce watts, rather than milli-watts of power. The new instruments, covering the frequency range from 20 to 1000 mc, are manufactured by Telonic Industries, Inc., Beech Grove, Indiana.



The high-power line of Sweep Generators incorporates new concepts in the design of swept RF generators. The two low frequency instruments employ inductively tuned oscillators, while the other two are designed with cavity-tuned oscillator circuits. All oscillators use high-power tubes in order to produce the specified output of over 15 volts RMS into 50 ohms (4-5 watts).

The high-power output is held constant within  $\pm 5\%$  over the maximum sweep width by use of AGC circuits controlling the oscillator B + voltage.

For general information on the new high-power line of Sweep Generators, contact Telonic Industries, Inc., Beech Grove, Ind.

## Precision portable meters

Item 50

A new line of precision portable electrical measuring instruments manufactured by P. Gossen and Company, G.m.b.H., in Western Germany has just been announced by their representatives, Canadian Research Institute of Toronto.

These meters, called the Giant, feature ruggedized movements, long 6 1/4" scales, with anti-parallax mirrors, and accuracies of 0.5%. Stocked and serviced in Canada, these are available in AC and DC voltmeters, ammeters, wattmeters and also in rectifier and thermocouple types for high frequency. These instruments, because of their robust construction and moderate cost, are especially suitable for bench work and for schools and universities.

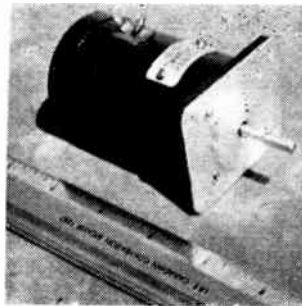
Canadian Research Institute, 46 St. George Street, Toronto 5, Ont.

## Phase generator

Item 51

Phase Generator, Model PG-31 is a mechano-electrical transducer of the rotational type, finding its main application in the field of close tolerance analog, or digital measurement and monitoring of shaft revolutions. The normal technique employed is that of relating the generator output frequency and phase to those of a known AC reference signal. Comparison and counting is performed either on the screen or a CRT oscilloscope, or through a suitable analog, or digital computing device.

Model PG-31 is presented in a standard 18 diameter motor frame with rectangular end-mounting



flange, accurately machined in Alcan 65-ST or 24-ST alloy, both featuring high mechanical strength and rigidity.

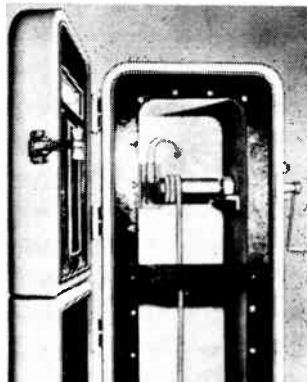
For additional data contact: Presenting Engineering Products Limited, 1268 Henry Farm Drive, Ottawa 3, Ont.

## Environmental chambers

Item 52

A complete line of environmental chambers especially designed for testing wire and insulation breakdown, in accordance with military specifications, is available from Cincinnati Sub Zero Products.

The chambers are constructed so that a mandrel can be installed in the upper part of the chamber. One end of the wire to be tested is suspended from the mandrel, with the other end



hanging free. A specified weight is attached to the free end to exert a force on the wire.

By means of an outside control, the wire is wound on the mandrel without disturbing the test temperature. After winding, the sample is removed and examined for surface cracking and other flaws. This "cold bend" test is used for improving many types of commercial and military wire.

For further information on wire testing cold chambers, or other production chilling equipment, write direct to Cincinnati Sub Zero Products, 3932 Reading Rd., Cincinnati 29, Ohio or The Romex Company, 3777 Lacombe Avenue, Montreal 26.

## Truck-auto-boat radio

Item 53

The ATR Truck Karadio is a new compact, self-contained airplane-style radio for trucks, boats, station wagons, and small cars. This handy unit is perfect for trucks because it is easy and inexpensive to install in the cab roof — and its powerful 8-tube performance provides remarkable freedom from engine, static, and road noises.

The in-line position of the speaker in this compact 6-lb. radio permits more sound to reach the listener, so that the volume need not be turned up to the point of distortion even when driving fast.

The ATR Karadio is simple to service — merely take off two easily accessible thumb nuts and remove the entire set.

Overhead mounting adds extra safety to driving, because the driver never has to take his eyes off the road to tune or adjust the set.

Further information available from the ATR Eastern Canada representative — R. C. Kahnert Sales Ltd., 73 Crockford Blvd., Scarborough, Ontario.

## Ultrasonic cleaner

Item 54

An ultrasonic cleaner for applications in which high energy density is required, has been announced by National Ultrasonic Corporation, 111 Montgomery Ave., Irvington, N.J., producer of a complete range of medium



and high power cleaners, solvents, detergents and accessories. Model 220 in National Ultrasonic Corporation's Heavydutyline, the unit features a 2-gallon tank made of heavy-gauge polished stainless steel. Tank is 9" long, 6" wide and 10" deep. 44 1/2% of the bottom of this tank is covered with driving elements. This is a larger percentage of coverage than that provided in most ultrasonic cleaners. Actual radiating surface is 24 square inches.

The generator, 115 volts AC single-phase 60 cycle, is designed for continuous operation. It delivers an average power output of 125 watts and produces peaks of 500 watts. Features include 0-60 minute timer, one tube oscillator, provision for remote control of equipment, front panel switching which permits a choice of either of two transducers and circuit breaker and 3-wire ground protection. Unit can be adjusted to available line voltage.

In Canada write to Electrolabs, 7385 St. Lawrence Blvd., Montreal 10, Quebec.

## Pocket receiver

Item 55

Multitone of Canada Limited has announced a new type of pocket receiver for its staff location system. Known as the Type 5 Industrial Receiver, this unit gives a call signal only. It has no facilities for speech reception. The note omitted is audible above any noise level that is normally experienced in industrial premises.

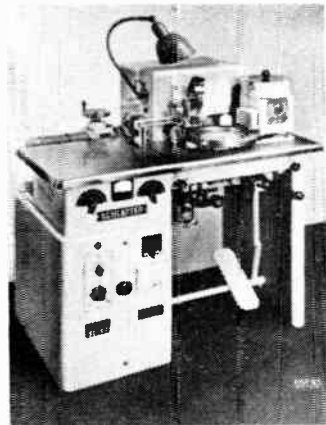
Weighing only 5 1/4 oz. the Type 5 receiver measures 5 3/4" x 2 1/2" and can be carried comfortably in any pocket.

Multitone of Canada Ltd., 24 Merton St., Toronto, Ont.

## Automatic contact welder

Item 56

Type Pa 12 sp. for silver contacts is designed to weld preformed silver and precious metal contacts onto spring contact arms. Contacts are hopper fed while springs are fed by hand to a traversing or turntable. Automatic welding up to 4,000 welds per hour and automatic ejection.



Also available with cutting and stamping heads to form contacts from wire or strip.

Full details from: Paul Reicher Machinery & Equipment Limited, 600 Eglinton Ave. East, Toronto 12, Ont. Telephone: HU. 7-0647.

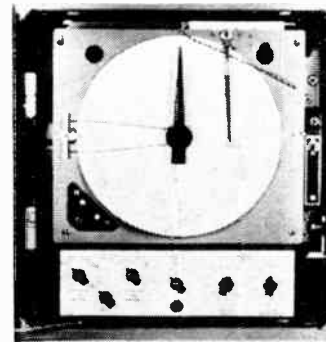
## Computing telemetering system

Item 57

The Bristol Company offers a new computing telemetering system for gas distribution and pipeline applications, designed to provide corrected flow measurement.

The system consists of Bristol's new Dyna-Servo Flow Transducer; the new Dyna-Servo Pressure Transducer; a new Dynamaster Totalizing Computing and Transmitting Instrument; and Bristol's Pulse-Width to Pulse-Count Transducer-Type Integrator with Counters.

The Dyna-Servo Transducer is a null-balance instrument. A signal determined by the measured variable (temperature, flow, pressure) is fed from the error-detector to an amplifier. The amplified signal is fed to a servomotor which positions a retransmitting slidewire, encoder, alarms, deviation contacts, etc.



The Dynamaster Totalizing Computing Instrument includes down-scale fail-safe and a Metameter Transmitter. The instrument has manual adjustments for specific gravity and supercompressibility.

In addition to the integrator, the receiving station may include a Metameter receiver for analog

recording or digital read-out of corrected rate of flow.

Further information is available from The Bristol Company of Canada Limited, 71-79 Duchess Street, Toronto.

## Power roll chart

Item 58

Available for tube tester models 658, 648R and 598 is the Jackson Power Roll Chart. Just push the lever switch up and the chart rolls upward. Down, the chart rolls downward. Complete cycle of chart in 25 seconds.

Write for further data to Canadian Marconi Company, Electronic Tube & Components Division, 830 Bayview Ave., Toronto 17, Ont.

## VSWR amplifier

Item 59

An improved version of the popular Narda VSWR amplifier has been introduced by the Narda Microwave Corporation, Mineola, N.Y. Designated Model 441B, the unit is transistorized and battery-operated and has built-in provision to show the state of battery charge. The amplifier's own meter is used to indicate this at a flick of a switch.

The most compact unit on the market, the Model 441B is supplied with nickel-cadmium batteries, providing complete independence from line voltage fluctuations. Batteries recharge automatically when unit is plugged in.



A special protective circuit permits switching and connect-disconnect with no danger of bolometer burnout. Provision is made for both crystals and high and low current bolometers. An expanded scale offers the highest gain of all VSWR amplifiers on the market, and provides the same sensitivity at both expanded and normal stages (0.1 microvolts at 200 ohms for full scale).

For further information write Frederick R. Brewster, John Mather Lupton Company, Inc., 420 Lexington Avenue, New York 17, N.Y. or MEL Sales, 1969 Avenue Road, Toronto, Ontario.

## Gyro indicating system

Item 60

A new achievement in aircraft instrument miniaturization — a remotely-located standby Vertical Gyro Indicating system with a two-inch wide, panel-mounted indicator — is described in a new two-color brochure issued by the Instrument Division of Lear, Inc. The new remote vertical gyro indicating system is intended as a standby unit to replace an aircraft's primary indicating system in the event of a malfunction. Copies of the brochure, which details system characteristics and engineering data, are available from J. A. Andrews, Lear, Incorporated, P.O. Box 688, Grand Rapids 2, Michigan or Railway & Power Engineering Corp., 3745 St. James Street West, Montreal.

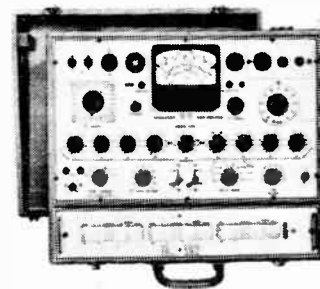
For complete information on products check off item number on page 81

## Mutual conductance tube analyzer

Item 61

The Triplett Electrical Instrument Company, Bluffton, Ohio, announces a new portable true Dynamic Mutual Conductance Tube Analyzer, Model 3444, which will be of interest to laboratory and research engineers, electronic specialists and electronic technicians.

This laboratory type tube analyzer in a portable case measures true Gm without any extra compensating factors. It uses proper value DC electrode potentials, 5 KC-AC signal source, and a vacuum tube microammeter. Very low (33 ohm) plate impedance for best correlation.



Many other tube analyses features ordinarily available in only laboratory type equipment are provided.

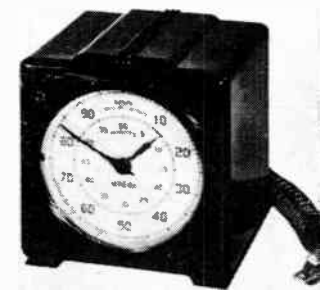
There are four direct reading Gm ranges: 0-1000 micromhos; 0-3000 micromhos; 0-10,000 micromhos; and 0-30,000 micromhos; DC filtered leakage measures (0-10 megohms at 85 volts.)

The case is gray leatherette-covered, 15 3/8" x 18 1/2" x 7 3/4". The Triplett Electrical Instrument Co., Bluffton, Ohio.

## Precision interval timers

Item 62

Standard Electric Time Co. of Canada Ltd. announces a complete line of precision interval timers of accuracy up to 0.005 of a second. Timers are available for a wide range of applications in panel mounting and portable models.



Write for further information to: Standard Electric Time Co. of Canada Ltd., 726 St. Felix St., Montreal, Que.

## Dacom recording system

Item 63

The development of a high-speed recording system that "reads" the magnetic tapes from electronic computers and instantly puts high-quality characters on microfilm has been developed by Eastman Kodak Co. The system is called Dacom for Datascope Computer Output Microfilmer.

Dacom is designed to cope with the tremendously high output of electronic computer data, an output so high that it is frequently put on magnetic tape for storage until it can be decoded.

The Kodak system "reads" magnetic tape and displays the corresponding letters or numbers on the face of a cathode-ray tube. A special camera continuously photographs the face of the "TV-like" tube to put a complete page on microfilm.

Dacom has a speed of 16,500 characters per second. As many as 66 lines of 130 characters can appear as a page, and these are microfilmed at more than two frames per second. The system can record 6,900 lines or more per minute. A roll of 1,000 feet of 16mm film will contain the decoded information from more than 35 reels of 2,400-foot magnetic tape.

With the new system a vast amount of information can be recorded, ready for storage, viewing, or reproduction.

Canadian Kodak Sales Limited, Toronto 15, Ontario.

## Precision oscilloscope

Item 64

A portable high performance measuring oscilloscope designed for general laboratory use and of special interest to the service engineer, the Tequipment Service scope combines the high performance formerly only possible with much larger instruments, with an unsurpassed simplicity of operation.

New versatile triggering circuit gives two modes of triggering: (1) Automatic Synchronization — for most applications simply switch to auto, and the time base locks automatically to any frequency between a few cycles and 1 Mc/s at any input level; or (2) Selective Triggering. Enables the time base to be triggered from any selected point on the input waveform.

This new trigger circuit gives rock steady synchronization from even the most difficult complex waveforms.

Built in TV sync separator selects line or frame pulses from positive or negative video signals.

3" flat tube gives a bright, fine trace over the whole of the screen area. Full 5 cms. X and Y deflection.

For further information consult Canadian Electronics Ltd., Edmonton, Alberta.

## Square wave polarograph

Item 65

The Mervyn Harwell Square Wave Polarograph is an instrument for detecting and measuring elements present in solutions or mixtures in very minute traces. Manufactured by Mervyn Instruments of Woking, England, it is 200 times more sensitive than conventional polarographic instruments. It will, for example, detect lead when it is present in a sample to the extent of less than one part in ten million.

Another feature of this instrument is that it will detect elements which are present in widely varying concentrations — it will detect and measure cadmium at a concentration of two parts per million, even though zinc may be present to the extent of 200,000 parts per million. Hence very



little pre-treatment of samples is necessary.

For full details contact: Telluro-meter Canada Ltd., 1562 Carling Avenue, Ottawa, Canada.



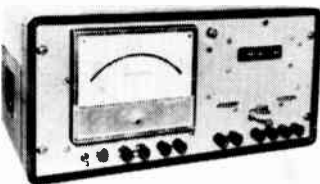
## Electronic wattmeter

### Item 66

New electronic wattmeters — designed for measurements at sustained accuracy and resolution down to .01 per cent of rated input — have been announced by the Weston Instruments Division of Daystrom.

Versatile in application, the new electronic wattmeter — designated Model 1483 — provides varied power measurements and resolution to much lower power factors than conventional indicating type dynamometers.

Since output of the new instrument is a low impedance DC current, and can be measured in many forms and degrees of precision, the Model 1483 electronic wattmeter can be used to actuate digital meters and remote, indicating DC milliammeters and to drive strip-chart recorders. The new electronic wattmeter also can be paralleled with several other Model 1483's for summarizing polyphase powers on one indicator; drive precision integrators to translate readings to energy (power x time); and can be read directly with a Type K potentiometer for maximum precision.



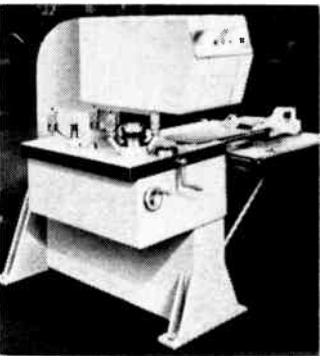
For further information about the new Model 1483 electronic wattmeter, write Daystrom Ltd., 840 Caledonia Road, Toronto, Ont.

## Strippit fabricator

### Item 67

Strippit Tool & Machine Company of Brampton, Ontario have introduced a new deep throat model of their Strippit Fabricator.

Designated their "Super 30 Fabricator" by the company, the new machine is a single station, high speed punch press with a throat depth capacity of 30". For straight line punching, it will handle a 30" workpiece of any length, utilizing the Strippit multiple-stop gauging system. For production punching with the Strippit Duplicate, its maximum work size is 25" x 30". Hole punching capacity ranges from a 3 1/2" hole in 16 gauge mild steel to a 1/2" hole in 1/4" mild steel with a tolerance of ±.005. It will handle 90° corner notching up to 5" x 5" in 16 gauge mild steel as well as rectangular, radii, vee and special shaped edge notches.



The new machine will do straight line nibbling and contour shearing at 165-strokes per minute with a capacity of 1/4" mild steel. A single switch permits instant changeover from single stroke punching to nibbling. The Super 30 Fabricator features the

Strippit quick-change punch and die system which enables the operator to change from one size to another in less than 20 seconds.

For complete information — illustrated literature, dimensions, specifications, price and delivery — write to Strippit Tool & Machine Company, 118 S. Hansen Road, Brampton, Ontario.

## Electronic lung

### Item 68

A new lightweight electronic lung is now available to persons with paralyzed respiratory muscles, the frequent result of poliomyelitis. It can replace the iron lung which, although an effective machine for sustaining life, is heavy, cumbersome and restraining to the patient.

The new lung, called the Barnet Ventilator was developed by Pye engineers working very closely with the medical profession. It is manufactured by W. Watson & Sons Ltd., a member of the Pye Instrument Group.

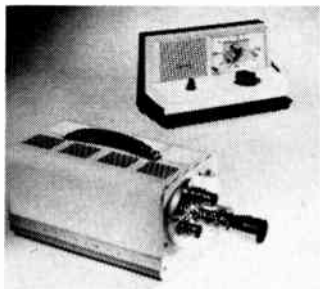
In addition to its use in polio the Barnet Ventilator is of the utmost value in every case of respiratory insufficiency arising from any cause. It can also be used in operating theaters for the administration of anaesthetics.

Pye Canada Limited, 84 Northline Road, Toronto 16, Ontario.

## Closed circuit TV system

### Item 69

The Sylvania Camera is the heart of Sylvania's moderately priced closed circuit TV system. The camera, a Vidicon type, weighs only 16 lbs. It requires no special lighting and will transmit an image on Channels 2 through 6 to any standard home type television receiver. It is equipped with a turret mount for three different lenses.



Its applications are varied: (1) in industry, as a training aid by observing others at work without disturbance; (2) in education — brings lectures and demonstrations to other locations without the need for mass assemblies; (3) in medicine — it permits close-up viewing of surgical procedures without disturbing the surgeon or technicians; (4) in military-police — observation of records and files without going to central file system.

Sylvania Electric (Canada) Ltd., 6233 Cote de Liesse Road, Montreal, Que.

## Character sensing equipment

### Item 70

IBM Series 1200 Character Sensing Equipment is directed at the banking industry. It is a system for banks of various sizes to automate. It has the ability to process the very paper on which the banking industry writes. The system can automatically calculate charges, analyze accounts and provide management reports as well as prove, sort, post and write statements and journals.

Write for particulars to: International Business Machines Company Ltd., Don Mills Rd., Toronto 6, Ontario.

## Two-channel potentiometer recorder

### Item 71

The new Varian G-22 is a very compact, low cost dual channel strip chart recorder with both pens traversing the full width of a 5-inch chart. Weight is only 35 pounds. Portable and panel-mount versions are available. Interchangeable plug-in chassis on each channel permit various recording characteristics to be used. Range is adjustable from 0.9 mv to 0-100 mv. Zero can be set anywhere across the chart.



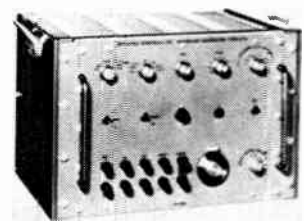
Two speeds are standard, four speeds optional. Chart-speed options range from 1/4 in/hr. to 8 in/min. Full span balancing time is one second, and accuracy is 1% of full scale. Available accessories include alarm contacts, re-transmitting potentiometers, and event markers on either or both margins of the chart.

Send inquiries attention: Ed Vopal, Advertising Manager, Varian Associates, Instrument Division, 611 Hansen Way, Palo Alto, California.

## Waveform generator

### Item 72

Type LF 51 Low Frequency Waveform Generator is an instrument capable of generating a very wide variety of electrical test signals over the range of frequencies encountered in servomechanisms, process controllers, and mechanical systems in general. It also has applications in physiology, in programming automatic systems, and in analog computation. It generates sine waves from 500 c/s down to 0.0005 c/s (one cycle every 33 minutes), square waves and pulses of duration 100 microseconds up to 1,000 seconds (Rise time 10 microseconds, 10-90%), ramp functions, triangular, saw-tooth, trapezoidal and sine squared pulses.



The plug-in non-linear shaping unit can be modified to simulate almost any desired function. The absolute accuracy of frequency calibration is ±2%, the incremental and re-setting accuracy being much better, due to the decade system. The amplitude is continuously variable up to 150 volts peak to peak with an accuracy of ±3%. Up to 5 mA can flow in the load without overloading the instrument.

Additional information available from The Glendon Instrument Company Limited, 46 Crockford Blvd., Scarborough, Ontario.

## MK. 11 and MK. 15 ice detector

### Item 73

The MK. 11 and MK. 15 Ice Detectors CARL standard stock items, are designed for airframe and engine intake installations, respectively. Variants of these two units are currently being produced by CARL for the Lockheed Electra, Convair Model 880 and Model 600, and the Northrop T38.

When icing conditions are encountered the detector operates a lamp in the cockpit, warning the pilot that these conditions prevail. The frequency of the warnings indicates the seriousness of ice accretion. The ice detector may also be used to initiate the operation of any ice protection system.

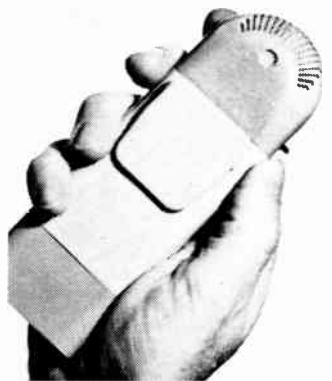
Other associated equipment designed and manufactured by CARL includes the Type T401 Static Ice Detector, the T403 Anti-iced Air Intake, and the T266 and T315 De-Icer Controllers.

Further information can be had from Canadian Applied Research Limited, 750 Lawrence Ave. West, Toronto 19, Ontario.

## Personal call receiver

### Item 74

A new series of transistorized pocket receivers has been made available for use with the Multitone "PERSONAL CALL" Staff Location System. Known as the



Series Eight, these receivers are for use in low to medium ambient noise levels and are capable of receiving a spoken message as well as a selective call signal. Among improvements incorporated in the re-styled receivers are greatly increased strength of the high impact plastic and aluminum case and increased sensitivity. Weight is very low at 5 1/4 ounces complete with mercury batteries.

Multitone of Canada Limited, 24 Merton Street, Toronto.

## Flame photometer

### Item 75

Canadian Research Institute, 46 St. George St., Toronto 5, Ont., Canadian representative for Baird-Atomic, Inc., Cambridge, U.S.A. have just announced an amazing new instrument for the rapid determination of those two chemist's headaches — sodium and potassium. Not only does this new Flame Photometer make easy work of what is most difficult to do by conventional means, but will determine Na and K almost simultaneously from the same micro-sample, which may be as small as 0.1 ml (twenty millionths of a gallon!). This analytical instrument reads directly on a meter scale and eliminates tedious calculations. Despite its high reproducibility of 0.5%, it is one of the very lowest priced Flame Photometers on the Canadian market. Spares and service will be rapidly available from

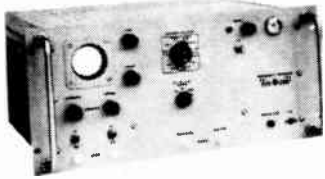
Canadian Research Institute, 46 St. George St., Toronto.

For complete information on products check off item number on page 81

## Frequency standard

Item 76

A compact precision frequency standard, providing a stability of  $5/10^8$  parts per week and  $3/10^8$  over short intervals, is now available from Hewlett-Packard Co.



The Model 100ER standard, according to the manufacturer, not only provides exceptionally high stability, but offers a wide variety of output signals. Signals available include six sinusoidal frequencies (10 cps, 100 cps, 1 KC, 10 KC, 100 KC and 1 MC) and four pulse signals (10 cps, 100 cps, 1 KC and 10 KC). These may be distributed for use at many different stations on a production line or in the laboratory.

The frequency standard includes a timing comb for calibrating, and for measurement of sweeps and time intervals. It also has a built-in oscilloscope for Lissajous comparisons. Rated load of the instrument is 50 ohms at 1 MC and 100 KC, and 5,000 ohms at the lower frequencies.

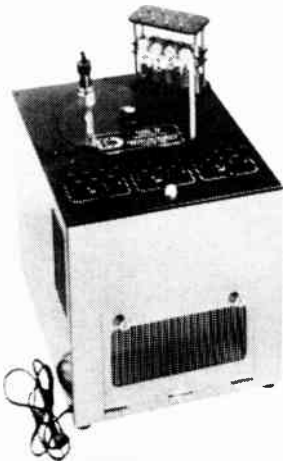
Model 100ER is extremely compact —  $8\frac{3}{4}$ " high, 19" wide and 18" deep. It weighs 35 pounds. Distributed by Atlas Instrument Corp. Ltd., 50 Wingold Ave., Toronto 19, Ont.

## Oil bath constant temperature

Item 77

The Weston Instruments Division of Daystrom Ltd. has announced development of a highly regulated, controlled temperature bath designed to maintain a bank of 12 standard cells at a constant temperature of plus or minus  $0.01^\circ\text{C}$ .

In operation, standard cells are immersed in a tank of neutral oil, and the oil temperature is maintained throughout its volume at  $35^\circ\text{C}$  by a circulating system. The polyethylene tank is insulated to minimize heat loss, and a glass-mercury thermometer — graduated in increments of  $0.02^\circ\text{C}$  per division — provides visual indication of the oil temperature.



The normal standard cell has a temperature co-efficient of approximately 50 microvolts per  $^\circ\text{C}$ . Since the temperature of the bath is held to within plus or minus  $0.01^\circ\text{C}$ , the output variation of the cell is held to 0.5 microvolt.

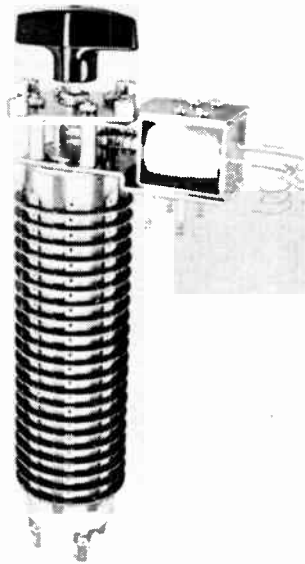
Daystrom Limited, 840 Caledonia Road, Toronto 19, Ontario.

## Solenoid lock

Item 78

Designed for use where it is important that circuit-control settings be changed only by authorized personnel or in a prescribed sequence, a solenoid locking mechanism can now be furnished with ESCO Type JR multi-pole rotary switches. Mechanisms can be provided to lock every position of the rotary switch so that no setting can be changed until the solenoid lock is released; or they can be provided with some positions locked and the rest free for local control.

Release can be effected by energizing the solenoid or, where fail-safe protection is required, by de-energizing the solenoid. Coils are available for 12-24-115 volt DC operation and can be impregnated to meet MIL-T-152. The eight-position switch can be furnished in 5, 10, 15, 20, or 25-section assemblies and with a



wide variety of contact arrangements. Basic electrical rating is 10 amperes 125 volts AC and switches can be supplied to meet MIL-S-21604.

Detailed information is available from E. Dennehy, Electro Switch Corp., King Ave., Weymouth, Boston 88, Massachusetts, or George M. Fraser Limited, Toronto, Ontario.

## Navigation system

Item 79

A logical sequel to the current R-Theta Navigation System, which CARL developed and manufactured in quantity for the RCAF and other NATO countries, ANADAC was developed primarily for use in the light strike fighter. Because of its versatility it is equally suitable for intruder, interception, reconnaissance and ground support operations. The complete series, from which selections can be made to build systems of various capabilities, is comprised of the following units:

Pilot's Navigation Indicator, Control Panel, Vector Addition Panel, Station Selector, Range and Bearing Computer, Ground Speed and Drift Computer, Track Off-Set Computer, Pictorial Display Unit and Coupler, TACAN Off-Course Computer, System Junction Box.

The system is built around a multi-purpose indicator which at all times displays steering information and, in conjunction with a dead reckoning analog computer and other units, can give guidance for accurate track-keeping or show a navigation

situation in terms of range and bearing from selected reference points. Alternatively this same indicator can display the outputs of various navigation aids such as ADF, VORTAC or TACAN.

Canadian Applied Research Limited, 750 Lawrence Ave. W., Toronto 19, Ont.

## Wire-reclaiming winch assembly

Item 80

The Ramsey Model X-600 Wire Reclaiming Winch Assembly is widely used by telephone and telegraph companies, and railroads who have their own telegraph and telephone equipment. The unit breaks the wire off the poles and winds it on the collapsible reels. The wire is then tied, the reel collapsed, and the wire quickly removed from the reel. The collapsible reels are not furnished with the winch assembly as they are standard reels in use everywhere by utility companies. Reels are attached to the winch shaft by spring-loaded snap on device, and can be quickly removed when not in use. Winch can be used for general winch work with or without reels.

Model X-600 R assembly drives from Willys power take off gear box mounted on draw bar by sprockets and chains furnished. Model X-600 L assembly drives from center power take off furnished with winch kit by use of universal joints and shaft. Rated capacity of winch is 12,000 lbs. Ramsey winches for "Jeep" vehicles are sold by "Jeep" dealers throughout Canada.

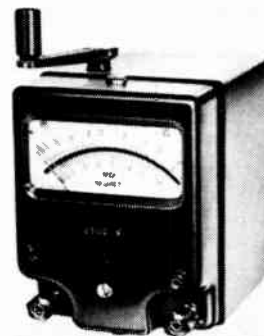
Write Willys of Canada Limited, Windsor, Ont.

## Megmet insulation testers

Item 81

Conway Electronic Enterprises announces the immediate availability of Precision hand-driven Insulation Testers in a range of voltages.

There are 4 types available — Megmet 100 V, reading to 10 MΩ — Megmet 500 V, reading to 50 MΩ — Megmet 1000 V, reading to 100 MΩ — Megmet 2500 V, reading to 5000 MΩ (in 2 ranges — 0-500 and 0-5000)



These units are driven by a collapsible, permanently fitted crank, and all instruments employ a crossed coil movement.

The indicating instrument is of the magnetolectric type, and is designed so that voltage fluctuations caused by irregular cranking have no influence on results of measurements.

These instruments possess a very high degree of accuracy and workmanship, and the prices are approximately  $\frac{1}{2}$  of any competitive instrument offered in this field today. The above instruments are covered by our one year guarantee.

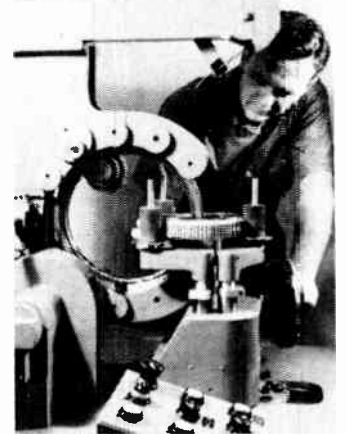
For further information contact — Conway Electronic Enterprises Reg'd, 1514 Eglinton Ave. West, Toronto 10, Ont.

## Winding machine

Item 82

A new winding machine, Maxitor, that is specially designed for winding heavy gauge wire on large toroidal forms, has been introduced by Boesch Manufacturing Company, Inc., of Danbury, Connecticut.

Three interchangeable heads are available for Maxitor. The HW-300 head winds wire gauges from  $\approx 20$  to  $\approx 7$  AWG on forms to a finished O.D. of as much as 14". HW-200 head winds gauges from  $\approx 24$  to  $\approx 10$  to a maximum finished O.D. of 10". The HW-100 head handles gauges from  $\approx 40$  to  $\approx 22$  to a maximum O.D. of 10".



Additional features of Maxitor include push-button drive ring and magazine positioning; micrometer brake settings for easy variable speed magazine tension control; and knob-controlled, infinitely variable turn spacing selection.

Complete information on Maxitor design and applications is available from the manufacturer, or contact Bayly Engineering Limited, Ajax, Ontario.

## "Megger" instruments

Item 83

Several new instruments have been announced by Evershed & Vignoles Ltd., manufacturers of "Megger" (Registered Trade Name) Instruments. These are described briefly below, but further details are contained in the individual leaflets mentioned.

6-Voltage Megger Insulation Tester: Provides six switch-selected test voltages which make the instrument particularly suitable for "step-voltage" resistance tests, time resistance tests, dielectric absorption tests. Operates on AC supply, output voltages 500 to 2500. Leaflet 051/13.

Megger Dielectric Testing Set: An AC driven timing device that can be incorporated in AC operated Series 1 Insulation Testers, was introduced to meet the requirements for time-resistance insulation tests. In these tests, a specified voltage is applied to the insulation, held constant for a prescribed period up to three minutes, and the resistance is measured at the end of this period. This feature is particularly important when testing devices with considerable capacitance such as lengthy cables or large machines. Leaflet 051/15 and 29.

Universal Ground Tester: The range and calibration make this instrument suitable for geophysical surveying, the siting for and measurement of grounding electrodes, and ground resistance measurements for cathodic protection. The scale is semilogarithmic to provide greatest accuracy in the area where it is most desired, and accuracy of reading is further augmented by a Vernier scale marking. Leaflet 051/24.

R. H. Nichols Limited, P.O. Box 500, Downsview, Ontario.

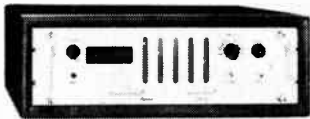
For complete information on products check off item number on page 81



## Solid state counter

Item 84

Model 5311 is equipped with a highly variable counting interval so that users may obtain indications of flow, pressure and speed in desired units, such as gals./sec, psi or rpm. The counting interval may be varied in 10 $\mu$ sec steps from 10 $\mu$ sec to one full second. Frequency counting range is 10 cps to 200Kc. Fully transistorized circuitry offers maximum reliability over the ambient temperature range of -5°F to +150°F.



The counter also makes extremely accurate period measurements by timing the duration of from 1 to 100,000 cycles in 10 $\mu$ sec units. It is possible to produce a percentage indication of deviation from any specific frequency by timing that number of input cycles. For example, to indicate percentage deviation from 400 cps, the counter times 400 cycles, thus reading "00,000" when exactly "on frequency" and "00,010" when ".01% low in frequency.

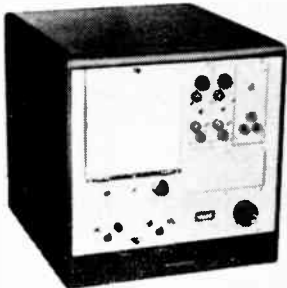
A portable model, powered by batteries, is also available.

Beckman Instruments Inc., Richmond 8, California, or R-O-R Associates Ltd., 1470 Don Mills Rd., Don Mills, Ontario.

## X-Y recorder

Item 85

X-Y recording of phenomena far beyond the limits of electro-mechanical plotters is now possible with a new X-Y recorder which uses optical galvanometers, a light beam trace and immediate-developing direct print paper charts.



The high writing speed of the Sanborn Model 670 X-Y Recorder makes possible fast, accurate recording of families of transistor curves, or of rapid mechanical displacement, velocity and acceleration. Traces are made by an ultraviolet light beam on 8" x 8" charts. These are loaded easily behind the hinged front panel monitoring screen, which has a phosphorescent coating that permits trace previewing.

Writing speeds in excess of 2500 in./sec. may be attained with the Model 670. The over-all frequency response is 3 db down at 130 cps and is independent of amplitude. Linearity is 1% of full scale; sensitivity, as high as 62.5 uv/in. Operating features include an Axis Record Switch to record X and Y axis for calibration; beam intensity control for maximum trace clarity; removable plug-in driver amplifiers and power supplies. Galvanometers are rugged, enclosed, low voltage, low resistance units.

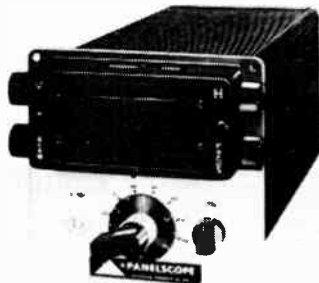
Complete information is available from the manufacturer, Sanborn Company, Industrial Division, 175 Wyman St., Waltham 54, Massachusetts.

## TV monitoring panelscope

Item 86

Aviation Electric Limited is offering the first small oscilloscope designed, by the Waterman Products Company, to view color or black and white TV sync pulses. A built-in selector switch allows selection of one of three negative going TV sync signals to be viewed at sweep rates of either one half the line or frame frequencies (H1, V1, H2, V2, H3, V3).

Another selector position permits connection of an external calibrating signal to the vertical amplifier. The vertical channel has a sensitivity of 1V p/p with a bandwidth of 6 MC. Two sweeps, 30 cps and 7875 cps allow both horizontal and vertical TV sync signals to be viewed. An external signal of +1V peak or more will synchronize the sweep generator. A diode clamp holds the base line at set levels independent of signal amplitude.



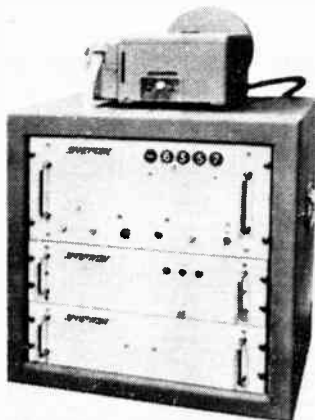
The Panelscope has overall panel dimensions of 5 1/2" high by 5 1/4" wide. It extends 10 inches behind the mounting panel. Since it includes its own high voltage supply for the 1 1/2" x 3" rectangular tube, only line voltage, 27 ma at +325V, 38 ma at +375V and 2.7A at 6.3V AC are required.

For further information write to Aviation Electric Limited, 200 Laurentien Blvd., Montreal, P.Q.

## Portable data processor

Item 87

Systron Corporation now is in full production on a single channel Analog to Digital Conversion System providing a punch paper tape processed in binary coded decimal form for use with most special-purpose digital computers. The 161 System measures DC voltages from 3 microvolts to 1000 volts with an accuracy of  $\pm 0.05\%$  and at a recording speed of 10 per second.

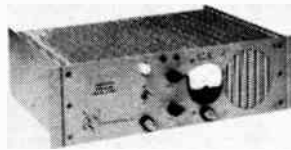


For further information Systron Corp., Concord, Calif. or Electro-design, 736 Notre Dame Street West, Montreal, Que.

## Transistorized DC supply

Item 88

A new, heavy duty transistorized power supply for operation in the 200-250 volts DC output range has been announced by Power Sources, Inc. Designated PS4017, its load current range is from 0-1.5 amps.



The supply is designed for nominal input of 105-125 volts AC, with front-panel switch selection of the nominal line voltage. Input may vary  $\pm 10$  volts around the selected nominal without affecting the output.

A front panel control permits selection of the required output voltage, and test jacks are provided for output monitoring.

Regulation is provided so that there is less than 0.2 volts change in the output for load variations from 0-1.5 amp with the line voltage held constant.

Under no-load conditions, the supply continues to operate at its preset output voltage. In addition, PS4017 is fully protected against component damage due to either continuous or momentary shorts.

Complete specifications on PS-4017 are available from Power Sources, Inc., Burlington, Mass. or E. G. Lomas, 227 Laurier Ave. West, Ottawa.

## Transistorized graphic level recorder

Item 89

A transistorized, high-writing speed, 20 cps-200 kc graphic level recorder (Type 1521-A) with a variety of uses in electronics, acoustics, and other branches of physical sciences and engineering,



is now available from General Radio Company, West Concord, Massachusetts.

The instrument records the rms magnitude of an AC voltage (on a logarithmic scale) rather than the instantaneous value, and can plot the output of an AC device as a function either of time or some other parameter that can be made time dependent, such as frequency.

A high-speed null-seeking servo-mechanism, of novel design, serves to position a logarithmic potentiometer and a pen to produce an ink trace on rectilinear paper. Three interchangeable potentiometers, with ranges of 20, 40 and 80 db, are available. Maximum writing speed is adjustable up to 20 inches per second, which corresponds to 400 db per second with the 80-db potentiometer. This permits measurement of reverberation time as short as 0.5 second.

It is also possible to convert this level recorder to a general-purpose DC recorder with adjustable zero level and 0.8-volt full-scale sensitivity by using a linear potentiometer, available as an accessory.

For further information write to: General Radio, 99 Floral Parkway, Toronto 15, Ontario.

## Multispeed tape recorder

Item 90

Model TRV-8 multispeed tape recorder is composed mainly of three interrelated packages: tape take-up and rewind desk; multispeed gear box and capstan shaft drive; and the electronic unit. The latter consists of a combined record and playback amplifier, a dual purpose record-and-playback magnetic head, an erase-and-bias oscillator, a half track (of 0.25 in. tape) erase head, a filter unit and an amplitude-vs.-tape speed compensating unit, switched in and out of the system as desired. The electronic unit comprises a built-in power supply and, for monitoring purposes—a PA stage with control, loudspeaker and a cathode ray tube record level indicator.



The purpose of the multispeed tape recorder is to provide means for recording and play-back of information on magnetic tape in a wide range of speeds.

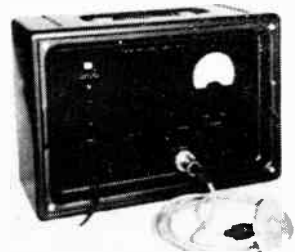
For further particulars write: Presentey Engineering Products Ltd., 1268 Henry Farm Drive, Ottawa 3, Ont.

## Accurate distance meter

Item 91

A new Distance Meter, Type DM-100, providing readings accurate to  $\pm 2\%$  of full-scale deflection, has been announced by Wayne Kerr Corporation, Philadelphia, designers and producers of instruments for electronic, physical and chemical measurements.

This new Wayne Kerr instrument operates in conjunction with non-contacting probes to provide a basically linear method of measuring distance from 50 microinches to 1/2 in. Distance is read directly from a moving-coil meter, the full-scale range depending upon the probe in use. Four probes are available—types A, C, E and F for full-scale ranges of 1, 10, 100 and 500 thousandths of an inch, respectively.



Wayne Kerr's Distance Meter affords a rapid and direct means of measuring distance in precision grinding processes, and can be readily adapted for such applications as the dynamic balancing of helicopter blades, and the measurement of verticality of control rods in nuclear power stations.

For further information write to: The Glendon Company Limited, Crockford Boulevard, Scarborough, Ontario.

For complete information on products check off item number on page 81



## Vacuum tube voltmeter

### Item 92

An all new, 7-inch vacuum tube voltmeter, produced by the Jackson Electrical Instrument Co., is being distributed in Canada by the Electronic Tube and Components Division of Canadian Marconi Company.

The large seven inch meter and hairline pointer give the new model — 590 — the greatest accuracy yet. AC voltage readings are exact from 20 cycles to 2 mc.



Fast warm up, built into the new model, enables it to give complete accuracy in less than five minutes; and accuracy is guaranteed by factory calibration.

The new model features all new silicon diode circuitry and a single probe for all measurements.

Ranges for DC volts, plus or minus, and AC volts are: 1, 3, 10, 100, 500 and 1,000 volts full scale. Also provided are separate 1 volt rms scale and separate peak-to-peak and Zero-center DC scales. Ohm ranges: Rx1, 10, 50, 100, 1k, 10k, 100k and 1 meg. The center of the Rx1 scale is 10 ohms. Accuracy for DC and ohms is 3 per cent of full scale and for AC volts, 5 per cent of full scale.

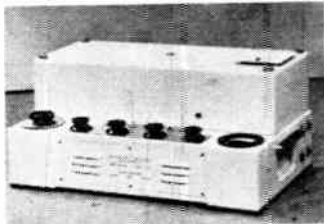
Electronic Tube and Component Division Canadian Marconi Company Limited, 830 Bayview Ave., Toronto 17.

## Infra red spectrometer

### Item 93

The Mervyn-NPL Infra Red Spectrometer is the first of a series of such instruments designed to cover a specific range of the Infra Red Spectrum.

The instrument covers the 3 micron region (1.4 microns) and is said to possess an overall stability which makes it eminently suitable for use as a process controller when it is locked at one wavelength setting. (It may also be used as a scanning spectrometer.)



The spectrometer may be used for analysis or control of many compounds found in petroleum refining, production of lubricating oils, plastics, paints, detergents and pharmaceuticals; also in the analysis of heavy water, and many organic compounds.

For further details contact: Tellurometer Canada Ltd., 1562 Carling Avenue, Ottawa, Canada.

## Contamination monitor

### Item 94

E.M.I. Electronics Ltd. has produced a new compact all-transistor monitor which offers unique facilities for detecting radioactive contamination.

Known as the E.M.I. Portable Contamination Monitor Type 1, the instrument employs the company's unique dual phosphor technique, and can be used for monitoring radioactive contamination on benches, clothing, and similar objects. All-transistor circuitry enables the instrument to be operated for long periods from a battery supply.

The dual phosphor technique enables both Alpha and Beta contamination to be monitored simultaneously. Separate distinctive tones are provided for Alpha and Beta either on headphones worn by the operator, or a built-in loudspeaker.

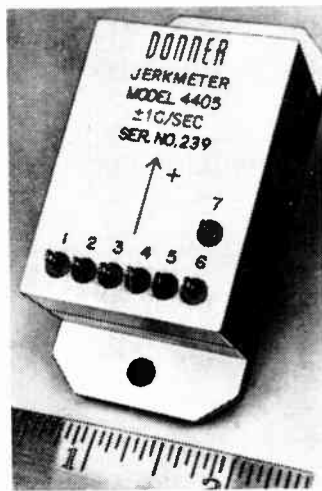
The new monitor provides high accuracy over a wide temperature range (0° C to 45° C), and by using a single switch it is possible to monitor the sum of Alpha and Beta contamination, Beta contamination alone, or just Alpha contamination. This information in the form of counts per second is displayed on a meter covering the range 0-5,000.

E.M.I. Electronics Ltd., Hayes, Middlesex, England.

## Precision jerkmeter

### Item 95

The first highly accurate instrument designed to measure jerk, the rate of change of acceleration, has been unveiled by Donner Scientific Company.



Accurate to 0.1%, the new instrument has principal applications related to missile and aircraft flight dynamics. Donner not only offers a linear Jerkmeter, only offers a linear Jerkmeter, Both units provide output voltages which can be used to instigate compensatory control forces or other actions. An acceleration output voltage is also available. Typically, a jerkmeter installed in a jet aircraft will provide an instantaneous output proportional to the rate of change of g's. This signal can be used to predict impending disaster conditions.

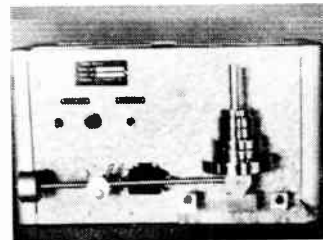
For more information, please address Transducer and Systems Department, Donner Scientific Company, Concord, California or Instronics Limited, Stittsville, Ont.

## Abrasion-scraper tester

### Item 96

Conforming to MIL-W-19583 (Navy) requirement to determine Abrasion Resistance of film-insulated high-temperature magnet wire, Peschel Model TS-2 Abrasion-Scrape Tester is a device that repeatedly scrapes the wire

with the cylindrical surface of a #11 steel needle. The length of the scrape motion in one direction is 3/4 inch, and the distance from the scraper head to the eccentric driving mechanism is approximately 6 inches. The frequency of the scraper is 60 strokes per minute. The device



is equipped with an electrical circuit providing 12 volts at approximately 5 milliamps between the needle and the wire sample. The electrical circuit is so designed that failure is detected and the device shut off when the film is worn through to the copper for approximately 1/2 of the stroke length. A mechanical counter indicates the number of strokes which were required to abrade the wire sample.

Input is standard lighting circuit, 115 volts, 60 cycle, single phase. The metal cabinet measures 14" x 8" high x 10 1/2" deep. Stark Electronic Sales Company, Ajax, Ontario.

## Executive intercom

### Item 97

New Loge Kwik-Kall desk intercom holds telephone to conserve space. Both 6 and 12-station models are available in matching telephone colors. Phone and intercom are not connected.

Write for full information to J. M. Loge, Sound Engineers, 2171 W. Washington Boulevard, Los Angeles 18, Calif.

## Transistorized tachometers

### Item 98

A line of transistorized tachometers having a dual function — measurement of speed without physical loading, and control of associated circuitry such as overspeed and underspeed control circuits — has been announced by Electro Products Laboratories, Chicago, Illinois.

Sensing device for the tachometer is a magnetic pickup. Angular velocity of shaft projections or a rotating gear induce a signal in the pickup corresponding to frequency of revolution. The pickup's signal is converted by the tachometer to a DC cur-



rent directly proportional to the frequency of the pickup's signal.

Instantaneous readings in addition to control circuitry are provided by a meter-relay unit whose scale is calibrated in RPM units. Accuracy of indication is 2% of full scale.

Additional information from Electro Products Laboratories, 4501 N. Ravenswood Avenue, Chicago 40, Ill.

## Multi-channel VHF radio link

### Item 99

Murphy Radio Ltd. of England are now in production on their new MR851 radio link equipment. This is a frequency-modulated system with a transmitter output of either 15 or 60 watts (determined only by the power supply chosen). Operating frequency is in the band 152-174 mc.

The baseband extends to 110 kc. and is capable of multiplexing 10 sub-carrier channels using double-sideband AM channelling equipment, or up to 24 using single-sideband. In addition, an engineering order wire is provided on a party-line basis. Test and alarm tones can also be carried on the baseband.

The basic terminals can also be employed back-to-back as non-demodulating repeaters. AFC is used throughout to maintain exceptional frequency stability.



Maximum deviation is 250 kc. The totally enclosed cabinets have front and rear doors for servicing.

Represented by Tele-Radio Systems Ltd., 3534 Dundas St. W., Toronto 9, Ont.

## Graphic recorders

### Item 100

We offer several different types of recorders — different in size, shape or application. The following descriptions are necessarily brief, but for detail, ask for the publication mentioned with each item.

**Evershed Recorders:** One of the most rugged and reliable recorders in industry. For the measurement of electrical quantities such as current, voltage, power, frequency, etc. Switchboard mounting and portable patterns, single and multiple pens and speeds, spring clock or synchronous motor drives, rectangular co-ordinates. Evershed Publication 222.

**Recording Millivoltmeter:** For special applications, designed primarily to record the output of thermopile measurement of solar radiation. Its moving coil is suspended in a magnetic field, thus eliminating friction encountered in normal jewelled pivots. Clockwork drive. Enclosed in dust tight aluminum case, wall mounting. Kipp Publication Reco 53.

**Operation Recorders:** For recording, on a time basis, the frequency and duration of any ON/OFF operation. Switchboard mounting and portable patterns, single and multiple pens and speeds, spring clock and synchronous motor drives. Single movement can also be fitted to standard Evershed recorders. Evershed Publication 248.

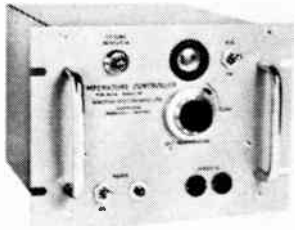
R. H. Nichols Limited, P.O. Box 500, Downsview, Ontario.

For complete information on products check off item number on page 81



## Temperature controller Item 101

This instrument will provide temperature control of furnaces or other devices up to a maximum of 1200°C and within limits of  $\pm 25^\circ\text{C}$ . These instruments are designed for long term stability and were designed for the control of creep furnaces which often



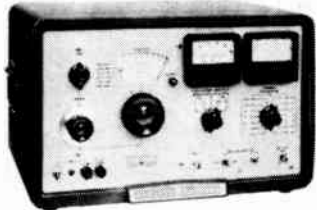
require a year or more to conduct one test. Sixty of these equipment have been in use for four years and the total outage time has been only five hours. All tubes used are now pre-aged for 200 hours and the serviceability factor has been improved still further.

**Mechron Engineering Products Ltd., 2437 Kaladar Ave., Ottawa, Ontario.**

## Signal generator Item 102

A new signal generator covering the broad frequency range from 50 KC to 65 MC is now available from the Hewlett-Packard Company.

The instrument, Model 606A, is particularly useful in driving bridges, antennas and filters, and measuring gain, selectivity and image rejection of receivers and IF circuits. Output is constant within  $\pm 1$  db over the full frequency range, and is adjustable from  $\pm 20$  dbm (3 volts rms) to  $-110$  dbm (0.1 microvolt rms).



The constant output impedance of Model 606A assures high measurement accuracy. A 10:1 voltage divider and dummy antenna, lowering minimum output to 0.01 microvolt (from 5 ohms) or simulating the IRE standard dummy antenna, is available for precision receiver measurements.

To insure maximum accuracy of frequency setting, Model 606A includes an internal crystal calibrator providing check points at 100 KC and 1 MC intervals with an error of less than 0.01%.

**Atlas Instrument Corporation Ltd., 50 Wingold Ave., Toronto 19, Ont.**

## Shock tester Item 103

A new addition to the Jolta line of intermediate and high shock test machines for qualification testing of components and assemblies to meet government specifications, is Jolta Model  $\pm\text{F-3003-B}$ .

This is an exceptionally versatile unit for testing of objects not exceeding 12 lb. or a 6-in. cube. The carriage consists of a totally rigid, precision-machined, single-unit aluminum casting (magnesium casting to special order). Extra long carriage guide rods stabilize the fall.

Overall height of the Jolta Model  $\pm\text{F-3003-B}$  is 67 in.; width 12 in.; depth, front to back, 8 $\frac{1}{2}$  in.

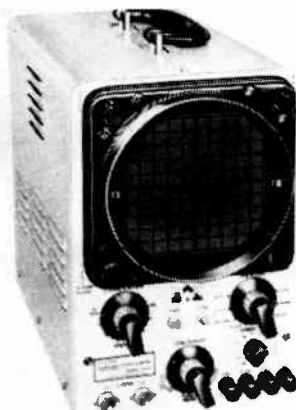
Complete specifications and performance data, as well as useful equations for computations in shock testing, are given in Bulletin 135, available from Jan Hardware Mfg. Co. Inc., Dept. EC, 38-01 Queens Boulevard, Long Island City 1, N.Y. or J. J. MacQuarrie Sales, 46 St. George St., Toronto 5, Ont.

## Craftscope, Model S-16-A Item 104

An Oscilloscope that is claimed to be the smallest five inch oscilloscope ever designed is now being marketed in Canada by Aviation Electric Limited.

Occupying less than  $\frac{1}{2}$  cu. ft. and weighing only 18 $\frac{1}{2}$  lbs., the S-16-A Craftscope is the first truly portable 5 inch scope yet offered to the industry.

It features DC to 7 MC response, direct reading vertical calibration, wide range repetitive sweep with additional fixed sweeps for color and industrial TV work, trace inversion, edge-lighted graph screen and many other professional features.



The Model S-16-A Craftscope is manufactured by Waterman Products Co., the manufacturers of the Pocketscope. For complete technical information write to: **Aviation Electric Limited (Exclusive Canadian Distributors) 200 Laurentien Blvd., Montreal 9, P.Q.**

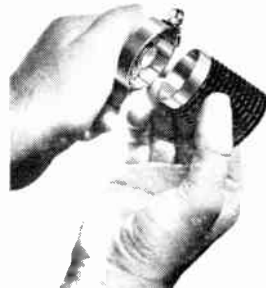
## Heat dissipator Item 105

A new transistor heat dissipator, the Thermoduct, distributed by Dayrand Limited of Montreal, features high cooling capacity, easy assembly, and low cost.

Made in copper and aluminum, the Thermoduct is available in a wide range of sizes to handle nearly all power transistors and most diodes. Two models with different fin spacings are used for filtered or unfiltered air.

Of Canadian design, the Thermoduct offers the equipment designer maximum cooling in minimum space, with the added convenience of "above ground" mounting — without mica washers which obstruct heat flow.

For further data, contact: **Dayrand Limited, 4612 St. Catherine Street West, Montreal 6, Quebec.**



## Dynamometer Item 106

This new unit incorporates a "feedback" torque control such that torque is reduced with speed decrease, permitting speed torque measurement around the knee of the torque curve, when maximum load range is approached.

Seven basic dynamometers from 1 ounce inch full scale to 750 ounce inches torque are available with speed measurement by



1 rpm increments to 8,000 rpm and to 30,000 rpm by 10 rpm increments.

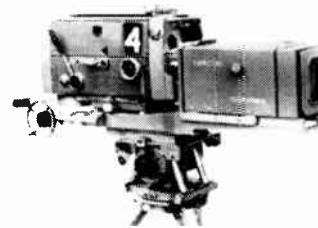
**Found Bros. Aviation Ltd., Canadian Licensees, Malton Airport, Malton, Ont.**

## Broadcast TV camera Item 107

A new range of image orthicon cameras is announced by the Transmission Division of Pye Canada Limited, McMaster Ave., Ajax, Ontario.

The Mark III Type 2042 camera chain features lightweight construction — 66 lbs. — fitted with a built in orbiter reducing the risk of target "burn in" and greatly extending the useful life of the pick up tube. Further protection of the pick up tube is provided by a thermostatically controlled target heater with remote temperature indication, and automatic scan failure protection with visual indication. A built in hour meter records pick up tube running hours.

The viewfinder has a 7 inch diagonal rectangular tube operating at 12KV with detail emphasis to aid focussing. There is an automatic montage registration facility, allowing the camera operator to view the picture



originating from his own camera, or originating from an external source or mixture of camera and external source, facilitating correct registration for inlay and overlay effects.

The camera is fitted with a four lens manually controlled turret (power drive optional) with "skew" mounted lenses allowing any combination within the limits 39 mm to 40 inches focal length without shadow interference. Any lens can be changed in 15 seconds.

For further information write to: **Transmission Division of Pye Canada Limited, McMaster Ave., Ajax, Ontario.**

## Sound and vibration analyzer Item 108

A portable, wide-range (2.5 cps — 25 kc) Sound and Vibration Analyzer — Type 1554-A — with a 10:1 span on each of four ranges, and featuring a  $\frac{1}{3}$ -octave bandwidth (1.26:1), narrow band-

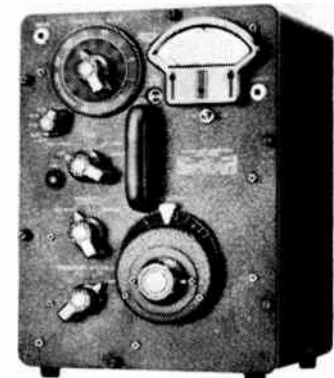
width (8%), constant with frequency) and all-pass response, is now available from General Radio Company. The instrument can be used to measure not only line (single-frequency) components, but also continuous (noise) components.

The instrument's narrow bandwidth is wide enough to embrace the small frequency fluctuations (or wow) arising from normal variations in speeds of engines, machines and appliances; 40-db discrimination obtains at one octave from selected frequency. The alternate,  $\frac{1}{3}$ -octave bandwidth is available, for the first time, at low vibration frequencies.

The analyzer is a tunable voltmeter whose bandwidth is a constant percentage of the center frequency. It consists of two RC-tuned selective amplifiers (connected in cascade), which can be either synchronously or stagger-tuned to produce narrow or  $\frac{1}{3}$ -octave bandwidths, respectively.

Narrow-band maximum response is flat  $\pm 2$  db over the entire tuning range;  $\frac{1}{3}$ -octave maximum response is flat  $\pm 4$  db over entire range; and the all-pass response is flat from 2.5 to 25,000 cps  $\pm 2$  db.

Input to the analyzer can be from a sound level meter, vibration meter or microphone.

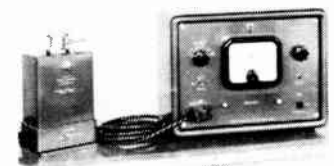


The analyzer dial can be driven from a G-R Graphic Level Recorder for the automatic analysis of sound spectra.

**General Radio Company, 99 Floral Parkway, Toronto 15.**

## Vibron electrometer Item 109

Type 33 Vibron Electrometer is a vibrating condenser amplifier, which is intended for the measurement of small DC voltages and currents derived from a high resistance source. It neither generates nor absorbs any current from the component under test, and hence can be used for measurements which are far beyond the capabilities of the conventional DC amplifier. It can also be adapted as a high impedance null detector for such purposes as the comparison of ionisation currents or very high resistances, or for determination of glass electrode potentials against a standard potentiometer, where the measurements must be independent of the resistance of the glass electrode.



Available from: **The Glendon Instrument Co. Limited, Toronto, Ontario.**

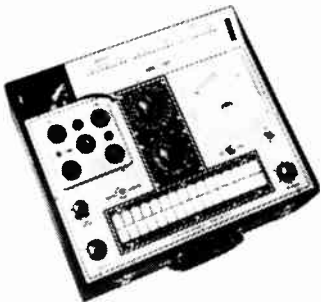
For complete information on products check off item number on page 81

## Tube tester

### Item 110

The Jackson Electrical Instrument Company has produced a new model for its line of tube testers, distributed in Canada by the Electronic Tube and Components Division of Canadian Marconi Company.

The latest model — 648R — has all the abilities and accuracy of the old 648 line plus several new



features that add up to speedier, more profitable service.

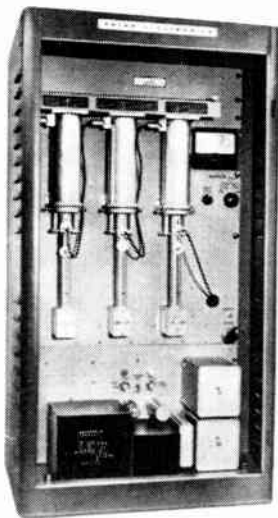
- Sockets are regrouped for easier use.
- Roll chart is completely separate from the working surface (and can be changed by the removal of only one screw).
- Little-used and obsolete tubes are in a separate book chart to give a shorter, more easily covered roll chart.
- New tube data for this unit is published monthly in P.F. Reporter and Trade Builder.

**Electronic Tube and Components Division, Canadian Marconi Company, Montreal, Que.**

## Heterodyne repeater

### Item 111

Adler Electronics has developed a low cost microwave system capable of transmitting television programs, through a series of relay hops, and over great distances without degrading their viewing quality. The Adler RT-3 Heterodyne Repeater fills the need for a reliable yet economical TV microwave system.



Quality engineered for continuous, unattended operation in the uncrowded 2 kmc frequency range, the overall economy of a private RT-3 microwave system puts network and remote programming within the reach of every TV station.

Complete information on request to **Adler Electronics, Inc., One LeFevre Lane, New Rochelle, N.Y.**

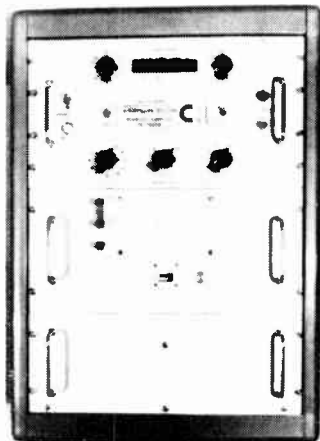
## High accuracy calibrators

### Item 112

Full scale production of four new AC and DC instrument calibration consoles — providing calibration accuracy of .05 per cent of indicated value — has been announced by Daystrom's Weston Instruments Division.

The new highly accurate AC and DC calibrators provide power source, circuitry, and control for the rapid calibration — including design, development, and service calibration — of practically all types of portable, panel, switchboard, and recording-type instruments used in the military services, aircraft industry, large utilities, and in industries using many and varied instruments in laboratories, or production processes and control.

The new completely self-contained calibration equipment — consisting of four consoles for the calibration of AC and DC ammeters, voltmeters, and wattmeters — provides measurement accuracy of .05 per cent — a constant percentage of accuracy maintained throughout the entire calibration range, from temperatures of 40°F to 100°F.



Additional information from: **Daystrom Limited, Weston Instruments Division, 840 Caledonia Road, Toronto.**

## Sweep generator

### Item 113

Jerrold Electronics Corporation in Philadelphia recently began production of its new Model 707 high output, extremely flat, sweep frequency generator. Boasting a  $\pm .05$  flatness over its highest octave of coverage, the new unit is available with plug-in oscillator heads covering any portion of the spectrum from  $\frac{1}{2}$  to 250 mc.

The 707 features an all-electronic saturable reactor, permitting a maximum deviation of approximately  $4\frac{1}{2}$  to 1 with sweep rates adjustable from one sweep every two minutes up to 60 sweeps per second.

Direct coupled circuits in the 707's monitoring detector and deviation drive circuits permit use of the instrument with "X-Y" recorders where permanent records for inspection or reporting



purposes are desired. Sawtooth or pyramid sweep shapes may be selected by adjustment of a front panel control. The output power exceeds + 20 dbm and is

monitored by a front panel meter.

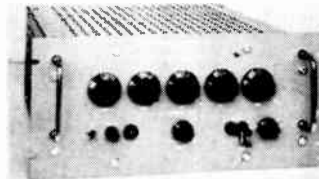
The new Jerrold precision instrument is designed to operate from a 115 volt 50/60 cycle supply built on a 13 by 17-inch chassis for cabinet or 19-inch rack mounting. The 707 will sell for \$795.00.

For additional information, contact **Jerrold Electronics Canada Limited, 50 Wingold Avenue, Toronto, Ontario.**

## Transistor tester

### Item 114

A unique programmable constant current source of unusual design has been introduced by



North Hills Electric Co., Inc., Mineola, L.I., N.Y. Designed especially for transistor testing, the Model CS-112 Current Governor furnishes currents from 0.1  $\mu$ a to 10 ma. in steps of 0.1  $\mu$ a at load voltages from zero to  $\pm 100$  volts.

Current is set to five places by decade knobs arranged to provide a digital inline readout. Accuracy at any current setting is  $1\% \pm 0.1 \mu$ a, short term stability 0.05%, line regulation is better than 0.1%, and load regulation better than 0.1%.

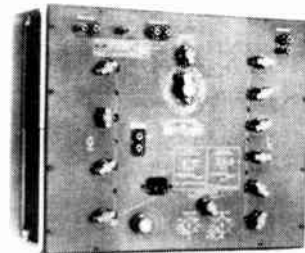
The CS-112 Current Governor is ideal as a transistor current source (avalanche testing) which may be programmed or modulated by a command signal.

The unit is 19" x 8 $\frac{1}{2}$ " x 15" and weighs 35 pounds. Data sheet and location of nearest sales office may be obtained by writing **North Hills Electric Company, Inc., 402 Sagamore Ave., Mineola, L.I., New York or Stark Electronic Sales, Ajax, Ontario.**

## Inductance bridge

### Item 115

A high-resolution (six-figure) inductance bridge (Type 1632-A) with a basic direct-reading accuracy of 0.1%, designed for the precise measurement of either



the series or the parallel components of two-terminal grounded inductors, at audio frequencies, over a wide range of inductance from millimicrohenries to 1111 henries, has been announced by the **General Radio Company, West Concord, Mass.**

Its high accuracy (two inductors of nearly the same nominal value can be compared to 10 parts in a million) and sensitivity (minimum indication — 0.001 microhenry) make it suitable for standardization measurements. A novel in-line digital read-out feature for both inductance and conductance (with automatic positioning of the decimal point) and the absence of a sliding balance also makes possible rapid preci-

sion measurements.

An outstanding feature is a panel-engraved bridge schematic, complete with balance equations and voltage limits, which eliminates the need to consult an instruction book.

At frequencies up to 1 kc, maximum accuracy is possible; however, the instrument is usable to at least 10 kc, with some reduction in accuracy.

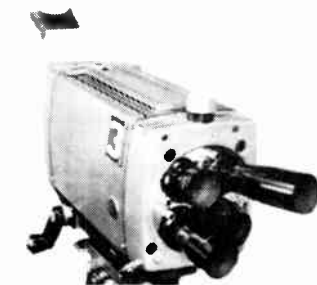
**General Radio Company, 99 Floral Parkway, Toronto 15, Ont.**

## Image Orthicon camera

### Item 116

The Pye Type 2131 4 $\frac{1}{2}$ " Image Orthicon camera of strong rigid construction, is suitable for studio or field use. The unit includes a built-in orbiter and hour meter with provision made for synchronizing the orbiting of several cameras.

An electronic viewfinder with 7 inch diagonal tube is incorporated with provision of detail emphasis and automatic registration facilities for montage. The turret is manually controlled and will accommodate lenses designed to the new BBC TV88 specification. All chassis are of the plug-in type for easy service and replacement.

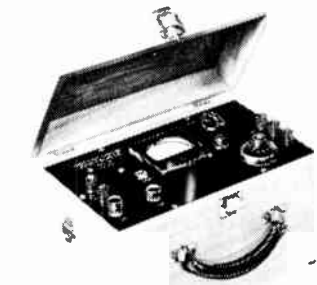


Further information available from **Transmission Division, Pye Canada Limited, McMaster Ave., Ajax, Ontario.**

## Cable fault locator

### Item 117

The Whitney Blake Cable Fault Locator is a completely self-contained portable unit (13 pounds) which locates open conductors, shorts, grounds, high resistance faults, crosses and split pairs in plastic, paper and rubber insulated cable. The unit operates on the bridge principle, although it differs from the common Wheatstone bridge. It is battery-operated and contains a transistorized 100 cycle tone source and a high gain tune amplifier for null detection. The null, or balance point, is attained by means of a single dial and is indicated by an easy-to-read meter.



Write for further data to Canadian rep.—**Sutherland, Griffith & Kerr, Ltd., 7220 Alexandra St., Montreal, Que.**

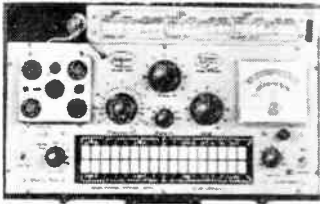
For complete information on products check off item number on page 81



## Tube tester

Item 118

The Jackson Dynamic Output tube tester tests tubes under actual operating conditions. Tests voltage regulator and reference tubes—indicates striking voltage and control voltage range. Also new 12 volt plate hybrid tubes—ample current capacity for even high current space charge grid tubes.

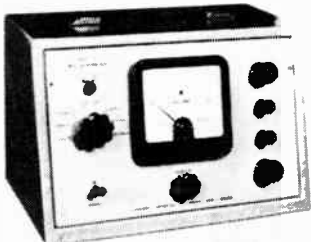


For further particulars write Canadian Marconi Company, Electronic Tube & Components Division, 830 Bayview Ave., Toronto 17, Ont.

## Milliohmmeter

Item 119

A Milliohmmeter designed for the measurement of low and very low resistance from 1,200 ohms down to 50 microhms is offered by The Glendon Instrument Company Limited. It is a transportable, direct reading instrument, with a clear linear scale and is very simple to operate. Special features are: simple operation, freedom from damage by misuse, very wide range, absence of batteries and minimal heat dissipation in test circuit—not exceeding one-eighth of one watt. It is very useful in measuring contact resistance of conductors, wiring, printed circuits, cable joints, con-



ductor rails and rail bonds, r.f. circuits, wave guides, fuses and fuse-holders, commutators, slip-rings, transformers and choke windings to mention only a few of the applications.

Further data from The Glendon Instrument Company Limited, 46 Crookford Blvd., Scarborough, Ontario.

## Impedance protection

Item 120

Interconnected systems today require reliable and selective protection relays which are capable of tripping faulted lines in the shortest possible time.

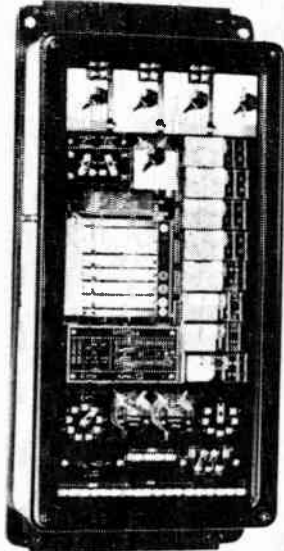
For voltages up to 220 KV, it is usually economical to employ relays with a single measuring element which can cope with different types of faults by internal switching. The R1Z24 relay has an operating time of 5 cycles. For voltages above 220 KV the faster 3 cycle R3Z24 relay with three separate measuring elements is preferred.

The impedance relay R1Z24 has three impedance dependents, a four directional time, and a fifth non-directional time steps. They are continuously adjustable from 0 to 8 seconds. The smallest impedance measurement is 0.1 ohm.

The relay is energized by line overcurrents of 1 to 2 times rated (can be switched to 2 to 4 times rated current) or by neutral cur-

rent 0.4 to 0.8 rated. The mode of actuation is recognized by mechanical targets which can reset externally by push button. The draghands of the step timing elements are also reset in this manner.

The relay can be complemented with an Actuation relay R3Z24 which permits setting the impedance relay twice as sensitively, and is recommended when either the short circuit currents are less than rated in periods of light generation, or the load current exceeds the normal short circuit in periods of heavy load.



Both relays R1Z24 and R3Z24 are available through The Ahearn and Soper Co. Ltd. in Ottawa, 384 Bank Street.

## Induction heaters

Item 121

The new medium frequency induction heaters, produced by Radio Heaters of England, are capable of performing any operation for which motor-generator installations are now used. They have the following additional advantages: initial cost and installation costs lower; complete equipment including tuning capacitors in one cubic (except variac or saturable reactor when required), alternatively the tuning capacitors may be remote from the generator as in M.G. installations; equipment may be single, dual



or variable frequency in the range 500 to 10,000 cycles; Curie rematch switching built into the equipment; more flexible operation as frequency may swing to accommodate load changes.

Complete details may be obtained from Electrohome, Technical Products Division, Kitchener, Ontario.

## Inverter power unit

Item 122

Instapac is an Onan-developed transistorized inverter power unit, which will instantly supply adequate AC power to the load (e.g. microwave radio equipment, electronic timers, hospital lights, etc.) on interruption of commercial power. Instapac has been designed to work in conjunction with an emergency generating unit, to take over critical loads instantly and operate essential equipment until the generating plant can take over.

Instapac will now be offered in either 19" relay rack mounting, with the necessary controls; or optionally, in a wall mount cabinet. It is now available in 3 input voltages . . . 24V, 36V and 48V. It is also being offered now with such optional items as a battery charger, meters (DC voltmeter, AV voltmeter, AC ammeter) and an output booster.

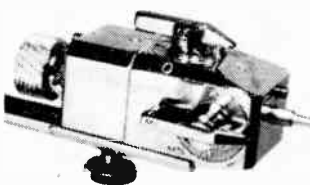
For complete data contact: D. W. Onan & Sons Inc., Minneapolis 14, Minn.

## Intra-cardiac pressure transducer

Item 123

Equipped with a standard Luer Taper for connecting hypodermics and catheters, the Telco type RA-8 pressure sensitive head is designed for measuring pressures using direct punctures of the heart or blood vessels during surgery or for renal or hepatic catheterization.

When used with the Telco Manometer type M41, the pressure sensitive head produces a direct indication of mean pressure on a meter, as well as making available an independent output for use in a photographic recorder, or an oscilloscope. Six ranges, from 12.5 mm. Hg. to 400 mm. Hg. are provided, and the frequency response of the Manometer is adjustable to five different characteristics. The pressure sensitive



head incorporates an exclusive damping system, which provides critical damping, regardless of the type of catheter or needle used.

Further information is available from A. C. Wickman Limited, Electronics Division, P.O. Box 9, Station "N", Toronto 14, Ont.

## Control unit

Item 124

An integrated control unit for low-temperature high-temperature chambers using liquid CO<sub>2</sub> for cooling has been introduced by the Development Engineering Company, Inc., of Norwalk, Conn.

The Control Unit is designed for use on new chambers or on existing chambers where conversion to liquid CO<sub>2</sub> cooling is desired. It is in a gray hammer-tone case, 6" x 10" x 3 1/2" deep, containing all the necessary equipment and wiring for cooling by liquid CO<sub>2</sub> and heating by electric control. Installation time is less than ten minutes.

The Control Unit is available without a thermostat or with various types of controls. This is a new piece of equipment for environmental testing.

For further information contact: Development Engineering Company, Inc., 9 Cross St., Norwalk, Conn.

## Electromagnetic indicator

Item 125

Allard Instruments Corp., of Mineola, N.Y., announces the development of a low price Electromagnetic Indicator. This unit is a compact, rugged shielded device intended to take reasonable abuse and last indefinitely. It is not subject to burnouts or damage by shock or vibration. This newly patented principle makes use of a rotating drum with a built-in permanent magnet. Part of the periphery of the drum is seen in the window as the indicating face. When the indicator is energized the reoriented magnetic field causes the drum to snap over to a new position to give magnetic balance. The model 111 indicator will snap back to its preferred keeper position when the power is removed.



The model 112 indicator will lock in position until a reverse polarity pulse is put through. Both units are available in input ranges up to 28 V.D.C. with an input power of approximately 0.5 watts and may be used on AC by means of rectification.

For complete specification data write to: A. Deskin Sales Company, 6875 Fielding Ave., Montreal, Quebec.

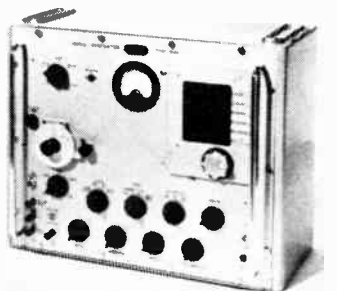
## VHF signal generator

Item 126

This instrument has an extremely wide frequency coverage, from 1 Mc/s to 320 Mc/s in 5 ranges. The operating frequency is shown on an illuminated film scale with a length of 4 feet on each range, and a crystal check oscillator is incorporated to ensure absolute accuracy of calibration.

A notable feature is the stabilization of the output level at any value between 2 microvolts and 220 millivolts, which avoids the tedious checking and resetting of the output when a number of different frequencies are in use.

An internal 1 kc/s oscillator is provided for amplitude or frequency modulation. Depth of modulation up to 50%, or deviation up to 80 kc/s, is monitored by a built-in meter to an accuracy of  $\pm 5\%$ . External modulation at any frequency from 30 c/s to 15 kc/s may also be applied either separately or simultaneously with



the internal modulation. External pulse modulation with pulse repetition frequencies from 30 c/s to 50 kc/s may also be applied.

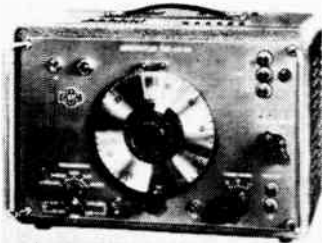
Full details from Airmec Limited, High Wycombe, Bucks, England.

For complete information on products check off item number on page 81

## Low frequency generator

Item 127

The C R C Very Low Frequency Generator is designed to provide signals from 500 CPS down to 0.005 CPS. It provides a highly



stable sine wave, square wave, or sawtooth output. A synchronizing output signal is also available.

The frequency ranges vary in the ratio of 1:10. Hence only one scale is necessary on the dial, and this of course provides excellent readability.

The generator is expected to find many uses in studies involving servomechanisms, vibrations, transmission lines, transformers, mechanical stresses and strains, medical research, geophysical research, etc.

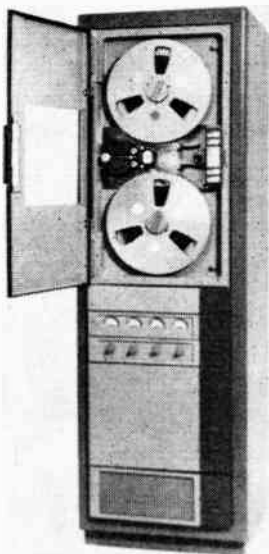
For further details contact: Tellurometer Canada Ltd., 1562 Carling Avenue, Ottawa, Canada.

## Magnetic tape recorder

Item 128

The FR-100B precision magnetic tape recorder is designed for the storage, transfer and processing of a variety of data for business, military, industrial and scientific applications.

Developed from the Ampex FR-100 and FR-100A, the new machine has been produced to fill an urgent need for more diversified recording capabilities and versatile applications in laboratory-type recorders in its price range.



The FR-100B features a plug-in modular design which allows accessibility of all electronic components and sub-assemblies; the plug-in amplifiers are interchangeable. It uses a precision plate casting to which all other tape guiding elements are referenced.

Write Ampex American Corporation, Instrumentation Division, 607A Commonwealth Bldg., Ottawa, Ont.

## Self-energized portable bridge

Item 129

The ICOMET Bridge is designed for speedy and accurate inductance, capacitance and resistance measurement, and covers the magnitudes most commonly used in AF and RF engineering.

The Bridge is suitable for production, service, design and development work. An internally contained battery supplies power required for all measurements. Ranges of measurement are as follows:

Resistance: 0-120  $\Omega$ , 0-1.2 K $\Omega$ , 0-12 K $\Omega$ , 0-120 K $\Omega$ , 0-1.2 M $\Omega$ , 0-12 M $\Omega$ .

Inductance: 0-120  $\mu$ H, 0-1.2 mH, 0-12 mH, 0-120 mH, 0-1.2 H, 0-12 H.

Capacitance: 0-120  $\mu$ Fd, 0-1200  $\mu$ Fd, 0-.012  $\mu$ Fd, 0-1.2  $\mu$ Fd, 0-1.2  $\mu$ Fd, 0-12  $\mu$ Fd.

Accuracy of unit is 1% of center scale, dropping to 1 1/2% at scale extremities. This unit is very inexpensive and is an ideal tool



for quick and accurate measurements. This unit is covered by our one year guarantee.

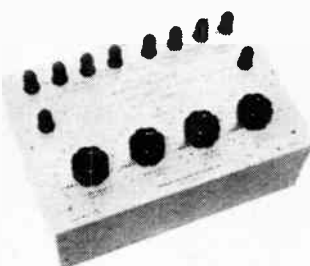
For further information contact — Conway Electronic Enterprises Reg'd, 1514 Eglinton Ave. West, Toronto 10, Ont.

## Students' wheatstone bridge

Item 130

An inexpensive bridge designed specially for educational purposes. The robust construction adopted ensures long life and maintenance of calibration under the most arduous condition. The bridge consists of a 4 decade variable resistance together with 3 pairs of ratios mounted in a case. There are no internal connections, the ratios and the two ends of the variable arm being brought to terminals so that the necessary connections are made by the students.

All the resistance coils are non-inductively wound so the bridge can be used with suitable accessories for elementary alternating

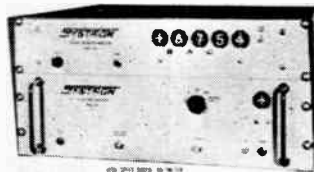


current bridge experiments. Available from The Glendon Instrument Company, Limited, 46 Crockford Blvd., Scarborough, Ontario.

## Digital voltmeter

Item 131

A high speed all electronic Digital Voltmeter is announced by Systron Corporation. The Model 1231 features accuracies to better than .05%, 20 millisecond conversion, In-Line readout, and automatic polarity for only \$1,895.



Provides a 4 digit indication from  $\pm .0001$  to 99.99 volts with optional ranges down to 1 microvolt and up to 1000 volts. Complete line of converters available which operate with Model 1231 for automatic component testing of Diodes, Capacitors, Resistors, etc. Free Technical Bulletin on request to Systron Corporation, 950 Galindo St., Concord, California.

## New stereo link

Item 132

Audio Electronics Inc. state that their new Audionix Stereo Link IV may be used to convert phonographs or radio combinations from monaural to stereophonic sound. It has a wide-range, 4-watt, push-pull, transformer-type amplifier with separate volume, base and treble controls. Speaker system comprises one 6 1/2" speaker and two 3 1/2" tweeters and crossover network.

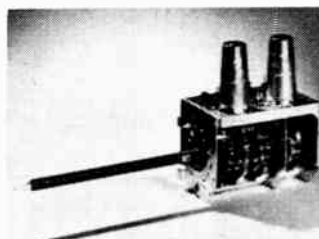
Link comes equipped with 15 ft. of low-loss cable for connection to main unit. Hand-rubbed cabinet, measuring 19" long x 13" high x 10" deep, is available in walnut, mahogany or limed-oak finish.

Information may be obtained by writing to: Audio Electronics Inc., 9500 St. Lawrence Blvd., Montreal 11.

## Television tuner

Item 133

General Instrument — F. W. Sickles of Canada Ltd. announce production of their new Model 500 TV tuner. This tuner is de-



signed and tooled in Canada to meet the exacting requirements of the Canadian market.

Featuring individually adjusted coils for all channels and all circuits, the Model 500 offers a high standard of performance.

Automated production using dip soldering and continuous wound coils assures uniformity and reduces human variables to a minimum.

The "500" is available in a variety of fine tuning applications, such as off-set, concentric, plunger, and the new General Instrument pre-set.

A variety of circuits is offered, including Tetrode, Cascode, and Super Cascode in 'hot' and 'cold' chassis versions.

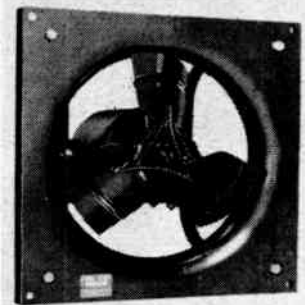
General Instrument — F. W. Sickles Canada Limited, P.O. Box 408, Waterloo, Ont.

## Cooling fans

Item 134

Two new lines of Canadian Sirocco air-moving units for cooling electronic equipment are now available from American-Standard Products (Canada) Limited. One is a line of small, compact tubaxial units; and the other is a line of special purpose propeller type units for ventilating cooling and ventilating electronic equipment cabinets where low-pressure, high volume air is required.

The new propeller-type fans are available in a variety of configurations, size, and wheel designs to meet a broad range of commercial or military specifications. A typical model has fan inlet and motor supports of die-formed steel, a fan wheel with aluminum blades, and a motor treated for high humidity and antifungus. Rated at 1/2 HP, this typical model delivers 1,300 cfm



of air at zero static pressure, and 1,725 rpm. Finish may be gloss black enamel to meet military specifications, with other finishes furnished on request. The full line is described on Bulletin No. 5512, available from American-Standard at 310 Ellis St. East, Windsor, Ont.

## Portable recorder

Item 135

A new line of low cost Portable Potentiometer Recorders with 6 inch chart has been developed by Systron Corporation for applications such as strain gauge or thermocouple monitoring. New optional features include ball point pen, one millivolt span preamp, and resistance bulb bridge for temperature measurements. Available for either portable or rack mounting use, the compact design allows up to four recording channels to be mounted in a 19 inch wide rack. With selectable 9 to 120 millivolt span, gear shift selection of chart speeds, 0.8 second balance time, and 1/4% sensitivity the units provide extreme versatility. Free technical bulletin on request.



Systron Corporation, 950 Galindo Street, Concord, California or Electrodesign, 736 Notre Dame Street West, Montreal, Que.

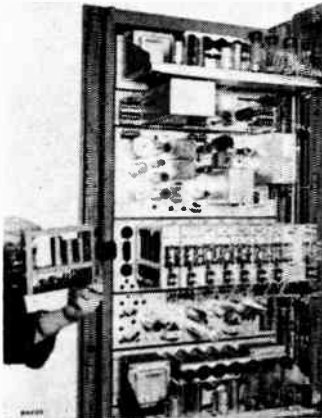
For complete information on products check off item number on page 81



## Telemetering system

### Item 156

Brown Boveri has developed a telemetering system which accommodates up to 38 measurands on a single audio channel with simultaneous indication of all measurands. Unlike the more common wide band frequency multiplex systems for multiple



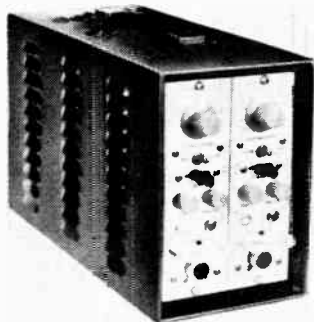
measured transmission this system operates on the time multiplex principle. Each function to be metered, or indicated, to a remote station is transduced into a given frequency which varies proportionally to the metered quantity. These individual frequencies are scanned electronically in sequence by a "Decatron" (10-step cold thyratron) and transmitted to the receiving end. The receiver scanning device is synchronized to the transmitter with two special signals, one for synchronization and one for phase control.

Brown Boveri (Canada) Ltd., 1015 Beaver Hall Hill, Montreal 1, Quebec.

## Portable amplifier

### Item 157

A new Dual Channel Portable Amplifier System specifically designed to accept any two Massa interchangeable Preamplifiers has just been announced by Massa Division of Cohu Electronics, Inc. The purpose of this portable system is to provide a convenient power source for driving Massa Pen Motors or other recording galvanometers having comparable characteristics. The Basic Unit, Model ASA-200, consists of two completely transistorized driver amplifiers housed in a lightweight portable cabinet with carrying handle. Any two Massa interchangeable Preamplifiers may be plugged into the Basic Unit. Low, Medium, High Gain DC; Carrier; and AC Preamplifiers can be supplied.



Specifications of PR-200 (Medium Gain DC) Preamplifier when used with driver amplifier of Model ASA-200 and a Massa OS-500 Pen Motor are as follows:

Input:  $\pm .050$  v to  $\pm 200$  v for  $\pm 10$  millimeters deflection. Input Impedance: 5 megohms single

ended, 10 megohms differential. Output: 600 ma maximum into 20 ohm load. Drift: less than 2 mv equivalent input per hour at maximum gain.

For further information please write or call, Atlas Instrument Corp. Ltd., 50 Wingold Avenue, Toronto 19, Ont.

## Sound systems

### Item 158

A new concept in sound system design has been introduced by Executive Communication Systems Limited, manufacturers of intercom and sound systems. Utilizing transistorized pre-amplifiers, this new sound system offers designers and builders two basic client-advantages:

1) Greater flexibility than was previously possible in the location of microphones, record players, power booster amplifiers and other components of the sound system;

2) Faithful, distortion-free reproduction of voice page messages and background music.

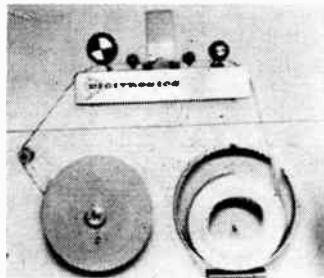
Small transistorized pre-amplifiers are the heart of this new Executive sound system. One pre-amplifier is located adjacent to — and in some cases built into — every Executive microphone, radio tuner and record player in the system. This pre-amplifier boosts the weak signal produced by the voice or music source and makes it strong enough to travel long distances to the power booster amplifier or mixer without noise pickup or other decrease in the quality of sound reproduction.

Additional information on this new sound system is available from Executive Communication Systems Limited, 331 Bartlett Avenue, Toronto 4, Ontario.

## Tape spooler

### Item 159

Model 4533 DYKOR Spooler unit provides a take up reel for a minimum of 300 feet of punched paper or Mylar tape. The six inch diameter reel unit can be used with standard DYKOR



photoelectric readers for operating speeds up to 300 characters/second if fast stop requirements are to be met.

In addition to the take-up reel, there is a feed bin. Together they maintain the simple loading and unloading of tape which is characteristic of the in-line feed of the DYKOR readers. The unit mounts on standard 19" relay racks directly beneath the reader and requires 8 $\frac{3}{4}$  inches of panel.

For further information write: Dykor Tape Reader Division, Digiconics Corporation, Albertson, L.I., N.Y.

## Signet amplifier

### Item 160

Hackbusch Electronics Limited announces the Stromberg-Carlson new line of Signet Sound Equipment consisting of:

"Signet" Amplifier/10 — Model SAU-10; power output — rated 10 watts, peak 19.6 watts; inputs 1 microphone, 1 phono-radio.

"Signet" Amplifier/22 — Model

SAU-22; power output — rated 22 watts, peak 40 watts; inputs 2 microphone, 1 phono-radio.

"Signet" Amplifier/33 — Model SAU-33; power output — rated 33 watts, peak 64.5 watts; inputs 2 microphone, 1 phono-radio.

"Signet" Amplifier/70 — Model SAU-70; power output — rated 70 watts, peak 138 watts; inputs 2 microphone, 1 phono-radio.

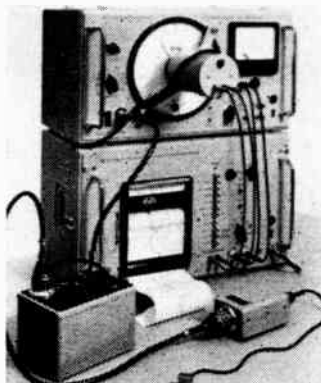
"Signet" Mobile completely transistorized amplifier; power output — 8 watts, less than 5% distortion; inputs 1 microphone, 1 phono.

For further information write to: Hackbusch Electronics Limited, 23 Primrose Ave., Toronto, Ontario.

## Vibration analysis

### Item 161

Frequency range 10-15,000 cps. The synchronous drive is powered from the AC supply and operating together with the wave analyzer Type FTA and DC recorder Enograph-G Type ZSG combine to make an automatic recording analysis system.

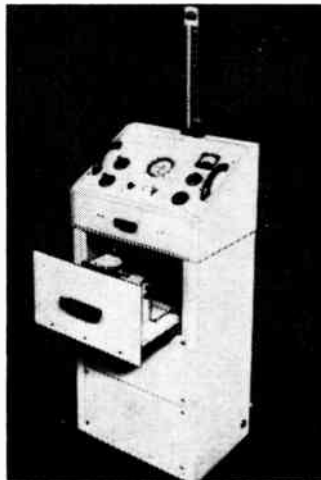


For further information write or call The Ahearn and Soper Company Limited, 850 Belfast Rd., Elmvale Acres, Ottawa, Ontario, CE. 6-9411.

## Blood pressure follower

### Item 162

The Blood Pressure Follower has been designed to follow continuously changes in systolic digital artery blood pressure in man over long periods of time



without the need for an arterial puncture. The normal method of taking blood pressure involves the use of an arm cuff, the standard sphygmomanometer, and either a stethoscope to listen to the Korotkov sounds in the artery below the cuff, or some mechanical or electrical means of recording pulsation.

A disadvantage of the arm cuff is that it causes discomfort to the patient. The nutrition of the limb may be impaired, particularly if the cuff is left inflated for too long a time. Furthermore, the stethoscope method can be used effectively only in quiet surroundings, and provides at best only spot readings.

The Blood Pressure Follower, in contrast, gives a continuous record with the minimum of discomfort to the patient. It operates without the need to disturb a patient, who may even be asleep in a hospital bed or resting quietly in a room, with the equipment itself set up, if desired, in an adjoining room or otherwise placed out of the patient's sight.

Further information from: Mechtron Engineering, 2437 Kaladar Ave., Ottawa.

## Sideband transmitter

### Item 163

The TMC Model SBT-1K is a conservatively rated general purpose radio transmitter capable of providing 1000 watts PEP throughout the frequency range of 2-32 mcs. The SBT-1K is designed primarily for single sideband service, but may be used with suitable exciters for many types of emission.

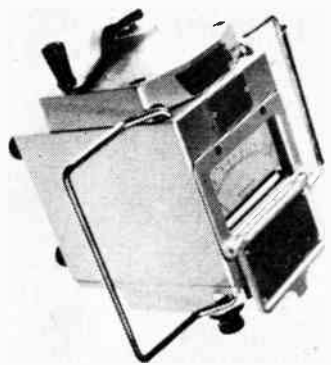
Operating Modes: CW, MCW, SSB, DSB, ISB, FS. Output impedance: will match any unbalanced load from 50 to 600 ohms at  $\pm 45$  degrees. Output circuit: Pi Network. Includes VSWR bridge to measure forward and reflected power. Distortion products: Better than 40 db down relative to PEP output, including 3rd order. Harmonic suppression: Second harmonic at least 50 db and third harmonic at least 65 db down from PEP output. Primary power: 115/230 volts single phase 50/60 cycle AC approximately 1900 watts.

Write for fuller information to TMC (Canada) Ltd., Ottawa, Ont.

## Resistance test set

### Item 164

A rugged, heavy duty crank-type Insulation Resistance Test Set is now available on the Canadian market. This series of in-



struments, the Model E-17, is made by Hitachi Ltd., of Tokyo (one of the world's largest electrical manufacturers), and stocked and serviced in Canada by Canadian Research Institute, 46 St. George Street, Toronto 5, Ont. These testers are housed in cast metal cases, and incorporate true crossed-coil ohmmeters so sturdily constructed that levelling and adjustment are not required while in use. The built-in dynamo incorporates a slip-clutch speed regulator for easy hand cranking and delivers from 100 to 2000 volts depending upon the rating and range desired, covering from 5000 ohms to 5000 megohms, reading on a large clear 3" scale.

Further information from: Canadian Research Institute, 46 St. George Street, Toronto.

For complete information on products check off item number on page 81



## Diamond truss tower

Item 165

The Diamond Truss self-supporting tower is available in steel, aluminum and fiberglass. In many instances the completed tower can be furnished as economically in aluminum as in galvanized steel. The aluminum tower weighs approximately 60% less than a comparable steel tower designed to the same load and rigidity requirements.

The Diamond Truss patented hinged base permits the tower to be assembled on the ground, all cables and conduits installed and the complete tower erected as one unit. Savings of as much as 75% in erection have been realized from the feature. The OMEGA sections which are used as columns on the aluminum towers, are so designed that cables, conduits etc. are located within the leg section for easy assemblies and protection from the weather.



Further information from: Pioneer Industries Inc., Sioux City, Iowa, U.S.A.

## TV-FM amplifier

Item 166

Blonder-Tongue Laboratories, Inc. announce their new Model HAB low cost TV-FM amplifier. The unit boosts signals up to 14 times for small master TV systems and weak signal home installations.



The three tube Model HAB features a special frame grid input circuit to provide highest possible signal-to-noise ratio. Maximum output is 0.7 volts at 75 ohms and 1.4 volts, at 300 ohms with 22 db gain on low TV and FM channels, and 24 db gain on the high TV channels.

A built in power supply operates on conventional 110-120 volt, 60 cycle current. The amplifier is protected in a grey Polytone steel cabinet, measures a compact 6" x 5 3/8" x 4 3/8". It weighs only 4 1/2 pounds.

Information may be obtained by writing Telequipment Manufacturing Company Limited, London, Ontario.

## Baseband combiner

Item 167

The CB-2B Electronic Baseband Combiner operates on the principle of parallel addition of a number of baseband currents in a common load. By monitoring the noise content of each receiver

signal and electronically varying the receivers output impedance accordingly, undesired receiver inputs are eliminated in the common load. The unit illustrated will accommodate the outputs of two receivers, for quadruple diversity reception two such



panels, or more if necessary, would be strapped together at the signal output. Complete standby of combiner panel and power supplies without switching can be provided so that failure of a component will not affect output. Designed for standard 19" rack mounting the dual diversity combiner panel requires 7" of rack space.

Further information from the Canadian Westinghouse Company Limited, Hamilton, Ontario.

## Portable megaphone

Item 168

The PP-IT is a high-power portable megaphone requiring no external power source. Its transistorized 20 watt power amplifier is powered from dry cells which are easily replaceable.

A push-to-talk switch is incorporated in the microphone which applies power to the amplifier only when talking into the microphone, thus affording maximum battery economy.

In addition to serving as a highly efficient high-power megaphone, the unit has additional desirable features. For example, a talk/listen switch is incorporated which converts the megaphone into a highly directional, sensitive, listening device, such as might come in handy in applications to boats. Also, a phonograph jack has been incorporated, which permits the unit to be used in conjunction with a record player.

The transistor amplifier of the unit is of low distortion, and is highly stabilized against temperature variations.

John R. Tilton, 51 McCormack Street, Toronto, Ontario.

## Rugged airborne recorder

Item 169

The Ampex AR-200 is one of the smallest instrumentation recorders developed to date for complete flight data acquisition, yet it offers the maximum reliability. It displaces only 1.6 cubic feet of space, and can accommodate from 7 to 32 recording tracks. It is 57 per cent smaller and 35 per cent lighter than its predecessors; solid-state components and printed circuitry are used throughout, allowing the volume (1.6 cubic feet) and weight (full system, 90 1/2 lbs.) to be less than that of any other commercially available recorder.



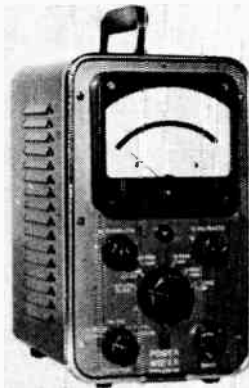
For more information, precise specifications and illustrated brochure, write to Ampex American Corporation, Commonwealth Bldg., Room 607A, Ottawa, Ont., or call Central 6-9763.

## Compensated power meter

Item 170

FXR's Model B-831A Temperature Compensated Power Meter measures RF and microwave power with incredible stability. The readings are accurate and virtually drift-free, even in the 10 microwatt range.

When used in conjunction with an FXR Series 218 Temperature Compensated Thermister Head, the power meter is a hundred times more stable than comparable instruments. This is due to a unique method of compensating for ambient temperature changes.



For further information write to: Radionics Limited, 8230 Mayrand Street, Montreal.

## Miniature recorder

Item 171

The Rustrak, already noted for extremely low cost, compact size and dependable method of recording, was greatly improved during 1959. In addition to the



standard DC ranges, 1 milliamp and up, AC voltage ranges and 200 and 100 microamps. DC ranges were made available.

Another important change was the optional availability of a hinged front cover enabling the operator to write on the chart while the recorder is operating. An improved chart brake mechanism was also introduced.

The Rustrak recorder is manufactured by the Rust Industrial Company, Manchester, New Hampshire, and represented in Canada by Elder Electronics, 541 Brant Street, Burlington, Ontario.

## Running time meters

Item 172

A new range of running time meters, offered by Cramer Controls Corporation, are available in the new Chinese square style or the standard round, with or without re-set and in a wide range of total time record.

Ruggedly constructed and synchronous motor driven, they are suitable for measuring operating or down time of machines, operating time of transmitters, aircraft requirements, etc.

Contact Power Service Products, 618 Vaughan Rd., Toronto 10, the Canadian agent, for further information.

## AC tachometer generator

Item 173

The Barber-Colman reversible shaded pole motor fulfills the requirements of a low cost, rugged, accurate and dependable AC tachometer or rate generator. With rated AC voltage applied to the main winding, a voltage is generated in the shading windings which is proportional to the speed at which the rotor is driven. This voltage is very nearly linear in the range of 1000 to 3000 rpm and is usable beyond these speeds with but a slight loss in linearity.

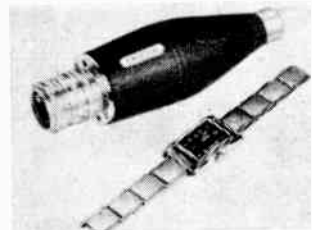
The performance curves indicate the response of the AYAE rate generator with low impedance shading coils (series impedance of all coils approximately 150 ohms). The generated voltage is of the order of two volts per thousand rpm. This voltage can be increased to the order of 10 volts per thousand rpm by the use of shading coils of higher impedance.

For further information write: John Herring Company Limited, 3468 Dundas St. West, Toronto.

## Television camera

Item 174

This is a Miniature Fernauge Television Camera, manufactured by Grundig, for the radial and axial view inspection of tubes.



It is 2.36 inches in diameter. The camera, in different housings, can be used for borehole inspection and internal inspection of concrete structures up to a depth of 1300 feet.

Other details available upon request to L. G. Blunt Ltd., 44 York Street, Toronto 1, Ont.

## Valve voltmeter

Item 175

The Winston Type M.25 Valve Voltmeter is a small self-contained multi-range instrument designed for general use in laboratories, test-rooms and workshops.

Its main features are an exceptionally long meter scale (5 inches, a mirror scale is fitted), freedom from zero drift, and a small compact AC probe using the latest silicon junction diodes. The instrument case and body are made in fiber glass, combining excellent mechanical strength, and at the same time allowing the circuit to "float". The insulation to mains and earth is better than 100 M. ohms.

The Voltmeter is essentially a center zero reading device, but facility for a left-hand side dial zero is provided for AC and  $\pm$  DC measurements. The offsetting control is so arranged that no rezeroing of the meter is necessary when going from balanced to plus or minus DC or AC, and vice versa.

Further data on this equipment available from Mechron Engineering Products Ltd., 2437 Kaladar Ave., Ottawa 1, Ont.

For complete information on products check off item number on page 81

## COMPONENTS AND SUB-ASSEMBLIES

### Pilot lights

Item 176

The Dialco line of sub-miniatures now includes a new series of units which are water-tight on the face of the panel. Water-tightness is achieved by means of a flat,  $\frac{1}{8}$ " thick, neoprene gasket on the shank of the lens holder — and — a  $\frac{1}{8}$ " thick retained "O" ring seal behind the flange of the mounting bushing.



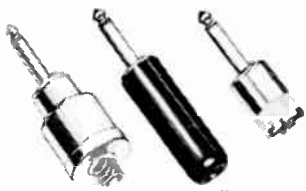
Other salient features of these pilot lights are: (1) Compactness: Each unit measures 1-7/64" in length and mounts in a single 15/32" clearance hole. Mounting from the front of the panel facilitates replacement of either the complete unit or the lamp. . . . (2) Fully Insulated: Requires no special insulating washers. The socket, lamp, and all connections are well insulated from the mounting bushing by means of phenolic material of military specification grade. Two terminals are provided for the electrical connections. . . . (3) Light Source: Accommodates T-1-3/4 midget - flange - base incandescent lamps of voltages ranging from 1.3 to 28.0 volts. . . . (4) Assemblies meet all applicable military specifications.

Please address inquiries to R. E. Greene, Dialco Corporation, 60 Stewart Avenue, Brooklyn 37, N.Y. or Lake Engineering Company Limited, 123 Manville Road, Scarborough, Ontario.

### Silent plugs

Item 177

An ordinary phone plug or connector, when disconnected at the instrument, is often the source of objectionable noise if accidentally touched because of the open circuit "hot grid" of the amplifier. Replacing the plug or connector with one of the new Switchcraft Silent Plugs eliminates this problem because the



circuit closes automatically, eliminates which occur when the "hot" plug is touched, bumped or dropped on floor. These "Silent Plugs" are an added protection against damage to the cone of the speaker in the amplifier.

A complete catalog of Audio Accessories No. S-590 may be obtained by writing directly to Atlas Radio Corporation Ltd., 50 Wingold Ave., Toronto 19.

### Coaxial switch

Item 178

A new manually-operated rotary coaxial switch has been placed in production by Jerrold Electronics Corporation, Philadelphia. Designed for use wherever RF energy is to be switched from one



circuit to another, the new CS-250 transfers RF energy from 0 to 1000 mc with a maximum VSWR of 1.1 up to 500 mc and 1.2 up to 1000 mc.

The ruggedly-built CS-250 is a four terminal, two position transfer switch, coaxially mounted in a rugged die cast metal frame. Its dual wiping, self aligning switch contacts are silver, mounted in a Kel-F dielectric.

Insertion loss in the CS-250 is less than 1/10 db to 1000 mc. Isolation between the open and closed circuit is 58 db at 100 mc and 40 db at 1000 mc.

The CS-250 is available with BNC connectors at 50 ohm impedance.

The new coaxial switch will sell for \$19.60.

For further information write to: Jerrold Electronics, 50 Wingold Ave., Toronto, Ontario.

### Isolating/Drainage transformer

Item 179

A new low loss Combined Isolating and/or Drainage Transformer, manufactured by Osborne Electric Company, Ltd., Toronto, is available for use on telephone



lines subject to high voltage surges. This equipment is molded in epoxy resin and insulated for 10 KV pri to secondary and all windings to ground.

For further data please contact Osborne Electric Company, Ltd., 95 Wesley St., Etobicoke, Toronto 18, Ontario.

### High-sensitivity vidicon tube

Item 180

A new high-sensitivity vidicon tube, WL-7325, for televising scenes over a wide range of illumination levels is available from the Canadian Westinghouse Company, Hamilton.

When operated under recommended conditions, the WL-7325 is capable of resolving detail information equivalent to 600 television lines. This resolution is more than adequate for broadcast and industrial applications

working on normal television standards.

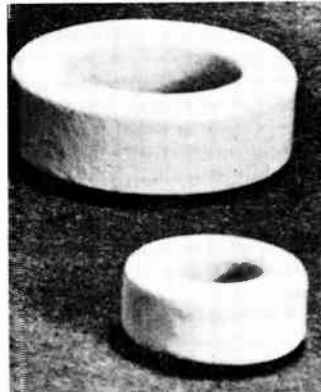
The main characteristic of the WL-7325 is its ability to produce satisfactory pictures with an average illumination as low as one-tenth of a foot-candle on the faceplate. Thus, with an inexpensive lens, useful pictures can be obtained from scenes having a highlight brightness of less than five foot-lamberts.

For further information, please write Information Department, Canadian Westinghouse Co. Ltd., Hamilton, Ontario.

### Powder core

Item 181

A 160-mu moly-permalloy powder core — the highest permeability available on the market today — has been introduced by Magnetics Inc., Butler, Pennsylvania.



Developed specifically for audio filter low frequency applications, the 160-mu cores offer circuit designers 28 per cent higher inductance than is attained with 125-mu cores.

Two additional distinct advantages are miniaturization and higher Q. At least 10 per cent fewer turns of wire are required to yield a given inductance. The higher inductance-fewer turns ratio also permits use of heavier wire for windings, appreciably reducing DC resistance and resulting in a significantly higher Q.

The 160-mu cores are available in eight standard sizes, ranging in outside diameter from .500 to 1.370 inches, and inside diameter from .300 to .950 inches.

Additional information may be obtained by writing to Magnetics Inc., Butler, Pennsylvania or George M. Fraser, 1554 Yonge Street, Toronto 7, Ontario.

### C.W. magnetrons

Item 182

Rogers Electronic Tubes and Components have just introduced two new types of C. W. magnetrons. These are the Philips 7091 and 7292 magnetrons developed as C. W. power oscillators in industrial microwave heating generators.

Both types are capable of delivering a C. W. output power of 2 kW at a frequency of 2425-2475 Mc/s. Both types have the same electrical properties and differ only in the cooling system for the anode-block. Type 7091 is a forced-air cooled magnetron and type 7292 is the water-cooled version.

The chief applications of these two magnetrons is in the food industries for microwave heating. The extremely fast and uniform heating given by microwave is extremely good for processing, defrosting and preheating food-stuffs.

Complete details are available from Rogers Electronic Tubes and Components, 116 Vanderhoof Avenue, Toronto, Ontario.

### Rotary selector switch

Item 183

A new series of rotary selector switch assemblies featuring a "cock-and-fire" actuating mechanism and non-tease circuitry has been introduced by Micro Switch, Toronto, Ont. a division of Honeywell Controls Limited.

The "28AS" series assemblies are designed for use on aircraft, electronic and computer panels, and

other areas where mounting surface is at a premium. They can be provided with two to eight plastic enclosed single-pole/doublethrow basic switches and two or three actuator positions. Detents are 90 degrees.

While moving positively from one position to another, the "cock-and-fire" actuating mechanism imparts a good feel of the detent action, and provides immediate indication of each position in the operating cycle.

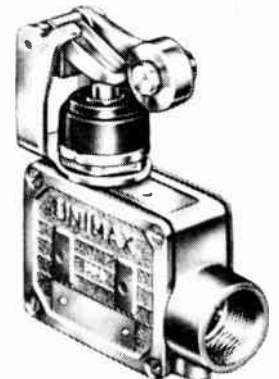
A variety of switching sequences can be factory adjusted to fit customer requirements. Individual actuating levels pivot on a common rod, insuring maintained adjustment.

Further information from: Honeywell Controls, Vanderhoof Ave., Toronto 17.

### Precision switch

Item 184

The unimax adjustable-roller-arm enclosed switch comprises a basic 2HB-5 single-pole, double-throw, precision snap-acting switch in a die-cast aluminum housing having a sealed over-travel plunger and an adjustable roller-lever actuator suitable for operation by either fast or slow cams or slide actuating devices. The actuator arm can be adjusted through 240 degrees around its shaft, and the actuator bracket can be rotated about the plunger and locked in any of eight positions, 45 degrees apart. The nut that locks the actuator arm tends to tighten as operating force is applied, thus preventing accidental change in the operating point of the switch.



Neoprene-gasketed, interchangeable side plates and the neoprene boot sealed to the plunger make the assembly resistant to moisture, dust, and oil.

A data sheet giving details of operating characteristics, dimensions, and mounting styles is obtainable from: J. Martinez, Unimax Switch Division, The W. L. Maxson Corporation, Ives Road, Wallingford, Connecticut or Aero-motive Engineering Products, Montreal, Que.

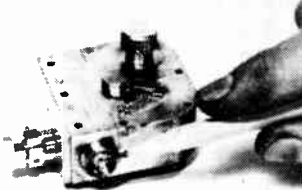
For complete information on products check off item number on page 81



## Wavelength components

### Item 185

FXR, Inc., is now offering a commercial line of recently developed and proven 2 MM wavelength (G-Band) and 3 MM wavelength (F-Band) components, according to an announcement from Henry Feldmann, President of the Company. These miniature instruments with frequency ranges from 90 to 140 KMC and 140 to 220 KMC, F-band and G-band respectively, are not scaled down versions of their lower frequency counterparts but products of advanced microwave engineering and new manufacturing techniques.



The commercial line is comprised of waveguide and flanges, slotted sections, precision variable attenuators, detector mounts, E/H tuners, precision phase shifters, frequency meters, fixed terminations, series shunt and E/H tees, E- and H-plane 90° bends, precision sliding shorts, standard gain horns, harmonic generators, rectangular-circular transitions and crystal, bolometer, thermistor and harmonic generator cartridges.

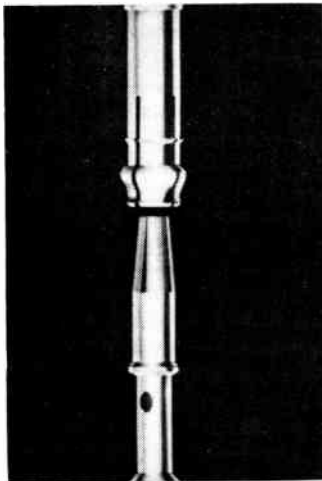
Further information from: Radionics Limited, 8230 Mayrand Street, Montreal.

## Miniature connector contact

### Item 186

A new type of miniature connector contact was made available recently by U.S. Components, Inc. of New York. Embodying an advanced design principle, REMI Re-entrancy Miniature Contacts can be removed or replaced easily with pliers or by hand, eliminating the need for special tools.

REMI... the result of U.S. Component's continuing program for research and development... employs metallic sleeves with long cantilever springs to ensure ease of insertion, withdrawal, and operational stability, providing the optimum in re-entrancy or closed entrancy performance.



REMI's new metallic sleeve design permits interchangeability of male and female contacts at all times.

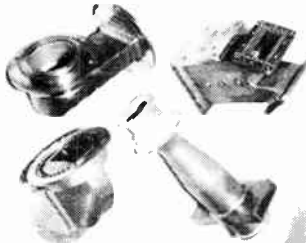
For complete details, contact J. J. MacQuarrie Sales, 46 St. George St., Toronto 5, Ont.

## Decca radar electroforming

### Item 187

The Electroforming process is based on the electro deposition of copper using both low temperature soluble and stainless steel formers. The parts produced are of high dimensional accuracy and have excellent electrical properties. Complex internal shapes with re-entrant cavities can be accurately made in one piece.

A very important feature of the process is that any metals on which copper can be satisfactorily deposited may be used as inserts over which the copper is grown. They then become an integral part of the finished article. Brass inserts can be used and are commonly employed for posts, probes, couplings and flanges. As a result of these inserts being an integral part of the finished article, the distortion which so often results from soldering and brazing is eliminated, enabling close tolerance to be held on the finished article.

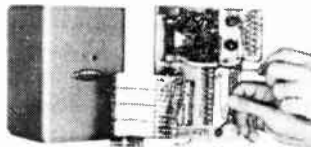


For further information write to: Decca Radar (Canada) Limited, 23 Six Points Rd., Toronto.

## "Do-it-yourself" telephones

### Item 188

A fully automatic dial telephone system for internal communication needs can now be installed at less cost than most intercoms, according to DuKane Corporation, St. Charles, Illinois.



Heart of the new DuKane system is a compact, lightweight automatic switchboard, smaller than a portable typewriter case, and easily mounted under a desk, behind a counter, or even on a plywood partition.

The new "10 1" telephone system is designed to fill the needs of smaller businesses, or to provide internal communications wholly within departments of larger organizations. Two to ten lines are possible, and provision can also be made for loudspeaker paging in special areas. Both desk and wall telephone instruments are available, in black and colors.

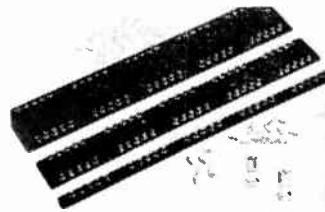
Additional information from General Sound and Theatre Equipment Company, 861 Bay St., Toronto.

## Terminal boards

### Item 189

Cambridge Thermionic Corporation announces that all-set terminal boards with CAMBION (R) No. 1010 castellated terminals are now available in 13 1/4" lengths and widths of 1/2", 1 1/2", 2", 2 1/2", and 3". Corresponding part numbers are: No. 1411, No. 1416, No. 1421, No. 1426, and No. 1431. Three board materials are avail-

able: laminated phenolic per MIL P-15035B, laminated nylon phenolic per MIL P-15047B, and laminated thermosetting glass cloth per MIL P-18177B. Board may be 3/32 or 1/8" thick.



One-half-inch wide board has single row of 25 No. 1010 terminals; all others, double rows of 25 terminals each. Terminals are mounted on 3/8" centers. All boards are sectioned into five 2 5/8" sections for convenient breaking into suitable lengths. Each section is drilled for 14 terminals with 10 mounted. Hole size is .120 No. 31 drill. Terminals are brass per QQ-B-626a, furnished in 6 shank lengths from 5/64" to 19/64". Both boards and terminals are available in any quantity.

For further information write: Cambridge Thermionic Corporation, 445 Concord Avenue, Cambridge 38, Massachusetts.

## Push button attenuator

### Item 190

The Daven Company, Livingston, New Jersey, announces the development of a new variation of its RF 540 and 550 Push Button Attenuator. As a Spec 7130 Network, dial lights are installed which indicate the total attenuation in decibels when one or more of the dial buttons are depressed. Any of the standard Daven RF 540 or 550 series can be modified to incorporate this dial light arrangement.

The dial lights will operate from an external six volt source. The unit is mounted on a standard 19" rack panel.

All these units have a flat frequency response from DC to 225 megacycles. All are available for a total of either 120 DB in steps of 2 DB or 100 DB in steps of 1 DB, using standard Daven RF 540 and RF 550 attenuators.

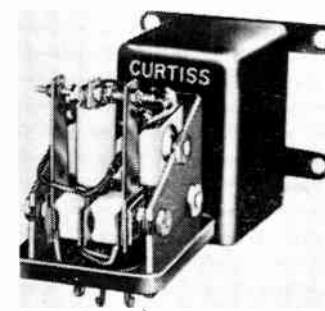
For further information, write to the Daven Company, Livingston, New Jersey.

## Time delay relay

### Item 191

The new Curtiss-Wright STR Series relay provides a unique combination of features to meet airborne and missile application requirements.

The STR relay will reset the instant it is deenergized, providing the same time delay period for each succeeding cycle. This operational advantage has been achieved by employing a special



thermal element in conjunction with a pair of magnetic relays. This component combination utilizes the heating and cooling intervals to obtain the total time delay period.

Voltage compensation is provided for operation on 22 to 32 volts DC. Temperature compensation is over the range of -65°C to +125°C. The unit may be operated under high shock and vibration.

Power drain less than 3 watts after the timing period; 10 watts during timing. Contact rating 2 amperes at 28 volts DC resistive load. Approximate dimensions 1 3/4" x 1 1/4" x 1 1/2" with bracket or stud mounting.

Further information available from Curtiss-Wright Corporation, Electronics Division, Components Department, 620 Passaic Avenue, West Caldwell, New Jersey.

## Panel meters

### Item 192

3 1/2" military style panel meters are now being produced by Helipot Division of Beckman Instruments, Inc.

Built in accordance with MIL-M-10304A, the new line features voltmeters, ammeters, microammeters, and milliammeters. There are 61 standard models now available.

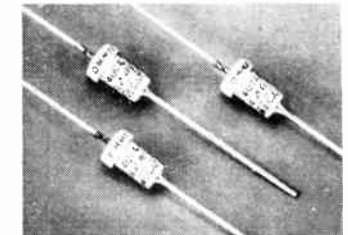


Complete specs, prices, and order information are available in a six-page data sheet from R-O-R Associates, Limited, 1470 Don Mills Road, Don Mills, Ontario.

## Tantalum slug capacitors

### Item 193

Extensive tests have substantiated the fact that Ohmite Series TS capacitors meet the physical



and performance requirements of military specification MIL-C-3965B for tantalum slug electrolytic capacitors, Styles CL44, uninsulated and CL45, insulated, case size T1. Mil requirements have been met for all voltage and capacitance ratings and for all "grades" (vibration test requirement) called for in the size furnished by Ohmite.

Series TS capacitors have the distinguished characteristics of tantalum electrolytic capacitors — excellent stability, great capacitance per unit volume and efficient operation at temperature extremes. They are superior to other tantalum wet electrolytics in having lower leakage and power factor. A marked increase in the military applications of Ohmite slug-type capacitors is expected as a result of these tests.

For additional information, request Bulletin 159 from Ohmite Manufacturing Company, 3693 Howard Street, Skokie, Illinois.

For complete information on products check off item number on page 81

## Precision rotary switch

Item 194

Custom designed, the SG-270 Precision Rotary Switch is ideal for circuit sampling, sequencing, programming, digital generators, etc. Precision metal rings and brushes provide smooth, trouble-free action with either Make-Before-Break (MBB) or Break-Before-Make (BBM) contacts.

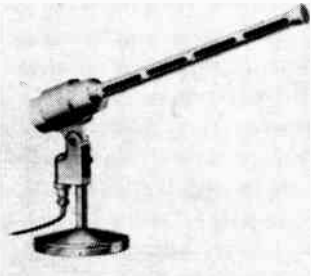


Multiple gangs can be assembled to provide multi-pole switches. Cased in special plastic, the SG-270 Switch is inherently fungus resistant . . . stable at high temperatures. Available in sizes 5/8" - 1 1/4" - 1 3/8" - 2" - 3" - 5" diameter in various mounting styles. Write, stating requirements, to The Gamewell Company, 1238 Chestnut St., Newton Upper Falls 64, Massachusetts, U.S.A., or Douglas Randall (Canada) Ltd., 126 Manville Road, Scarborough, Ont.

## Sound spot microphone

Item 195

Model 644, a new concept in directional microphones, is now being manufactured by Electro-Voice, Inc., Buchanan, Michigan. This 644 Sound Spot uses a combination cardioid and distributed front opening, enabling it to maintain proper response far away from the sound source.



Its front effective acceptance angle is 45 degrees on each side of center. Random noise cancellation from the rear and sides exceeds 20 db. E-V rates the 644 Sound Spot's frequency response smooth from 40 to 12,000 cps.

E-V of Canada Limited, 73 Crockford Blvd., Scarborough, Ontario.

## Console cabinets

Item 196

Premier Metal Housings, Ltd. of Montreal, has announced the introduction of an entirely new line of Prem-O-Rak Console cabinets, designed for modular console systems.

These handsome two-tone cabinets can be assembled in an endless variety of arrangements. The system consists of sloping cabinets, pedestal frames, work tops, writing shelves, turrets and sliding drawers. They are also designed to be used with Premier Heavy Duty Transmitter Racks (PR series) as well as the Premier Prem-O-Rak desk cabinet racks (POR series).

Further information can be had from Premier Metal Housings, Ltd., 5810 Smart Ave., Montreal, Quebec.

## Non-drift miniature switch

Item 197

A new highly reliable rugged longer life compact miniature Trolex series rotary switch (1 1/8" body dia.) designed for low power selector switching applications has been developed by C. C. Meredith & Co., Ltd., Streetsville, Ontario, a subsidiary of Chicago Telephone Supply Corporation. Exceptional uniformity and reliability is attained by new automated manufacturing processes. Permanently positioned terminals are firmly molded into housing and cannot turn or twist out of place. Unique design prevents solder from running down into circuit elements during soldering. Molded glass alkyl housing exceeds MIL standards, has high mechanical strength, low toxicity and exceptional non-drift char-



acteristics. Type 212 is not subject to breakage during ordinary handling nor accidental dropping. Further information from: C. C. Meredith & Company Limited, Streetsville, Ontario.

## Sub-miniature diodes

Item 198

Extremely small Sub-Miniature 1 and 2 cell selenium diodes known as Minifiers have been developed by IRC.

Designed specifically for reliability and long operating life (20,000 hours) in automatic gain controls, bias supplies, detectors automatic frequency controls and sensitive DC relays.

Assembled in drawn brass housings to provide a high efficiency heat dissipation and better mechanical protection Minifiers are coated with a thermosetting material for environmental protection. Complete assembly measures 1/8" in diameter.



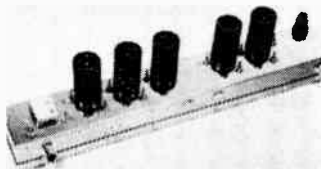
Features include: Rated Current .25 to 1.0 milliamps. Typical forward drop at rated current 1.5 to 3.0 volts. Minimum forward current at 1 volt per cell, 50 to 200 milliamperes. Maximum reverse current at 26 volts per cell, 4 to 16 milliamperes. Peak inverse voltage 46 and 92 volts.

For further information write to IRC Resistors, Division of Renfrew Electric Co. Limited, 349 Carlaw Avenue, Toronto 8, Ont. for Bulletin M-1.

## I.F. amplifier

Item 199

LEL has introduced a new addition to their IF amplifier line which extends the range of their



standard cataloged units to 200 mc. The IF 39 has a gain of 120 db, 3 mc bandwidth, 200 mc center frequency, detector output, and provision for gain control. A matched input noise figure of 6.5 db is standard; lower noise figure input circuitry can be supplied if required.

For further information contact: LEL, Inc., 308 Oak Street, Copiague, New York or E. G. Lomas, 227 Laurier Ave. West, Ottawa, Ontario.

## "Muffin" fan

Item 200

Measuring only 1 1/2" by 4 1/4" square, the new Muffin Fan recently released by Rotron, opens new areas for designers who, because of space limitations, have been unable to include air cooling in equipment under production. This new fan features an inside-out motor with cantilevered bearings and with the air impeller integral with the rotor. This highly efficient, shaded-pole motor draws only 13 watts. No capacitor is required nor are there any commutators, slip rings or brushes which could shorten life or reduce reliability.

The fan is designed for continuous duty, maintenance-free



operation with a life expectancy of 3 to 5 years when operated within the ambient temperature limits of 40°F to 110°F and within the nameplate electrical rating of 105 to 120 volt AC, 60 cycles.

Further information may be obtained through Rotron's representative in Canada - The Hoover Company Limited, Hamilton, Ontario.

## Illuminated magnifiers

Item 201

Outstanding features:

Large precision ground lens. Excellent distortion-free magnification. Brilliant shadow-free lighting all around viewing area. Luxo's famous precision spring-balanced action, the magnifying lamp adjusts easily to any position . . . and stays put! Can be mounted anywhere! Table, bench, machine, wall, etc.

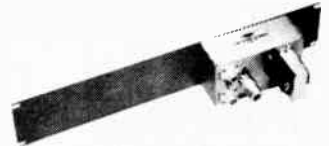
Further information from: Payette Radio Limited, 730 St. James Street West, Montreal.

## V.H.F. receiver pre-amplifier

Item 202

Where weak signals are encountered, there are many ways of improving circuit quality with higher towers, lower loss coaxial cable, higher antennas, or higher power at the transmitter. However, doubling signal power can be a very expensive matter at 50 mile range. In these circumstances, the BP-1 is well worth considering as a means of adding db.s to your present signal-to-noise ratio.

As an example of the improvement to be expected, measurements were taken on a fully serviceable receiver of well known make, which has a stated



20 db quieting point of less than 0.8 microvolts. The best sensitivity that could be achieved without the pre-amplifier was 0.6 microvolts for 20 db quieting. However, with the pre-amplifier, the quieting point dropped to 0.22 microvolts, an improvement of 8 db. Paralleling the pre-amplifier output with a 50 ohm dummy load to represent a second receiver, the quieting point rose only to 0.24 microvolts.

For further information write to: Pylon Electronic Development Company Limited, 161 Clement Street, LaSalle, Montreal 32.

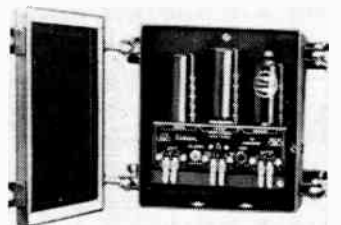
## DC amplifier

Item 203

Measurement Engineering Ltd., have announced a new Fielden DC Amplifier having a stability of 0.1%. This amplifier should become a most useful component in all systems where a DC output of several milliamperes directly proportional to a DC input of a few millivolts is required with a high degree of repeatability. Typical applications are in strain gauge systems for weight measurements, in computers, and in temperature control systems where a saturable core is used.

For weight and force measurements a resistance type strain gauge or load cell fed from a stabilized DC supply is connected to the input of the DC Amplifier and the output of the amplifier is fed to an indicator or recorder to show or record weight, force in lbs., tons etc.

In computers the amplifier is a ready means of converting the few millivolts DC available from a transducer into the several milliamperes required for the successful operation of the computer.

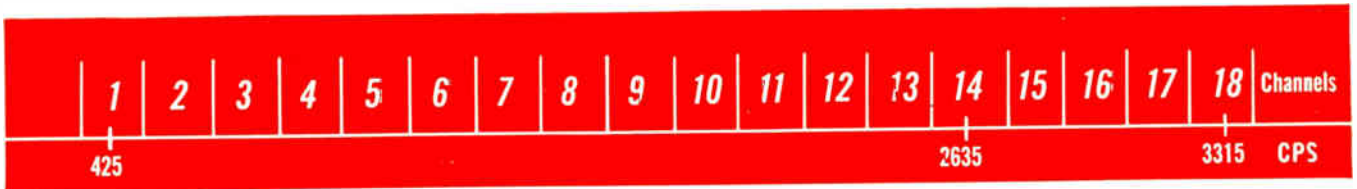


The transducers, covering temperature, pressure, flow, weight, level and other quantities are readily available.

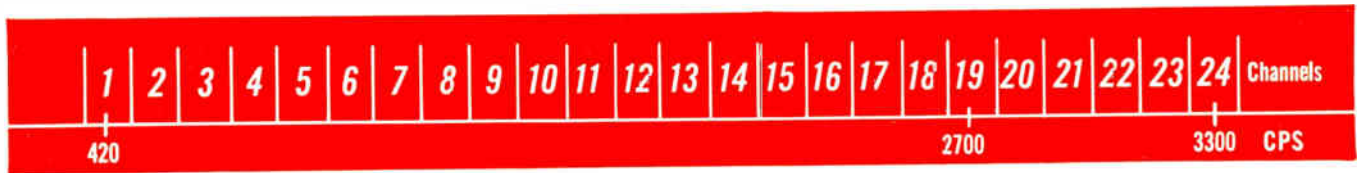
For further information write: Measurement Engineering Limited, Arnprior, Ontario.

For complete information on products check off item number on page 81

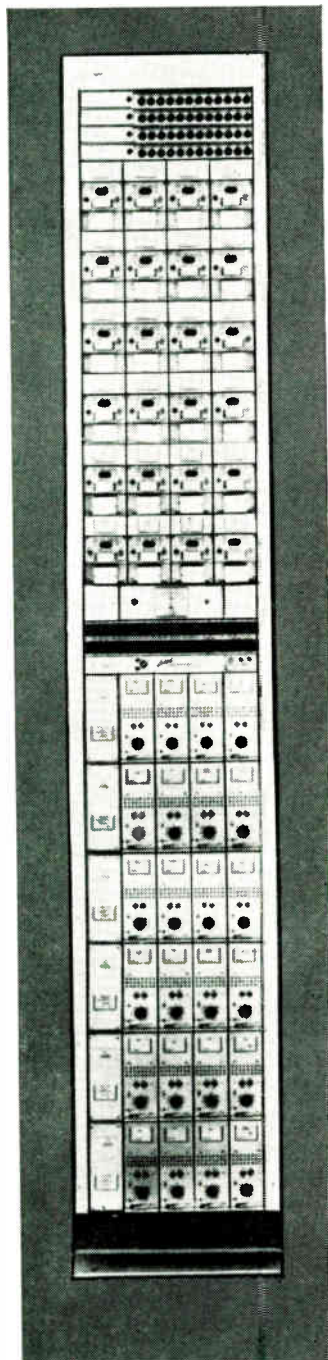




## 170 CPS CHANNEL SPACING



## 120 CPS CHANNEL SPACING



# MAXIMUM SPECTRUM UTILIZATION

## WITH *Lenkurt* 23A FM TELEGRAPH CARRIER

A new version of Lenkurt 23A FM Telegraph Carrier, the 23A-120, permits the application of 24 frequency-shift telegraph channels to a single voice channel, using 120-cycle spacing.

The reduced spacing increases by six the number of VFCT channels available between 400 and 3300 cycles, and by four the number that can be applied to a 2800-cycle voice channel. The system will operate at 66 WPM with less than 5% distortion. It is fully transistorized, provides all standard loop options, and a complete twenty-four channel terminal can be mounted in a single rack.

Lenkurt 23A equipment is also available with standard 170-cycle channel spacing.

Call or write any Automatic Electric sales office for further details.

**AUTOMATIC ELECTRIC** 

Subsidiary of  
**GENERAL TELEPHONE & ELECTRONICS**

For complete details check No. 10 on handy card, page 83

# UP TO 20 OUTSIDE LINES . . . UP

# *the 90-B-20 P-A-B-X* *your subscribers*

The Type 90-B-20 P-A-B-X by Automatic Electric, is the fast, efficient method of business communication that is tailored to your subscribers' particular needs.

It is a *complete* communication system . . . can handle from 30 to 90 inside telephones and up to 20 outside lines . . . deal with up to 32 separate, *private* conversations at the same time.

## **ATTENDANT CABINET**

Although the Type 90-B-20 can be operated without an attendant cabinet, it is usually desirable for an attendant to handle incoming outside calls. The compact attendant cabinet can be located on the desk of a receptionist or other employee without greatly affecting her regular duties. Answering, holding, and transferring operations are carried out quickly and easily by means of pushbuttons. Signal lamps show the progress of all calls and also indicate when the attendant's services are required. Ringing is automatic.

Desk type attendant cabinet takes less space than a typewriter . . . measures only 16 inches wide, by 11 inches deep, by 7¼ inches high. Finish is pleasing light green, and smart, modern styling is designed to complement any office. Signal lamps and pushbuttons are mounted on convenient sloping panel. Attendant uses a standard black, or coloured, desk telephone.



For complete details check No. 11 on handy card, page 83



# TO 90 INSIDE TELEPHONES . . .

*P-A-B-X... the system  
subscribers can afford!*

## STANDARD FEATURES:

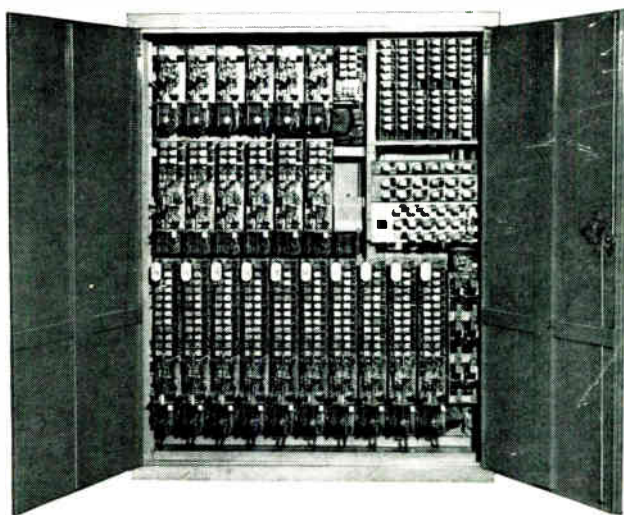
- Standard dial telephones with two-wire lines to switchboard
- Maximum 1200 ohms for central office trunks and local lines independent of each other
- Automatic local service
- Trunk service from automatic or manual central office
- Direct dialing of outgoing trunk calls
- Local station enquiry and transfer of trunk calls
- Attendant cabinet pushbutton operated
- "Camp-on" busy for waiting incoming calls
- Keymarker for local calls by attendant
- Night answer and transfer by local stations
- Trunk offering ("Tic" Tone) for important incoming calls

## OPTIONAL SERVICES AVAILABLE:

- Second attendant cabinet for heavy traffic
- Automatic code call service
- Automatic night service
- Conference service
- Right-of-way service
- Secretarial answering service
- Tie lines to distant P-A-B-X
- Trunk groups to more than one public exchange
- Direct trunks to local lines
- Toll route restriction
- Group hunting over local lines
- Trunk service during battery interruption

## ILLUSTRATED LITERATURE

Ask about illustrated literature describing the equipment's many savings and advantages. Supplies will be mailed to you free on request. Send copies to your subscribers!



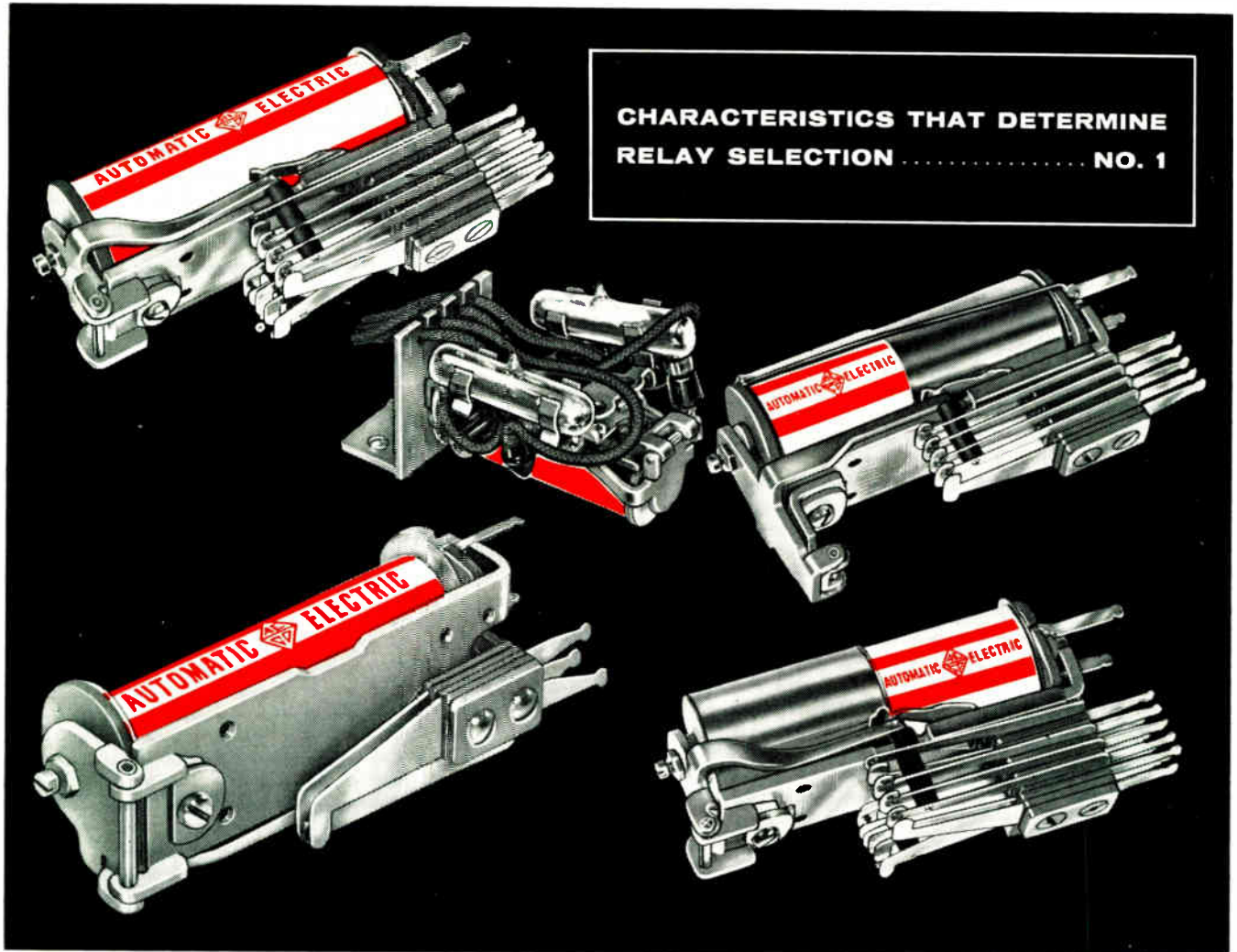
Switching equipment for the Type 90-B-20 P-A-B-X is mounted in one (for up to 50 local lines) or two (for up to 90 local lines) metal cabinets finished in gray hammertone. The cabinets measure 56 inches wide, 20 inches deep and 70 inches high, with double hinged doors front and rear. Power equipment (storage battery and charger) is mounted externally.

*For full details, call or write  
the nearest office of  
Automatic Electric Sales  
(Canada) Limited.*

# **AUTOMATIC ELECTRIC**



Subsidiary of  
**GENERAL TELEPHONE & ELECTRONICS**



**CHARACTERISTICS THAT DETERMINE  
RELAY SELECTION ..... NO. 1**

*Class A—a versatile, long life, telephone quality relay.*

# when **first cost** is important

**Helpful selection data Class A series**

**CONTACT:**  
Single or twin

**CONTACT CAPACITY:**  
Normal 3 amps, others available

**OPERATING VOLTAGE:**  
Maximum 250 volts DC

**OPERATING TIME:**  
Range is .002 to .025 seconds

**RELEASE TIME:**  
Range is .005 to .025 seconds

**RESIDUAL:**  
Adjustable or fixed

Variety of contact arrangements available

When you want quality relays that will help you hold down costs, Class A relays by Automatic Electric are your obvious choice. And because these relays are the *original* telephone type, you can be sure of reliable performance and extreme versatility as well.

Where a job calls for unusual spring loads, for instance, or constant high speed operations, Class A relays can be supplied with

heavy duty armature bearings. In addition you have your choice of quick-acting, slow-operating, slow-releasing, and slow-acting types, with single or double pile-ups of up to 20 contact springs.

For versatility, long life, and price, the Class A relay by Automatic Electric is the finest available *anywhere*. Call or write Automatic Electric Sales (Canada) Ltd., 185 Bartley Drive, Toronto 16, Ont. Branches across Canada.

***AUTOMATIC ELECTRIC***



Subsidiary of  
**GENERAL TELEPHONE & ELECTRONICS**

AN ORGANIZATION SERVING CANADIAN INDUSTRIES WITH COMMUNICATION, TIME AND CONTROL SYSTEMS

For complete details check No. 12 on handy card, page 83

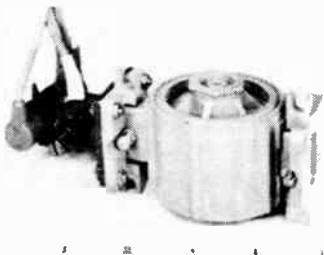
4004



## Stalo cavity

Item 204

Varian Associates' VA-1299 Stalo Cavity. Frequency: fixed tuned (with  $\pm 15$  Mc trim) at any frequency from 8500 to 9600 Mc; Stabilization Factor: 20 (with VA-201 B klystron); Insertion Loss: 10 db; Unloaded Q: 20,000; Temperature Coefficient: less than 5kc/°C; Weight: 1 lb. (approx.); Features: hermetic seal.



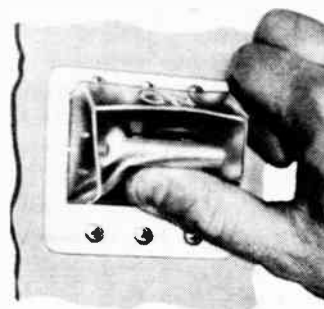
The VA-1299 cavity is the latest in the new series of Stabilization cavities from Varian Associates. It features all of the outstanding advantages of the well-known VA-1281 B cavity plus light weight and a hermetic seal, to eliminate atmospheric effects on frequency stability. With the combination of a VA-1299 and a VA-201 B a long term stability of approximately  $\pm 1$  Mc can be obtained over a wide variety of severe and airborne environmental conditions. Special cavities designed for specific applications can be furnished on request.

Varian Associates, 611 Hansen Way, Palo Alto, Calif.

## Visual inspection device

Item 205

APM Rubrglas is a new engineering tool just developed by the A.P.M. Corporation, 252 Hawthorne Ave., Yonkers, N.Y. Rubrglas-Seels® are transparent, flexible covers made of this tough glass-clear silicone. The material has an elongation (stretch) of 500%, and a temperature range from -160°F up to 500°F, and it is resistant to acids, ozone and sunlight. Rubrglas has a shelf life in excess of 25 years. APM will mold Rubrglas into flexible windows, lenses or transparent bellows to cover switches, control panels and other moving parts. Visual inspections and mechanical adjustments can now be made on hot or cold mechanical and electrical devices without exposing the controls or removing the Rubrglas-Seel.



Illustrated above is the immersion-proof Rubrglas-Seel designed for Heinemann circuit breakers. Note that the circuit breakers are actuated right through the Rubrglas.

For further information write to: A. T. R. Armstrong, P.O. Box 38, Station "D", Toronto 9, Ontario.

## Photoconductive cell

Item 206

This is a cadmium sulphide photoconductive cell of the "head-on" type. It is hermetically sealed in a glass to metal seal with a glass window. The cell itself is mounted on a 1/4" metal disc and there are pigtail or pin terminals at the back of the "head-on" arrangement. A particular feature of the cell is its high power dissipation capability. It will dissipate 1.0 watt and when mounted on a suitable heat sink may dissipate up to 3.0 watts for short periods. The significance of the higher powered handling capability is that it may operate more rugged and inexpensive relays, counters, thermals relays, solenoids, smaller lamps and motors directly without intermediate electronic amplifiers.

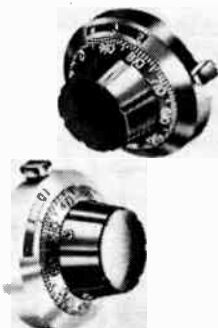
Further details available from National Semiconductors Ltd., 146 Bates Rd., Montreal 26, Que.

## Counting dials

Item 207

Helipot Division of Beckman Instruments, Inc., Toronto, Ont., announces the addition of two new models to its line of Duodial turn-counting dials.

The new members of the popular RB series are: model RBC, which incorporates two set screws; and the ebony-finished RBD, designed for applications where black matte finish and white-filled numerals are preferred.



Mechanically, both models are identical. Working parts consist of two coaxial dials... the inner calibrated in hundredths of a turn, the outer in full turns. The number of completed turns is clearly visible in a window directly opposite the index. The black-nylon knob, integral with the inner dial, is directly connected to the shaft of the device with which it is used, so readings are free of backlash.

Capacity of both the RBC and RBD dials is 15 full turns, with no mechanical stops on either model.

Further information from: Helipot Div. of Beckman Instruments Inc., 3 Six Points Road, Toronto, Ontario.

## Pulse transformers

Item 208

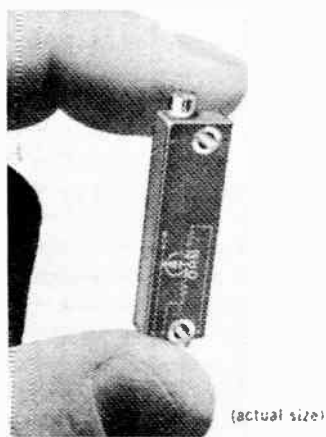
Detailed description of Miniature Pulse Transformers for blocking oscillator pulse coupling, inverting and impedance matching is outlined in Bulletin PT 160. The pulse width, rise time, pulse inductance, DC resistance, impedance ratio and four types of packaging (molded, tubular, plug-in and chassis mounting) are fully explained. Grain oriented, thin-metal core material is used in the transformers which are built to Mil T27A and offered in several different winding configurations.

Valor Instruments Inc., 13214 Crenshaw Blvd., Gardena, California, or Deskin Sales Company, 1091 Shorecrest Street, St. Martin, Montreal 40, Que.

## Miniature potentiometer

Item 209

Welded connections and winding potted in high-temperature epoxy. Double connection-rotating and sliding for positive contact with wiper. Wiper arm made of precious metal, completely damped. New ratcheting design, no backlash at any point, constant wiper pressure. Kel-F insulator provides moisture and dust barrier.



For further information: Precision Electronic Components (1956) Ltd., 50 Wingold Ave., Toronto 19, Ontario.

## Auxiliary actuators

Item 210

Two new auxiliary actuators for use with the ISX1-T sub-miniature switch have been announced by Micro Switch, Toronto, Ontario, a Division of Honeywell Controls Limited.

Fabricated of corrosion-resistant steel, these actuators absorb the side thrust which a cam or slide might exert on the switch plunger.

Catalog Listing JX-40 has a leaf actuator for use with low angle or slow moving cams or slides. Catalog Listing JX-45 has a roller leaf actuator to allow rapid cam or slide operation.

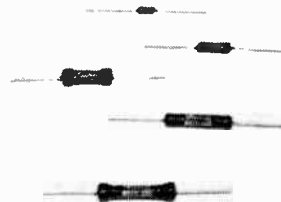
Sub-miniature switches and their complementing "JX" actuators will find usage on aircraft relays, computers, miniature recording devices, rocketry equipment, satellite gear and other applications where weight and space are at a premium.

All inquiries to be directed to B. Colwell, Merchandising Department, Honeywell Controls Limited, Vanderhoof Avenue, Toronto 17, Ontario.

## Axial terminal resistors

Item 211

A new line of axial terminal resistors in vitreous enamel coating conforming to Specification MIL-R-26C is now available.



For further particulars concerning these resistors, write the manufacturer — Marsland Engineering Ltd., 154 Victoria St. South, Kitchener, Ont.

## Rotary switches

Item 212

A complete new line of standard rotary switches has been made available to the trade covering switches from 1 to 24 poles and from 2 to 24 positions. All of these switches are packed individually in dustproof and tarnish retarding containers, and are stocked by leading radio parts distributors.

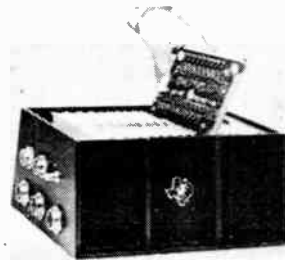
An 8 x 24 chart listing these switches with cross reference to other makes is available upon request from: Radio Components Limited, 50 Wingold Avenue, Toronto 19, Ontario.

## Modulation telemetry system

Item 213

The Apparatus Division of Texas Instruments Incorporated has developed a 25-pound, 1/2-cubic-foot pulse code modulation telemetry system for missiles and space vehicles. The package is designed entirely with solid-state devices and may be used to drive any of the TI transmitters dictated by the particular application. The system multiplexes and encodes 64 analog channels; and processes five 8-bit parallel digital data channels plus a serial digital data channel at a nominal bit rate of 200 kc.

A key feature of the package is its high-speed multiplexer which handles low- and high-level data, or a combination of both, with only a single low-level amplifier. Overall accuracy of the system is  $\pm 0.25\%$  — made possible by a unique bidirectional servo loop that nulls out system



drift. The system is designed in individual modules so that the basic design can be rapidly modified to meet the needs of other missiles or space vehicles.

Texas Instruments Incorporated, 600 Lemmon Ave., Dallas 9, Texas.

## Ferrite isolators

Item 214

A series of special Ferrite Isolators has been developed by Airtron's Engineering Staff to perform a twofold function in microwave transmission. The isolators not only afford the usual function of isolating the signal source from reflective RF energy but also can provide controlled amounts of forward loss.

By controlling the forward insertion loss values of these isolators in respect to the operating frequency to meet various system requirements, compensation for variations in local oscillator output power is achieved. The resultant bias entering the mixer crystal thus remains constant.

The construction of an X-band local oscillator Ferrite Isolator which has been designed to furnish shape insertion loss characteristics. Weighing less than 6 ounces the unit provides isolation values in excess of 40 db over the frequency range 8500 to 9600 megacycles per second. Similar units can be supplied to operate at power levels up to several hundred watts, with the insertion loss depending on frequency and insertion loss requirement.

For further information write to: Airtron Canada Limited, 349 Carlaw Ave., Toronto 8, Ontario.

For complete information on products check off item number on page 81

## C-band isolators

Item 215

Raytheon now offers three medium power C-band isolators covering the commercial band.

They are the Raytheon Model Nos. ICM13 (5925-6475 Mc/s), ICM12 (6575-7125 Mc/s) and ICM21 (7125-7650 Mc/s).



Each of these isolators has UG-344/U flanges, mates with RG-50/U waveguide, weighs 2.6 pounds and is 5.0 inches long; thus complete interchangeability is assured.

Rated at 5 watts average power, their 40 db minimum isolation is designed especially for commercial systems to reduce intermodulation distortion to a negligible level with a maximum insertion loss of 1 db and a VSWR of no more than 1.15 over the band.

These devices are readily available from Raytheon Company Special Microwave Devices Sub-division, River Building No. 2, Waltham 54, Massachusetts.

## Variable trimmer

Item 216

JFD Electronics Corp. of Brooklyn, N.Y. announces the development of a new variable trimmer — the MAX-C. The outstanding advantage of the new series is their extremely wide range of capacity per unit; approximately three times more than previous similar sized trimmers.

This new advancement in trimmer performance was achieved by a revolutionary production innovation. The electrode band consisting of metallized silver is laminated on to an unusually thin high dielectric constant precision-bore glass cylinder. This provides 300% greater capacity per square centimeter of dielectric surface over conventional heavier wall cylinders. To compensate for the fineness of the glass, a thicker outer glass cylinder is added to strengthen the assembly. As a result, the MAX-C also gains unusually strong vibration and shock-resistance.

Write to JFD Electronics Corp., 1462 62nd Street, Brooklyn 4, New York for descriptive literature.

## Molded inductors

Item 217

These "Stanwyck" subminiature molded inductors have been developed in Canada by Stanwyck Coil Products Ltd., Hawkesbury, Ontario. While approved for 125°C to MIL-C-15305A they are still economical to use in domestic and commercial applications requiring inductances from 0.1 uhy to 1000 uhy.



For further information contact Lake Engineering Co. Ltd., Scarborough, Ontario.

## Telephone handsets

Item 218

The vogue for pastel colors in home and office decorations and furnishings is well established and, with this trend, there is also an increasing demand for telephones in color. No. 500CR and No. 500DR table type telephone sets and No. 554AR and No. 554BR wall type telephone sets have been available for a number of years in ivory, red, green, yellow, beige and black.

To provide as wide a choice as economically possible, a systematic study of color preference was undertaken by several large operating companies, with the result that five new colors have been added to those already available. The total range of colors now available are, with their code identification following: light gray-61, ivory-50, red-53, green-51, light beige-60, yellow-56, aqua blue-62, rose pink-59, white-58, and black-3.

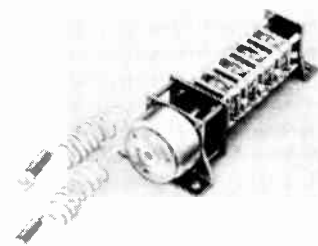
For further information get in touch with the nearest office of Northern Electric Company Limited.

## Solenoid-operated rotary switch

Item 219

The ESCO type MA-12-S solenoid-operated switches provide for remote control of multiple circuits with a compact rotary switch mechanism. Up to five poles, in a tap switch arrangement having twelve taps per pole, can be supplied.

The "Ledex" solenoid coil is available for DC voltages ranging from 6 volts to 230 volts. Self-interrupting contacts as well as suitable rectifiers for AC operation are also available. The solenoid requirements in terms of available power supply, pulsing method (mechanical and/or electrical), frequency of operation, number of operations, and ratio of energized time to de-energized time are arranged to customer specifications.



For details write to: Mr. T. K. Brydson, Electro Switch Corporation, 167 King Avenue, Weymouth 88, Massachusetts.

## Audio signal transistor

Item 220

A new versatile transistor, series 2N1008, A, B, covering a range of applications from hi-fi sets to guided missiles is being produced by the Red Bank Division of the Bendix Aviation Corporation.

Designed for audio amplification, they are especially suited for use as single-ended audio drivers. They can dissipate 400 mw at 25°C and 67 mw at 75°C.

Low distortion at higher power levels is claimed due to a linear current gain characteristic. Maximum collector base voltage is 60 volts.

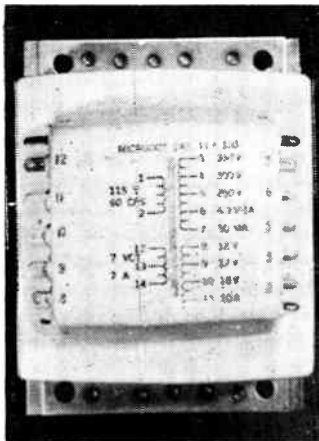
It can be used in automatic positioning devices in automated machinery, ultrasonics, portable radios and phonographs, electronic toys, TV, and in many military applications.

Sold in Canada by: Computing Devices of Canada Limited, P.O. Box 508, Ottawa, Ontario.

## Specialty transformers

Item 221

The unit illustrated is contained in a mold which is the result of a special technique enabling these transformers to exceed the requirements of military specifications. This special molding technique gives uniform dimensional stability allowing closer



packaging tolerances than have been previously available.

Microdot Inc., 220 Pasadena Avenue, South Pasadena, Calif.

## Beam power tetrodes

Item 222

Three Philip's Beam Power Tetrodes are now available from Rogers Electronic Tubes and Components. These are types 6146, 6159 and 6883 for use as RF amplifiers, oscillators and frequency multipliers and as AF amplifiers and modulators in mobile and fixed communications equipment.

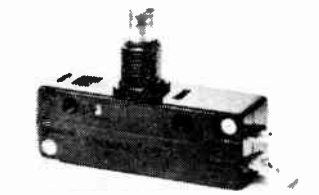
All three types are identical with the exception of their filament voltages. These are type 6146 — filament voltage 6.3V; type 6159 — filament voltage 26.5V; type 6883 — filament voltage 12.6V. Types 6146 and 6159 have a large — wafer octal 8-pin base (Jetelec B8-86) and the 6883 has a small wafer 8-pin base (Jetelec B8-159).

Full specifications and details can be obtained from Rogers Electronic Tubes and Components, 116 Vanderhoof Avenue, Toronto, Ontario.

## Unimax switches

Item 223

Unimax Type A switches are designed for use in applications that require fully-enclosed, high quality, snap-acting switches with quick-connect terminals at low cost.



These switches are available with a variety of actuators and the terminals are suitable for solder or taper-tab connections. Overlap construction of the housing provides a seal against dust and moisture. The manufacturers claim that the type A switches have a mechanical life in excess of 1,000,000 operations. Full information and literature are available from: Aeromotive Engineering Products Ltd., 147 Hymus Blvd., Pte. Claire, Que.

## High frequency phase-shifters

Item 224

Diehl Manufacturing Company, Somerville, N.J., announces the availability of their High Frequency Phase Shifter for any frequency between 10 KC/s and 10 MC/s. Dual or single channel units are ordinarily provided with a Cathode Follower output.

This line of phase-shifters depends for its great accuracy on Diehl's exceptional precision resolver combined with an optimum Capacitive Resistance Network.

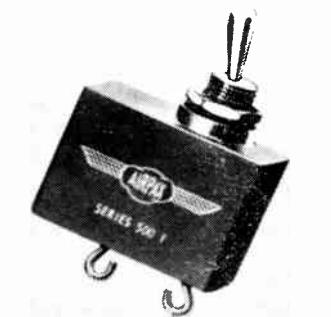
The network and Resolver are housed in anodized aluminum housings and a rugged, compact frame work supports the electronic components.

Further information is available from their Canadian representatives: Douglas Randall (Canada) Limited, 126 Manville Road, Scarborough, Ontario.

## Circuit breakers

Item 225

For positive protection of current sensitive components common to transistor circuitry, Series 500-I electro-magnetic circuit breakers provide tripping action within 25 milliseconds on overloads of 150% of rated current. These miniature, hermetically sealed circuit breakers are available with current ratings from 50 milliamperes to 10 amps.



Only slightly larger than an on-off switch, they will replace fuses, overload relays and operational switches. Designed for use at DC (50 volts maximum) and AC (120 volts RMS maximum, 60 or 400 CPS), these breakers can be supplied in ganged assemblies to save space and to automatically trip two or three circuits when an overload occurs in any one breaker.

For further information contact: Airpax Electronics Incorporated, Cambridge Division, Cambridge, Maryland.

## Styroflex fittings

Item 226

New Styroflex Fittings, manufactured by Dielectric Products Engineering Company, Inc., of Raymond, Maine, feature: unparalleled ease of assembly, with no flanging required; positive mechanical locking; gas tightness for pressurization; very low VSWR.

They will be available in production quantities during the first quarter of 1960, at competitive prices, for all popular RF terminations.

These connectors may be used on Styroflex, Spirafil, and Foamflex interchangeably, and can be removed and re-installed without damage to the connectors.

For further information, contact Canadian representative: Dayrand Ltd., 4612 St. Catherine Street West, Montreal 6, Quebec.

For complete information on products check off item number on page 81



## Packaged wiring

### Item 227

The Daven Company, Livingston, New Jersey, announces that it is expanding its facilities for the handling of packaged wiring and assembly projects. Purchasers of any allied Daven components may now use Daven's wiring service and take delivery of the entire packaged wired assembly, tested and ready for installation.



As part of its expansion of wiring facilities, Daven has developed and installed advanced machinery to handle special wiring and assembly projects with greater speed and economy than most end users are able to achieve. All assemblies are, of course, fully tested by Daven and adhere rigidly to the standards established by the purchaser of the components.

For further information on Daven's Packaged Wiring Service, write to **The Daven Company, Livingston, New Jersey.**

## Toggle switch

### Item 228

The Unimax Type 8SB2-1 toggle switch combines the advantages of multi-circuit control, single-hole panel-mounting, and a toggle actuator, with subminiature size.

The assembly comprises eight Unimax Type USM5 switches, secured in a mounting bracket, with a four-way toggle mechanism. The 15 32-32 threaded bushing permits single-hole mounting in panels up to 1/4 inch thick. The toggle is maintained in center position and is spring-returned from each of the four possible "operate" positions. Each "operate" position actuates two single-pole, double-throw switches. The eight basic switches contained in this unit meet Specification MIL-S-6743 and Military Drawing MS-25085-1.

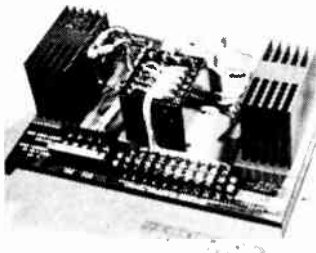
For further particulars write **Unimax Switch Division, The W. L. Maxson Corporation, Ives Rd., Wallingford, Conn.**

## Power control unit

### Item 229

A standard Power Control Unit, utilizing solid state thyratrons and its own recently-developed Control Amplifier, has been developed by Control, a division of Magnetics, Inc., Butler, Pa.

The small, chassis-mounted unit requires only power and load connections, and can be controlled in an open or short circuit mode of operation from a variety of signal sources.



The unit controls up to three kilowatts, and gives circuit designers a complete solid state system from logic input to power-handling output. High efficiency of the solid state thyratrons permits application at extremely

high levels. In addition multiple isolated inputs are provided by the unit's Control Amplifier, essentially a high speed magnetic amplifier which controls the thyatron's firing angle.

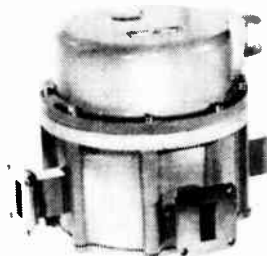
The Power Control Unit is highly efficient, inasmuch as most of the input becomes usable output. For example, when operated from a 120-volt 60-cycle supply, the unit's output is rectified full-wave DC, 103-volts. AC output units also are available.

Additional information may be obtained by writing to Control, a division of Magnetics, Inc., Butler, Pennsylvania or **George M. Fraser, Ltd., 1554 Yonge St., Toronto 7, Ontario.**

## D-B waveguide switches

### Item 230

New E-plane waveguide switches manufactured by DeMornay-Bonardi, Pasadena, Calif., are used to transfer the connection between waveguides. Transfer may be direct, or by remote control.



Two switch types are supplied — one is a 2-way exchange, which switches a common waveguide to either adjacent waveguide. Disconnected waveguide is terminated in a matched load. The second is a 4-way exchange, which switches two pairs of waveguides. The switches are used in measurement set-ups, and in experimental and operational systems.

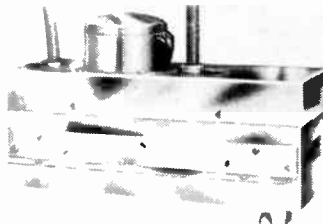
All units are plated nickel over silver over copper. Sizes range from 2.6 to 90 Kmc.

Further information from: **Bayly Engineering Limited, Hunt St., Ajax, Ontario.**

## Step attenuator

### Item 231

Designed for use where manual operation of attenuators is not practical, a new line of 6 or 12-position automatic step attenuators from Empire Devices is



powered by a motor-operated driving mechanism. Actuation of a simple rotary switch, or of push buttons causes the mechanism to produce, automatically, the rotary and linear movements required to insert the desired attenuation value.

Typical applications of the new units, trade-marked Empower, including use in radio-active contaminated areas, on tower installations, wherever panel space is limited, or whenever the attenuator must be located in an inaccessible part of the equipment.

Empower attenuators may be obtained in a wide range of standard attenuation values from 0.1

DB to 60 DB, and capable of handling one or four watts of RF power. Frequency range is from DC to 4 KMC, and standard units operate from a 28 VDC power source.

For additional information, contact **E.M.I.-Cossor (Canada) Ltd., 301-303 Windsor St., Halifax, N.S.**

## Insulated terminals

### Item 232

The new terminal  $\pm 2610$  is designed to press fit into hole  $.136 \pm .002$  in diameter in panels from  $1/8$ " to  $1/4$ " in thickness. It is ideal for use wherever conditions of extreme humidity and low capacity to ground are encountered. Two over-all lengths are available:  $\pm 2610-6$  is .325" with greatest spacing between top and middle turrets;  $\pm 2610-7$  is .365" with turrets spaced approximately equidistantly. Terminals are brass per QQ-B-626A. Finish: (1) .0003" silver plate plus water dip lacquer or (2) .0003" tin-lead solder plate.

For further information, write to **Cambridge Thermionic Corporation, 445 Concord Avenue, Cambridge 38, Massachusetts.**

## Relay with new sockets

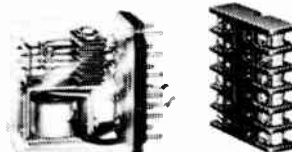
### Item 233

Struthers-Dunn have redesigned their new 219 frame 10 ampere relay using heavy duty 12 pin plugs and industrial type phenolic sockets.

These industrial general purpose relays are ideal for use in the machinery field — replacing many larger contactor type relays.

They are designed to facilitate control circuitry standardization and simplify field maintenance replacement problems.

Features include: — 10 ampere current carrying parts — 150 volt electrical spacings of  $1/4$ " over surface — 1500 volts Dielectric test — Three standard contact arrangements available — Totally enclosed in clear plastic case.



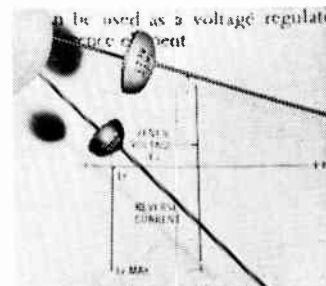
For further information write to **Struthers-Dunn Relays, Division of Renfrew Electric Co. Limited, 349 Carlaw Avenue, Toronto 8, Ontario.**

## Zener diodes

### Item 234

Economy Zener diodes at low prices are available in 500 milliwatt, 1 watt and 10 watt series in RETMA 10% voltage steps from 5.6 to 27 volts.

Units are sealed with three layers of humidity resistant material permitting operation under shock, vibration and temperature extremes normally encountered.



Request Bulletin SR-257 from **International Rectifier of Canada Limited, 1581 Bank St., Ottawa.**

## Capacitance standards

### Item 235

The increasing need for capacitance standards for measurements, where the capacitance is but a fraction of a pf, has prompted the development of standards with three terminals. Such capacitors are relatively free from the effects of capacitance from the connecting leads to ground which can affect the direct capacitance, and the capacitance between leads can be eliminated by shielding; also losses are lower, because dielectric losses appear in terminal-to-ground capacitances.



A line of such 3-terminal capacitance standards — in both fixed and variable types — is now available from the **General Radio Company, West Concord, Mass.**

The fixed units (Types 1403 Standard Air Capacitors) are offered in six values in powers of 10 from 0.01 to 1000 pf. Since there is no solid dielectric in the direct capacitance field, losses are barely measurable, being of the order of 10 microradians.

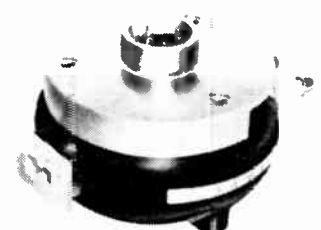
Three models of variable capacitors (three-terminal models of the well-known Type 722 Precision Capacitor) are now being produced: Type 722-CB (50 to 1100 pf), 722-CC (5 to 100 pf), and 722-CD (0.5 to 11 and 0.05 to 1.1 pf).

Additional information from **General Radio, 99 Floral Parkway, Toronto 15, Ontario.**

## Compatible carcinotrons

### Item 236

A new family of eight electrically compatible carcinotrons, recently announced by the Electron Tube Division of Litton Industries, is the first such group to



use wide band sole tuning without frequency or power holes when a tube is operated into as much as a 2-to-1 mismatch.

With wider-than-normal-band RF output couplers, the Litton carcinotrons minimize other components such as antennas, waveguide plumbing, and load isolators. Tuning rates are considerably faster than on any tubes previously obtainable, with size and weight the smallest to date.

For information write **E. L. Rogers, Litton Industries, Electron Tube Division, 960 Industrial Road, San Carlos, Calif.,** stating "need to know".

## Differential transducer

Item 237

IRC have available 2 different types of transducers, one operated by pressure differential and the newest one known as Series 70-3000 operated by the displacement of moveable core.



This new electro mechanical transducer is ideal for use in accelerometers or other measuring indicating, gauging and process control devices.

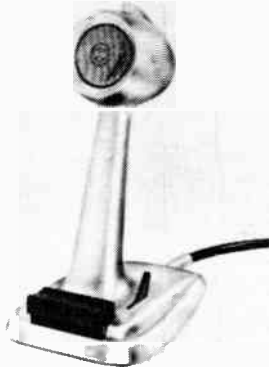
Features include: High sensitivity, 0-1% linearity, Low null voltage, High voltage output, Wide range of sizes, Moisture and shock resistance.

For further information write to: IRC Resistors Division of Renfrew Electric Co. Ltd., 349 Carlaw Avenue, Toronto 8, Ontario for Data Bulletin R-3.

## Microphone Model 250

Item 238

The Turner Microphone Model 250 is designed for dispatch, paging, P.A. control tower and amateur use. Response 60 to 10,000 cps. Output level - 52 db. Exclusive 3-way switching. Lift the mike, it is alive. Depress front bar for push to talk. Move the lever-lock switch forward; the mike is alive and stays alive.



For additional information contact Canadian Marconi Company, Electronic Tube & Components Div., 830 Bayview Ave., Toronto 17, Ontario.

## RF coaxial plugs

Item 239

New, lightweight RF coaxial connector series, the first to utilize aluminum shells, have been added to the standard Cannon N and SC coaxial lines. These new plugs have been assigned the prefix "AL" the chemical symbol for aluminum. Two special adapters for Foamflex and Raytherm coaxial cables are also available in this new Cannon ALRF line.

The new ALN and ALSC connectors are 35% to 40% lighter in weight than comparable standard RF coaxials. Their electrical

performance exceeds that of the brass-shell N and SC series.

ALN and ALSC Cannon Plugs have a black anodic coating for maximum corrosion resistance. Moisture sealing characteristics have been improved over those of the N and SC series. The ALN series accepts RG, Foamflex, and Raytherm coaxial cables. The ALSC accommodates only RG cable. Both series feature an improved clamping mechanism which does not distort the cable dielectric.

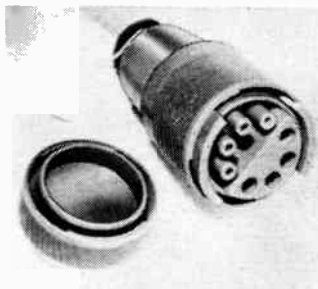
For information write Cannon Electric Canada Limited, 160 Bartley Drive, Toronto 16, Ont.

## Hermaphrodite power connector

Item 240

Specialty Electronics Development Corp. has developed a revolutionary non-reversing hermaphrodite power connector.

The connector pictured is for military field use. It has a power rating of up to 100 amperes, 400 volts AC and is suitable for two, three or four-wire cables. Only one solder connection is necessary for each conductor.



Built-in safety ground contacts mate before any power contacts are mated. Short circuit prevention is also built in through the spacing of pins at maximum distance and insulation. As many as four pins can be broken without failure in any conductor path.

The connector measures 2 3/4 inches in diameter. It weighs 1 1/4 pounds in a dull black, anodized aluminum housing. Both cable and panel types are available.

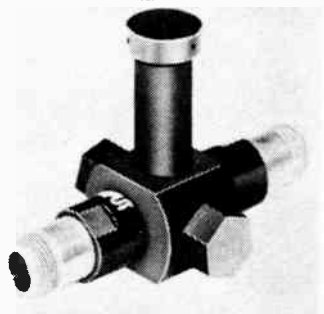
For further information write The Ahearn and Soper Company Limited, 850 Belfast Rd., Elmville Acres, Ottawa, Ontario.

## Solid-state limiters

Item 241

Microwave Associates offers two new solid-state microwave limiters designed to protect all UHF receivers against overload and burnout.

Models MA-3400 and MA-3401 both having Type N coaxial fittings for input and output, can be used not only as low-level crystal protectors in duplexer



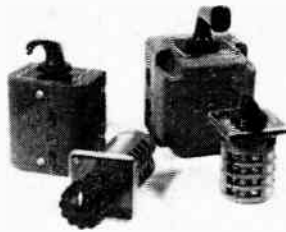
applications, but can serve as solid-state protectors for use with traveling wave tube amplifiers; communication receivers; and as part of a low-insertion loss switch, can be used in front of parametric amplifiers.

This device has excellent applications as a switching device also. Details available from Microwave Associates, Burlington, Mass., or from Can. rep.: E. G. Lomas, 227 Laurier Ave. W., Ottawa, Ont.

## K & N switches

Item 242

These cam operated drum switches are designed to meet all industrial requirements. Stand-



ardized units insure greatest versatility of application. Double-break, special silver-alloy contacts provide highest interrupting capacity with minimum space. CSA approved and designed to provide for at least one to five million trouble-free operations without maintenance.

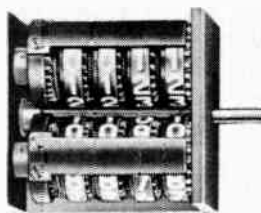
Standard switches are available in six sizes and amperage ratings from 10 to 200 Amps. Larger ratings up to 800 Amps. available for special applications.

Kenny Consolidated Engineering Industries Ltd., 58 Wellington St. E., Toronto, Ont.

## Dual bank counter

Item 243

Durant Manufacturing Company of Milwaukee, Wisconsin, has announced a new line of instrument counters for use in navigation and tracking equipment, machine tools and all digital readout equipment where plus and minus readings are needed.



The shutters of the new group of counters are arranged to give plus and minus, or north and south readings. Long life, high speed instruments, the Dual Bank counters are built with nylon wheels and pinions to reduce torque and give lower moment of inertia, higher speed and longer life.

A highly versatile instrument, the Durant Dual Bank Counter is available in right hand drive, left hand drive, clockwise or anti-clockwise rotation and with three, four or five digits. One revolution of the shaft is equal to one revolution of the first wheel, or ten counts to one revolution of the shaft. The lightweight, sturdy frame is of aluminum in instrument black finish. The unit is capable of operating over a range of from a minus 55 degrees Centigrade to 75 degrees Centigrade.

Complete information on the new line of Dual Bank Counters may be obtained by writing the Canadian sales rep. Wainbee Tools Ltd., 64 Racine Rd., Rexdale P.O., Ontario.

## Toggle switch

Item 244

A new series of precision pull-to-unlock toggle switches that require much less behind-panel space than other similar switches has been announced by Micro Switch, Toronto, Ontario, a division of Honeywell Controls Ltd.

Designated the "13AT" series, they feature a positive lever locking device as an integral part of the switch. It holds the toggle lever in a set position and requires a definite pull of approximately .090 in. to change from one position to another. Accidental toggle lever movement. Since the toggle is oversize and has a knob on the end, changing it from one position to another is simple and fast even when wearing heavy gloves.

The "13AT" series of switches are available in countless combinations . . . 2-pole through 4-pole units . . . with or without gold contacts and/or turret type terminals. Each of the subminiature basic switches in an assembly has a single-pole double-throw snap contact arrangement.



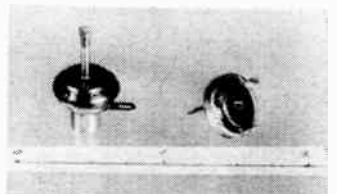
These switches have a threaded bushing for panel mounting. Their compact design and light weight make them ideal for aircraft, mobile, marine and electronic applications wherever space and/or weight is a critical factor.

Inquiries to be directed to B. Colwell, Merchandising Department, Honeywell Controls Limited, Vanderhoof Ave., Toronto 17. Ask for Data Sheet 160.

## Mica capacitors

Item 245

The hermetically sealed Eric Button Silvered Mica capacitors illustrated were developed in Canada to meet stringent Military UHF and VHF applications. This provides a unit which is superior in performance to the convention resin sealed units. Capacity values, tolerances and electrical properties are outlined in specification MIL-C-10950B.



For further information write Lake Engineering Co., Limited, 123 Manville Road, Scarborough, Ontario.

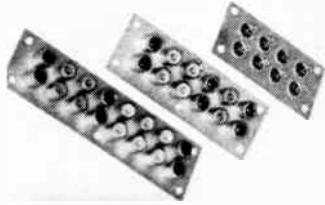
For complete information on products check off item number on page 81



## Input jacks

Item 246

Accurate Electronics Corporation is offering multiple phono input jack assembly panels in any multiple required. The jacks are mounted on a common ground plate with positive electrical



ground connections. Spacings between pairs may be varied to meet customers' requirements and pairs may be color-coded in white, red, blue, black, green and yellow.

For further information write to: **Accurate Electronics Corporation, Elyria, Ohio.**

## Infrabeam control

Item 247

A coded infra-red transmitter and receiver control assembly offering all the advantages of photoelectric detection but with the additional reliability of electro-mechanical equipment.

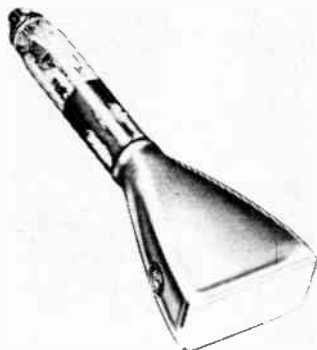
Ideally suited to such applications as door operation, machine control, area surveillance, conveyor control, liquid level control, etc.

For further information contact the Canadian agent, **Power Service Products, 618 Vaughan Rd., Toronto 10, Ont.**

## Flat face cathode ray tube

Item 248

A new, ultra-modern tube design has been introduced by Aviation Electric Limited, Montreal. The compact, 3" x 1½" tube is the latest addition to the Waterman family of Rayonic type cathode ray tubes.



The manufacturers claim that high sensitivity and light output are combined with a flat face and high altitude performance to make the new tube a highly beneficial component.

Called the 3ASP7, the unusual tube is designed to give a good pulse display at low duty cycles. Sensitivities under a typical anode voltage of 2000V are 33V/in. vertical and 80V/in. horizontal. It has the anode brought out separately and is rated up to 35,000 feet. Phosphors include P1, P2, P7, and P11.

Less than 9" in. length, Aviation Electric claims that the 3 ASP7 offers quality performance superior to that found in much larger tubes.

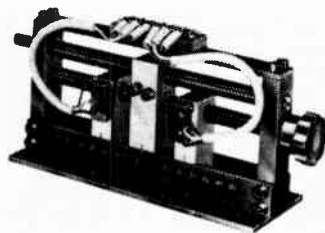
For further information about this new Rayonic type tube, contact **Aviation Electric Limited, 200 Laurentien Blvd., Montreal 9, P.Q.**

## Electromechanical limit stops

Item 249

The Helipot Division of Beckman Instruments, Inc., Toronto, Ontario, now has two types of limit stops available as limiting devices for mechanical or electro-mechanical motions, such as the drive of a multi-turn potentiometer.

Beckman Limit Stop BP-522 provides electric and mechanical operation limits by de-energizing the drive immediately before the mechanical limit is reached, thus preventing extreme mechanical shock loads. It is manually adjustable to limits between 1 and 100 revolutions of the input shaft. Stop positions are indicated by two index blocks and a direct reading linear scale.



Limit Stop BP-525 is cam operated to provide circuit make-or-break points over any desired rotational arc. Cam assemblies are available to cover a combined range in degrees of valley of either 0° — 180° or 180° — 270°.

Units are available for delivery from **R-O-R Associates, Limited, 1470 Don Mills Road, Don Mills, Ontario.**

## pH meters

Item 250

Canadian Research Institute, 46 St. George St., Toronto 5, Ont., have just made available a detailed catalog on the pH measuring equipment manufactured by Photovolt Corporation, New York, U.S.A. Instruments are available for laboratory and industrial use in line-operated and battery models. The testers are stocked and serviced in Canada.

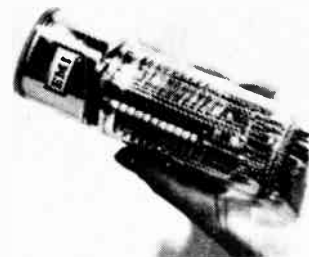
**Canadian Research Institute, 46 St. George St., Toronto 5, Ont.**

## Photomultiplier tube

Item 251

A new Photomultiplier Tube Type 9558B, which has a tri-alkali photo-cathode formed from antimony sodium potassium caesium, has recently been introduced by E.M.I. Electronics Ltd.

This cathode is characterized by a high quantum efficiency of between 15 and 20% in the blue region (at 4,200 Å) and an extended red response up to 8,500 Å, while having at the same time a very low value of dark current. A typical tube has a photo sensitivity of 100 μA/L, an overall sensitivity of 200 A/L at an average of 1700 volts and a



dark current under these conditions of 0.003 μA. These tubes are especially suitable for application in spectrometry, particularly flame spectrometry and for scintillation counting with

materials such as caesium iodide and also for scintillation counting of C<sup>14</sup> and H<sup>3</sup>.

**E.M.I. Electronics Ltd., Hayes, Middlesex. Canadian representatives EMI-Cossor Electronics Limited, 2005 MacKay St., Montreal.**

## Vibrating capacitor

Item 252

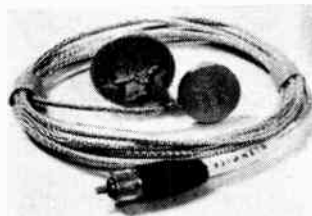
The Stevens-Arnold Vibrating Capacitor is a device which enables simple AC circuitry to be used for measuring an extremely small charge. This charge may originate as (1) an unknown current or (2) the potential of a very high impedance input which cannot be loaded by the measuring circuitry. Previously such measurements have necessitated the use of critical laboratory equipment requiring frequent recalibration. Now, with the Vibrating Capacitor perfected, not only can reliable measuring equipment be produced but it is stable enough to be satisfactory for constant process measurement and control. The Vibrating Capacitor achieves high standards of reliability because it has only one moving part, namely, a heavy vibrating reed. Therefore, there is nothing to wear out or to require adjustment.

For further information write: **John Herring Company Limited, 3468 Dundas St. West, Toronto.**

## Self-generating accelerometer

Item 253

A sub-miniature self-generating accelerometer, less than 0.1 inches in height, 0.5 inches in diameter, and weighing ¾ gram, has been developed by the Instrument Division of Gulton Industries, Inc., Metuchen, New Jersey. It is believed to be the thinnest and lightest accelerometer commercially available today.



The new accelerometer is particularly suited for use in wind tunnel testing of simulated aircraft where weight is an important factor in selecting an instrument to determine wing flutter, tab buzz or control system response.

The minute profile of the accelerometer permits it to be inserted between the skin and strut of a plane or missile. In addition, it can be built into many types of electronic gear as a permanent installation. This permits periodic checks of vibratory conditions, as well as making it unnecessary to disassemble the equipment to remove the accelerometer after it has served its purpose.

**Gulton Industries, Inc., 212 Durham Ave., Metuchen, N.J.**

## Lever-actuated switch

Item 254

The ESCO type MA-12-L miniature switch provides multi-circuit control, panel-mounting, and lever operation in a compact unit suitable for low-power and electronic circuits. The assembly can be furnished with either one or two sections, giving up to twelve-pole switching. The lever actuator can be arranged to be spring returned to center from either or both of the two end positions or can be maintained in any or all of the three positions, or limited to two positions. Insulation of both sta-

tionary and movable contacts is molded of alkyd type MAI-60, per MIL-M-14E, and the basic switch is designed to meet MIL-S-3786. The electrical ratings are: 3 amperes continuous current at 115 volts AC; interrupting rating, ½ ampere at 115 volts AC; voltage breakdown 1000 volts RMS.

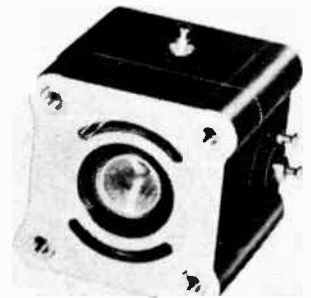
For details write to: **Mr. T. K. Brydson, Electro Switch Corporation, 167 King Avenue, Weymouth 88, Massachusetts.**

## X-band magnetrons

Item 255

Microwave Associates has developed a series of miniature, exceptionally compact magnetrons for x-band applications. They are both fixed-tuned (MA-212 and MA-221) and mechanical tunable (MA-214, MA-217, and MA-219) and operate either as CW or pulsed tubes. Form factor is based on small-x waveguide flange and the tubes occupy less space than a two-inch cube.

The MA-212 for example is fixed-tuned (8800 — 10,000 Mc) and available in 200 Mc increments. Nominal output is 1 watt for CW operation (10-15 ma) and



up to 10 watts peak power for a wide range of pulsed conditions. The MA-214 series also has nominal output of 1 watt for CW operation and up to 20 watts peak (MA-219) in pulsed operation. MA-219 is shown in illustration.

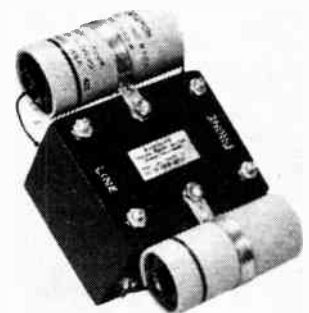
Minimum pulse jitter on all of these new tubes makes them ideally suited for doppler and beacon radar applications.

**Microwave Associates, Inc., Burlington, Mass., or E. G. Lomas, 227 Laurier Ave. West, Ottawa, Ont.**

## Telephone waystation filter

Item 256

A new telephone waystation filter is available for use on carrier circuits that are subject to high voltage surges. This equipment features epoxy molded inductor and external high voltage capacitors and is insulated for 10 KV to ground and 10 KV line to line.



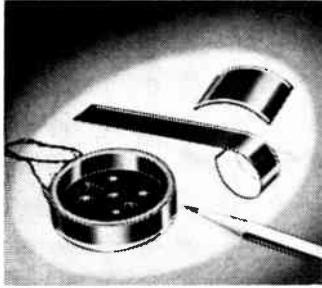
For additional information on this filter contact **Osborne Electric Company, Ltd., 95 Wesley St., Etobicoke, Toronto 18, Ontario.**

For complete information on products check off item number on page 81

## Contour photocells Item 257

Three-dimensional selenium photovoltaic "contour photocells" open the door to completely new design possibilities in photoelectric devices. Since these specially processed pliable photocells can be shaped into almost any form, they can be mounted on a rotating shaft in a position control servo-mechanism . . . or they may be used as a form of non-linear function generator, when formed into a photo-sensitive cam.

Manufactured by International Rectifier Corporation, El Segundo, California, these unique light-sensitive cells may be used in a wide variety of electronic photoelectric devices for control applications, production flow processes, automatic inspection and sorting, and similar functions.

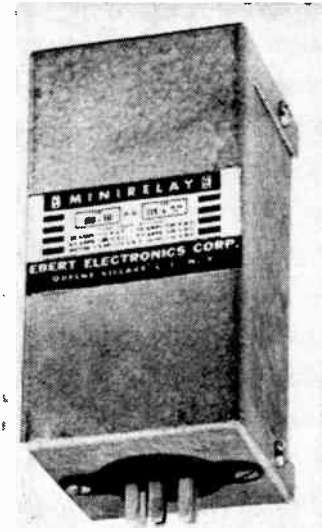


These cells can be produced to any requirement (curved, cylindrical or other configurations) in three-dimensional shapes with as little as one inch radius of curvature.

For additional information, write to: Atlas Radio Corporation Ltd., 50 Wingold Ave., Toronto 19.

## Plug-in MiniRelay Item 258

In response to requests for chassis mount Mercury Plunger Relays, Ebert Electronics Corporation, Queens Village 28, N.Y. has added a plug-in MiniRelay series to its expanding line. This feature, available in one and two pole relays, offers speed in installation and eliminates the need for special mounting brackets.



Normally open or normally closed contacts are available in the single pole MR-10PL and in combinations of the contacts for the two pole MR-14PL device. As do all Ebert Relays, the plug-in series incorporates rugged, hermetically sealed contacts and offers millions of silent, service-

free operations without pitting, sticking or corroding of contacts.

For additional information write to: Philips Electronics Industries Limited, 116 Vanderhoof Ave., Leaside, Toronto, Ontario.

## Solderless terminals Item 259

Waldom Electronics Inc., Chicago, Illinois announces the recent addition of the Avikrimp construction style to their line of solderless terminals.

The Avikrimp uses an annealed, tin-plated brass sleeve to add extra barrel strength and permanently anchor the wire insulation to the terminal. In addition to this protection against stress and high-vibration, the Avikrimp style employs a permanently attached Nylon insulation sleeve which extends beyond the metal support sleeve — no extra insulation necessary.

These terminals meet the highest standards for commercial and government use.

Samples and literature are available upon request from the warehousing sales representative in Canada: Active Radio & TV Ltd., 58 Spadina Ave., Toronto, Ontario.

## Submersion-proof connectors Item 260

A new connector family known as the 89 Series has been developed by Amphenol. The 89 Series



of connectors are ideally adapted to heavy duty use for all outdoor applications of connecting electronic and communication equipment such as:

- Ground Support Equipment for Missile Launchers.
- Geophysical Equipment for ground and air survey detection.
- Under-water Applications.
- Commercial Applications wherever there is a need for a Ruggedized Power Connector.

These connectors are completely water-proof and will operate even when submerged in ice, mud or water. An internal rubber gasket in the cable clamp; a type "W" washer at the mating faces provide water-proof protection.

To facilitate handling in rough weather, coupling rings are extra long and heavily grooved. Flats are conveniently located for field servicing with standard open end wrenches. Caps and chains are provided for all connectors.

For further information write to: Amphenol Canada Ltd., 349 Carlaw Ave., Toronto 8, Ontario.

## "HR" cannon plug Item 261

Now in production quantities, a complete new line of Cannon Plugs known as the "HR" series is available from Cannon Electric Canada Limited. The new HR (Heat Resistant) connector, the result of intensive high-tempera-

ture research by Cannon Electric developmental engineers, is designed to perform continuously in 1000°F heat and under nuclear radiation bombardment.

Moisture-proofing on these connectors is accomplished by means of ball-cone seats on all mating surfaces.

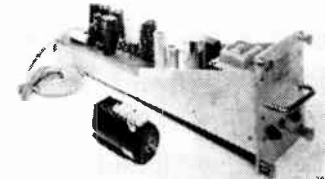
The HR series embraces a complete range of MS-type shell styles and sizes, and a wide variety of insert patterns. Layouts provide from 2 to 24 contacts in a single shell. HR connectors will mate with standard MS types.

A modification of the HR series, rated at 650°F continuous duty, is also available.

For further information about the Cannon HR Series, write to: Cannon Electric Canada Limited, 160 Bartley Drive, Toronto 16, Ontario.

## Servo amplifiers Item 262

A new series of Diehl instrument servo-amplifiers in ratings suitable for driving the popular Diehl 1, 5 and 10 watt motors.



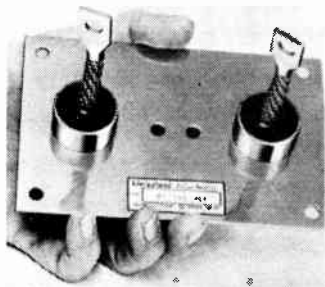
These servo-amplifiers use printed circuitry for high reliability and incorporate adjustment controls for gain, phase and internal or external feedback.

Featuring reliable high quality vacuum tube circuitry of advanced design, AC or DC input and push pull output stage matched to motor control phase.

Detailed information from Douglas Randall (Canada) Ltd., 126 Manville Road, Scarborough, Ontario.

## Silicon rectifier Item 263

Low cost, 100 ampere silicon rectifier with heat sink for rapid, easy installation in battery charging applications. The center-tap rectifiers features single unit, compact construction, consisting of two silicon junctions mounted on a 4" x 6" nickel-plated copper cooling fin. Mounting holes are spaced for fitting on practically any battery charger.



Junctions incorporate the exclusive International Rectifier "Quad-Seal" process, including successive layers of humidity resistant, insulating resins and sealants. Operation range from -20 to -130°C. For more detailed data, request Bulletin SR-210 from: International Rectifier of Canada Limited, 1581 Bank St., Ottawa.

## Vacuum relay Item 264

Jennings Radio Manufacturing Corp. announce their new RB7B vacuum transfer relay that offers the highest voltage rating obtain-

able anywhere in a miniature relay of this size. Where space and weight is critical this new relay will be particularly effective in many relatively high voltage applications involving antenna switching, pulse forming networks, and similar rf and DC circuits.

The two pole double throw RB7B measures only 1 1/2" overall but has a rated operating voltage of 4 kv at 60 cycle and 2.5 dv at 16 mc. It has a continuous current rating of 6 amps at 60 cycle and 3 amps at 16 mc.

Manufactured and distributed by: Jennings Radio Manufacturing Corp., P.O. Box 1278, San Jose, California.

## Pressure to voltage system Item 265

Ultradyne, Incorporated, P.O. Box 3308, Albuquerque, New Mexico, has released the new voltage controlled Model DCS-4 pressure to voltage system, in which the Model S-30 pressure transducer is combined with stable transistorized electronic circuitry containing mostly passive elements. The single package operates from standard unregulated 28-volt DC aircraft and missile power supplies, and has a signal output of 0.5 or ±2 1/2 volts DC over the rated pressure range. Users of DC systems thus have the benefit of the features of the Ultradyne variable-reluctance transducer. The instrument



is very resistant to shock and vibration, due to the fact that the only moving part is the stiff metal diaphragm. Fatigue problems due to acoustic vibrations also are virtually eliminated.

For further information write to: Ultradyne Inc., P.O. Box 3308, Albuquerque, N.M., U.S.A.

## High current resistors Item 266

"Corrib" and "Powr-Rib" resistors are now being stocked by Ohmite Manufacturing Company, augmenting again, the "world's largest, ready-to-ship stock of power resistors". Characterized by high current ratings with low resistance, Corrib and Powr-Rib units are widely used in load banks for starting and stopping or for speed control of large DC motors employed in heavy installations — trucks, cranes, machine tools, etc.

"Corrib" type resistors employ a corrugated ribbon of resistance alloy edgewound around a ceramic tube and anchored in place with vitreous enamel. Cooling fin action of the ribbon contributes to the high dissipation efficiency.

"Powr-Rib" resistors are uncoated or "bare" types which offer even higher power handling capability. These are stocked in Edgewound or Round Wire types — the latter construction being employed for the higher resistance values. Clamp type terminals are easily moved and extra terminals are available for use as taps. Stock Powr-Rib Range: 0.10 ohms at 100 amps to 25 ohms at 5 amps approximately. For additional information write Ohmite Manufacturing Company, 3688 Howard Street, Skokie, Illinois.

For complete information on products check off item number on page 81

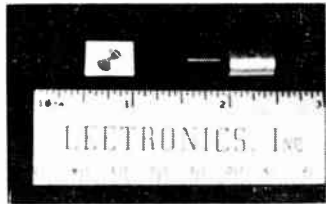


## Miniature rotary solenoid

Item 267

LE 5, an hermetically sealed miniature rotary solenoid is now available from Leetronics, Inc., electromagnetic specialists.

Accessories made to customer specifications include flag or indicator, flag enclosures, mounting, and special jewel bearings.



Tentative engineering specifications state that unit operates on any voltage to 120 volts without external resistor, DC and/or AC to 2500 cycles without rectification. Basic movement weighs only 3.7 grams. Power or torque: 0.1 gram centimeter with 100 milliwatts input. Ambient plus coil temperature not to exceed 300°F. Higher operating temperatures can be had to 750°F.

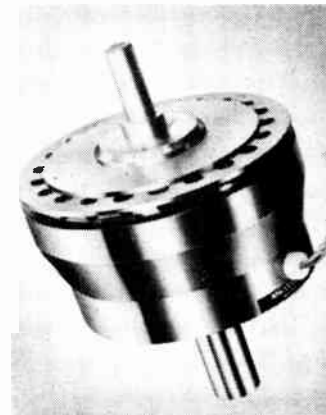
For further information write to William M. Hummel, 868 Dundas Highway East, Dixie, Ont.

## Hysteresis clutch

Item 268

A new development in the hysteresis clutch is the provision of a stationary coil, eliminating the necessity for slip rings.

The hysteresis clutch employs no mechanical friction members producing torque proportional to excitation, independent of slip speed, driving in synchronism upon demand.



These units are ideally suited to industrial applications requiring long life and precise torque control, such as tension control, torque limiting, high inertia starts, zero backlash bi-directional actuation.

Found Bros. Aviation Ltd., Malton Airport, Malton, Ont.

## Fuseless protector

Item 269

The No. 117B Protector is intended for indoor termination of six pair multiple drop wire at a subscriber station. Like the single pair No. 111A Protector its use is recommended when station protection is required in areas served by grounded metal sheath cable (lead, alpeth, stalpeth, etc.) For short runs it may also be used on batters and ringing feeders of key telephone systems, small P.B.X. etc.

The No. 117B Protector may be mounted in a GB-11 Terminal Box when necessary for appearance or other reasons.

Mounting screws are provided for this purpose. The overall dimensions of the protector are

8 $\frac{3}{8}$ " long, 2" wide and 2 $\frac{1}{8}$ " deep. The distance between the  $\frac{1}{4}$ " diameter mounting holes is 8".

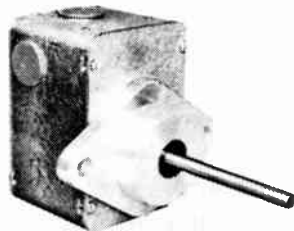
The No. 117B Protector consists of a moulded terminal block containing twelve No. 107C Protectors, twelve binding posts for drop and station wire connections and a ground strip assembly. Two additional binding posts, one at each end, are provided for ringing ground connections. One of these posts includes a pronged washer to permit the use of a No. 10 gauge wire for protector grounding purposes.

Northern Electric Company Limited, Communications Equipment Division, 1600 Dorchester St. West, Montreal, Que.

## Detecting governors

Item 270

Synprotex speed detecting switches are now furnished housed in a stamped steel box, complete with wiring knockouts and flange for external mounting. The box measures 2 $\frac{3}{4}$  x 4 $\frac{1}{2}$  x 3" deep and can be supplied with shaft length and diameter to order.



This new box housing is designated style "B". It will accept up to 2 different Synprotex speed detecting units, each of which can detect a high and low limit. Speeds from 500 to 4000 rpm can be detected. (Other types available for speeds from zero to 15,000 rpm.)

The Synprotex speed detecting switches used in the style "B" housing are capable of detecting pre-determined speeds within 1% accuracy. They are actuated by speed alone, independently of voltage or load of other environmental conditions. The life of these Synprotex units is stated at over 1,000,000 cycles of uniform operation.

Additional data available from Torq Engineered Products, Inc., 32 W. Monroe St., Bedford, Ohio.

## Transistorized oscillator

Item 271

Another "giant stride forward" in telemetering, in the shape of a new millivolt transistorized oscillator that reduces bulk and weight, lowers power demands, and eliminates a source of error, is available from the Hoover Electronics Company, of Timonium, Maryland.



The new oscillator makes it possible and advantageous, for the first time, to feed the output of low level transducers (such as thermocouples, strain gauges, accelerometers) directly into the Hoover subcarrier oscillator without DC amplification.

The advantages of eliminating the separate DC amplifier are fairly obvious, once it's been thought of. This means fewer

packages, with a resulting saving in bulk and weight, lower power consumption, and the elimination of one possible source of error which has plagued telemetering in the past.

The floating input terminals eliminate problems which often result from a common ground among several components.

The subcarrier oscillator contains an internal voltage regulator. As a result of carefully designed circuits, its only power requirement is +26 volts. The distortion of the output signal is limited to less than 1% by a bandpass filter which also prevents interference with adjacent channels.

For further information write to: Hoover Electronics Company, Timonium, Maryland, U.S.A.

## Reflex klystron

Item 272

A new reflex Klystron, the Philips type 55335, is now available from Rogers Electronic Tubes and Components. The 55335 is a forced air-cooled, mechanically tunable reflex klystron for use as an oscillator in the 31-36 kMc/s frequency band. It is capable of delivering an output power of more than 100 mW in the middle of the band.

The Philips 55335 incorporates a dispenser type cathode. The wave guide output is designed for coupling to rectangular waveguide RG-96U (E.I.A. designation WR28, British WG22) with outside dimensions 0.360" x 0.220".

The application for the 55335 is as a local oscillator tube in radar systems and power source in measuring equipments.

Further details and specifications are available upon request from Rogers Electronic Tubes and Components, 116 Vanderhoof Ave., Toronto, Ontario.

## Vertical gyro

Item 273

Kearfott Company, Inc., Little Falls, New Jersey, a subsidiary of General Precision Equipment Corporation, has announced the



availability of the B2115 Vertical Gyro, a two-degree-of-freedom instrument having 360° of freedom about the outer gimbal axis and ±85° of freedom about the inner gimbal axis. Vertical erection is accomplished by a self-contained erection system incorporating a liquid bubble-type vertical sensing device which detects spin axis displacement from vertical in both pitch and roll axes, and electrical torquers which correct these errors by application of appropriate torques. This highly reliable unit is ruggedly constructed to operate without diminished performance under the most severe missile environments.

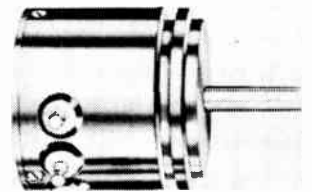
Lake Engineering Company Ltd., 123 Manville Road, Scarborough, Ontario.

## Miniature pots

Item 274

Helipot Division of Beckman Instruments, Inc., Toronto, Ontario, announces the complete redesign of their Series T,  $\frac{7}{16}$ " diameter miniature precision potentiometers.

Now in full production this single-turn has been upgraded electrically, mechanically and environmentally. Standard resistance range extends from 650 ohms to 100,000 ohms  $\pm 5\%$  with  $\pm 2\%$  available. Standard linearity tolerance is  $\pm 0.50\%$ ;  $\pm 0.20\%$  available. Power rating is now 1.2 watts at 40°C, derating to zero at an elevated 125°C.



Weighing only 0.6 oz., in its cup-type, all metal housing, the new T comes in servo or bushing mounting styles. Starting torque is .10 oz. in. maximum per section. . . 5 ganged sections are readily available.

Mechanical tolerances are held to practical limits in all areas. . . shaft runout .0010" max. T.I.R., register face runout .0020" max. T.I.R., register diameter .0015" max. T.I.R., end play .0040" max., radial play .0020" max.

Units are available for delivery from R-O-R Associates, Limited, 1470 Don Mills Road, Don Mills, Ontario.

## Metal film resistor

Item 275

A new molded precision metal film resistor is now being manufactured by Electra Manufacturing Company. It features low controlled temperature coefficient, low noise level and high stability under severe humidity conditions. According to the manufacturer, this new metal film resistor offers performance that equals or surpasses a precision wire wound resistor, yet is smaller, lower in cost, also gives better R.F. performance, plus uniformity in size over wide resistance ranges. It is available in five sizes,  $\frac{1}{4}$ th through 2 watts.

Complete details may be had by writing Electra Manufacturing Company, 4051 Broadway, Kansas City, Missouri.

## Feed through terminals

Item 276

Latest additions to the Cambridge Thermionic Corporation's extensive line of Cambion® electronic components are feed-through terminals 1030, 1031, and 1032.

Designed for use in plug-in components, the 1030 and 1031 terminals fit into 7- or 9-pin miniature sockets. These have pin diameters of .040" and are available in six different mounting shank lengths; terminal 1032, with a pin diameter of .032", is available in five different mounting shank lengths. All are of quality brass, finished with .0003" silver plate and coated with water dip lacquer. The new terminals, like the entire Cambion line, are quality-controlled and guaranteed.

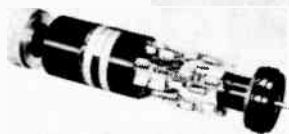
For further information write to Cambridge Thermionic Corporation, 445 Concord Avenue, Cambridge 38, Massachusetts.

For complete information on products check off item number on page 81

## Amplifier/resolver

### Item 277

A new amplifier/resolver module only three inches long has been introduced by American Electronics, Inc., Instrument Division, Culver City, California. Designated, Ampsolver, the new unit consists of a size 8 winding compensated resolver and a dual channel buffer amplifier within a size 15 frame. Weighing only 8 ounces, Ampsolver offers unity transformation ratio with zero phase shift over a temperature range from  $-55^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$ .



Ampsolver features an input impedance of 1 megohm minimum with a low output impedance of  $270 + j400$  ohms. Cable connections have been eliminated by direct drive from resolver to amplifier. Trim adjustment can be made in the field to  $\pm 2\%$  of unity transformation ratio. Its versatile design permits adapting Ampsolver to computing chain functions.

For additional information contact American Electronics, Inc., 1025 W. Seventh St., Los Angeles 17, Calif.

## Mercury contactor line

### Item 278

A new line of Durakool mercury hypressure "hydrogen arc-quenched" heavy load carrying contactors with mercury to metal (tungsten) contacts has been announced by Measurement Engineering Limited. Two sizes of contactors are being offered — 60 amp., 6.6 KW-T load and 100 amp., 10 KW-T load, with combinations for every requirement, such as normally open or normally closed contacts, and any



coil voltage. The manufacturer claims these contactors are ideal for tungsten lighting or the switching of heavy motor loads and are designed to handle DC as well as AC work. New contactor bulletin 600 is now available from Measurement Engineering Limited, Arnprior, Ont

## 23" picture tube

### Item 279

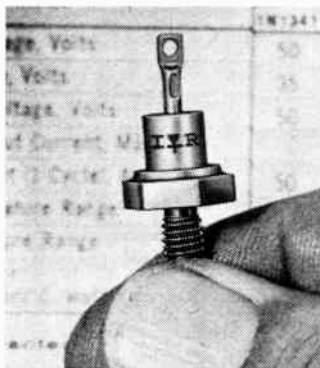
Marconi Picture Tube Type 23MP4 is a new square cornered 23" picture tube which does not employ an attached safety plate. It has conventional strength without the necessity of an integral panel. It employs  $114^{\circ}$  deflection but still utilizes standard  $110^{\circ}$  sweep components. This is made possible through a channeled interior in the yoke area, and as a result the tube is no longer than popular 21" tubes. It weighs only about  $3\frac{1}{2}$  lbs. more than the standard 21"  $110^{\circ}$  tube, but has an additional 20 square inches of picture area.

Canadian Marconi Company, Electronic Tube & Components Div., 830 Bayview Ave., Toronto 17, Ontario.

## Diffused junction rectifiers

### Item 280

New Jeduc 6 and 12 amp silicon diffused junction rectifiers having PIV ratings from 50 to 500 volts are now available in types 1N1341 through 1N1347 and 1N1199 through 1N1205 respectively. Allowed base temperatures are as high as  $190^{\circ}\text{C}$ .



Units feature low leakage, low forward voltage drop and high uniformity. Diodes are nickel plated for good contact resistance and corrosion prevention. Request Bulletin SR-311 from International Rectifier of Canada Limited, 1581 Bank Street, Ottawa.

## Pilot light

### Item 281

Industrial Devices, Inc., Edgewater, N.J., announces a new press-fit OMNI-GLOW Pilot Light mountable from the front of panels.

Utilizing four molded-in nylon ribs which give a positive grip, the new units push in through a .500/.505 hole and snap into place on panels up to .065 thick. The unit can also be used on heavier panels.

Available in a wide variety of styles, the press-fit OMNI-GLOW cannot be removed by finger pressure, although it can be pried loose should replacement become necessary. Units are UL and CSA approved.

Industrial Devices, Inc., River Rd., Edgewater, N.J.

## Snap-acting switch

### Item 282

The type USM4 Unimax sub-miniature snap-acting switch is designed for use where ambient temperatures are high and available space is low. This switch is only  $25/32$ " long x  $1/4$ " wide x  $1/2$ " high. This small size permits Type USM4 switches to be gang-mounted, four to the inch, for multiple-circuit control in miniaturized apparatus.

The electrical ratings of this single-pole, double-throw switch are: 2.5 amperes, 30 volts DC,

inductive; 5 amperes, 30 volts DC, resistive; and 5 amperes, 125/250 volts AC.

Write for further data to Unimax Switch Division, The W. L. Maxson Corporation, Ives Rd., Wallingford, Conn.

## Waveguide components

### Item 283

For the first time, the microwave engineer now has available measurement equipment and components for WR-159 and WR-229 Waveguides. Introduced by the Narda, Microwave Corporation, Mineola, Long Island, New York, these products are engineered and manufactured to the same high standards and with similar specifications to Narda's standard catalog line.

The new components include adaptors, detectors, impedance meters, low power and sliding terminations, and slide screw tuners. Directional couplers are also available for WR-229 Waveguides.

Specifications for these units, designed to cover frequency ranges from 3300 to 4900 mc and 4900 to 7050 mc, respectively, are identical to models covering adjoining frequency and waveguide sizes, as described in the standard catalog. Complete information as to model numbers, price, and specifications are available by writing to the Narda Microwave Corp., Mineola, Long Island, New York.

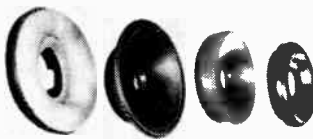
## Ear cushions

### Item 284

Four different styles of ear cushions are available for use with Permadyne Extended Range Dynamic Headphones.

Style #1505 is widely used in aircraft and other applications where noise exclusion and optimum comfort is a must. (Navy-NAF-48490-1). Solid rubber back, with Kapok filled chamois ring. Style #1537 is a light weight, soft sponge synthetic rubber cushion that fits over the ear to provide real comfort and seal. (Navy-C-49104-B).

Style #1545 is extensively used by the communications branches of the armed services. (Army MX-41/AR). Style #1250 is the most widely used cushion. Molded from soft synthetic rubber  $3/64$ " thick. The outer roll on the face provides very good seal and comfort to the wearer. (MC-162-A).



Additional data available from: Permadyne Division, Melody Master Mfg. Co., 2149-51 W. Roscoe St., Chicago 18, Ill.

## Magnetic clutches

### Item 285

Dynamic Instrument Corp. announces the addition of an entirely new and improved line of magnetic clutches and brakes for use in servo and control systems, analog computers and precision instrumentation in general.

The newly developed line encompasses nine models in five frame sizes and has the highest torque ratings in the field.

The magnetic design is such that it does not load the bearings, which results in low breakaway torque and long life, hitherto a major difficulty in the magnetic clutch and brake field.

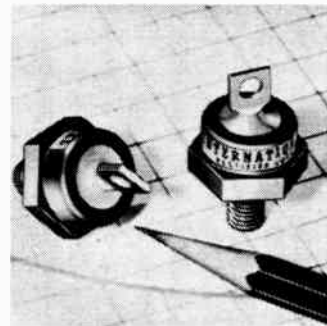
For further information contact Dynamic Instrument Corp., 59 New York Avenue, Westbury, L.I., N.Y.

## Silicon power rectifiers

### Item 286

International Rectifier Corporation, El Segundo, California announces a series of low-cost 25 to 35 amp, 50 to 500 PIV-rated silicon power rectifiers designed specifically to provide exceptional performance (including operation to  $130^{\circ}\text{C}$  base temperature) in commercial equipment applications.

This series embodies a new technical advancement in the sealing of silicon rectifier junctions termed "Quad-Sealed" — a four-layer seal assuring high resistance to humidity, shock, vibration, temperature extremes and other adverse environmental conditions.



Diodes in this series feature an over-sized anode lug which efficiently removes heat from the rectifier junction... allows the unit to withstand unusually high peak current surges.

Atlas Radio Corp. Limited, 50 Wingold Ave., Toronto 10, Ont.

## Transmitter racks

### Item 287

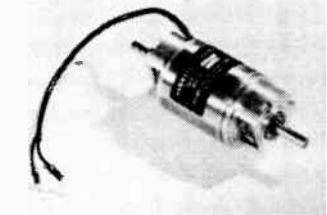
Premier Metal Housings, Ltd., of Montreal, has introduced a new line of Prem-O-Rak Modular Transmitter Racks designed for multiple installations and for use with the Prem-O-Rak console cabinets. The new racks, named the "F" series, have front and rear rounded tops, 22" wide frames made of 14 gauge steel, two adjustable panel mounting angles and many other features. Doors, and panels, flush doors, shelves and turrets are available as accessories for modular systems. Units are available through the manufacturer.

For further information write Premier Metal Housings, Ltd., 5810 Smart Ave., Montreal, Que.

## Magnetic clutch

### Item 288

The comprehensive range of precision magnetic clutches manufactured by Reeves Instrument Corporation, New York, has been increased to include a series of miniatures built to the highest standards.



They are specifically designed for use in high quality electro mechanical servo systems.

For further information on these units or any Reeves precision electro mechanical equipment contact:

Douglas Randall (Canada) Ltd., 126 Manville Road, Scarborough, Ontario.

For complete information on products check off item number on page 81



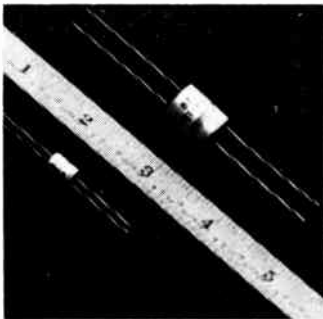
## Wide-band coupling transformers

Item 289

Two series of Wide-Band Coupling Transformers have been announced by Aladdin Electronics of Nashville, Tennessee. These miniature transformers have been designed specifically for use as coupling transformers in the audio and radio frequency range. Some of the outstanding features are:

Very wide frequency response.  
Low attenuation in the frequency band (down 2db maximum at frequency extremes, at rated power level).  
Low distortion (5% maximum at rated power level).  
Little phase shift.

Small size and weight.  
One series is conservatively rated at one watt and the other series at one-half watt. Overloading the units by 100% will narrow the frequency band within which they can be operated without increasing distortion. The pass-band of a transformer is increased slightly by operating at less than rated power levels. Each series can withstand momentary overloads up to ten times its rated power handling capacity.



All units are available with either one or both windings center tapped. The units will perform at temperatures between  $-55^{\circ}\text{C}$  and  $+130^{\circ}\text{C}$  and will meet the applicable environmental specifications of MIL-T-27A, Class R, Grade 5.

For further information write to Lake Engineering Co. Limited, 123 Manville Rd., Scarborough, Ontario.

## Miniature rheostat

Item 290

Ohmite Manufacturing Company's unique miniature rheostat, the Model E, can now be furnished in the enclosed style also.



The enclosure consists of a light-weight, drawn aluminum housing which is dust-tight. The three rheostat terminals are brought out to corresponding terminals on the back panel. Exclusive of the shaft, the entire enclosure measures  $1.3/64$ " diameter x  $1\frac{1}{2}$ " long.

Both the enclosed as well as the unenclosed units are rated  $12\frac{1}{2}$  watts at  $40^{\circ}\text{C}$  ambient. Yet the rheostat itself, is no larger than many one or two watt potentiometers. Ohmite's time-proven all ceramic and metal construction and vitreous enamel coating is employed for this tiny unit to achieve high dissipation efficiency and long life.

For complete details concerning unenclosed and enclosed Model E rheostats, request Bulletin 157 from Ohmite Manufacturing Company, 3661 Howard St., Skokie, Illinois.

## Wafer magnetic brake

Item 291

Dynamic Instrument Corporation's miniature electro-magnetic wafer brake is the answer to critical size/weight control applications requiring a dependable high performance braking device.



ACTUAL SIZE



With an overall length of only .405" and an output torque of 16 oz. in. (min.), this unit is extremely suitable for use in airborne and other miniaturized control applications.

Manufactured to meet or exceed applicable military specifications, the wafer brake has no slip rings, brushes, rotating coils, or other moving electrical parts which are subject to wear. Life tests in excess of 1,000,000 cycles have proven the reliability of this unit.

The unique magnetic design completely eliminates bearing thrust load thus greatly increasing the life of the bearings and resulting in extremely low drag torque (0.05 oz. in. max.).

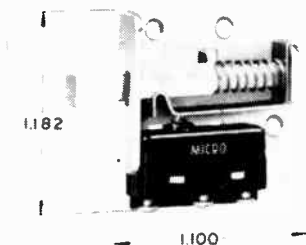
For further information write Dynamic Instrument Corp., 59 New York Ave., Westbury, L.I., N.Y.

## Door interlock switch

Item 292

A new subminiature door interlock switch for use on high cabinets, radio, radar, sonar, X-ray and other electronic cabinets has been announced by Micro Switch, Toronto, Ontario a division of Honeywell Controls Limited.

This tiny switch, Micro Switch Catalog Listing 17AC1-T measures only  $1.182$ " x  $1.50$ " x  $.35$ ". It is used to automatically cut off power when the cabinet service door is opened. By pulling the plunger to the maintained contact position, it is possible to check circuits with the power on. The plunger automatically returns to the normal operating position when the door is closed, eliminating the dangers of "tying down" or wiring around conventional switches. Total travel of the plunger is approximately  $5/32$  in. in either direction.



Inquiries to be directed to B. Colwell, Merchandising Department, Honeywell Controls Limited, Vanderhoof Ave., Toronto 17. Ask for Data Sheet 159.

## No-shaft potentiometer

Item 293

The new Clarostat Cap-Pot is ideally suited for use in portable transmitting and receiving equipment, as well as trimmer applications where a high degree of resolution in limited space is required.

The Cap-Pot is constructed of nylon, the knob being an integral part of the unit. It measures .500" in diameter with a behind panel depth of  $\frac{1}{8}$ ". Mounting on panel is done through a single hole with lock nut run up from rear side of panel. Choice of wire or solder lug terminals is available. The Cap-Pot weight is .20 oz.

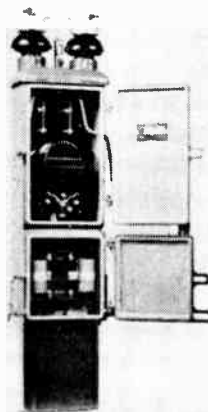
Power rating of the potentiometer is .5 watts at  $40^{\circ}\text{C}$ , derated linearly to 0 at  $105^{\circ}\text{C}$ . Linear functions only. Dielectric strength is 900V rms at sea level for 1 minute.

Further particulars upon request to Canadian Marconi Company, Electronic Tube & Components Div., 830 Bayview Ave., Toronto 17, Ontario.

## Communications protector

Item 294

Osborne Electric Company, Ltd., Etobicoke, announces a new Communications and Telephone Protector which is designed to prevent high voltage surges or light-



ning from damaging carrier current and telephone apparatus. It is so designed that it will pass from 20 cycle ringing current up to 450 KC with less than 0.5 db loss.

Osborne Electric Company, Ltd., 95 Wesley St., Etobicoke, Toronto 18, Ontario.

## Stud-type terminal blocks

Item 295

Catering to the widest range of wiring tastes and requirements, the Kulka line has just added a stud-type molded-barrier terminal block. It is available in various sizes accommodating from 1 to 26 stud posts, and in current-handling ratings from milliamperes to 90 amperes. The screw studs are separated by molded barriers for minimized electrical leakage and shorts. Molded thermostetting plastics are used, with high tensile strength bakelite for general commercial use, and in CFG, MFE, MAI-60, MME and MDG to meet military MIL-M-14 specs with latest revision. The blocks have two mounting holes.

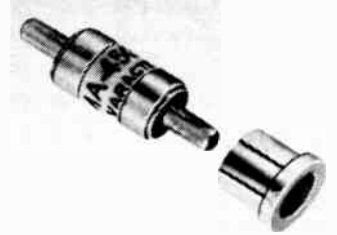
Descriptive bulletin, as well as Terminal Block Catalog 14, may be had from Kulka Electric Corp. 633-643 S. Fulton Avenue, Mt.

Vernon, New York, or through their Canadian Sales Representative, A. T. R. Armstrong Limited, P.O. Box 38, Stn. "D", Toronto 9, Ontario.

## Varactor diodes

Item 296

A new series of hermetically sealed silicon Varactor diodes has been introduced by Microwave Associates. Designated MA-450A through MA-450E, they feature reversible polarity by means of a base adaptor supplied with each diode.



The new diodes are mechanically rugged for maximum reliability. Cartridge shunt capacitance, measured at 100 kilocycles, is about 0.4 micromicrofarads. Series lead inductance is less than  $10^{-9}$  henries. Power dissipation rating ranges between 300 milliwatts for lowest cutoff types to 150 milliwatts for highest cutoff types.

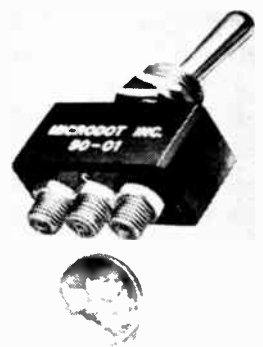
MA-450 varactors are intended for use as the amplifying element in low-noise parametric amplifiers; balanced, single sideband modulators; harmonic generators where they replace point contact diodes; sub-harmonic generators (Parametrons); RF limiters; and in many other specialized applications.

Further data from Microwave Associates, Inc., Burlington, Mass., or from E. G. Lomas, 227 Laurier Ave. West, Ottawa, Ont.

## Miniature coaxial switch

Item 297

A miniaturized coaxial SPDT switch with all the electrical and mechanical features of normal coaxial switches. The new type 90-01 SPDT coaxial switch for 50 ohm cable is designed so that it can be directly inserted into a miniaturized circuit without adapters. Positive toggle action assures proper switching action and panel mounting provides easy installation. Mating connectors are available for application, at, above, or below 400 MC.



VSWR is less than 1.2 to 2 kmc and insertion loss is 0.5 db at 2.0 kmc. Voltage ratings is at 1500 volts maximum (60 cps) and cross-talk is better than 60 db to 2.0 kmc. Operative life is at a minimum of 50,000 cycles. The switch weighs only one and a quarter ounces.

Microdot Inc., 220 Pasadena Avenue, South Pasadena, Calif.

For complete information on products check off item number on page 81

## MATERIALS AND HARDWARE

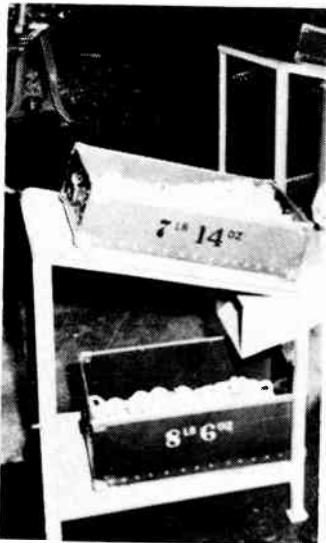
### Fibre tote trays

Item 298

One of the best ways to speed production and lower costs is to keep "pick up" and "put away" operations as close together as possible.

Good workplace arrangement plays an important role here. Many times, the key to good workplace arrangement is the proper use of such materials handling aids as tote trays and parts trucks in work areas around production machines.

A prominent plastic fabricator has significantly improved operations by installing special labor- and motion-saving material handling trucks next to lathes, punch presses and other machines. Each of these special trucks is equipped with a delivery chute and two lightweight Kennett vulcanized fibre tote trays, manufactured by National Fibre Company of Canada, Ltd.



Kennett tote trays are made of vulcanized fibre, a tough, long-lasting cellulose plastic. Their inherent resilience cushions shock to protect contents from damage. They will not dent, splinter, crack, rust or corrode. And being considerably lighter in weight than wooden or metal containers, they can carry higher net loads.

National Fibre Company of Canada Limited, 107 Atlantic Ave., Toronto 3, Ontario.

### Cable and wire insulation

Item 299

Bakelite Company, Division of Union Carbide Canada Limited, has announced that it has placed on sale two new types of low shrink silicone rubber stock for cable and wire insulation.

The first is "Union Carbide" K-1347 Silicone Rubber Compound, a premium grade material with superior physical and electrical properties for high quality wire and cable insulation, under conditions of exposure to extreme hot and cold temperatures. It is designed for use on wire to meet military and industry specifications. It can be continuously vulcanized at the wire factory on conventional equipment, with either steam or hot air. It is supplied in sheet form in 25 and 50 pound cartons.

The second is "Union Carbide" K-1357 Silicone Rubber Compound, which is available in coiled

strips for direct feed to the extruder. It can be cured in either steam or hot air in the wire manufacturing process. K-1357 gives excellent electrical and physical properties at moderate cost, in addition to affording savings in the fabrication process.

Silicones Department, Bakelite Company, Division of Union Carbide Canada Limited, 40 St. Clair Avenue East, Toronto 7.

### Speed clips

Item 300

A new dual-functioning Speed Clip, developed to fasten aluminum intermediate frequency cans to printed phenolic circuit boards in electronic equipment, is available from Dominion Fasteners Limited, Hamilton, Ontario.

Serving also as a positive ground for I.F. cans, the new Speed Clip is assembled easily and rapidly. It is merely pushed by hand over the bottom edge of the I.F. can, requiring no special cut-outs in the can or special assembly tools. Two barbs on the clip bite into the side of the can, providing firm retention and an excellent grounding connection between can and clip. The lower half of the clip, consisting of a dart-like extension with a spring tab, is then pushed into a mounting hole in the phenolic panel. The spring tab supplies tension to hold the unit in place until the final soldering operation. The solder completes the ground connection from clip to circuit and secures the clip permanently to the circuit board.

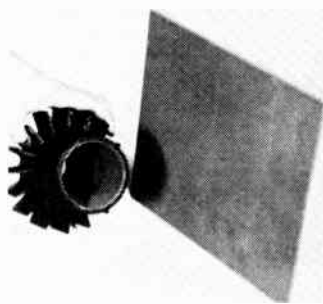
Removal of the intermediate frequency can for inspection or repair is easily achieved by expanding the barbed leg of the Speed Clip away from the can with a simple tool.

Further information from Dominion Fasteners Limited, Hamilton, Ontario.

### High loss ceramic foam

Item 301

Emerson & Cuming, Inc., Canton, Massachusetts, announces a new series of bulk resistive ceramic foams, designated Eccosorb BR. It is particularly useful in microwave components such as attenuators, terminations and loads. Eccosorb BR is available in sheet form, weighing approximately 20 lbs./cu. ft., and is readily machined to wedges, tapers, etc.



Further information from Emerson & Cuming Inc., Canton, Mass., or M. J. Howard & Company, 1168 Gertrude Street, Ottawa.

### Aluminum core tungsten wire

Item 302

Canadian General Electric Company Limited has announced a new type of stranded wire for vacuum metallizing which has an aluminum core. Coils made from this new type wire will "wet" more quickly and will give longer, better service.

The company revealed that the new aluminum core tungsten wire becomes an "Open Strand" design the first time it is flashed

in use.

As the aluminum core vaporizes and disappears in the first flash of the metallizing process, space is left between the tungsten strands of the coil. This increases tungsten surface area by at least 25 per cent over that in former coil material of tightly-twisted tungsten strands.

The result is quicker, more even "wetting" of the coil by the melting aluminum charge as it heats to the vaporization point of the aluminum.

Such even "wetting" helps to lengthen coil life, since it reduces hot spots caused by a balling-up of the aluminum.

Tests with "Open Strand" design coils, first introduced by General Electric in October 1958, have shown that they can give as much as 80 per cent more production per coil than former types.

Since its aluminum core provides even, complete "wetting" for the first metallizing flash, new General Electric aluminum core stranded tungsten arrives ready to vaporize metal.

Canadian General Electric Company, 940 Lansdowne Avenue, Toronto, Ontario.

### Conductive coating

Item 303

Hysol (Canada) Limited, Toronto, announce production of Hysol 6251, a new conductive coating based on epoxy resins. Low volume resistivity, exceptional toughness, and excellent adhesion are important qualities of 6251. It is very easy to handle and working time exceeds four hours.



The compound is recommended for rebuilding areas worn away by sliding contacts, and as a conductive base for plating plastics when reliable bonds of the coating to the plastic are necessary. Full cure can be effected in forty-eight hours at room temperature or in as little as seven minutes at 300°F. The volume resistivity of the coating at 25°C is .0008 ohm-cm.

Free technical literature is available upon request. Kits may be obtained from Hysol (Canada) Limited, P.O. Box 53, Station R, Toronto, Ontario.

### "Instant" sealant

Item 304

Dow-Corning-Silicones announce development of a new single package silicone sealant that cures in place to a tough, rubbery solid without the addition of catalyst or heat. An important time and labor-saving feature of this new one-component product is the ease of instant application. Primers are not necessary in achieving good adhesion to most surfaces. On exposure to air the compound becomes tack-free within one hour and sets up to a completely cured seal within 24 hours.

Resiliency and adhesion remain virtually unchanged at operating temperatures ranging from -70 to 500°F. Other properties that add versatility to this sealant include oxidation and moisture resistance, and also to the effects of weather and ozone.

Dow Corning Silicones Ltd., Tippet Rd., Downsview, Ont.

### Magnet wire

Item 305

The Federal Wire & Cable Division of H. K. Porter Company (Canada) Ltd., Guelph, Ontario has added two new magnet wires to their product line — Nythane and Isobond.

Isobond is a bondable film over Polyurethane enamel, its main features are its solderability at lower temperatures and a higher cut through temperature than Bondel Magnet Wire. Principal use of Isobond Magnet Wire would be in the manufacture of form wound yoke coils.



Nythane Magnet Wire is a nylon coating over a polyurethane enamel. Its high solderability, abrasion resistance, chemical resistance and good windability makes it highly desirable for use in series armatures and fields, stators and other difficult winding operations. It is especially suited for use on automatic coil winders. Nythane Magnet Wire is rated as a Class "A" magnet wire and is available in natural or red colored finishes.

For further information write to: H. K. Porter Company (Canada) Limited, Guelph, Ontario.

### Tape clips

Item 306

A new device for keeping tapes from unwinding is being marketed by Robins Industries Corp., 36-27 Prince Street, Flushing 54, N.Y. An improvement over its original tape clips Robins new clip is designed so that a reel of tape will lie flat in its storage box with the clip in place. It is also longer and more easily handled.

On a full reel of tape, the device clips on one edge of reel flange and automatically keeps the tape from unwinding. On a less than full reel the end of the recording tape is folded around the edge of the reel and Robins clip is placed over the tape.

For further information write to: Robins Industries Corp. 36-27 Prince Street, Flushing 54, N.Y. or E. S. Gould Sales Company, Montreal.

### Cable pulling device

Item 307

Siemens has produced a cable pulling device, suitable for 4 inch conduits, driven by two electric motors fed from rechargeable batteries.

It pulls a 500 foot long perlon thread through the conduit. Should an obstacle be encountered increased tension on the thread carries the motors to



reverse and the device to come back out of the conduit. In case of further failure to penetrate, the length of the string is marked and the distance to the obstruction is clearly indicated.

The cable pulling device is available through the Ahearn and Soper Co. Ltd., 384 Bank Street, Ottawa 4.

For complete information on products check off item number on page 81



## Junction terminal bushing

Item 308

Now available from Cords (Canada) Ltd. is HEYCO'S new junction terminal bushing — a miniature nylon insulated receptacle for use with standard female wire terminations.

These bushings, which provide insulated quick disconnect access through housings and feature snap-in installation, have a multitude of uses — you can invent your own. Their versatility challenges your imagination.

They are used to modernize electrical circuits and components such as motors and control devices by eliminating "pig tail" wire leads, screw terminals and junction blocks. They provide neat appearance, nylon insulation and can also be used as a jack or plug-in receptacle.

Cords (Canada) Ltd., 149 Sterling Road, Toronto, LEnnox 7-1221.

## Funnel flange eyelets

Item 309

United's Funnel Flange Copper Eyelets have shown the following advantages in exacting laboratory tests, in high speed production, and in superior performance under the most severe operating conditions such as in printed circuits for guided missiles and rockets:

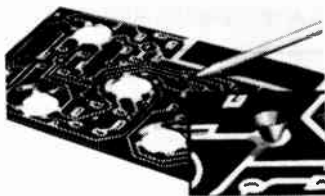
Better solder connections provided by funnel flange and flared setting which eliminate flux trapping so that solder flows smoothly around setting.

Permanent trouble-free assemblies because eyelet is made from chemically pure electrolytic copper with a co-efficient of expansion closer to etched or printed circuit.

Excellent affinity for solder demonstrated in tests by leading producers of electronic equipment.

Ease of insertion ensured by barrel O.D. of .058" for boards with .062" holes; barrel length designed for  $\frac{1}{16}$ " thick PW boards.

Faster insertion of component leads because of the 90° funnel-shaped flange.



For additional information on United's Funnel Flange Eyelets, Miniaturized Eyelets or Standardized Eyelets contact Industrial Sales Division, United Shoe Machinery Company of Canada Limited, 2610 Bennett St., P.O. Box 1658, Place d'Armes, Montreal, Que.

## Packing box

Item 310

A new standard packing box, designed to accommodate all sizes of S-type meters and protect calibration during shipment, is being used by Canadian General Electric's Meter plant at Quebec, P.Q., for shipping polyphase watt-hour meters.

A contour-molded kraft pulp unit pack, the new package is constructed of a stronger material than the previously used corrugated cardboard. The use of only two sections — top and bottom — reduces by half the number of internal packing parts previously used. Because of the added strength of the new pack-

age, meters are subjected to less impact in shipment.

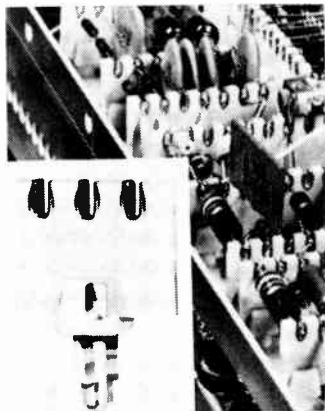
Since the new pack accommodates all sizes of S-type meters, both old and new, the need for meter superintendents to stock several different sizes of boxes is eliminated. The standard carton size also results in more efficient warehousing.

Canadian General Electric Co., Ltd., 214 King St. W., Toronto, Ont.

## Terminal strips

Item 311

The new Tektronix Ceramic Terminal Strips with nylon-yoke chassis fittings were originally developed for use in the assembly of Tektronix Oscilloscopes and auxiliary equipment in order to reduce both the required area and the depth of the chassis.



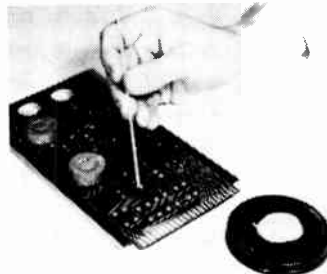
Old, time-consuming methods of attaching strips to chassis have been done away with — a quick snap-fit of the nylon yoke-pin into polypropylene spacer sleeve provided is all that is required to attach strip firmly to chassis. Strips come with one or two nylon yokes assembled, depending on size. Three sleeve heights are available to vary clearance of strips over chassis. Connection will not break or let go when subjected to shock or vibration.

Full information is available from Tektronix, Inc., P.O. Box 831, Portland 7, Oregon.

## Conductive cement

Item 312

A new conductive cement, based on epoxy resins, is offered by Hysol (Canada) Limited, Toronto. Named Hysol 6250, it is 100% solids. Volume resistivity is measured at .01 ohm-cm at 25°C. Offering excellent bond strengths to most materials, Hysol 6250 is particularly recommended for repair of printed circuits and for bonding of electrical components where soldering cannot be tolerated.



The compound will cure fully in twenty-four hours at room temperature, or in two hours at 140°F. It is supplied in convenient kit form. Free technical information is available upon request from Hysol (Canada) Limited, P.O. Box 53, Station R, Toronto, Ontario.

## Insulating materials

Item 313

Miniaturization, higher operating speeds and greater output are all raising operating temperatures in electrical and electronic equipment.

To meet increasing demand for insulating materials to withstand high temperatures during long periods of continuous operation, Spauldite heat resistant laminates have been developed. These Spauldite grades offer various combinations of properties and cover a wide range of requirements for these new materials.

Three resin systems, phenolic, modified phenolic and melamine, have been employed to provide different combinations of important properties.

Spauldite G-5-766, a melamine laminate, combines good resistance with non-flammability and good heat stability at high temperatures. Spauldite G-787, Spauldite G-789, both with modified phenolic resins, are designed for greater stability at higher heat levels. Asbestos grades, with phenolic or melamine resins, have excellent heat resistant properties. They are recommended for mechanical applications and some low voltage electrical uses.

Spaulding Fibre of Canada Limited, Toronto 18, Ontario.

## Wire stripper

Item 314

A new precision made tool for stripping wire without accidental cutting or nicking has just been introduced by General Cement Mfg. Co., Rockford, Ill. Called the "Strip-Er-Clip", the tool will strip and clip all wire from 14 to 26 gauge.

"Secret" of the "Strip-Er-Clip", is a seven-stop gauge that adjusts instantly to the correct wire size and prevents wire damage. This simple little safe-guard is easily moved with just thumb pressure.



The entire unit is made of heat-treated steel, with specially ground cutting edges for fast, effortless clipping and stripping. A heavy insulated grip provides comfort and safety, with the jaws streamlined for use in cramped quarters.

For additional information, write direct to General Cement Mfg. Co. (Division of Textron Inc.), 400 South Wyman Street, Rockford, Illinois, or Charles W. Poinfion Ltd., 66 Racine Road, Rexdale, Ontario.

## Solvent stripper

Item 315

Solvent Stripper Monastrip EP for epoxy, polyester and for silicone rubber potting, casting and encapsulating compounds permits the wider use of the epoxies and polyesters potting and encapsulating resins on many items of considerable value since now such assemblies are not lost, in case a defect should develop.

The casing can be partly or totally removed for the purpose of correcting defective wiring, replacing of parts or salvaging of valuable components.

Monastrip EP is non-flammable and requires no special equipment. A simple container with pressure tight cover is recommended. It does not deteriorate with age or use. It requires replenishing only to offset loss due to evaporation and absorption.

This solvent stripper finds universal use in the electronic, electrical and aircraft industries.

For further information write Mona Industries, Inc., Paterson 17, N.J.

## Tape splicing kit

Item 316

A new low cost audio tape splicing kit is now available in Canada which facilitates editing and programing according to a simple color code. The kit can be used for both stereo and monaural tapes, providing a simple clean splice that will last a lifetime.

The splicing block is of gold anodized aluminum and a cutting blade is provided. A full assortment of color-coded pressure sensitive Mylar splicing and editing strips are supplied in a plastic storage compartment in the base of the splicing block.

The shirt-pocket-sized kit may be used by amateurs without previous splicing experience to obtain professional quality tapes, cleanly edited and free from "bloops".

Called, Quick-splice, the new kits are distributed in Canada by Len Finkler Ltd., 1794 Avenue Road, Toronto, RU. 1-5232.

## Expanded metal mesh

Item 317

Expamet Pattern Mesh is an entirely new "lace-like" expanded metal mesh. Its recurring patterns sparkle and reflect the light, creating new decorative effects of exceptional beauty.

It can be color-anodized in 12 different colors and gives unlimited scope for bold new decorative treatments, for loudspeaker and high fidelity grilles. Made of aluminum, there are 28 different patterns, from over 3" to as small as the point of a pin. There are hundreds of uses: aircraft grille covers, mobile radio cases and instruments needing maximum ventilation strength, electric fan and machinery guards, neon sign backgrounds, TV, film and stage sets, radar equipment covers, etc.

Write for illustrated brochures to: Cresswell Pomeroy Ltd., 35 Densley Avenue, Weston, Ontario.

## Flame-retardant laminate

Item 318

Fireban X, a new flame-retardant version of Grade X laminated plastic, is described in a Technical Bulletin 3.1.1.1. offered by Taylor Fibre Co., Norristown, Pa.

The bulletin describes Fireban X as a paper base grade with low phenolic resin content. It was developed for use where both mechanical strength and flame retardance are required.

Typical applications, the bulletin notes, are structural parts for radio, aircraft, and switchgear; terminal boards or panels, and insulating washers.

Minimum and maximum property values of the new material, including physical, mechanical and electrical properties, are given.

Fireban X is available in sheets approximately 49 x 49 inches in thicknesses from  $\frac{1}{8}$  to 1 inch inclusive.

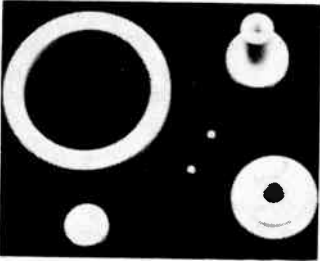
For copy of Bulletin No. 3.1.1.1., write Taylor Fibre Co., Norristown, Pa. or A. A. Andersen & Company Limited, 20 Algic Ave., Toronto 18, Ont.

For complete information on products check off item number on page 81

## Fluorocarbon base resin

### Item 319

Fluorosint resin is a Teflon base material which has a thermal coefficient of expansion approximately one-fifth of unmodified Teflon TFE fluorocarbon resin. The coefficient of expansion of Fluorosint is very close to that of aluminum, copper, brass, magnesium and silver so that it may be used in complete assemblies more efficiently.



The addition of the high temperature inorganic reinforcing agent used in Fluorosint has a negligible effect on dielectric strength, volume or surface resistivity, or density. Dielectric constant and loss factor are excellent. The dimensional stability of Fluorosint is markedly superior to that of Teflon, both in resistance to creep or "cold flow" and in resistance to deformation on thermal cycling. For example, Fluorosint may be quenched in water from 700°F with negligible change in dimensions.

For further particulars write any of the Canadian representatives: Peckover's Ltd., 115 McCormack St., Toronto, Ontario; Peckover's Ltd., 2025 St. Catherine St. W., Montreal, Quebec; C. M. Lovsted & Co. (Can.) Ltd., Box 4185, Station D, Vancouver, B.C.

## Resistance alloys

### Item 320

NICRALLOY High Temperature Electrical Resistance Alloys are the products of Hall & Pickles Ltd. of Sheffield, England.

Nicalloy A is an 80/20 Nickel-Chromium alloy which has been developed for use as electrical resistors, operating at temperatures up to 2100°F. (1150°C.)

Nicalloy B differs from the A quality in that a proportion of the nickel and chromium content of the alloy has been replaced by iron. This enables the production of a less expensive alloy suitable for electrical resistors operating at temperatures up to 1740°F. (950°C.)

Both A and B qualities of Nicalloy are tough and ductile, and do not become brittle, even after exposure to high temperatures for long periods.

Full details available from Arbutnot Ewart (Canada) Ltd., 35 Densley Ave., Toronto 15, Ont.

## Industrial film chart

### Item 321

A new, easy-to-read wall chart, now available from Kodak, will make it easy for industrial photographers to choose the Kodak 16mm, 35mm, or 70mm motion picture film best suited for a specific use.

The chart is expected to be particularly valuable to companies engaged in recording test data photographically in the guided missile, aircraft, and other fields where film requirements are of a special nature.

The charts explain the general characteristics of each film, the size in which it is available and how it is spooled.

The films are listed according to their relative sensitivity under four categories; panchromatic,

orthochromatic, blue sensitive, and special sensitivities, which includes infrared and spectroscopic.

There is a section on Kodak Color Film in which negative color film and reversal color films are listed separately.

A large halftone picture shows the standard types of cores and spools used with both the black-and-white and color films.

The chart will be valuable to project engineers confronted with the problem of selecting a film best suited to their needs.

Interested photographers and technicians may obtain the chart, "Kodak 16mm, 35mm, and 70mm Films", by writing on their company letterhead to Canadian Kodak Sales Limited, Toronto 15, Ontario.

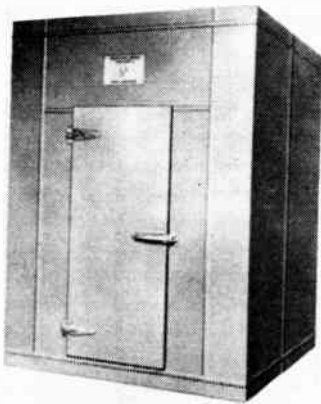
## Environmental test chamber

### Item 322

Typical of their line of custom-built walk-in type environmental test chambers was one recently completed by the American Research Corporation.

Although only 6' x 7½' the room was completely prefabricated and rigorously tested at the factory before delivery to the customer.

The chamber simulates temperatures from -100° to +250°F and relative humidities from 20% between +35° and 185°F. Similar equipment is available for temperature simulation only.



Completely automatic in operation, the test chamber has such features as automatic temperature control, two-pen round chart recording humidity control, automatic float control of water level, water cooled condenser, and safety thermostat to protect heaters from accidental burnout.

American Research Corporation is represented in Canada by Computing Devices of Canada Limited, P.O. Box 508, Ottawa, Ont.

## Epoxy bonded laminate

### Item 323

Spaulding Fibre of Canada Limited announces a new cold punching glass material, G-10-773. It is an epoxy bonded glass base laminate, which has built in fungus and cyanide resistance.

Stability over a wide range of conditions puts Spauldite G-10-773 into the specifications when there's a tough job to do. This material retains its high electrical properties despite adverse moisture conditions. Mechanical strength is high. And Spauldite G-10-773 can be punched without heating. Approved to MIL-P-18177. Fungus resistant. Class B temperature rating. Furnished in fabricated parts, sheets, rods, tubes and copper clad.

Spaulding Fibre of Canada Limited, 70 Coronet Rd., Toronto 18, Ontario.

## Thermoplastic

### Item 324

A new, tough thermoplastic of 1,001 applications can be sawed, sheared, drilled, punched, sanded, cemented and polished. Can be worked with ordinary tools and machinery. Can be vacuum formed, screwed, riveted and bonded. Ideal for electric panels, instrument boards, name plates, chemical-resistant pipe, tote boxes, textile bobbins, cathode edge strips, electrolytic tanks.

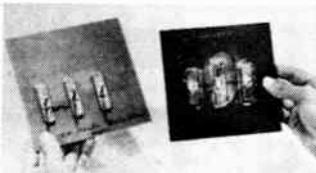
It is flexible, chip-proof, weather resistant, fungus resistant, of light weight, electrically non-conductive.

For full information, contact: Empire Engineering Co., 738 Dundas St. E., Toronto, Ontario.

## Fiber glass laminate

### Item 325

The Glastic Corporation has introduced a new track resistant insulation for service in contaminated, humid atmospheres. The fiber glass alumina-polyester laminate is called Grade UTR "Resistrac" (trademark).



It is conservatively rated with a 200-hour value as established under the suggested ASTM Dust-Fog Tracking Resistance Test. In comparison, general purpose glass polyester tracked to ground in less than 5 hours; phenolic laminate failed by carbon tracking in less than one hour.

"Resistrac" is also flame resistant. Complete data and prices may be obtained from H. P. Ruggles and Co., Ltd., 88 Caroline Street, Hamilton, Ontario.

## Galvanizing coating

### Item 326

The Coldgal Mfg. Co. has developed a new cold galvanizing coating for metals which prevents corrosion. The rust resistant compound is applied by brush or spray gun and is stick dry in 20 minutes. The finished coating is grey in color and needs no further coating unless a specific color is desired.

Overcoating Coldgal can be started after 3 hours. The surface is age hardened in 20 to 24 hours. The compound is non-poisonous and, therefore, no special equipment is necessary for its application. It is durable in sub or sea-water locations, boiling water, air temperatures of 240° or minus 30°C. Can be stored indefinitely when container is well-sealed.

Further information can be obtained by writing Coldgal Manufacturing Co., 4205 Courtraie Ave., Montreal, P.Q.

## Copper etching

### Item 327

After several years of experimenting with various methods of producing printed circuits, electronic engineers have generally accepted the printed and etched, copper laminated, plastic board as the most dependable and economic type of circuit board.

In 1954 it became apparent that the electronic industry would require large quantities of etchant for copper in this relatively new field. The Philip A. Hunt Company of Palisades Park, N.J., with its long experience in the production of engravers' iron chloride solution, felt that an etchant specifically designed for

printed circuit work was needed. Several months of development work in their research laboratories produced an iron chloride solution which gave superior results on the printed circuit boards. This etchant was called "Hunt R.C.E. Solution". (Rapid Circuit Etch).

Write Philip A. Hunt Company, Palisades Park, New Jersey.

## Magnetic tape

### Item 328

IBM Durexcel Magnetic Tape is available for use on 727 and 729 Model 1 magnetic tape units. It combines outstanding durability and reliability through an advanced development in the formulation of magnetic tape coating. This results in the long error-free life so important in many data processing applications. Its use is particularly advantageous in all applications requiring repeated or frequent file processing.

Full information from International Business Machines Company Limited, Don Mills Road, Toronto 6, Ontario.

## "Epoxy-cement"

### Item 329

An adhesive with remarkable bonding properties has just been announced by G. C. Electronics Co., Rockford, Illinois. Available in kit form, the new product is called "Epoxy-Cement" and it cures at room temperature through chemical action.

"Epoxy-Cement" has a bond strength of 3,000 lbs. per square inch on metals, ceramics, wood, glass, plastics and many others, including materials normally different to cement. There is said to be no shrinkage on curing.

The manufacturer claims "Epoxy-Cement" is resistant to water, solvents, heat or cold, and fungus; excellent dielectric properties are also claimed.



Two tubes are included in the "Epoxy-Cement" kit, consisting of a base resin and a hardener. The two ingredients must be mixed prior to application. The kit (Catalog No. 346) totals approximately 3 oz. Those wanting further information should write direct to G. C. Electronics Co. (Division of Tectron Inc.), 400 South Wyman Street, Rockford, Illinois, or to Charles W. Pointon Ltd., 66 Racine Road, Rexdale, Ontario.

For complete information on products check off item number on page 81

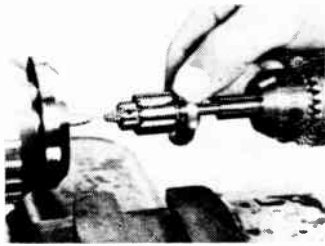


## Precision driller

### Item 330

Ultra-Fine Hole Driller for Mill or Drill Press. Following on the success of the Hunter Small Hole Driller released earlier this year, Hunter is now introducing an even more precision ultra-fine hole driller that features the famous "Albrecht" micrometer chuck or the small Jacob's.

With this highly precision Hunter-Stanley Small Hole Driller, Hunter claims an accuracy of .0002. It has "finger Tip control" which allows the operator to "feel his way" thus saving breakage of many small drills.



For complete information write: Hunter Tool, P.O. Box 564, Whittier, California, or Len Finkler Limited, 1794 Avenue Road, Toronto 12, Ontario.

## Metal-clad flexible cable

### Item 331

Standard Wire & Cable Limited of Toronto is now manufacturing a comprehensive range of metal-clad building cables which may be buried in plaster and cement.

The new cable, called 'Armour-Locked', is available with single or multiple conductors and with aluminum, or galvanized steel armour. The Armour-Locked cables can be used in moderate moisture conditions — without additional protective conduit — will carry 600 volts and meet CSA spec. 22.2 No. 51.

Standard Armour-Locked eliminates the need for costly rigid conduit installations. Since the interlocked spiral metal armour is formed as an integral part of the cable — not as a separate cover — a firm but flexible conduit with the minimum amount of air space between conductors results. Standard Armour-Locked cables have conductors insulated with type R code grade rubber and type ACH heat resistant rubber for higher temperature ratings. 1, 2, 3 and 4 conductors are available in a wide range of sizes.

Standard Wire and Cable Limited, Toronto, Ontario.

## Plate circuit cards

### Item 332

Prototype development is greatly simplified through use of the "Carte Blanche" series of standardized plated circuit cards, products of Litton Industries, U.S. Engineering Co. Division.

This series, using a standard grid pattern and hole spacing, has been designed to allow alteration or modification of standard sizes to fit individual experimental or production applications.

Providing maximum flexibility for package engineering, these modules feature circuit contact extensions and a land pattern compatible with standard .1 grid design. They are available also with terminals.

The universal card contains 22 fingers to fit standard plug-in, right angle or swage type connector with .156 spacing, and may be sheared or sawed to any size.

For information, write: U.S. Engineering Co., 13536 Saticoy Street, Van Nuys, California.

## Splicing tape

### Item 333

Guaranteed non-bleed characteristics combined with permanent holding qualities and uniform tape thickness are features of the new Robins magnetic splicing tape.

Outstanding qualities of this new splicing tape include a Dupont Mylar\* film backing 1.5 mil thick, tensile strength: 25 lb/in. width, adhesion 35-40 oz/in. gauge or caliber: .002-.0025, resistance to solvents: excellent, 0° hold: 1,000g (acetate) 18 days.

Industrial use of this splicing tape is expected to be phenomenal as it was specially formulated to withstand temperature extremes.

Rolls for industrial uses will be supplied by Robins according to individual requirements.

Robins Industries Corp. 36-27 Prince Street, Flushing 54, N.Y. or E. S. Gould Sales Company, Montreal.

## Mobile rack

### Item 334

The Mobile Rack illustrated is designed to hold the new polystyrene Plastiboxes recently introduced to Canadian industry. The unit permits the assembly of a large number of parts for one job or order to be transported to the production area with ease, eliminating other time-consuming methods. The unit can also be used to continually restock production lines by exchanging full bins of small parts for low stock or empty boxes. Plastiboxes are self-stacking with a bin front from which parts can be taken without disturbing the boxes above, making them extremely useful for order picking in stores or for bench work.



The boxes are available in five sizes ranging from 3 1/2" x 3 1/2" x 2" to 11" x 19" x 7" and come in a range of five colors for coding purposes. Descriptive literature is available. A. P. G. Plant Equipment Ltd., 191 King Street East, Toronto.

## Solder circuit etch solution

### Item 335

The common, mass-produced, etched circuit board is obtained by masking the leads, connectors, and circuit parts with printing ink resist and then etching away all the remaining copper laminated layer. If the etched boards have to be stored for any length of time, the copper parts are apt to tarnish so that fluxing and soldering become more difficult and less trustworthy. To overcome this difficulty and to obtain copper laminated boards which can be reliably soldered at any

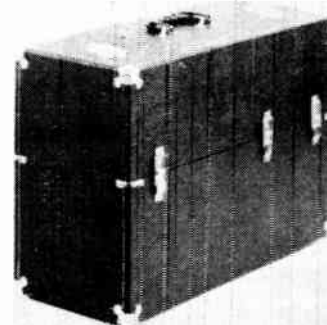
later date, the solder plating method was developed.

The advantages of using Hunt Solder Circuit Etch Solution are detailed in Technical Bulletin No. 3, obtainable from Philip A. Hunt Company, Palisades Park, New Jersey.

## Handy tube kaddie

### Item 336

The Audionix Tube Kaddie is intended for technicians working on radio, TV, Hi-Fi or industrial electronic equipment. About 200 tubes can be carried in its three compartments and there is a handy removable tray provided for tools. It is a lightweight, wood-veneer cabinet, lock-jointed, leatherette-covered and with all corners metal-reinforced.



Tube Kaddie measures 21 1/2" x 13" x 9 1/2". Information on this and other Audionix electronic products can be had by writing the manufacturer: Audio Electronics Inc., 9500 St. Lawrence Blvd., Montreal 11.

## Colored silicone rubber

### Item 337

A wide range of color versatility in silicone rubber is now made possible with a new room temperature vulcanizing (RTV) silicone rubber compound available from the Chemical Materials Section of Canadian General Electric. Designated as RTV-40, this compound is a solvent-free paste which cures up to a tough silicone rubber at room temperature after the addition of a curing agent.

This new compound possesses many outstanding characteristics found in other RTV silicone rubbers—superior ozone and weathering resistance, heat resistance and low temperature flexibility. Typical physical properties, after a room temperature cure include: tensile strength, 550 psi; durometer hardness, 55; elongation, 150 per cent; and die B tear strength, 30 lb/in.

Complete product and application information may be obtained from Chemical Materials Section, Canadian General Electric Company Limited, 940 Lansdowne Avenue, Toronto 4, Ontario.

## Air staker

### Item 338

A combination arbor press and staker developed at Cramer to meet the requirements of small production runs. Offers accurate tool alignment, instant and simple changeover from one job to another, complete control over staking force and full operator safety.

Further information from Power Service Products, 618 Vaughan Rd., Toronto 10, Ont.

## Wire stripper

### Item 339

The Rush Model K-7-B Rotary Wire Stripper uses 4 Blades (not knives) to strip off the insulation from stranded wires, not larger than 1/4" O.D. Blades are specially

designed to fit the kind of insulation on wire.

If conductors are concentric with outer circumference of wire, all insulation can be removed without damage to conductors. If conductors are not concentric with outer circumference of wire, all of the insulation cannot be removed, safely.

Samples of wire and stripping specifications are requested by manufacturers, The Eraser Company, Inc., Syracuse 4, N.Y.

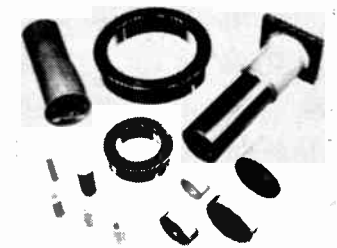
## Ferromagnetic materials

### Item 340

New non-memory, inductive core materials used successfully as antenna couplers at intermittent service temperatures up to 350°C. The cores changed less than 10% in Q and permeability after 100 hours at 275°C in atmospheric conditions.

Known as Ferrotron ferromagnetic materials, the cores are claimed to extend the operating range 75°C to 150°C over previously available compositions. The new materials are useful as tuning cores, cup cores, loading cores, etc.

Ferrotron materials are characterized by a positive Q coefficient and constant magnetic permeability. They have a volume resistivity higher than 10<sup>10</sup> ohm-cm and high dielectric strength. The dielectric losses are low across the frequency spectrum. Ferrotron cores are also claimed to have impact strength up to 50 times greater than conventional cores, with properties unaffected by moisture and aging.



Canadian representatives of Polypenco, Inc. are: Peckover's Ltd., 115 McCormack St., Toronto, Ontario; Peckover's Ltd., 2025 St. Catherine St. W., Montreal, Que.; C. M. Lovsted & Co. (Can.) Ltd., Box 4185, Station D, Vancouver, B.C.

## X-Band signal generator

### Item 341

The DY-5381 Signal Generator delivers a minimum power output of 250 milliwatts over the range from 8,500 to 10,000 mc, with outputs up to 400 milliwatts in the vicinity of 9,500 mc. The oscillator is tuned through the entire frequency range by a single knob; the frequency dial is approximately calibrated every 100 mc. The DY-5381 features a continuously-operating power monitor which permits power setting repeatability within ±0.5 db over a wide ambient temperature range.

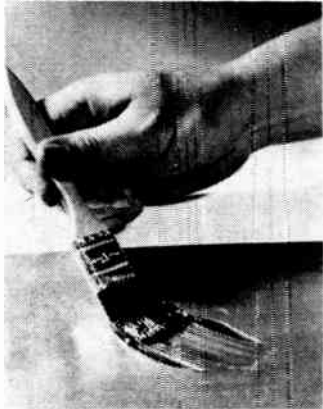
The instruments includes a 100 db rotary-vane attenuator; output power accuracy is ±1 db ±2% of attenuator setting. Types of modulation provided internally are pulse and fm, separately or simultaneously, and square-wave. The pulse length is variable from 0.5 to 25 usec; the repetition rate is adjustable from 35 to 3500 pps. Internal fm is at power line frequency with a maximum deviation of ±7.5 mc. The internal square-wave frequency is adjustable from 35 to 3500 cps. Provision is also made for external pulse, fm, and square-wave modulation.

For further information please write or call, Atlas Instrument Corp. Ltd., 50 Wingold Avenue, Toronto 19, Ont.

For complete information on products check off item number on page 81

## Epoxy adhesive Item 342

A new low-cost epoxy adhesive, BONDMASTER M685, priced at from 1/2 to 1/3 the cost-per-gallon normally associated with equivalent products in the same chemical family, is now available. The new product is a two-part, 100% reactive, room-temperature-curing formulation that is available in free-flowing viscosity which permits simplified brush application.



Originally developed for the bonding of rigid expanded polystyrene foams to themselves, to metal, wood, and other materials, the new epoxy adhesive has found widespread applicability for the bonding of metals and rigid plastics in intermediate strength "structural" applications.

Write Rubber & Asbestos Corp., Department P, 225 Belleville Ave., Bloomfield, New Jersey.

## Ultrasonic flaw detector Item 343

A brand new ultrasonic test instrument, the Sonoray Model 5, has been announced by Branson Instruments, Inc., Stamford, Connecticut. "Although the Sonoray is based on known principles, it offers so many refinements in the state of the art that it can certainly be considered a new approach. Performance, portability and price — all three are radically different: from those the buyer or user of ultrasonic equipment as known to date.



Designed with the user in mind, the new instrument offers simplified operation, convenient size and weight for field testing, yet preserves the flexibility required for laboratory requirements. The bright oscilloscope trace is visible under normal shop lighting conditions.

For further information write: Electrodesign, 736 Notre Dame Street West, Montreal.

## Transistor receiver Item 344

An outstanding new development in a communications type receiver, the Heathkit Model GC-1 General Coverage Transistor Receiver, the "Mohican", offers many firsts in receiver design as well as complete portability through its all-transistor circuit and use of eight long-life standard flashlight cells for power supply.

One of the most outstanding features of this receiver is the use of transistors previously available only in military equipment. Other features include a built-in telescoping, 54" whip antenna, flywheel tuning, tuning meter and large, easy to read side-rule, edgelighted dial.

Electrical bandspread is provided on five separately calibrated ham bands. The beat frequency oscillator (BFO) is uniquely tuned through the variable capacity effect of a diode and is adjustable by means of a front panel potentiometer.



Additional information available from Daystrom Ltd., Heath Division, 2 Raitherm Rd., Toronto 19, Ontario.

## Compression receiver Item 345

The CR-1A Compression Receiver is essentially an intermediate frequency amplifier which applies limiting and dis-



crimination in the conventional manner of any FM receiver. It performs however, an additional function of compressing the deviation by a factor of four, and applying this compressed signal to a narrow band resonant filter which attenuates wideband noise and thus improves threshold level. Frequency response is flat within 1 db from 300 cycles to 300 kc. Designed for mounting on standard 19 inch racks the panel occupies only 2 units of rack space.

Further information from: Canadian Westinghouse Company Limited, Hamilton, Ontario.

## Automatic voltage regulator Item 346

Model 650 Automatic Voltage Regulator is designed specifically for industrial or laboratory use to control power line voltage variations with accuracy and speed. It may also be used to obtain a continuously variable voltage from 0 to 130 volts AC. Since the performance of this unit is completely independent of

load power factor, its use is unrestricted. An extremely high degree of reliability is obtained by the complete elimination of all transformers and vacuum tubes. The unit consists of a closed loop servo system which



automatically controls a continuously adjustable auto-transformer, it operates over 50-70 cps range with 0.5% voltage regulation.

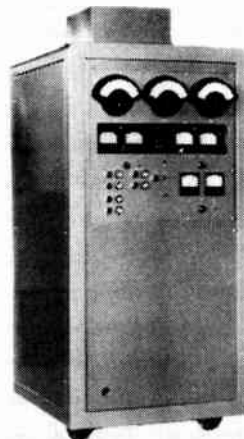
For further information please write or call Atlas Instrument Corp. Ltd., 50 Wingold Avenue, Toronto 19, Ont.

## Regulated power supplies Item 347

FXR, Inc., announces the addition of three continuously variable high-voltage regulated power supplies to their line of commercial precision microwave components. The voltage ranges are 0 to 10 KV, 0 to 12 KV and 0 to 18 KV, respectively. The new components incorporate many of the basic design features which earned for their time-proven predecessors a reputation for precision and stamina.

The new units supply beam, focus, filament and magnet voltages for backward wave oscillators, carcinatrons, travelling wave amplifiers, stable local oscillators and other frequency sensitive tubes requiring the beam voltages within the ranges designated.

Voltage regulation is better than 0.1 per cent with a 10 per cent variation of primary power. The maximum ripple is 4 or 5 MV, depending upon the model.



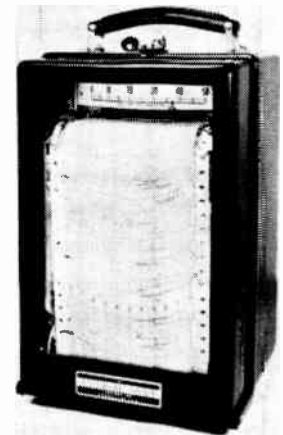
Further information from: Radionics Limited, 8230 Mayrand Street, Montreal.

## Recording DC microammeter Item 348

A recording DC microammeter that unites extra-sensitivity, ruggedness, and simplicity of operation is now being manufactured and marketed by The Esterline-Angus Company, Box 596, Indianapolis 6, Indiana. This new microammeter has a basic range of 0-50 microamperes DC with an approximate input resistance of 200 ohms. DC voltage ranges of 0-10, 50, and 200 millivolts are also included. A drift-free magnetic amplifier, powered by 120

volts, 60 cycles, is combined with a proven permanent-magnet moving-coil movement to assure high stability and long trouble-free service. Accuracy within 2 per cent of full scale is guaranteed.

This recording microammeter can be used in any circuit providing up to 50 microamperes DC. It may be operated with normal left hand zero or set for center zero operation for such applications as null detection in bridge circuits. The recording microammeter can be used in series with or as a substitute for indicating instruments that give only instantaneous readings, thus providing permanent records previously obtained only through manual data plotting.



The instrument is offered in portable models and models designed for permanent mounting. Motor or spring driven chart drives are offered. Chart speeds of 3/4 inch per hour through 12 inches per minute are standard on all models.

For additional information, write for Catalog Section 41, Esterline-Angus Company, Box 596, Indianapolis 6, Indiana.

## Strip chart recorder Item 349

A new strip-chart recorder which provides instant selection — of six chart speeds is now available from F. L. Moseley Company.

The new Moseley Autograf recorder, Model 80A, has a full scale sensitivity of 0.05% and a resolution and accuracy of 0.2%. Its six chart speeds (2, 4, 6, 8, 15 and 60 in/min) are selected instantly by front panel push buttons. All other function controls are grouped conveniently on the panel.

Model 80A's input range of 5 mv to 100 v is covered in 10 steps, or by vernier for completely continuous span voltage control. Input resistance is 200,000 ohms/v through 10 v, and 2 megohms on higher ranges. The instrument has a full range zero set and provides pen speeds to 0.25 sec. full scale. It employs standard 120' chart rolls.



Further information on the Model 80A strip-chart recorder may be obtained from F. L. Moseley Company, 409 N. Fair Oaks Avenue, Pasadena, Calif.

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## Pulse generation *(Continued)*

point by an audible click and a warning light flash on the front panel. As soon as the pulses stop the relay lets go, allowing operation to resume. If nothing is done to lower the duty cycle, such as reducing pulse width or repetition rate, this process will continue at a rate determined by the amount that the duty cycle is being exceeded. In this way, the average power dissipation is automatically reduced to a safe value.

### Attenuation circuitry

The design of the output attenuator system was complicated by the fact that a 50-volt pulse into 50 ohms at 10% duty cycle resulted in an average power dissipation of 5 watts. This meant that individual attenuator increments greater than 2 db would require the use of large power resistors. In a system where all attenuator increments would be inserted individually, all resistors would have to be equally large. The resulting attenuator system would then be costly and space consuming. This problem was solved by putting a series of five 10 db attenuator increments on a rotary selector switch, arranged in a ladder configuration, so that only the first step required higher wattage resistors — all the others being standard half-watt values. Six additional push-button-actuated attenuators provide sufficient small increments to enable a total attenuation range of 59.5 db in 0.5 db steps. The major advantage of this system is that a true impedance match exists under any possible combination of attenuator settings, thereby minimizing distortions of pulse waveform.

### Termination and interconnecting characteristics

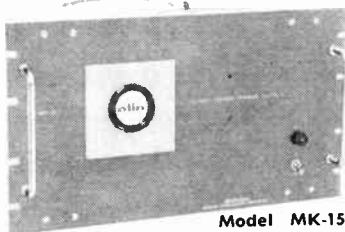
When dealing with fast, high quality pulses, the importance of impedance matching cannot be over-emphasized. Interconnecting cables used with the Type 404 must be terminated with a pure 50 ohm resistance.

The method of termination and interconnection is also important. All junctions should be made up of coaxial plugs and connectors. Terminations should also be coaxial, even to the extent of using "T" connectors to provide plugged on terminations with a minimum of discontinuities. Failure to observe these precautions can result in severe distortions of pulse waveshape. When viewing pulses directly on high impedance deflection plates, the need for proper termination is accentuated. In most cases the use of deflection plate terminals provided by oscilloscope manufacturers is unsatisfactory because of the long leads from the terminal board to the deflecting plates. Figure 4 demonstrates the correct method for this type of viewing.

### Extending the pulse delay

The Type 404 does not normally exceed 8 usec of pulse delay. However, when the situation demands, it is possible to extend this range simply by adding a capacitor in shunt with a particular timing capacitor in the pulse delay multivibrator. Extended pulse delays up to hundreds of usec can be obtained in this manner, providing that the operator is aware of the 70% duty cycle limit on the pulse delay circuit. For instance, the maximum possible repetition rate when the pulse delay is 100 usec would be approximately 7.5 kc. Even at this longer delay, the jitter is less than that observed on many other makes of pulse generators.

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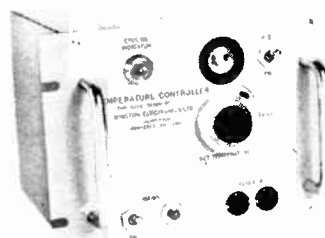
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For complete details check No. 36

ELECTRONICS AND COMMUNICATIONS, February, 1960

For complete details check No. 41 on handy card, page 83

## BRIEFING THE INDUSTRY

■ A general purpose digital computer system will be marketed in Canada by **The McBee Company Limited** of Toronto, first deliveries of the system being scheduled for this summer.

\* \* \*

■ **Canadian National Railways** is reported planning a large-scale electronic traffic control system between Portage la Prairie and Winnipeg. The cost of the project is estimated as high as \$2 million.

\* \* \*

■ A radio-telephone and radar traffic control system for the Port of Hamilton has been announced by **C. W. Morgan**, general manager of the **Hamilton Harbor Commission**. The installation is believed to be the first of its kind on the seaway system.

\* \* \*

■ **Tokyo Shibaura Electric Co. Ltd. (Toshiba)**, Japan's electronic colossus, will add 10 billion yen to its capitalization of 15 billion for a total of 25 billion yen — approximately \$70 million — during 1960. Approximately 10 per cent of Toshiba's 300 million shares is held in the United States.

\* \* \*

■ A new radio-telephone link spanning the 4,752 air miles from Vancouver to Tokyo brought Canada and Japan into telephonic conversation on November 3rd last.

\* \* \*

■ Approximately \$30 million was spent on additions and improvement to plant and equipment by the **B. C. Telephone Company** during 1959 and it is planning what may be the largest expansion program of its history for 1960.

\* \* \*

■ The installation of an IBM 704 computer has been completed in Toronto for the use of business, industry and universities. The facilities include the assistance of five mathematicians on a 24 hour a day basis.

\* \* \*

■ **The Canadian Commercial Corporation** has recently awarded a

contract to **Raytheon Canada, Ltd.** in the amount of \$1,350,000. The equipment included in the contract is for use on the North American early-warning air defense system.

\* \* \*

■ According to **Group Captain C. B. Limbrick** of the **Royal Canadian Air Force**, the \$200 million **Mid-Canada early warning radar line** has done little more than open up some fine fishing country in the Canadian North.

\* \* \*

■ A six-man team of Canadians has reported to the **System Development Corporation of Santa Monica, Calif.**, to work closely with the firm's staffs on air defense computer programs relating to the Canadian portions of the SAGE system. The team, headed by **Squadron Leader R. E. Churchill** of the RCAF is expected to spend at least two years in Santa Monica.

\* \* \*

■ **Servomechanisms (Canada) Limited**, Toronto, Ontario, has just received a \$570,000.00 contract from the **Canadian Department of Defense Production**. It is for the manufacture of control systems for AN/ARC-552 UHF Communication Sets. The contract was awarded on the basis of competitive bidding and calls for seven different types of UHF communication control panels and associated equipment. These control units form part of the AN/ARC-552 UHF communication gear which will be used to convert the fleet of the Royal Canadian Air Force to UHF communication. The equipment was designed by **Collins Radio Company of Canada Limited**, also of Toronto.

\* \* \*

■ In a recent visit to Toronto officers of the **General Electric Company** stated that they expect the volume of defense business to be executed by the company during 1960 will approach \$1,400,000-000 and of this amount roughly \$350,000,000 will be for subcontracted materials.

## Growing market for antenna system

A modern mobile home park in Fruitland, Ontario with over one hundred mobile homes has a central TV Antenna system with underground wiring and plug in hook ups.

The system, which incorporates electronic equipment with boosters on each channel, was installed by **Niagara Co-axial** and perfect reception is obtained from Hamilton, Toronto and three Buffalo stations.



Also a music band attachment is incorporated which converts FM radio to an unused TV band.

The Antenna system is in keeping with all other aspects of this mobile home park which has underground services throughout including hydro, sewer, water and Bell Telephone connections for each mobile home.

The mobile homes are completely self contained units and inlets are provide to which services are hooked up from a service rail running between each row of angled lots which are 40 to 60 feet.

There are 200 mobile home parks (including vacation sites) in Canada. Most of these are quite small but there are some going above 300 homes. Applications by responsible business groups to build large fully serviced mobile home parks are increasing and it is with these that the market for such antennae distribution system principally lies.



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For complete data on Edo Model 345 Loran,  
send for Technical Manual to Dept. D-1.

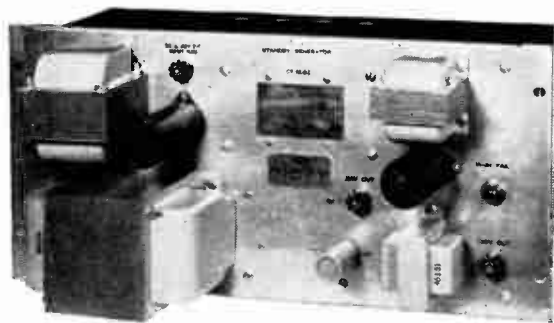


(CANADA) Ltd.

CORNWALL, ONTARIO

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Communications Systems and Equipment

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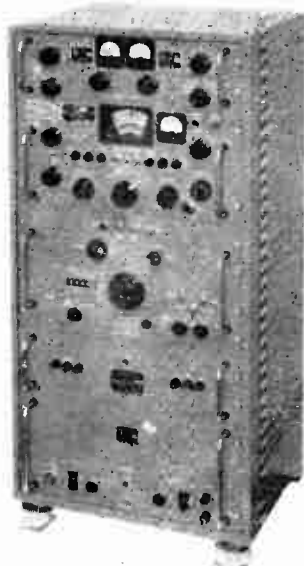
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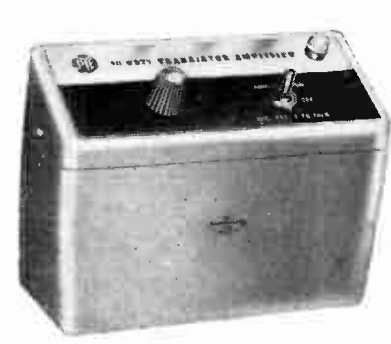
Similar to the Transhailer except that microphone is separate and a sling is provided for over-the-shoulder carrying. Can also be stood or mounted at an angle. Weighs 5½ lbs.

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The Portable Transistor Amplifier weighs only 5½ lbs. and measures 8" x 3½" x 6". Delivers up to 10 watts output. Available for either 12V. or 24V. D.C. operation.



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- PTC 1010 — TRANSISTOR AMPLIFIER



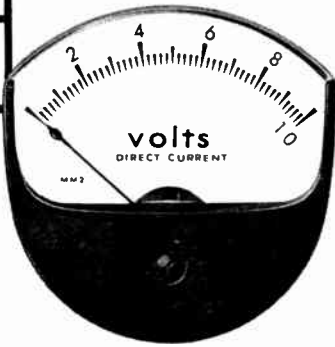
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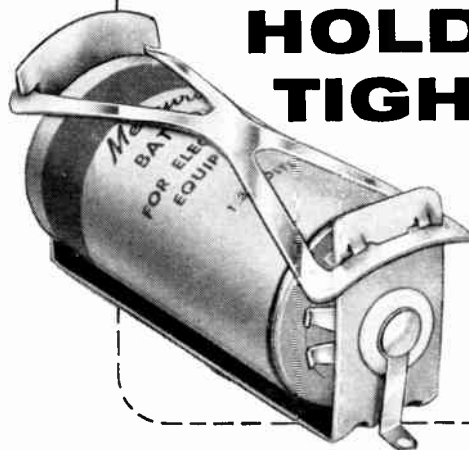
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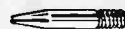
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#862 Offset slotted:  $\frac{1}{8}$ " dia. Straightens leads and tabs on miniature assemblies. Special loop for lifting small wires bent close to board.

#857 Straight slotted: Straightens tube tabs, melts and tip removes excess solder. (Solder runs into slot)  $1" \times \frac{3}{16}"$  slot opening .040.



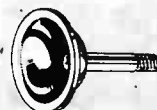
#863 Cube tip: Removes center pins of tube sockets and harness leads.

#856  $\frac{3}{8}"$  Cup tip: Simultaneously melts solder on  $\frac{3}{8}"$  dia. components such as tube sockets and I-F can leads.

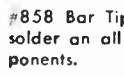


#855  $\frac{3}{4}"$  Cup tip: Simultaneously melts solder on all  $\frac{3}{4}"$  dia. components, such as octal and 7 pin tube sockets.

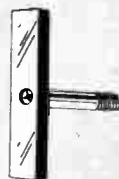
#854 1" Cup tip: Simultaneously melts solder on all 1" dia. components, such as 8 and 9 pin tube sockets.



#861 Triangle tip: Melts solder simultaneously from all electrolytic capacitor leads arranged in a triangular pattern. In one operation melts solder on multiple in-line terminal leads  $\frac{3}{8}"$  apart.



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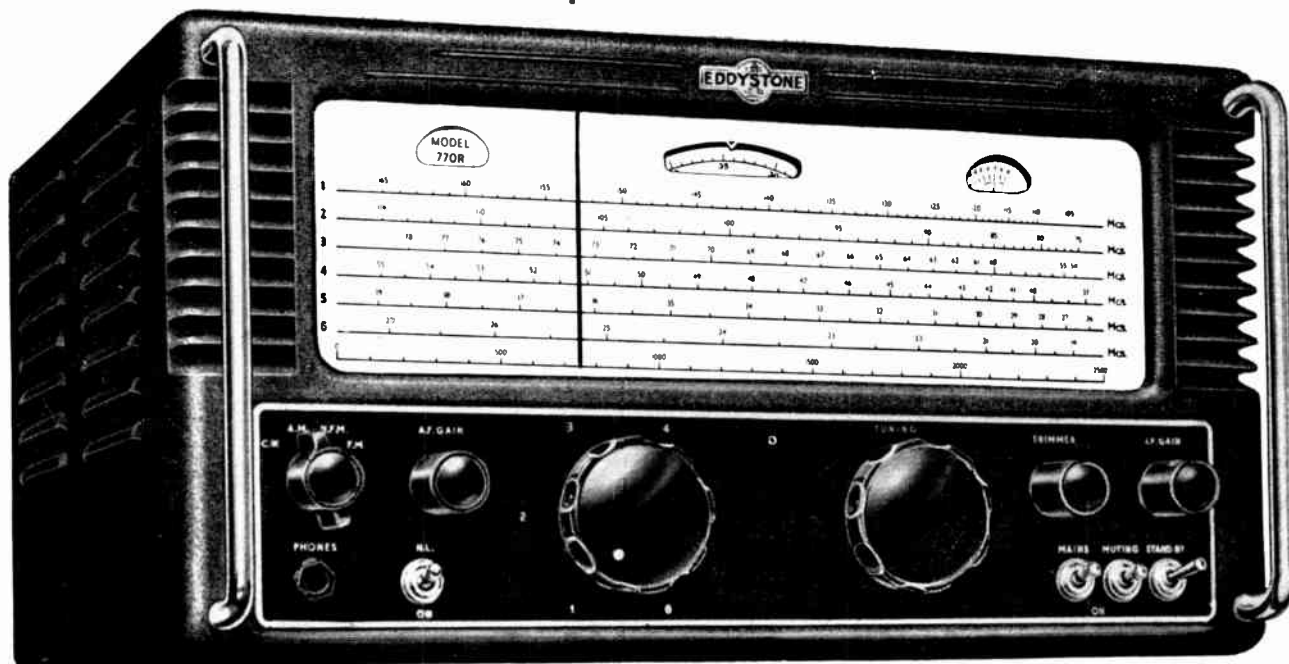
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For complete details check No. 20 on handy card, page 83  
ELECTRONICS AND COMMUNICATIONS, February, 1960

# Techdata For Engineers

## Building blocks

Folder on "3000 Series DEC Digital Test Equipment" describes new low-speed, low-cost building blocks available from Digital Equipment Corporation of Maynard, Massachusetts. Similar in appearance and design concept to Digital's popular line of 5 megacycle test equipment, the new building blocks operate at speeds up to 500 kilocycles and are priced to be economical in educational and control applications.

## Carcinotrons

Carcinotron catalog published by the Litton Industries Electron Tube Division for its two full-spectrum series of these M-type backward-wave oscillators. These tubes are the first carcinotrons with no holes when operated into a mismatch. The two carcinotron series are characterized by interchangeability, small size and light weight. The six-page catalog, No. T891, contains full specifications on one of the tubes and is available from the Director of Marketing, Litton Industries Electron Tube Division, 960 Industrial Road, San Carlos, California.

## Environmental test equipment

Two-page, two-color short-form catalog describes and illustrates 13 different types of environmental test equipment.

Featured are an acoustic-noise test system, auxiliary vibration (slippery) tables, and saw-tooth shock machines, as well as a large line of environmental test chambers. Associated Testing Laboratories, Inc., Manufacturing Division, Clinton Road, Caldwell, N.J.

## Flame photometer

Illustrated catalog on Direct Reading Flame Photometer produced by Baird-Atomic. This booklet describes the ease with which sodium and potassium may be determined simultaneously without calculation on the Model KY-1, stocked and serviced in Canada. Catalog available, without charge, from Canadian Research Institute, 46 St. George St., Toronto 5, Ontario.

## Meter-relays

Specialized expanded scale meter-relays with accuracies almost impossible to achieve with D'Arsonval meter movements alone are described in a new 12-page catalog issued jointly by

Assembly Products, Inc., Chesterland, Ohio, and Voltron Products, South Pasadena, Calif. Accuracy of these locking contact meter-relays is achieved by adding an expansion network that eliminates the part of the scale not needed and expands the section to be used. The catalog, available from either company, includes dimensions, prices, typical circuitry and ordering specifications.

## Time delay relays

Engineering Bulletin 5905, an 8-page illustrated catalog, contains complete technical data on electronic time delay relays incorporating no-moving-parts solid state timing module and features adjustable timing that provides maximum "on-the-spot" flexibility. Bulletin 5905 includes a comprehensive description of circuit design, manufacturing and assembly process, standard and special type specifications, and detailed data on sizes, available mounting arrangements, weights and terminal styles. Tempo Instrument Incorporated, P.O. Box 338, Hicksville, N.Y.

## Synchros and control resolvers

Illustrated 25-page handbook presents a detailed account of the application and measurement problems associated with synchros and control resolvers. It covers such topics as What is a Synchro, Application Problems, Electrical Zeroing Procedures, Electrical Error Measurement Procedures, Null Measurement Procedures, Phase Shift and Transformation Ratio Procedures. Theta Instrument Corporation, 520 Victor St., Saddle Brook, N.J.

## Microwave directional couplers

A six-page technical brochure describing microwave directional coupler design and operation is currently available from Waveline Inc., Caldwell, New Jersey. Thirty types of couplers are illustrated and their design and electrical performance data are discussed. Mechanical dimensions are given for each of these stock units. Custom designed types are displayed and their functions outlined together with suggestions for submitting specification data for special assemblies.

## C.D.C.'s - P.H.I.



C.D.C. Project Engineer E. K. Hammond shows two key units of the Position and Homing Indicator which is to be installed in the RCAF's CF-104G fighters. Heart of the unique automatic navigation system is a miniature analog computer which continuously computes the course and distance to any one of twelve pre-selected targets or destinations. The Indicator, at left, is mounted in front of the pilot and shows him the mileage and course at a glance. Not included in this photograph is the Station Selector which allows him to select any destination as easily as turning a television channel selector. The PHI was developed and is being manufactured by Computing Devices of Canada Limited, Ottawa.

## Direct long distance dialing links company centers

Canadian business is looking to streamlined communications for greater productivity, increased administrative efficiency and better customer service. An example in point is the Canadian Westinghouse Company, where direct long distance dialing went into effect during January between the firm's main plants and offices at Hamilton and distribution centers and offices in the Toronto area. Calls between the two cities can now be made without the service of long distance operators or switchboards.

In addition to Toronto, such centers as Montreal, Ottawa, London, Brantford, Buffalo, N.Y., and Pittsburgh are linked by direct lines to Hamilton.

Using direct lines presently in service, Westinghouse is saving between \$2,000 and \$3,000 monthly on long distance telephone bills, according to P. J. Forstner, communications supervisor.

Westinghouse is already examining the economic merits of an even broader and more complex system.



# NEW VOLTMETER

SELECTS TRUE R.M.S., AVERAGE OR PEAK RESPONSE . . . ENABLING CORRECT MEASUREMENT OF COMPLEX WAVES

This Bruel and Kjaer Model 2409 Electronic Voltmeter is provided with two damping characteristics . . . fast response identical to VU meters for audio work and high damping for low frequency work.

Extra DBM scale for transmission line work, referred to 1 milliwatt in 600 ohms.

Built-in Zener diode voltage standard for instant calibration check, with adjustment accessible at rear.

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Weight Only 10 lbs.

Uses standard U.S. style tubes. Operates on 115 or 230 volts, from 50 to 400 cycles.

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Supplied complete with application manual, two uxxx input connectors and line cord.

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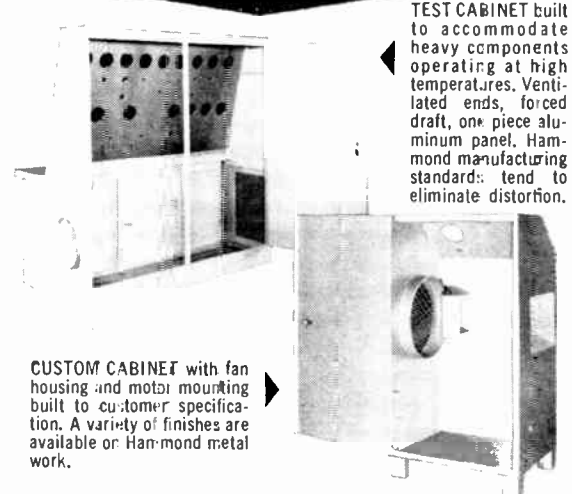
TORONTO  
Hickory 4-4429

TELEPHONE

MONTREAL  
HUnter 1-0770

For complete details check No. 49 on handy card, page 83  
ELECTRONICS AND COMMUNICATIONS, February, 1960

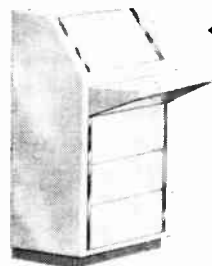
## ORIGINAL METAL EQUIPMENT . . . BUILT TO SPECIFICATIONS



TEST CABINET built to accommodate heavy components operating at high temperatures. Ventilated ends, forced draft, one piece aluminum panel, Hammond manufacturing standard: tend to eliminate distortion.

CUSTOM CABINET with fan housing and motor mounting built to customer specification. A variety of finishes are available on Hammond metal work.

## STOCK ITEMS FOR STANDARD REQUIREMENTS



MODULAR CONSOLE, a convenient equipment housing for many electronically controlled functions in industry or communications.

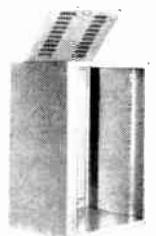


TABLE CABINET RACKS, highly versatile, sturdy, inexpensive, accurately extruded and tapped for 19" panels.



STANDARD PANELS from 13 1/4" to 22 3/4" heights, 19" and 24" widths, steel or aluminum.



EQUIPMENT CABINETS . . . one of a wide range of multi-use metal cabinets which give original equipment a professional look. Provides proper ventilation and rigid strength.



CHASSIS 4" x 8" x 2" to 14" x 17" x 5". Steel finished in gray enamel and bright zinc or aluminum finished in gray enamel or plain.

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**ELECTRONIC—ELECTRICAL  
CABINERY and METALWORK**

All Hammond high quality electronic cabinetry and metal work can be supplied as single prototypes or in production runs of large quantities. The factory will build to specification or co-operate in the design stage when desirable.

An extensive range of standard cabinets, panels, chassis and racks are carried in stock.

STANDARD ITEMS DISTRIBUTED BY LEADING JOBBERS COAST TO COAST

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**HAMMOND MANUFACTURING CO. LTD.**

GUELPH, ONTARIO, CANADA

H/17

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## Specialists meet

A group of electrical-electronic standards' specialists from U.S. and Canadian government agencies recently met for a three and one-half day seminar-workshop clinic on precision inductance and capacitance measurements at low frequencies. The meeting was sponsored by the General Radio Company and held at the company's plant at West Concord, Mass.

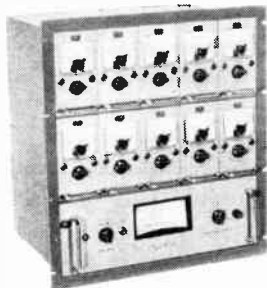
Engineers from the Canadian National Research Council and top technical personnel from the primary standards laboratories of the Royal Canadian Navy as well as from U.S. government agencies attended the symposium, featuring ten lectures and six-workshop sessions.

## Appoint Graham Montreal manager

Age Publication Limited announces the appointment of a new Montreal manager, J. R. "Tom" Graham. Mr. Graham was, until recently, a member of the sales and promotion staff at the firm's head offices in Toronto.

A former RCAF pilot, Mr. Graham is an advertising space salesman of no little note and brings a background of varied experiences to his new position in Montreal.

## Riggs AMS-II Remote Area Monitors for Detecting Gamma Radiation



Equipment features a new ionization chamber designed to operate in temperature ranges up to 250°F. Monitors are capable of multi-channel operation with alarm and recorder outputs available at each channel. Units are AC as well as battery-powered and come equipped with inter-connecting cable. Ranges can be selected from .01 mr/hr to 10<sup>6</sup>R/hr having logarithmic scales in 3 or 6 decades. Special self-contained and underwater equipment is available on special order.

### RIGGS Nucleonics Corp.,

145 West Magnolia Blvd., Burbank, Calif.

Canadian Representative  
Allan Crawford Assoc.,  
P.O. Box 214, Willowdale, Ontario

For complete details check No. 50

## scatter matter

David R. Hull, U.S.-EIA president, anticipates an all-time high of \$9.2 billion in factory sales for the electronics industry in 1959 and expects that sales in 1960 will be even better, approaching the \$10 billion mark.

\* \* \*

Zenith, the new atomic reactor built at the U.K. Atomic Energy Authority's establishment at Winfrith, went into operation just before the close of the year. According to U.K. authorities, Zenith is a mark of Britain's leading role in the development of atomic energy for peaceful purposes, and no fewer than 97 firms contributed specialist skills in the development and construction of the reactor.

\* \* \*

The airport at Wellington, New Zealand, is the first airport in the world to have had a high-power 500 kW 50 cm radar installed. The installation was supplied by Marconi's Wireless Telegraph Co. Ltd. of England, who were awarded the contract after an exhaustive evaluation of other radars from Europe and the U.S.A.

\* \* \*

Toshiba of Tokyo is now producing a video tape recorder employing a new concept which simplifies operation. Based on an entirely different system than the U.S. system, the Toshiba unit uses only one revolving head in contrast to the four-headed video recorder now in use. The Toshiba product is thus capable of recording the whole television field on a single diagonal track which eliminates the problem of horizontal stripes and the need to match four heads with similar characteristics.

\* \* \*

The Hellenic Telecommunications Board has approved a four-year program to improve telecommunication facilities in Greece. A network of radiotelephone stations will be established at points over the coasts and islands to provide coverage for the entire Aegean area, as well as Crete and Rhodes.

Britain is to build the first pilot plant of its kind and size for the commercial use of intense radiation in industry at the Atomic Energy Research Establishment in Berkshire. The new plant will permit firms now investigating the technical merit and commercial potentialities of irradiated materials to carry out full scale trial runs of irradiation processes.

\* \* \*

The pigeons of Trafalgar Square will have to find a perching spot other than Admiral Nelson's cocked hat. This by reason of an equipment designed by a British de-birding firm, who have interlaced the monument with a slightly electrically energized netting incompatible with pigeons.

\* \* \*

Shoji Enomoto, electronics export chief of Toshiba, Japanese electronics manufacturer, anticipates a rise in the export of Japanese transistor equipment to the United States in the coming year, particularly with respect to portable transistor TV sets.

\* \* \*

New York State legislation will likely institute laws during 1960 to prevent fraud in TV repairs. Recommendations call for the labelling of television tubes not of first quality, the prevention of TV service by inexperienced men and the requirement of labelling all re-conditioned articles with a "Used" tag.

\* \* \*

A new electronic recording device is to be used by British Railways' engineers to help check the performance and efficiency of new high voltage AC electrification schemes and equipment and associated signalling installations. The device, developed by Microcell Electronics of London, Eng., will provide information about an electrified system on a scale never before possible.

\* \* \*

In an effort to bring television to the homes of at least 75 per cent of the population of Australia, plans are being made to extend existing TV services to include country areas where possible.



## Telephone links

### Frobisher Bay with mainland

Regular long distance telephone service linking the outside world with the growing northern outpost of Frobisher Bay — located some 1,300 miles north of Ottawa on Baffin Island near the Arctic Circle — was officially inaugurated on December 23, 1959, at a ceremony in the office of Transport Minister George Hees.

Taking part in the inaugural long distance call to the northern center were Mr. Hees; Honorable Alvin Hamilton, Minister of Northern Affairs and National Resources; T. W. Eadie, president of The Bell Telephone Company of Canada; and Marie Panegoosho, art director of the Eskimo magazine "Inuktitut", who spoke in the Eskimo language.



Marie Panegoosho

Mr. Hees announced that the Bell Company had assumed responsibility for providing expanded telephone service at Frobisher Airport and the adjoining townsite as well as establishing standard long distance connections to the outside world.

The Minister of Northern Affairs and National Resources saw the inauguration of long distance telephone service to Frobisher "as part of a vast pattern of northern achievement that will one day add immeasurably to the economic growth and stability of this nation."

Millie Amp says,  
"For Quality  
at a low price  
buy Gold Brand!"

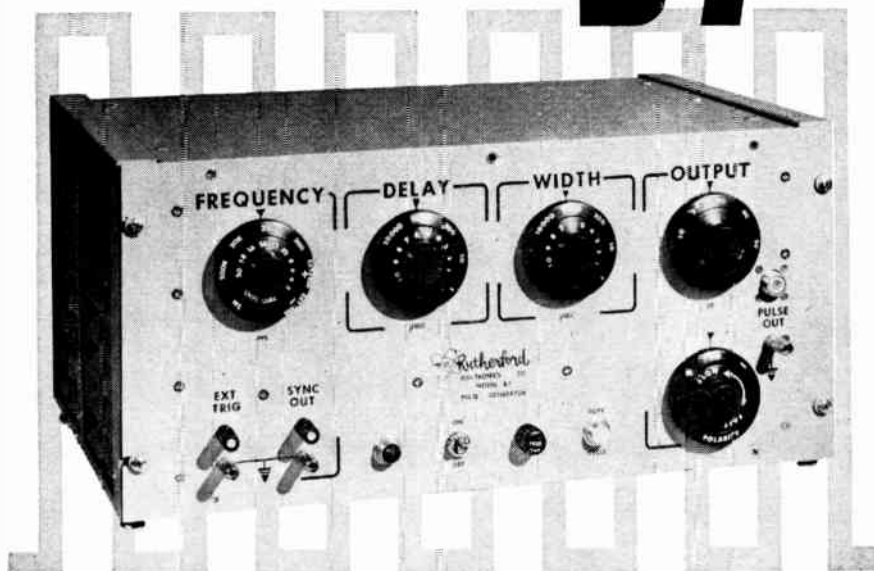
**"Gold Brand"**  
METERS

STARK ELECTRONIC SALES COMPANY  
AJAX, ONTARIO

For complete details check No. 53  
ELECTRONICS AND COMMUNICATIONS. February, 1960

## THE NEW RUTHERFORD PULSE GENERATOR

# B-7



*built for HIGH PERFORMANCE  
WIDE VERSATILITY  
LOW COST*

Today's basic research *demands* the finest. The Rutherford B-7 Pulse Generator is precisely engineered to meet the rigid standards of research and development—from biological research at low repetition rates, to transistors, transistor circuits, and magnetic core research at high repetition rates.

The one-unit Rutherford B-7's rack-mountable dimensions are compact: 19 $\frac{3}{4}$ " wide, 8 $\frac{3}{4}$ " high, and 12" deep. Amplitude is 50 volts delivered into a 50 Ohm load. Delay with respect to Sync. Out: 0-10,000  $\mu$ s. Width: .05  $\mu$ s-10,000  $\mu$ s. Repetition rate: 20 c to 2 mc. Cost: A budget-conscious \$720.

Your "spage-age" research and development grows steadily more important, your equipment more strategic. On the results of research performed with Rutherford equipment rest many scientific achievements. If you play a part in those still to come, put Rutherford on your scientific team. Write for complete information.

AS-60-1



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*pulse generators • pulse systems  
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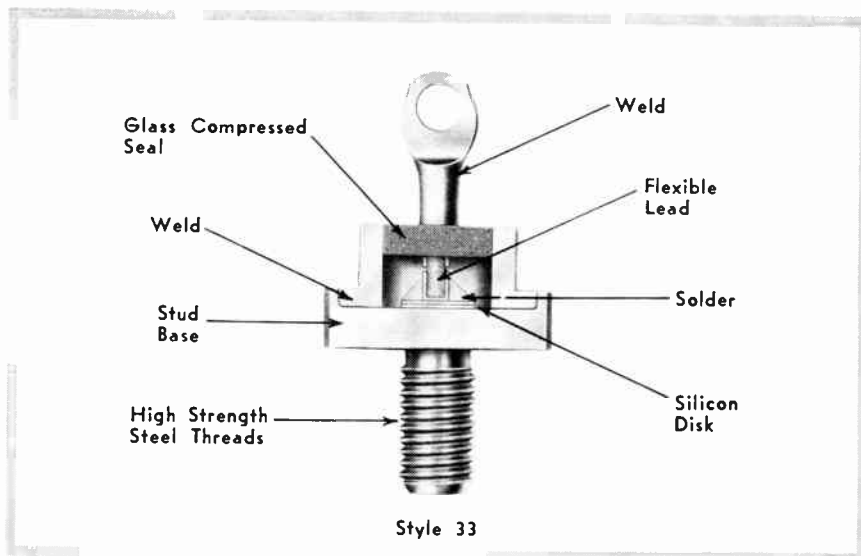
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specify reliable  
all STEEL construction

# Silicon Rectifiers

by

## SYNTRON

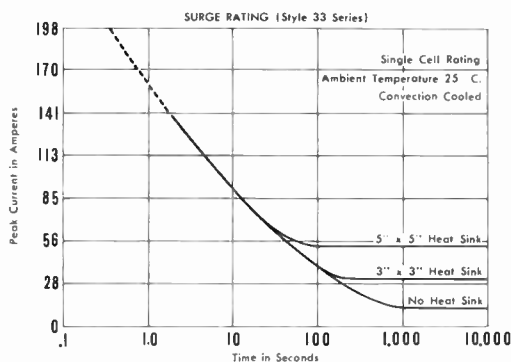


### SYNTRON'S exclusive all STEEL

assembly  
—high tensile  
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construction

100 inch pound mounting torque for maximum heat transfer — less corrosion — greater reliability — better contact. Mechanically and electrically superior.

Write for information and specifications



**SYNTRON (CANADA) LIMITED**

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## New Products

**Beyschlay resistors** *Item 350*  
High Stability Deposited Carbon  
Film Resistors. 1/10 — 1/4 — 1/3 — 1/2  
— 1 watt.

Stocked with 5% tolerance on all std. values. Low Noise — 5 insulating coats of oven baked special enamel for protection against humidity.

Enamel will not crack at temperature of 55°C and will withstand temperature up to 160°C.

Not exceeded in quality and priced extremely competitive.

Request free samples for your circuitry.

Small quantity packed in plastic tubing — convenient for use in Labs and service shops.

Production quantity on tape for automatic lead cutting and bending.

For further information write to:  
**Associated Electronic Components,**  
37 Roselawn Ave., Toronto 12.

### Mobilphone 2-way radio

*Item 351*

Rogers Majestic, veterans of ten years in the communications equipment field, announce a new 1960 2-way radio, the Rogers Majestic Mobilphone.

This new unit has a transistor power supply, full 30 watts output and is of a compact (5½" high, 10¾" wide, 18" long) rugged design to fit all vehicular applications. The frequency, 148 to 174 Mc/s, can be used with standard 60 Kc channel spacing or 30 Kc split-channel in up to two channel operation. Other features are transistorized microphone; sealed "Ferroxcube" IF filter for lifetime selectivity and performance; individual heat sinks for power transistors and automatic deviation control.

Complete information is available from **Rogers Majestic Communications Equipment, Philips Electronics Industries Ltd., 116 Vanderhoof Avenue, Toronto, Ontario.**

Millie Amp says,  
"Never before have I  
seen such quality  
for so little!"

**"Gold Brand"**  
METERS

**STARK**

STARK ELECTRONIC SALES COMPANY  
AJAX, ONTARIO

For complete details check No. 54



## New Products

### F.M. pre-amplifier

Item 352

The F.M. System produces changes in oscillator frequency which are in direct proportion to the changes in the variable under observation. This variable may be a transducer.

The Pre-Amplifier amplifies the oscillator output and converts the signal to a voltage which is directly proportional to the variable. This voltage is then presented to the driver amplifier of an oscillograph or other suitable recorder for display.

Data. Suitable for inputs from capacitance and inductance transducers. Frequency — 2 Mc/s nominal; variable in steps of approx. 40 kc/s. Bandwidth — 50 kc/s. Output —  $\pm 5V$  max. amplitude on any range. Impedance 1400 ohms. Stability — overall better than 1% of full scale for 20°C temperature change or 10% mains voltage variation. Mains supplies — 100/117V AC 60 c/s. Consumption 45 watts approximately.

For further information write to: **Southern Instruments Limited, Frimley Road, Camberley, Surrey, England.**

### Tachometer

Item 353

The Wilbac Model 424 is a completely new type of Tachometer developed by our Engineers. In essence it consists of a miniaturized Transistor Radio set, especially tuned to receive the ignition pulses radiated by every internal combustion engine, regardless of type. These pulses ordinarily produce noise in your domestic radio receiver or television set. In the Model 424 they are received and amplified and fed into a Computer circuit that counts them and then displays the answer as R.P.M. on a meter dial. The importance of this new development is that it means that NO electrical connections to the engine are necessary. Merely holding the tester near to the engine allows it to "pick-up" the radiated pulses. The unit comes complete with leather carrying case, equipped with shoulder strap, built in antenna and battery, ready to use.

The unit is small and compact and stores easily in any tool box. The battery used to power the unit is a standard Hearing Aid battery, especially chosen because it is readily available in any city or town across the Dominion.

For further information write to: **Bach Simpson, Limited, 1255 Brydges St., London, Ontario.**

Continued on page 88

## Need SPECIAL ROTARY SWITCHES? see ESCO of WEYMOUTH

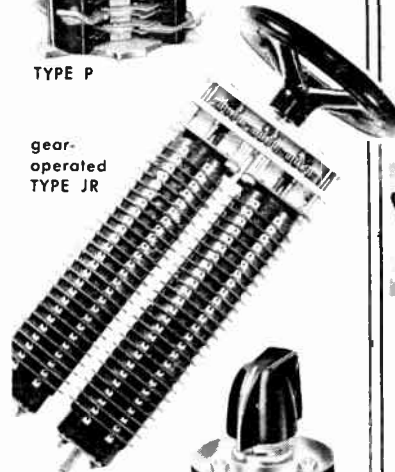


TYPE JR

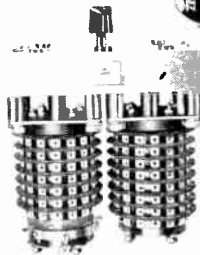


TYPE P

gear-operated  
TYPE JR

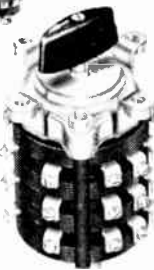


TYPE A/AF



geared pair  
TYPE HT

TYPE JS-JD



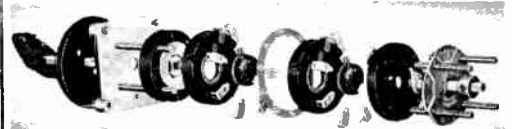
TYPE HT



**ESCO standard components are assembled to meet your requirements.**

A deviation from one of our standard switch assemblies will give you a *special switch* at a standard-switch cost.

Over 90% of our production is *special* in one way or another.



These standard switches can be modified to fit your application:

- *Type A* — up to 8 positions, 7 sections maximum, detent mechanism, rating 5 amp, 125 volts a-c, 30 volts d-c.
- *Type AF* — up to 8 positions, 6 sections maximum, detent action, rating with resistive load 5 amp. at 28 volts d-c or 115 volts 400 cps. per MIL-S-6807.
- *Type P* — Multi-section, up to 4 positions, snap-action, rating 10 amp, 125 volts a-c, 5 amp, 125 volts d-c, 30, 60, 100, 200 amp, 500 volts a-c, or 250 volts d-c. Can be assembled to meet Specification MIL-S-15291.
- *Type JR* — up to 8 positions, 30 sections maximum, detent action, rating 10 amp, 125 volts a-c, 5 amp, 125 volts d-c.
- *Type JD-JS* — up to 8 positions, 5 sections maximum, detent action or snap action, rating 30 amp, 230 volts a-c.
- *Type HT* — up to 16 positions, 10 sections maximum, detent action, rating 5 amp, 125 volts a-c.
- *Geared-Pair Type HT* — up to 16 positions, 20 sections maximum, detent action, rating 5 amp, 125 volts a-c. A single knob controls two Type HT switches assembled with a gear mechanism.
- *Navy Switches* — to MIL-S-15291 and Bureau of Ships drawings 9000-S6202-73075, 73826, 73827, 73295, 74422, and others.

Write for data sheets on individual switches or complete new catalog on ESCO rotary multipole switches. Send us your requirements and we'll give you full specifications on the ESCO switch that meets your need.

**ELECTRO SWITCH  
CORP.**

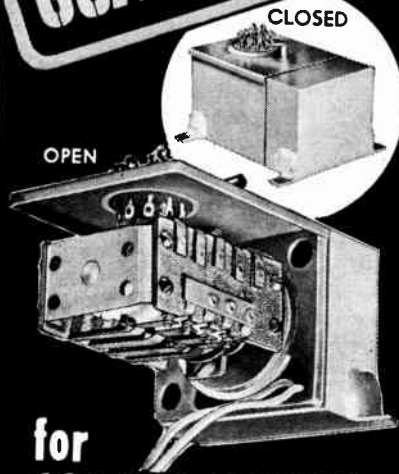
Weymouth, (Boston 88), Massachusetts

**GEORGE M.  
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**100,000 CYCLES**  
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**NEW**

miniaturized  
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## **CAM SWITCH**

- ✓ Hermetically sealed
- ✓ Extremely compact, light weight
- ✓ "Reliability engineered" for guaranteed performance
- ✓ Shock & vibration tested in conformance with MIL-E-5272A
- ✓ Operates 24 to 30 volts, DC, at 125°C ambient
- ✓ Rating, 1 amp.
- ✓ Size, 1 3/4" x 1 21/32" x 2 3/4"
- ✓ 7-pole, 18-position shorting with interrupter and homing

Designed to meet standards for guided missile systems, this new Cam Switch is typical of special designs by Tech Labs which can be easily adapted to specific needs. Write for complete data.

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LABORATORIES, INC.

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## engineers' book-case

**Introduction To Electronic Analog Computers** by John N. Warfield, University of Kansas.

A major contribution to the field, this book is indispensable for aeronautical, mechanical, and electrical engineers, and will help engineering research and development firms and other users of electronic computer equipment deal more quickly and creatively with a wide variety of technical problems.

**Introduction To Electronic Analog Computers** is published by Prentice-Hall, Inc., 70 Fifth Ave., New York 11, N.Y., contains 175 pages, hard cover bound, price \$6.00.

**Handbook of Automation, Computation, and Control (Volume 2)** edited by Eugene M. Grabbe, Simon Ramo and Dean E. Wooldridge.

The complete Handbook — Volumes 1, 2 and 3 — written and edited with an emphasis on systems engineering covers material of direct use to all levels of technical personnel in the associated fields of automatic control and computers.

**Handbook of Automation, Computation, and Control (Vol. 2)** is published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N.Y., contains 1094 pages, hard cover bound, price \$17.50.

**A Source Book in Mathematics (Volumes One and Two)**, edited by David Eugene Smith.

This work presents, in English translation, the great discoveries in mathematics from the Renaissance to the end of the 19th century. Selections from 125 treatises and articles, most of them unavailable elsewhere in English, offer a vivid, first-hand story of the growth of mathematics.

**A Source Book in Mathematics** is published by Dover Publications, Inc., 180 Varick St., New York 14, N.Y., is available in two volumes, paperback editions, containing a total of 701 pages, price \$3.50 the set of two volumes.

**Electro-Circuit Theory** by F. A. Benson and D. Harrison, both lecturers at The University of Sheffield, England.

This book is based to a large extent on lectures, which the authors have

gradually developed during the last ten to twenty years for undergraduate engineers.

It covers electric-circuit theory, in both light and heavy current applications, given in the first two post-intermediate years of University engineering courses.

**Electro-Circuit Theory** is published by Edward Arnold (Publishers) Ltd., of London, England, and is available in Canada through The Macmillan Company of Canada Ltd., 70 Bond St., Toronto, Ontario. The book contains 371 pages, hard cover bound, price \$5.00.

**Semiconductors** by R. A. Smith, Royal Radar Establishment, Malvern, England.

Dr. Smith's book gives a clear and comprehensive account of the physics of semiconductors and includes a brief review of their applications. The newcomer to this rapidly developing subject, whether a physicist or an electrical engineer, will find Dr. Smith's book an invaluable guide to its fundamentals.

**Semiconductors** is published by the Cambridge University Press and is available in Canada through the Macmillan Company of Canada Ltd., 70 Bond Street, Toronto, contains 494 pages, hard cover bound, price \$11.25.

**Space Technology** edited by Howard S. Seifert with assistance from a group of scientists and engineers at Space Technology Laboratories and at the University of California.

This book is the first collection of serious analytical treatments of all phases of space technology by 38 top men in their respective specialties. It is a thorough quantitative exposition of those natural laws which are uniquely related to space flight.

The subject of ballistics and flight dynamics — the foundation of space travel — is treated in an especially complete and analytical way. The next most vital subject, propulsion, covers both present-day and future systems. Major sections are also included on communications and guidance, man in space, and scientific uses of space.

**Space Technology** is published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N.Y., contains 1178 pages, hard cover bound.



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*designed and produced  
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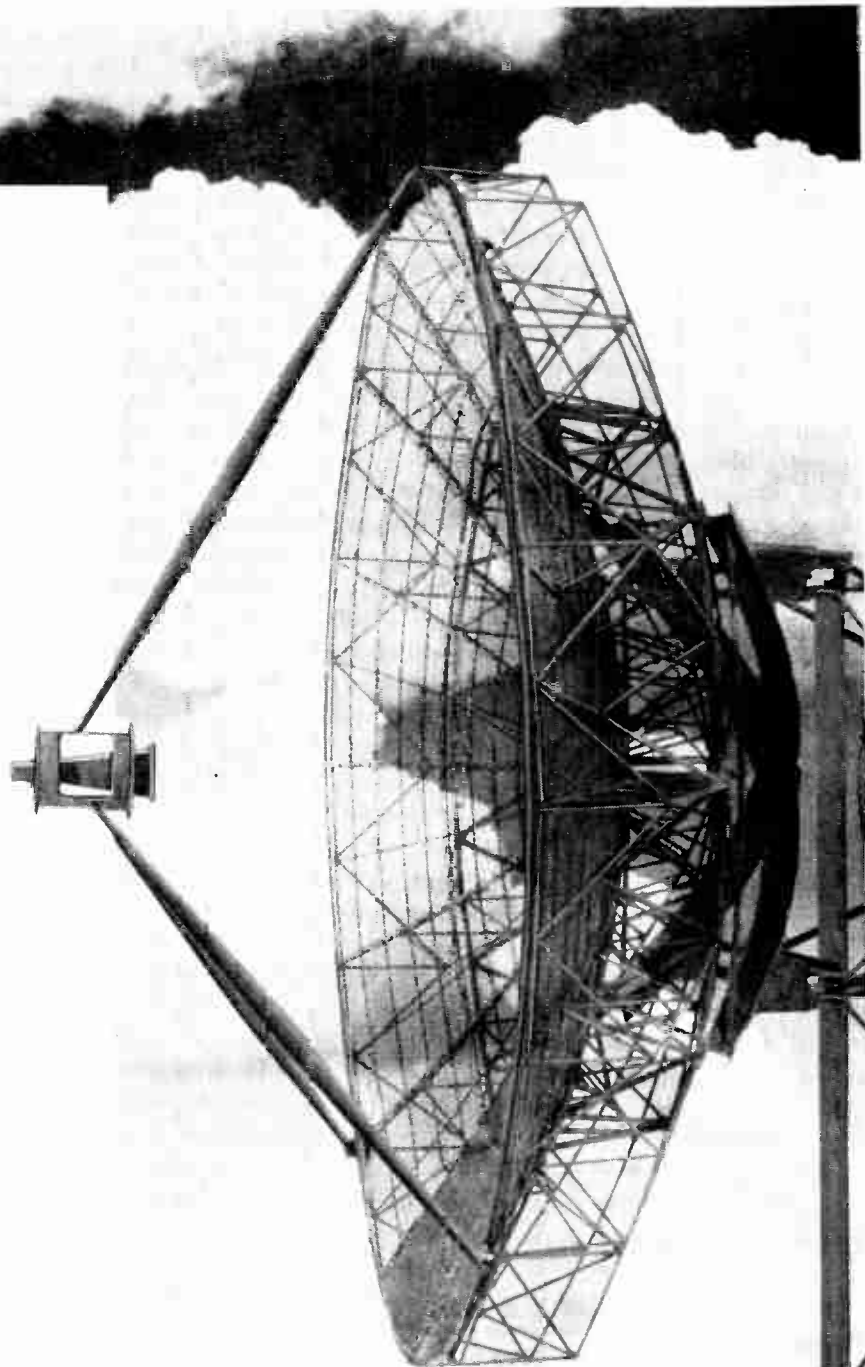
ANDREW Antenna Corporation Ltd. offers you a wealth of engineering and production experience in the specialized field of antenna systems for tropospheric scatter, microwave, UHF/VHF, broadcast/TV applications.

ANDREW Antenna system products for special applications are used in many major communications and missile defense installations throughout Canada.

You are invited to address your inquiries for product information or engineering assistance to

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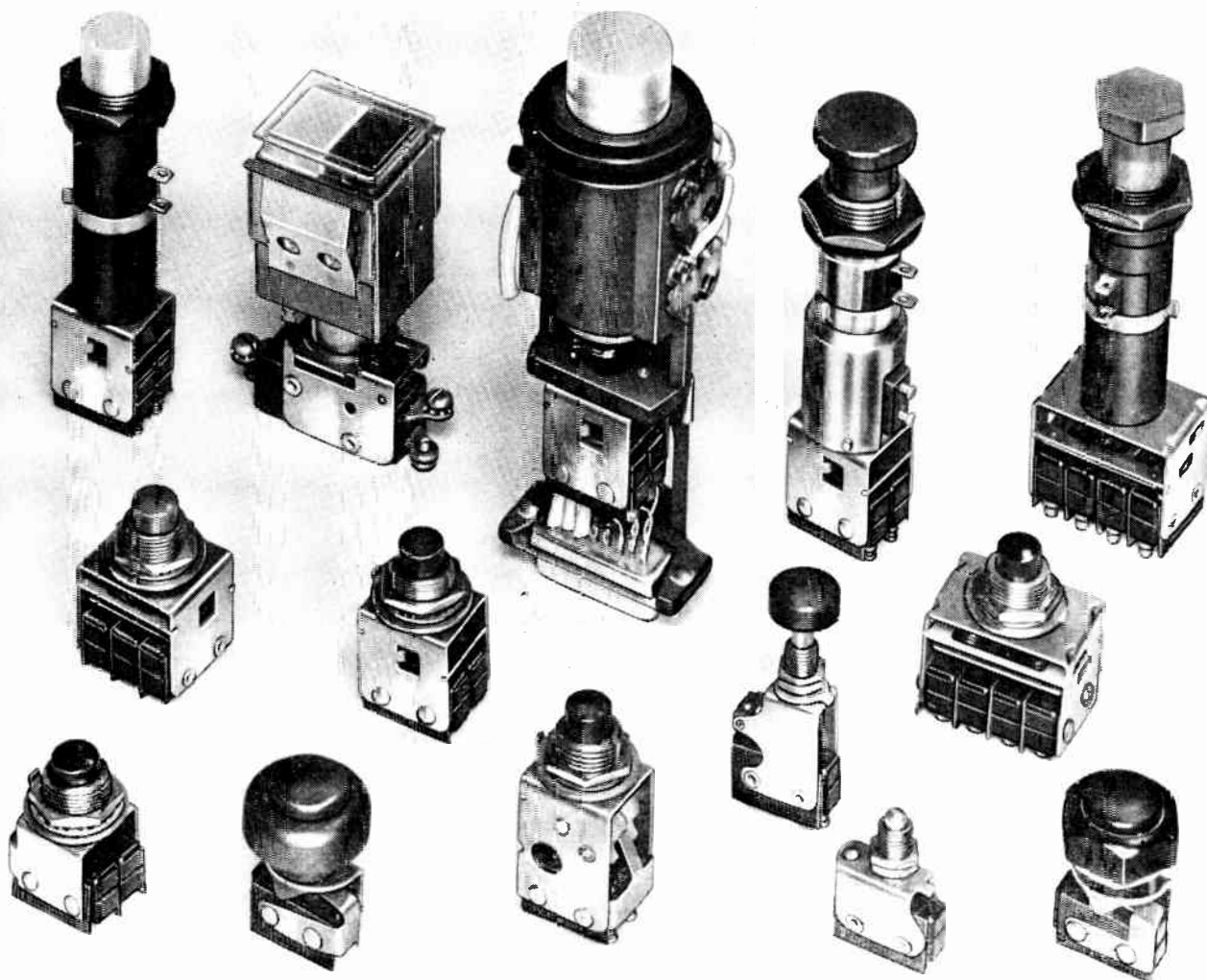


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# MICRO SWITCH Precision Switches



## Need pushbutton switches?

*Here is a sampling of a very wide choice*

These assemblies are typical of many different series of MICRO SWITCH pushbutton switches. Each series offers many variations of electrical and operating characteristics.

Operational characteristics include: momentary action, lock-down, alternate action, two-position alternate action, and magnetically held. Direct control of up to fourteen double-throw circuits is offered. Short and long button strokes can be provided. Sealed switches are available when protection is required from oil, water, sand, or salt spray. Special shock and vibration-resistant features are built into switches for

rugged duty service. Switches with illuminated pushbutton display are available. These include switch devices with interchangeable modular indicator and pushbutton units.

Experienced engineering assistance to help you select the pushbutton switch best suited to your requirements is as near as your nearest Honeywell office. Or write Honeywell Controls Limited, *Precision Components Division*, Toronto 17, Ont.



# Honeywell

## MICRO SWITCH Precision Switches

For complete details check No. 35 on handy card, page 83



# NEW VENTURES BEGIN HERE



In the modern laboratories of Northern Electric, new concepts in communications are constantly taking shape. Each project is approached with vigour, as a new and challenging venture, by a skilled research and development team — a group of men who keep their minds poised and eager to pioneer new techniques and improve established products — transistors, electronics, microwaves, carriers, video and audio.

At Northern Electric, research and development are setting the pace in the science of communications.

## Research and Development Laboratories

# *Northern Electric*

COMPANY LIMITED

SERVES YOU BEST

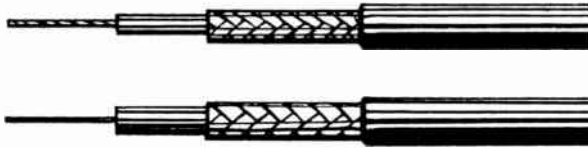
4445-13

For complete details check No. 44 on handy card, page 83

ELECTRONICS AND COMMUNICATIONS, February, 1960

World Radio History

# COAXIAL CABLES



**AVAILABLE FROM STOCK**

**WE UNDERSTAND WE HAVE THE MOST COMPLETE CANADIAN STOCKS OF COAXIAL CABLES INCLUDING:**

Standard and Low Temperature Jacket RG/U  
Polyethylene, Polyfoam and Teflon Dielectric  
Community TV Types.

**DISTRIBUTOR STOCKS LOCATED ACROSS CANADA**

*Write for a copy of our new IEC-3 catalog containing up-to-date cable information, or our old W-2 catalog.*

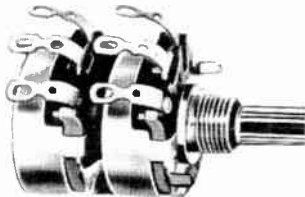


**CANADA LIMITED**

TORONTO • OTTAWA • MONTREAL • CALGARY

For complete details check No. 5 on handy card, page 83

## STEREO DUAL CONTROLS



with close  
tracking tolerances

**WE SPECIALIZE IN MANUFACTURING  
STEREO DUAL CONTROLS**

**INQUIRIES INVITED FOR QUOTATION**

**OTHER IRC CONTROLS:**

TYPE Q CONTROL —  $\frac{1}{2}$  watt carbon controls, ideal for radio, TV, record player, and test equipment use.

TYPE 2W CONTROL — 2 and 4 watt wire wound controls ideal for test equipment, Drive In Theatre speaker systems.

L&T PAD CONSTANT IMPEDANCE CONTROLS — 2 and 3 ganged wire wound controls for sound systems and individual speaker controls. Maximum 10 watts audio power (3 watts DC). Consult the factory.

*IRC controls are also available from local Distributor Stocks.*



**RESISTORS**

division of  
Renfrew Electric Co. Limited

TORONTO • OTTAWA • MONTREAL • CALGARY

For complete details check No. 37 on handy card, page 83

## Letters

### Tribute to circulation

The Editor:

Your presentation of our story on the Rogers Majestic Broadband was excellent and as a tribute to the wide circulation and reader interest, I have had several comments on the article from Ottawa and Montreal.

I feel that a publication such as *Electronics and Communications* is a must in Canada and hope that I may be able to assist you at a future date.

Regards,

G. W. Crossan

Rogers Majestic

Communications

Equipment

116 Vanderhoof Ave.

Toronto 17, Ontario.

### This we like to hear

The Editor:

In studying your publication, I would say its format and readability certainly surpass that of many other publications we have seen in the electronics field. Since the field of electronics is in its infancy and since technician's reading time is gradually being cut to nothing, a publication such as yours should be extremely successful.

I note with interest the article on page 22 of your January issue.

Will you please make arrangements to place us on your mailing list so that we receive each and every issue of your publication, *Electronics and Communications*.

Cordially,

Gerard S. Mullin

International

Communications, Inc.

310 East 71 Street

New York 21, N.Y.

### Pleased to oblige

The Editor:

We were quite surprised and pleased to see the article entitled "Indicating Surface Flatness with Electronics" in the January issue of *Electronics and Communications*.

We would very much appreciate receiving an additional copy of the January issue with Mr. Carbone's article for our files.

Sincerely yours,

Geo. A. Hawkins

Director of Market

Research & Sales

Promotion

Brown & Sharpe

Manufacturing Co.

Providence 1, R.I.



## Letters

### Philco successful bidder

The Editor:

We wish to draw to your attention an omission in the bottom paragraph on page 11 of the January issue of *Electronics and Communications*. The Philco Corporation is also involved in the Pinetree maintenance program.

The Philco Corporation of Canada was the successful bidder for Technical maintenance on the NORLANT portion of the Pinetree Line and has been maintaining that portion of the line for six months.

Yours very truly,  
H. T. Cottington  
Manager, TechRep  
Department  
Philco Corporation  
of Canada Limited  
Don Mills, Ontario.

### E & C quoted 37 times

The Editor:

It's with pleasure that we send you a complimentary review issue of our 1959 INTERNATIONAL EDITION of the "Electronic Guide". We've listed 37 of your 1959 articles and the name of your publication is featured over 30 times throughout this issue of the "Guide".

Sincerely yours,  
Mrs. D. E. Byal  
Business Manager  
Electronic Guide  
4131 Toluca Lake Ave.  
Burbank, Calif.

### Technical people pleased

The Editor:

Thank you very much for the copy of your November issue which had the feature article on cryotron switching circuits. It is seldom that editors are so thoughtful and, as a result, weeks pass before our library or clipping service come through with an article.

Our technical people are quite pleased with your presentation of the subject. It is one of the best treatments based on this subject that we, in this department, have seen.

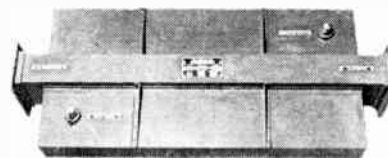
If we can ever be of any service to you, please let us know.

Sincerely,  
Suzanne Wymelenberg  
Public Relations  
Arthur D. Little, Inc.  
Thirty Memorial Drive  
Cambridge 42, Mass.

another . . .

**Airtron** . . . first

## L-BAND BI-DIRECTIONAL COUPLER



DESIGNED AND MANUFACTURED IN CANADA

### TYPICAL ELECTRICAL CHARACTERISTICS:

Frequency range: 1215 to 1365 MC/S. Direct Coupling:  $35 \pm 1.5\text{db}$ .  
Power rating: 2 Megawatts peak. Reflected coupling:  $27 \pm 2.5\text{db}$ .  
VSWR: Less than 1.15. Directivity: More than 20db.

Complete research and production facilities enable Airtron to manufacture your Microwave Components fully tested, both electrically and mechanically, to meet your most rigid specifications.

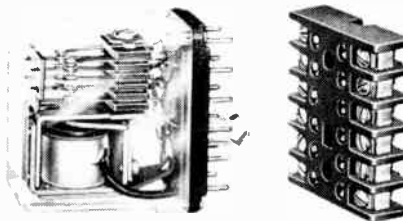
Write for further information and illustrated brochure on  
Microwave components.

**Airtron CANADA LIMITED**

TORONTO • OTTAWA • MONTREAL • CALGARY

For complete details check No. 3 on handy card, page 83

## NEW UNIVERSAL INDUSTRIAL CONTROL RELAY



219 FRAME

Designed to take care of the maximum number of Industrial Relay Applications.

Ideal for use in the machinery field, replacing many larger Contractor types.

Plug-in feature simplifies relay maintenance.

- 10 Ampere Current Carrying Parts
- Coils: AC to 120 Volts; DC to 125 Volts
- 3 Standard Contact Arrangement
- Plug-in Socket No. 27390 Suitable for Table or Wall Mounting

Write for NEW Bulletin 2219



**STRUTHERS-DUNN RELAYS**

division of Renfrew Electric Co. Limited

TORONTO • OTTAWA • MONTREAL • CALGARY

For complete details check No. 56 on handy card, page 83

## New Products

### Panel mount potentiometers

Item 354

Bourns, Inc., Riverside, California, announces a new complete line of Panel Mount Trimpot Potentiometers.

This unique new mounting style is available for all standard Bourns models...humidity-proof, high power, sub-miniature and high temperature models. Individual specifications and operation of panel mount units will be the same as the standard Bourns

Trimpot of the same type.

Requiring only 1/12 square inch or less of panel area, the units feature a self-locking shaft which does away with cumbersome lock nuts. The multi-turn adjustment provides up to 9000° of rotation to speed up and simplify the adjustment or balancing of circuits. The stainless steel construction assures compliance with military specifications for vibration, shock, salt



spray, etc. Screwdriver adjustment is easily made from the front of the panel, and the recessed head prevents accidental changing of the setting. A moisture barrier from outside elements is provided through a silicon rubber O-ring and Teflon washer.

This new complete line of panel mount Trimpot Potentiometer is available in resistances from 10 ohms to 1 Meg with wirebound or carbon resistance elements.

Complete data may be obtained by writing to **Bourns Inc., P.O. Box 2112, Riverside, California** or their Canadian Licensee, **Douglas Randall (Canada) Ltd., 126 Manville Road, Scarborough, Ontario.**

### Silicon diodes and rectifiers

Item 355

Eberle & Co. have made available special diodes with 50, 100 and 200 PIV, having reverse leakage current lower than 0.1 microamp at full PIV. Leakage current lower than 0.01 microamp can be guaranteed upon request. Maximum 5 millisecond peak current rating is 1 Amp and 60 cycle peak current rating is 300 milliamps.

Special 500 milliamp axial lead series of rectifiers for magnetic amplifiers and other critical applications feature reverse leakage current lower than 1 microamp at full PIV. A similar series with leakage current lower than 0.1 microamp at full PIV is also available. PIV rating of 50, 200, 400 and 700 volts, maximum 5 milliseconds peak current rating is 30 Amps and 60 cycles peak current rating is 5 Amps.

Special heat sinks, increasing current rating to 1 Amp per cell, available upon request.

For further information write to: **Associated Electronic Components, 37 Roselawn Ave., Toronto 12.**

### Millimeter wave diode

Item 356

A new millimeter wave diode — the 1N2792 — for unprecedented low noise mixer performance at 70,000 mc has been announced by Philco Corporation's Special Components department.

This recently declassified crystal is of integral wave guide construction with the germanium point contact structure mounted in a section of RG-98/U wave guide.

The 1N2792 is primarily designed for Radar and Space Communication applications. It is also well suited for EHF Video Detector applications. A crystal noise figure maximum of 13 db with this hermetically sealed unit assures lowest possible noise performance at 70 kmc.

Further information from: **Philco Corporation, Philadelphia.**

*Continued on page 89*

# bohne

## PRECISION MECHANICAL SPRINGS IN ANY QUANTITY



### SPRINGS ARE OUR BUSINESS—

Big lots — little lots — capacity 695,000 pieces per single shift. For the dependable materials and dependable know-how that make dependable springs, call BOHNE.

Prompt quotations given from blueprints, specifications or samples.

# bohne

INDUSTRIES LIMITED

1153 QUEEN ST. W., TORONTO 3, ONTARIO

For complete details check No. 14 on handy card, page 83



## New Products

### Magnetic clutches and brakes

Item 357

The clutches and brakes employ no mechanical friction members. Torque is proportional to excitation and the drive may be synchronous, without slip, on demand. Eddy current effect is insignificant so that torque or braking force is independent of slip speed. Mechanical analogy might be — a controllable spring producing a force independent of displacement and rate.

Hysteresis clutches and brakes are employed for precise tension controls, zero backlash actuators, fan drives where high starting torques are encountered, permitting the stored energy of the motor to be utilized.

Industrial units are furnished in configurations from 1/500 H.P. to 5 H.P. at 1750 RPM.

Hysteresis clutches and brakes, application engineering and consultation are available at **Found Bros. Aviation Limited, Malton Airport, Malton, Ont.**

### New lo-ohmmeter

Item 358

A new hand-size lo-ohmmeter with unusual range features including scale length of 3/16" to the .1 ohm position is the new Triplett Model 308.

Ranges are ohms 0.50, 0-500, 0-5000. 1 ohm center scale on 0-50 range; lowest reading .1.

This tester is for motor testing, armatures and fields, shorts between generator windings and grounds, and for many other phases of testing, including: Switch and relay contact resistances, shorts in TV or radio chassis wiring; electrical equipment in industrial plants, etc. Elastic strap on the back of the tester can be used to anchor it firmly in the palm of the hand.

The Triplett Electrical Instrument Co., Bluffton, Ohio.

Millie Amp says,  
"Are you paying  
too much for your  
meters? Better check  
Gold Brand!"



**"Gold Brand"**  
METERS



STARK ELECTRONIC SALES COMPANY  
AJAX, ONTARIO

## The WELWYN HIGH STABILITY

# Panclimatic

### DEPOSITED CARBON RESISTOR

Canadian Made Welwyn Carbon Film Resistors meet the exacting standards of some of the world's largest manufacturers of computers, missiles, and electronic apparatus — for stability and ruggedness, both electrical and mechanical.

Manufactured entirely in Canada, yet sold and accepted all over North America since 1946 — the Welwyn Panclimatic High Stability Resistor is available to you as a truly Canadian product for all your needs.

Meets and exceeds Spec. MIL-R-10509B. For further details, write for catalogue.

**WELWYN CANADA LIMITED**  
1255 BRYDGES STREET · LONDON, ONTARIO

K1573



For complete details check No. 62 on handy card, page 83

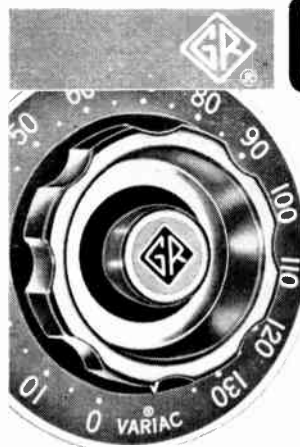
## Lafayette Radio

INDUSTRIAL  
ELECTRONICS  
DIVISION

### proudly announces

its appointment as  
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# GENERAL RADIO Variac®



Continuously-Adjustable Autotransformers with Exclusive DURATRAC (Pat. Pending) Contact Surface.

**Factory Prices Up to 99 Pieces**

Write or call for specifications to DEPT. EN, at any of the following addresses. Ask for your FREE copy of LAFAYETTE RADIO'S complete catalog of electronic parts and equipment.

165-08 Liberty Avenue  
Jamaica 33, N. Y.  
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WOrth 6-5300  
TWX: NY1-648

110 Federal St.  
Boston 10, Mass.  
HUbbard 2-7850  
TWX: BS4470

139 W. 2nd St.  
PLainfield, N. J.  
PLainfield 6-4718

24 Central Ave.  
Newark, N. J.  
Market 2-1661

For complete details check No. 52  
ELECTRONICS AND COMMUNICATIONS, February, 1960

For complete details check No. 39 on handy card, page 83

## **C RTPB NEWSLETTER**

### **Service to Frobisher Bay**

Telephone communications in Canada were pushed 700 miles further north from Goose Bay, Labrador, when Frobisher Bay recently opened a telephone service. This is now the Bell Telephone Company's most northerly exchange with about 200 local telephones. Connections with the regular long distance network are being provided from Frobisher Bay to link with the Bell Telephone Company's tropospheric scatter microwave system at Goose Bay and then down to Quebec City. With some 1,200 people now living in the Frobisher Bay area and many construction workers busy in the numerous expansion projects, Frobisher Bay is assuming vital importance in the development of the northern territories.

### **Recommendations on Regulatory Factors**

Further to the meeting of the Ad Hoc Committee on Regulatory Factors which was reported in the last issue of the Newsletter, the contributing sponsors of the CRTPB have been asked to vote on recommendations that emanated from the meeting. The date for return of ballots was set at January 29 and it is too early to record the result. The committee had been charged particularly with the task of proposing a resolution to the application of regulatory factors in the specifications for equipment to be used in the fixed land and maritime mobile service. A method of handling the problem was submitted by the Department of Transport which said in effect that the DOT would prefer to see a specification for type approval that would include all the regulatory factors which had been put forward. This could permit the type approval of equipment units which would be licensed without restriction if the use of radio could be justified and the spectrum space was available. In those cases where special requirements would exist which would justify deviations from the values set forth in the appropriate specifications, the DOT would normally consider licensing the system as a whole, provided that the deviation did not reduce the capabilities of the system and would not make the system an increased source of potential interference.

The Ad Hoc Committee on Regulatory Factors recommended that this DOT policy, as stated, be issued as a Radio Standards Procedure, and that the list of regulatory factors as issued by the DOT on November 26, 1957 be fully retained in all Radio Standards Specifications.

### **CRTPB Meetings**

A meeting of the CRTPB Amortization Committee on Specification 112 was held in Ottawa on January 5th. Object of the meeting was to establish an amortization policy applicable to non-type approved equipment under Specification 112.

The Executive Committee of the Planning Board met in Toronto on January 8th. Most of the business discussed concerned internal organization matters applicable to the Planning Board. It was recommended the Fixed Land and Maritime Mobile Committee be divided into two committees to be known as the Land, Fixed Mobile Committee and the Maritime Committee. This proposal has to be approved by the membership. It was felt that by dividing the Fixed Land and Maritime Mobile Committee into two separate committees, the requirements of each would be more effectively met.


### **Infrared Tracker for Artificial Satellites**

A tracker for detecting man-made satellites in orbit thousands of miles above the earth has been developed in the United States. A 19-inch concave mirror is used to detect the infrared energy generated by satellites as they pass through the thin atmosphere at high altitudes above the earth. The device can also be used to detect the infrared energy generated by the exhaust of a rocket engine. The energy is focused on a sensitive detector. The tracker, once it picks up a satellite, has a semi-automatic tracking device to keep it locked on the path of the satellite.



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**CANADIAN MADE**

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MEASURING  
INSTRUMENTS**

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AND LABORATORY  
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 **ELECTRONIC  
INSTRUMENTATION**

Only a complete Canadian instrumentation facility can offer the kind of service Canadians need. Bach-Simpson Ltd. is complete — in research, design, tooling and manufacture.

If our standard line of instruments, complete as it is, won't meet your requirements, ask us to demonstrate the unique combination of skills we can offer in the design of specialized instrumentation to meet your specific problem.

*Others have, and have been  
completely satisfied!*

  
**Bach-Simpson**  
LIMITED

JA 5187



# NEW

## WIDE-VUE panel instruments

# Simpson



3 1/2"



4 1/2"



2 1/2"

a new concept

in styling and visibility

The clean, graceful lines of these "Wide-Vue" panel instruments add two plus values to your equipment. First, style—ultramodern beauty that blends with the advanced design of today's panels. Second, functionalism—longer scales together with wide-angle readability. The 2 1/2" size, for example, has the same scale length as a conventional 3 1/2" panel instrument. The durable, plastic cover is formed in one piece, and can be supplied with black or color finishes. External magnet type movement or self shielded core magnet meter movement.



1255 BRYDGES ST.

LONDON ONT.

IN U.S.A.: SIMPSON ELECTRIC COMPANY, 5200 W. KINZIE ST., CHICAGO 44, ILL.

For complete details check No. 13 on handy card, page 83

# and now!

## FOR 50-60 c/s WORKING **MUIRHEAD** SERVOMOTORS AND MOTOR TACHOMETERS

In the standard frame sizes adopted by Bu. Ord. and R.A.E. for 400 c/s types, a range of 60 c/s servomotors and motor tachometers, suitable for 50 c/s operation also, is now in production. These efficient, high torque-inertia ratio motors are useful wherever a mains supply is available.

Size 18, 15 and 11 two phase motors are being produced similar to the Mark 8 Mod. 1, Mark 7 Mod. 1, and Mark 14 Mod. 2 400 c/s counterparts and motor tachometers similar to the Mark 16 Mod. 0 and Mark 12 Mod. 0. A 60 c/s size 11 motor tachometer, without a Bu. Ord. parallel, is also available.

These motors may be operated from a two phase supply or single phase supply split with a capacitor. Windings to suit customers' voltage requirements can be supplied.

		60 c/s Information			
Type		Stalled Torque	No load Speed	Output Voltage per 1000 r.p.m.	
<i>Motor</i>					
Size 18	.. 18M10B4 ..	3.5 oz. in. ..	3300	—	
Size 15	.. 15M10A4 ..	1.45 " ..	3300	—	
Size 11	.. 11M10A10 ..	0.63 " ..	3300	—	
<i>Motor Tachometer</i>					
Size 18	.. 18M10D6 ..	3.5 oz. in. ..	3000	1.25	
Size 15	.. 15M10B8 ..	1.45 " ..	3000	1.25	
Size 11	.. 11M10E1 ..	0.6 " ..	3200	0.2	

Full Canadian manufacturing, sales, parts and service facilities

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### OPPORTUNITIES

These classified advertisements are published to assist those in the trade who have articles for sale, positions available, positions desired, sales agency openings or business opportunities. Charges are 25c per word or figure, not including heading or box number. Minimum charge is \$5.00 payable on submission. No agency commission paid.

There is absolutely no charge for "positions desired" advts. Send all material to the attention of the advertising manager of ELECTRONICS AND COMMUNICATIONS, 450 Alliance Avenue, Toronto 9, Ontario.

#### BRITISH FIRM SEEKS U.K. AGENCY RIGHTS FOR CANADIAN ELECTRONICS MANUFACTURER

A large and reputable firm of British electronic equipment and component manufacturers situated in the North of England is desirous of obtaining U.K. representation rights for Canadian manufactured electronic equipment and components. The firm seeking this arrangement is a supplier of electronic equipment to H.M. Admiralty, Ministry of Supply and the United Kingdom Atomic Energy Authority. In reply interested parties should state the types of equipment or components they are prepared to place on the British market through such an arrangement. Address replies to:

Box 5022

Electronics and Communications  
450 Alliance Avenue - Toronto 9, Ontario

#### EXECUTIVE (38) — P.ENG., B.A.S.C.,

desires Vancouver location. Seeks appointment in administrative, technical liaison or sales capacity in telecommunications or related fields. Well versed in all levels negotiations, both Government and Commercial aspects. Experience includes technical knowledge of communications systems, financial and budget controls, project planning, sales management, contract preparation, negotiation administration.

Box 5028

Electronics and Communications  
450 Alliance Avenue, Toronto 9, Ontario

#### NEW OIL CAPACITORS

50 GE 1/2 MFD 25,000 VDC \$29.50 ea.  
300 POTTER 16 MFD 660 VAC \$2.35 ea.

Navilog, Box 9  
Englewood, New Jersey

Millie Amp says,  
"I know quality  
when I see it!"

**"Gold Brand"**  
METERS

**STARK**

STARK ELECTRONIC SALES COMPANY  
AJAX, ONTARIO

For complete details check No. 42 on handy card, page 83

For complete details check No. 55





# offers

Field Application Engineering  
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# represents

- Hewlett-Packard Company** —  
Comprehensive line of electronic test equipment  
DC through microwave.
- Dymec, Inc.** —  
Electronic Instrumentation Systems.
- Gertsch Products, Inc.** —  
Frequency measuring equipment and ratio transformers.
- Kintel, Division of Cohu Electronics, Inc.** —  
Wide range of DC instrumentation and closed  
circuit television.
- Massa, Division of Cohu Electronics, Inc.** —  
High speed recording systems.
- Tel-Instrument Electronics Corp.** —  
Voltage regulators and vibration calibrators.  
TV test equipment.
- Sierra Electronic Corporation** —  
Transmission line test equipment.
- Electro Products Laboratories, Inc.** —  
Magnetic pickups and proximity controls.
- Erik A. Lindgren & Associates**  
R.F. screen rooms
- Skydyne, Inc.** —  
Test equipment transit cases and mobiles.
- Taller & Cooper, Inc.** —  
Data handling and toll equipment.

*Extensive Stock For  
Immediate Delivery,  
Factory Warranty Service.*



Watch for the Atlas  
**TRAVELAB** visit to your area.  
This mobile demonstration  
laboratory features the  
latest in electronic  
instrumentation in operating  
display.



## ATLAS INSTRUMENT CORPORATION LTD.

50 Wingold Avenue, Toronto 19, Canada

BRANCHES IN: MONTREAL • OTTAWA • VANCOUVER

For complete details check No. 9 on handy card, page 83

## Mr. Donald Fleming

One of the hardest working men in the Diefenbaker government these days is undoubtedly Mr. Donald Fleming, the minister of finance. With the 1960 budget scheduled for presentation to parliament in the near future it is quite likely that the lights in Mr. Fleming's office will be burning late into the night as last minute revisions and amendments are made to that all important document "the budget".

As everyone knows "the budget" is a highly confidential document and any prior knowledge of its contents would, as the saying goes, be worth their weight in gold to any businessman with a modicum of brains and a few dollars for quick investment.

Well, it isn't likely that any businessman with brains or dollars is going to get a preview peek at "the budget" but in some cases it isn't necessary to get a preview peek at "the budget" to be fairly certain that it will contain certain taxes — taxes that have been incorporated in "the budget" for so long that they have become a habit of utterance from one minister of finance to another.

One tax that fits such a description is the 15 per cent excise tax on electronic tubes. This tax has been on the statute books since the days of World War II and has been firmly maintained year after year while tax concessions have been granted to a host of other items well within the luxury category.

Surely it is now time that careful consideration be given to either removing this tax or at least reducing it on behalf of the Canadian electronic industry especially at a time when this industry is being hard pressed by competitive products imported from low wage rate countries.

While recent legislation specifies that imported tubes be marked with the country of their origin as a means of permitting the identity of imported products from those of Canadian manufacture we believe that this measure, although a step in the right direction, is not enough to sell the buyer on Canadian made products.

All things being equal, price is the factor that wins the sale and some reduction of the 15 per cent excise tax on electronic tubes of Canadian manufacture would surely be reflected on their price tags, an inscription that is as carefully considered by the purchaser as the description denoting the country of origin.

If, therefore, Mr. Fleming should be searching about for a justified downward tax revision we suggest that he just look up electronic tubes, scratch his pen through this item, turn off his office lights and go home. He'll have done a good day's work.





**FEDERAL** SIGN  
and **SIGNAL** counts on Tung-Sol transistors  
to power three-in-one sound device

Federal Sign and Signal Corporation has combined a highly directional electronic siren, a mobile public address system and a car radio amplifier into one compact unit. This unique creation, the Interceptor, arms police patrol cars, fire engines, ambulances and civil defense vehicles with a three-pronged weapon to cope with life-and-death emergency.

The Interceptor counts on Tung-Sol power transistors to deliver the necessary three-purpose power with round-the-clock reliability. Federal, in fact, describes the large complement of Tung-Sol 2N242 and 2N382 germanium transistors as "the heart of the unit".

The 2N242 and 2N382 feature tight parameter control, sure-safe hermetic sealing and efficient thermal design . . .

qualities which assure peak performance and long life.

Like every other Tung-Sol component, these semiconductors are the products of carefully disciplined factory processes and rough-and-tough life testing aimed at bringing you the best in componentry.

Federal Sign and Signal Corp., the largest manufacturer of sound-producing devices, represents another of the discriminating companies benefiting from Tung-Sol components. Tung-Sol can serve you, too, with premium units for any industrial or military requirements. Get in touch with our applications engineers. They'll be glad to evaluate your circuitry and recommend the components to fit your design. In Canada: Abbey Electronics, Downsview, Ont.



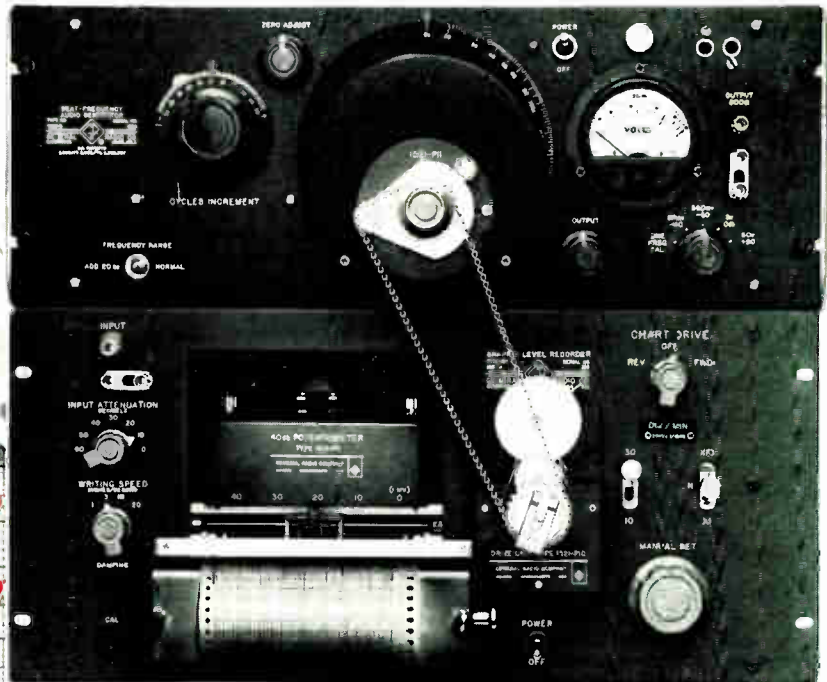
**ts TUNG-SOL**®





# AUTOMATIC RECORDING of FREQUENCY RESPONSE

... for Study of Filters, Networks, Amplifiers, Equalizers,  
Loudspeakers, Microphones, and Transducers of All Types.



Audio generator and level recorder couple mechanically for graphic recording in db on a truly logarithmic frequency scale.

## SYSTEM SPECIFICATIONS

**Frequency Range:** Generator, 20c to 20 kc on logarithmic scale, 20 kc to 40 kc. Recorder, traces rms level from 20c to 200 kc.

**Generator Output:** flat within  $\pm 0.25$  db from 20c to 20 kc. Output is adjustable from 5 mv to 50v open-circuit. Harmonic distortion is less than 0.25% from 100c to 10 kc, 0.5% below 100c, 1% above 10 kc.

**Recorder Sensitivity:** 1 mv, maximum (corresponds to 0 db). Can be varied from 1 mv to 1v in 10 steps with input attenuator.

**Recorder Range:** 40-db full scale, with plug-in potentiometer supplied; 20-db and 80-db pots also available.

**Pen Writing Speed:** 20 in/sec maximum with 40-db Pot (200 db/sec) with less than 1-db overshoot. Slower speeds (1, 3, or 10 in/sec) selected by panel switch to provide mechanical filtering of rapidly fluctuating levels.

**Paper Speeds:** 2.5, 7.5, 25, and 75 in/min. Optional slow-speed motor available for speeds from 2.5 to 75 in/hr.

**Recorder Accuracy:** Static accuracy better than 0.4% of full scale. Fast servo system with low overshoot provides excellent dynamic accuracy.

Write For Complete Information

FREQUENCY IN CYCLES PER SECOND

9-inch length from 20c to 20 kc

Full 4-inch recording width

Frequency response recording for various settings of an adjustable notch filter. Plot shown actual size.

PRICES: Type 1304-B Beat-Frequency Generator .....	\$625
Type 1521-A Graphic Level Recorder (with 40-db pot) .....	\$995
Type 1521-P10 Drive Unit .....	\$ 72
Type 1521-P11 Link Unit .....	\$ 18
<b>Complete System</b> .....	<b>\$1710</b>

Chart paper only \$2.30 per 100-ft. roll

## GENERAL RADIO COMPANY

WEST CONCORD, MASSACHUSETTS

Canadian Engineering Office in TORONTO  
99 Floral Parkway, Toronto 15, Ontario  
Arthur Kingsnorth • Richard J. Provan  
Tel: CHerry 6-2171

Repair Service: Bayly Engineering Ltd., Ajax, Ontario

For complete details check No. 30 on handy card, page 83

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