

Electronic cooking — see description on page 5.

electronics and communications



an age publication
MARCH 1961



Electronics and Communications

**CANADIAN EXPORT
PRODUCT ISSUE**

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QEL

MR & W PREZIOSI
& EASTGATE CROSS
SEABROUGH ONT

*There's
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Model "880" High Stability HF receiver. Superb specification and performance — designed to meet professional requirements. Range 500 kc/s to 30 Mc/s. Dial setting accuracy within 1 kc/s. Combines the advantages of crystal control with continuous tuning.



Model "730/4" General Purpose HF receiver. Developed to meet a Government specification and capable of an excellent performance. Range 480 kc/s to 30 Mc/s. (Special versions available giving crystal control and low frequency coverage.)

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for

**EVERY SERIOUS
PURPOSE**



Model "850 2" General Purpose LF/MF receiver. Range 10 kc/s to 600 kc/s approximately. Full communications facilities.



Model "770U" Ultra High Frequency receiver, covering from 150 Mc/s to 500 Mc/s. Excellent performance throughout and suitable for receiving either FM or AM signals.

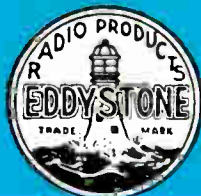


Model "770R" Very High Frequency receiver, covering from 19 Mc/s to 165 Mc/s in six ranges. Accepts AM, FM and CW. High sensitivity, fine control, thoroughly reliable.

Between
10 kc/s
and
1000 Mc/s



Model "770S" Extra High Frequency receiver, having a range from 500 Mc/s to 1000 Mc/s. Specially developed circuitry gives high performance.



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- Precision workmanship, rigid quality control and immaculate cleanliness to fulfill exacting government specifications for missiles, rockets, aircraft, satellite and radar components.
- Redesigned higher current heaters to reduce filament burn outs.
- Gold grids to reduce secondary emission.
- Structurally reinforced to withstand higher shock and vibration conditions.
- Tested to tighter controlled life-tests and conditions.

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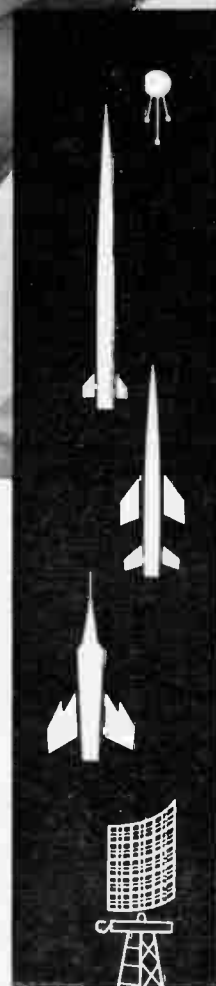
CANADIAN Marconi COMPANY

830 BAYVIEW AVENUE • TORONTO, ONTARIO

BRANCHES: Vancouver • Winnipeg • Montreal • Halifax

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ELECTRONICS AND COMMUNICATIONS. March, 1961





fills the chair when no one's there

Now ELECTRONIC SECRETARY offers a full range of automatic answering sets opening a broader market for these profitable machines. The brand new transistorized long-play model, shown above, will answer the phone 24 hours a day, seven days a week — ideal for the small business man or professional man who must leave his phone unattended, yet relies on his phone for business. And it's great for large companies too. It is suitable for taking long or short messages, sales orders and reports, absentee reports, employee suggestions, or for giving messages and delivering announcements. All this at a low monthly rental. ● Other basic ELECTRONIC SECRETARY models, at lower rentals, are the Short Play and Answer Only models. The Short Play will answer and receive 12 short messages; the Answer Only unit will answer and deliver a message up to three minutes in length. ELECTRONIC SECRETARY is only one of a vast range of telephone products sold by AUTOMATIC ELECTRIC, a company known all across Canada for best quality products, and fast, efficient after-sale-service. For full information write Automatic Electric Sales (Canada) Limited, 185 Bartley Drive, Toronto 16, Ont. Branches across Canada.

*New line of ELECTRONIC SECRETARY
telephone answering sets

AUTOMATIC ELECTRIC

Subsidiary of

GENERAL TELEPHONE & ELECTRONICS



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an age publication

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Canada's pioneer journal in the field of
electronics and communications engineering

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COVER STORY

Electrons Cooking — Hughes technician Maria Cascio takes batch of partly-assembled semi-conductors from "curing oven" at semiconductor manufacturing plant of Hughes Aircraft Company in Los Angeles. Heat process insures good electrical contacts in the tiny electronic devices.

ELECTRONICS INSTRUMENTATION

KIN TEL Model 20/20 TV Camera for Closed Circuit TV

Applications

— the 20/20 has a video bandwidth of 8 mc permitting a full 650-line horizontal resolution with any high quality standard TV monitor, with resolution limited solely by the video amplifier in any home television receiver. An optional sync generator provides 2:1 interlace and locks the vertical sweep to the 60 cps line for optimum picture quality with a standard monitor.



GREIBACH Model 500

— precision laboratory meters, frictionless design yields parallax-free rugged suspension. Sensitivities to 0.2 microampere, accuracies conservatively rated at 1/4%. Available in panel mount, Thermocouple RMS reading AC types. Overload factor to 125,000,000%.



HEWLETT-PACKARD Model 185A

— this oscilloscope features easy viewing, rise time less than 0.7 millimicroseconds, full 10 cm vertical display, built-in amplitude and time calibrators, sweep magnifier, high impedance probes, X-Y recorder output, sweep delay and beam finder.

SIERRA Model 210A

— a UHF power amplifier, 7125 and 7750 mc, two kilowatt broad band amplifier with power gain of over 40 db, requires only 100 milliwatts of r-f drive. Seven VA 856 klystrons are available for full coverage of the 625-mc span, the cavities of each tunable over a 100-mc range.

SIERRA Model 125A

— a compact V.T.M., 3 to 600 KC with narrow and wide selectivity settings plus a flat voltmeter position. Its measurement range (tunable mode) is
— 90 dbm to +32 dbm;
flat mode,
— 30 dbm to +32 dbm.



HEWLETT-PACKARD Model 606A

— a new signal generator covering the H.F. spectrum (including 30 and 60 MC radar IF bands). Output is constant within ± 1 db over the full frequency range, and is adjustable from +20 dbm (3 volts rms) to -110 dbm (0.1 μ v rms). Can be provided with a 10:1 voltage divider and dummy antenna lowering minimum output to 0.01 μ v.

GERTSCH Model FM-7

— a portable VHF Frequency meter with minimum accuracy of .0002% (direct reading) or .0001% (with correction curve) over frequency range of 20 to 1000 Mcs. May be used as a signal generator. Combined with the DM-3 and RFA-1, provides a complete communications servicing package.



GERTSCH Products, Inc., VPS-1

— variable phase standard permits phase between two self-generated voltages to be shifted to any desired angle, with an accuracy of $\pm .05^\circ$ or better. Generates two signals of equal amplitude, differing in phase by any angle from 0 to 360°.



GERTSCH Products, Inc., Model SS-1 Synchro Standard

— when driven by a suitable signal source, provides stator outputs S_1 , S_2 , and S_3 corresponding to the outputs of a master synchro as the shaft is rotated in 5° increments. Quadrant switching is provided to simulate operation over a full 360°.

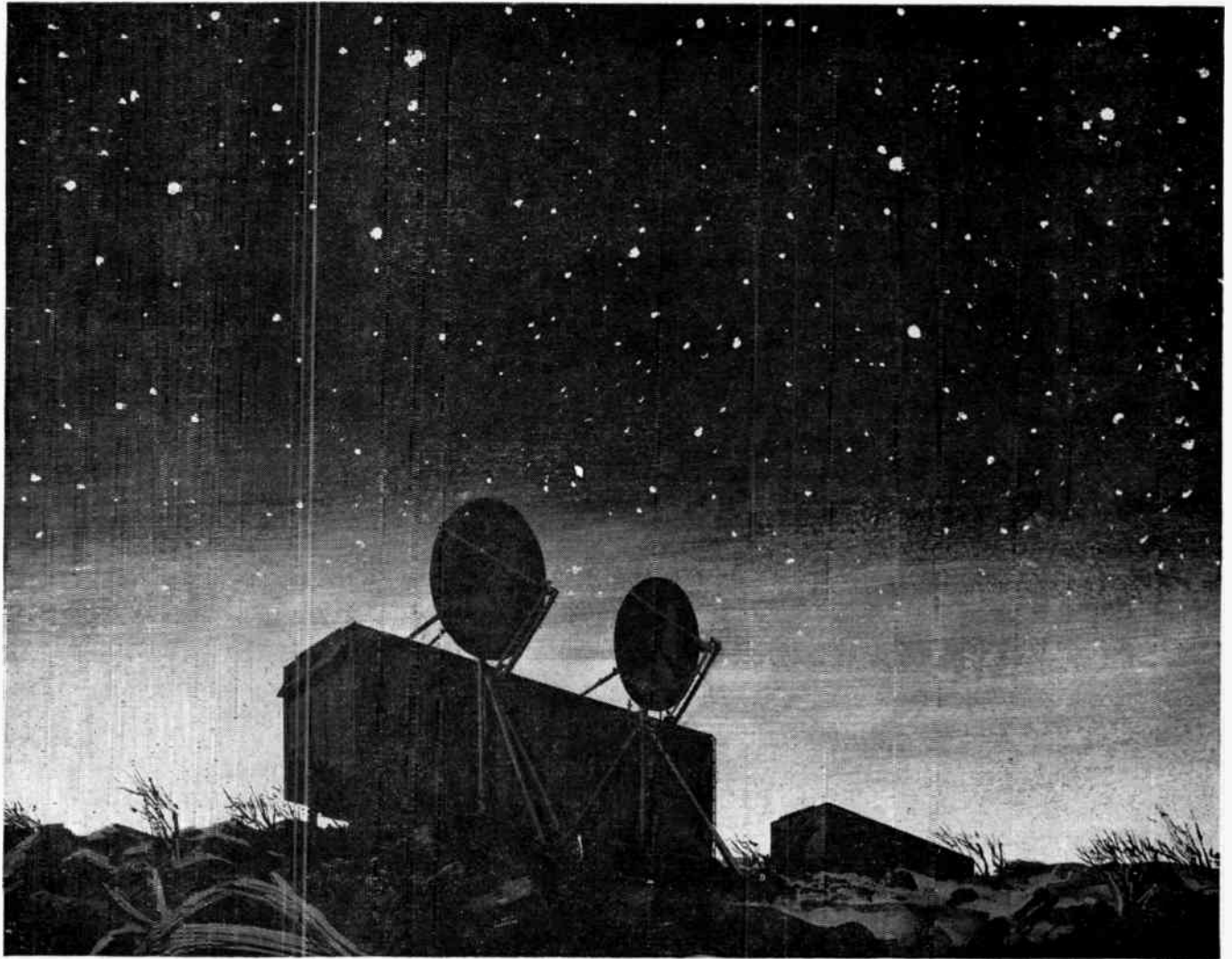


ATLAS INSTRUMENT CORPORATION LTD.

50 Wingold Avenue, Toronto 19, Canada

BRANCHES IN: MONTREAL • OTTAWA • VANCOUVER

For complete details check No. 5 on handy card, page 61



... and 200 miles away a telephone rings!

Eight hours ago, an expanse of barren mountainous country made communication impossible. Tonight, 60 telephone channels and teletype span the wilderness.

Transportable MICROSCATTER is a super high frequency radio system for long-range communication. Developed by Canadian Westinghouse, MICROSCATTER beams signals high above the earth sending two-way voice and teletype messages up to 200 miles over land and water . . . *without* costly relay stations.

The compact MICROSCATTER radio system fits in a standard 30 ft. truck trailer. Now, whenever men and equipment move, MICROSCATTER moves right along with them. It is particularly suited to military and government projects in remote locations. Units designed for self-contained field operations are set down by helicopter.

CANADIAN

Westinghouse Microscatter

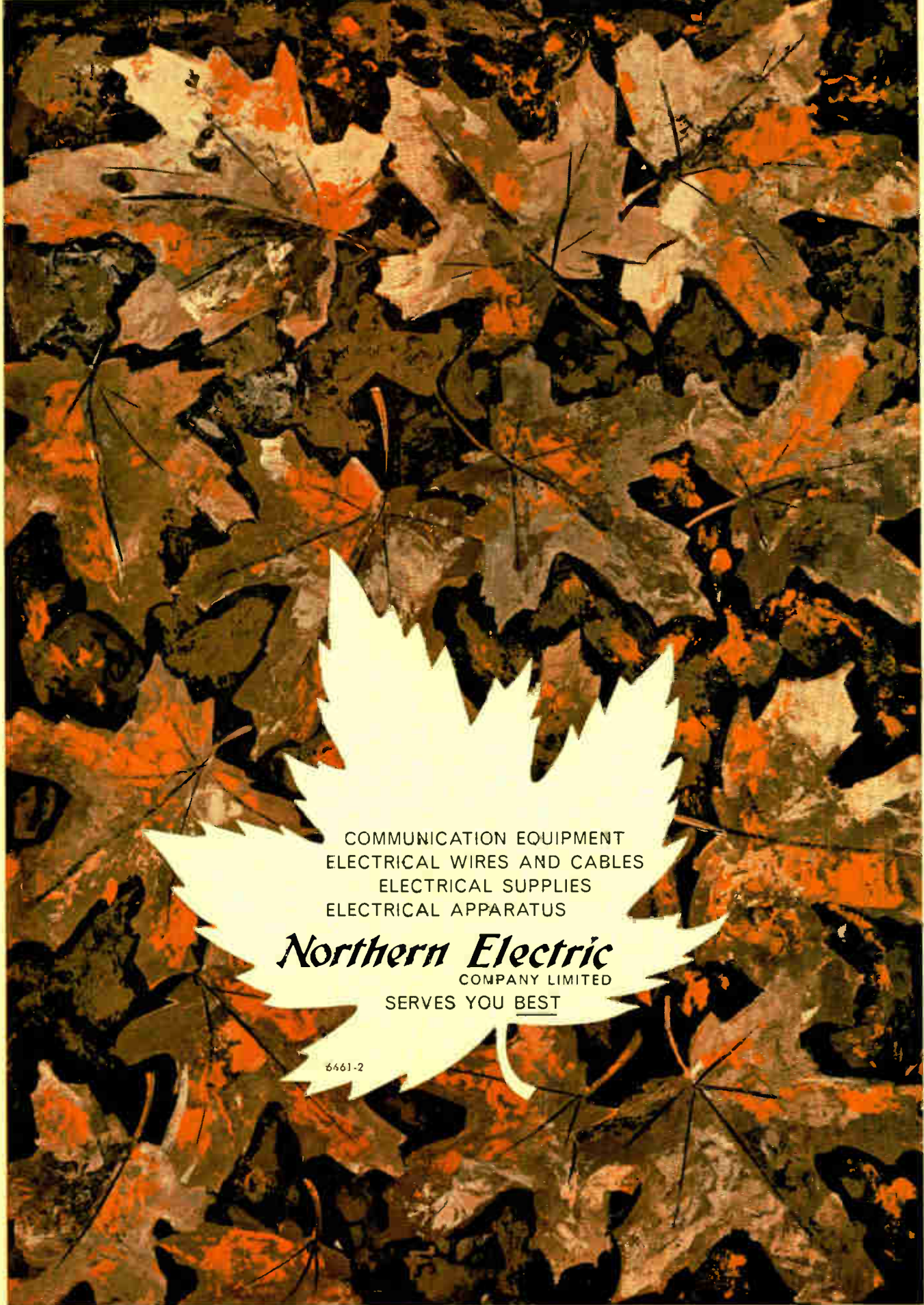
A Westinghouse communications specialist will be pleased to explain fully the MICROSCATTER operation and relate it to your problem. Contact your nearest Westinghouse office, or write to Canadian Westinghouse Company Limited, Electronics Division, Hamilton, Canada. **YOU CAN BE SURE . . . IF IT'S WESTINGHOUSE.**

MICROSCATTER APPLICATIONS

COMMERCIAL	MILITARY
Fixed Station—120 telephone channels —television and sound	Wide Band—radar —data —120 telephone channels
Transportable—60 telephone channels —teletype	Tactical and Transportable—60 voice channels —teletype —data

FEATURES

- Frequency—4400-5000 mc
- Antennas—10 to 28 ft. diameter
- Power—2 KW
- Range—100 to 200 miles



COMMUNICATION EQUIPMENT
ELECTRICAL WIRES AND CABLES
ELECTRICAL SUPPLIES
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Northern Electric
COMPANY LIMITED
SERVES YOU BEST

6461-2

For complete details check No. 36 on handy card, page 61



THE FINEST INSTRUMENT FOR ALL-PURPOSE TESTING ...

*WESTON Model 901 Group
Now better than ever*

Weston's matched line of Model 901 portables are well known for sustained accuracy and dependability under general test conditions. This modern group of AC and DC multi-range instruments consists of ammeters, voltmeters and wattmeters covering a wide range of measurement.

Designed for critical use, the Model 901 DC series is now accurate to 0.25%. Hand-calibrated mirror scales are combined with knife edge pointers to eliminate parallax errors. Widely-spaced markings on 5.5-inch long scales facilitate readability. The Model 904 AC series is now stocked in multi-range, frequency-compensated versions only.

Excellent for field use, these portables are housed in rugged plastic.

Other features include wide, shadow-reducing windows which are specially treated against electrostatic effects, and self-shielded mechanisms that offer positive protection against external magnetic influences.

Call your Weston representative for complete information, or write for Catalog 06-203. Daystrom, Incorporated, Weston Instruments Division, Newark 12, New Jersey. *International Sales Division, 100 Empire St., Newark 12, New Jersey. In Canada: Daystrom Ltd., 1480 Dundas Hwy. East, Cooksville, Ontario or 5430 Ferrier Street, Montreal, Quebec.*

Weston Model 901 Group consists of: Model 901 DC Instruments; Model 904 AC Instruments; Model 902 AC Rectifier-Types, and Model 905 AC and DC Single Phase Wattmeters. Protective leather carrying cases are available for all models.



DAYSTROM, LIMITED
WESTON INSTRUMENTS DIVISION

Reliability by Design

WORLD LEADER IN MEASUREMENT AND CONTROL

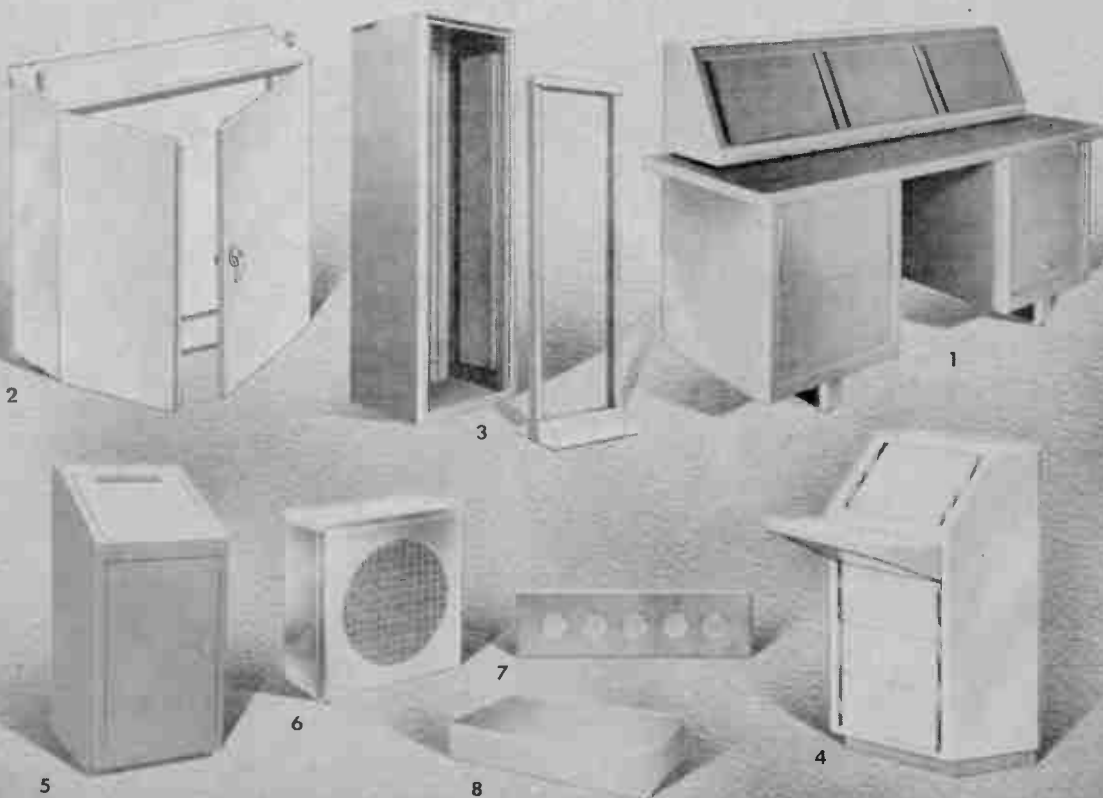
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For complete details check No. 19 on handy card, page 61

HAMMOND Electrical and Electronic Cabinetry

Cabinets • Racks • Chassis • Consoles • Tables • Drawers • Speaker Enclosures • Utility Cases • Panels
• Equipment Covers and Enclosures . . . are all part of the Hammond line.

1. Consoles, Tables and Turrets . . . for communication and control systems.
2. Panel Enclosures . . . N.E.M.A. 12 specs., dust, water and oil-spray proof.
3. Cabinets and Racks . . . for mounting and housing electronic equipment.
4. Modular Consoles . . . designed and constructed for multiple groupings.
5. Special Metal Cabinets . . . for electronic controls in industry.
6. Speaker Enclosures . . . for all sizes—table or wall mounting.
7. Rack Panels . . . steel or aluminum, plain or punched.
8. Chassis . . . steel or aluminum . . . constructed for heavy duty service.



Quality metal work economically fabricated!

Hammond's modern plant is equipped to produce durable, finely finished metalwork to close tolerances and high quality standards for Canadian Industry. The factory carries an extensive range of stock items, and dies used for more than 14,000 original metal fabrications are available to produce special requirements at an economical price.



HAMMOND

ELECTRICAL and ELECTRONIC CABINERY

Standard Items Stocked by Leading Jobbers

H3

HAMMOND MANUFACTURING COMPANY LIMITED • GUELPH, ONTARIO, CANADA

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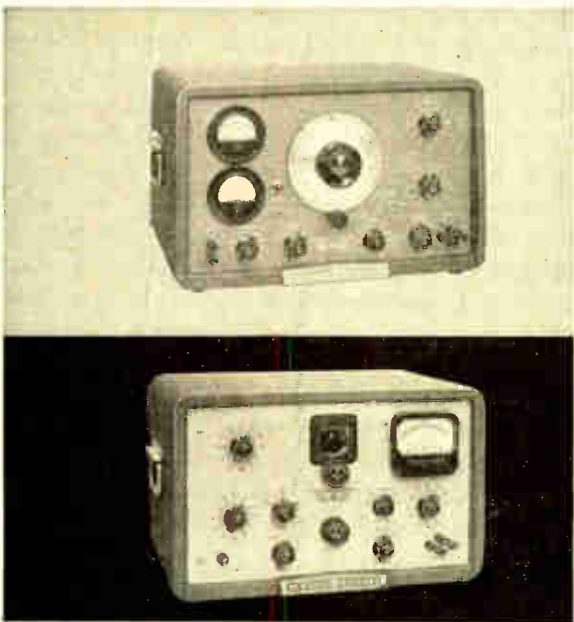


**Easy to operate,
highly stable,
wide range**



PRECISION OSCILLATORS

precision oscillators perform a wide variety of audio, video, and low frequency tests. They offer the outstanding advantages of flexibility and broad usefulness at moderate cost. Employing the pioneered RC resistance capacity circuit, the units combine accuracy and reliability with ease of operation and minimum adjustment.



205AG AUDIO SIGNAL GENERATOR—Six instruments in one; 20 cps to 20 KC!

Uses: Measure amplifier gain and network frequency response, measure broadcast transmitter audio and loudspeaker response, drive bridges, use in production testing or as precision source for voltages. Monitors oscillator output, measures output of device under test.

Advantages: Self-contained instrument, no auxiliary equipment needed. 5 watts output, ± 1 db response, less than 1% distortion, hum more than 60 db down, no zero setting, output and input meters read v and dbm; four output impedances.

Price: \$600.00 (cabinet model), \$585.00 (rack mount).


206A AUDIO SIGNAL GENERATOR—Less than 0.1% distortion; 20 cps to 20 KC!

Uses: Convenient, precision audio voltage source; checks FM transmitter response, makes high quality, high fidelity amplifier tests, transmission measurements.

Advantages: Continuously variable audio frequency voltage, (output 15 dbm) 0.2 db response, hum 75 db down, 2% frequency accuracy, less than 0.1% distortion. 111 db attenuator with 0.1 db steps.

Price: \$800.00 (cabinet model), \$785.00 (rack mount).

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

 pioneered the world-famous
resistance-capacity
oscillator circuit

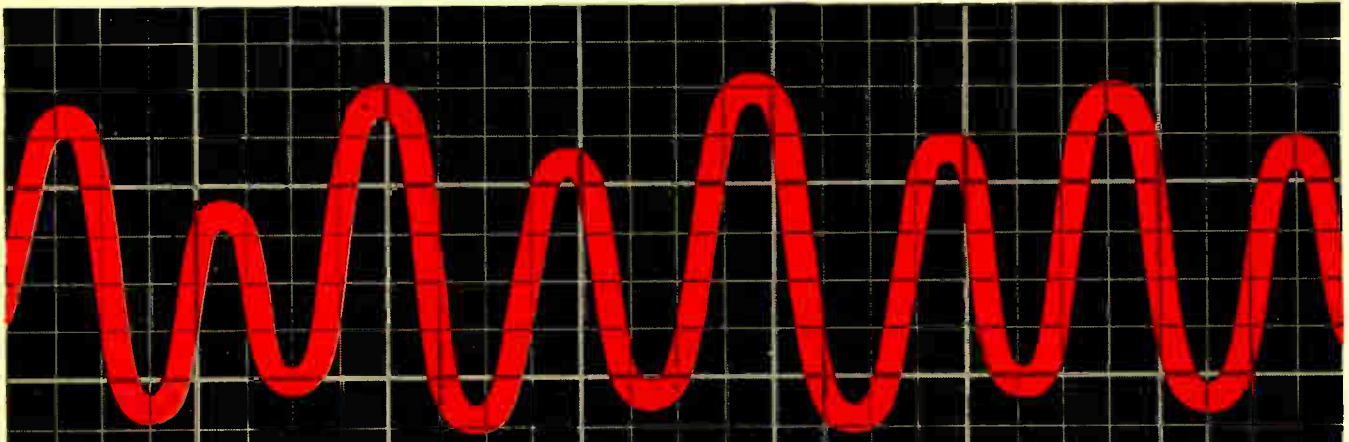
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Rue du Vieux Billard No. 1, Geneva, Switzerland
Cable "HEWPACKSA" Tel. No. (022) 26. 43. 36

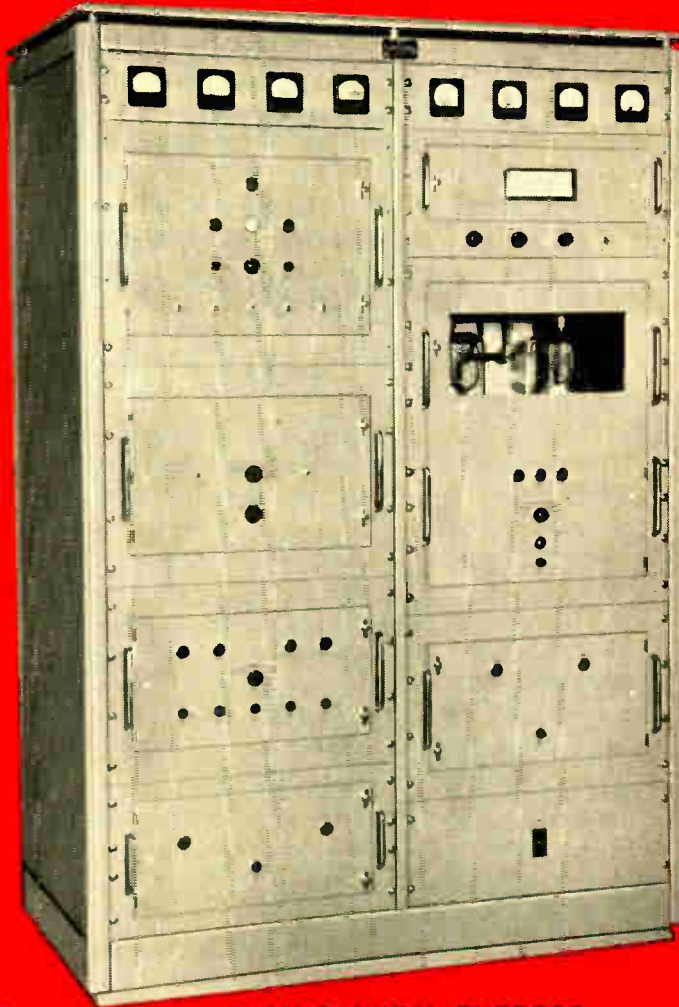
Field representatives in all principal areas

6428

For complete details check No. 27 on handy card, page 61



MULTI-PURPOSE COMMUNICATIONS BY STC



3 KW GENERAL PURPOSE
TRANSMITTER



For complete details check No. 49 on handy card, page 61

A comprehensive range of low and medium frequency transmitters of advanced design for beacon and communication purposes, built to meet the stringent requirements of the Canadian Army and Department of Transport.

25 WATT BEACON TRANSMITTER

200-415 KCS, CW/MCW/RT, with automatic keyer and with "press to talk" facility.

50 WATT BEACON TRANSMITTER

Frequency range 280-330 KCS, CW/MCW, with automatic keyer.

3 KW TRANSMITTER

Frequency range 100-200 KCS, CW/FSK, will accept keying speeds up to 100 wpm (400 wpm FSK).

3 KW BEACON TRANSMITTER

Frequency range 190-415 KCS, CW/MCW/RT, with automatic keyer.

2 KW TRANSMITTER

Frequency range 100-230 KCS, CW/FSK, will accept keying speeds up to 100 wpm (400 wpm FSK).

All transmitters are supplied with an Antenna Tuning Unit. For dual installations an Automatic Transfer Unit is available.

STC CANADA

**9600 St. Lawrence Blvd.,
Montreal, 11, P.Q.**

STC systems cover the whole broad field of telecommunications including: telephone and telegraph, radio and television microwave links . . . designed, manufactured and installed by STC engineers.

EIA report

by R. T. O'Brien

Specifications and standards

The Receiver Division Committee on Safety has completed its review of the Canadian Standards Association's safety specification for radio and television devices.

The Committee was given the task of reviewing and revising the specification to bring it into line with up-to-date manufacturing procedures and make provision for future developments in new materials and miniaturization concepts. The draft now goes to the Receiver Engineering Committee and the Components Engineering Panels for comment.

The long and difficult meetings of the Committee have been tempered by a very real concern for the welfare and safety of the buying public. There is a growing concern over the volume of unsafe appliances finding their way into the country which are not safety-approved and which constitute a very real threat to the lives and safety of unsuspecting housewives and Canadian homes.

Canadian manufacturers must have safety-approval for their products before they can be marketed and the Committee has worked diligently on the complex specification to ensure that virtually every conceivable shock and fire hazard in their product is eliminated. Every possible situation and environment has been considered, from the one-in-a-million chance of picture tube implosion to the size of ventilation holes through which an object could be pushed by inquisitive children.

One of the strongest recommendations the Committee makes is to the Canadian consumer — Buy Canadian-made Products, they are Safety-Approved for Your Protection.

ETV standard drafted

The outline of the standard for Educational Television Classroom Receiving Systems is being submitted to the Receiver Engineering group for review by the Ad Hoc Committee which was set up to write it just after the first of the year.

The Standard was drafted at the request of the Metropolitan Educational Television Association of Toronto (META), who asked that a system be developed quickly in view of the interest being shown by many School Boards throughout the Province in educational television.

META is an association of senior members of the Visual Aids Departments of all the School Boards in Metro Toronto. They ask that a Canadian system be developed based on the best features of many ETV systems which have undergone serious appraisal by Canadian educators over the past two years.

There were many unusual considerations to be resolved in arriving at the draft standard. Adequate and good picture and sound for a typical large classroom was one of the knotty problems. Portability, viewing height and angles in various school grades, tamper-proofing of controls, and sturdiness of cabinetry and mountings were among the other features that had to be considered. The resulting draft is designed to give School Boards an outline of what to look for when shopping for Canadian classroom systems and a standard should be available to them before the end of this school term.

Land mobile and VHF Maritime equipment

The Land Mobile and Marine Equipment Committee of the Electronics Division has finished its work on the draft proposals for mobile equipment operating between 25 and 470 mc/s and for VHF maritime-mobile equipment. Ten standards are proposed.

The proposals have been submitted to member companies for comment. If these are favorable and the approvals of the Electronic Division Officers and the Director of Engineering are obtained, standards could be available to the industry by mid-summer.

Standard for sound system

A new EIA standard for the Installation of Sound Systems in Public, Educational, and Industrial Buildings has been submitted for final approval.

Originating in the Sound Equipment Engineering Committee of the Electronics Division this specification establishes minimum standards covering methods of sound system distribution to maintain compatibility with the quality of the buildings in which such systems are installed.

the industry's business



To emphasize export by local manufacturers, the St. Thomas Board of Trade held Trade Winds in which large products were lined up along the street and smaller items displayed in shop windows. Left to right in front of Lorain Products (Canada) display were: J. A. McBain, MP; Honorable George Hees, Minister of Trade and Commerce; W. R. Hudspeth, Australian Trade Commissioner; and J. A. McVeigh, General Manager, Lorain Products (Canada).

Joint reception and dinner held

Organized by the secretaries of the Canadian Electronic Sales Representatives Association and the Canadian Electronic Wholesalers' Association, the members and their guests held the first joint reception and dinner in the King Edward Hotel, Toronto, January 9.

During the afternoon each Association held its own separate meeting and both groups converged in the evening in the Terrace and Elizabeth rooms of the King Edward for an informal reception and dinner. The affair was attended by over 70 members of the industry representing the manufacturing and wholesale sales divisions. Milton J. Stark, president of Stark Electronic Instrument Co. Ltd., Ajax, Ontario, was the guest speaker.

Canadian agents for Alma Components Ltd.

On January 27, Alma Components Ltd. announced that they have appointed Associated Electronic Components Ltd., 1560 Avenue Road, Toronto 12, Ontario, to be their agents for Precision Wirewound Resistors in Canada.

Fourth annual sales seminar held

Atlas Radio Corporation Limited held their fourth annual week-long sales seminar in Toronto recently.

During the seminar, the sales staff were told of the many new products and programs that will be available during the coming year, and the many steps being taken by the company to improve service to their customers.



Northern Electric's booth at the Canadian Pulp and Paper Association's convention held at the Queen Elizabeth Hotel in Montreal.

TV service relayed 200 miles

A television relay system which is being installed for the first time in Canada by the Canadian Marconi Company will provide viewing facilities for subscribers living some 200 miles from the initial source of the transmission.

Designed to reach viewers outside the normal range of radiated television, the system will originate at St. Felicien terminal, amplified and then relayed with the aid of four substations to Chapais, 180 miles to the north and Chibougamau, some 20 miles further north-east. This relayed community television system is the first to be approved by the Board of Broadcast Governors and the Department of Transport.

U.S. firm purchases Canadian stocks

James F. Coonan, president of Mandrel Industries, Inc., Palo Alto, California, announced January 12, that Mandrel had acquired all outstanding shares of Electronic Research & Development Company, Ltd., Calgary, Alberta. This company produces telecommunications equipment, two-way radios, and military electronic apparatus.

CGE completes major order

The electronic equipment department of Canadian General Electric Co. Ltd., recently delivered an order for 46 two-way mobile radio sets, plus equipment for 20 base stations, to Trans Canada Pipe Lines Ltd.

Trans Canada is using the CGE equipment in the operation and maintenance of its transcontinental gas pipe line, over a 500 mile stretch of the line between the Alberta-Saskatchewan border, and the city of Winnipeg.

Lockheed Canadian regional office

Lockheed Aircraft Corp. announced February 7, the establishment of a corporate regional office for Canada. Directing the company's activities will be Erik Nelson, a veteran aircraft and airline executive with 33 years experience. His headquarters will be in Ottawa and as regional director he will co-ordinate the Canadian activities of the several Lockheed divisions and subsidiaries.

1961 Toronto High Fidelity Exposition

John R. Tilton, president of the Dominion High Fidelity Association, Toronto, announced February 7 that plans for holding the 1961 Toronto High Fidelity Exposition are progressing satisfactorily. This year's Show will move to the Seaway Hotel, Lakeshore Boulevard West, Sunnyside, Toronto, where 58 rooms and salons have been booked for the week commencing October 16th. Actual show dates for the public will be Wednesday to Saturday, October 18th to 21st, inclusive.

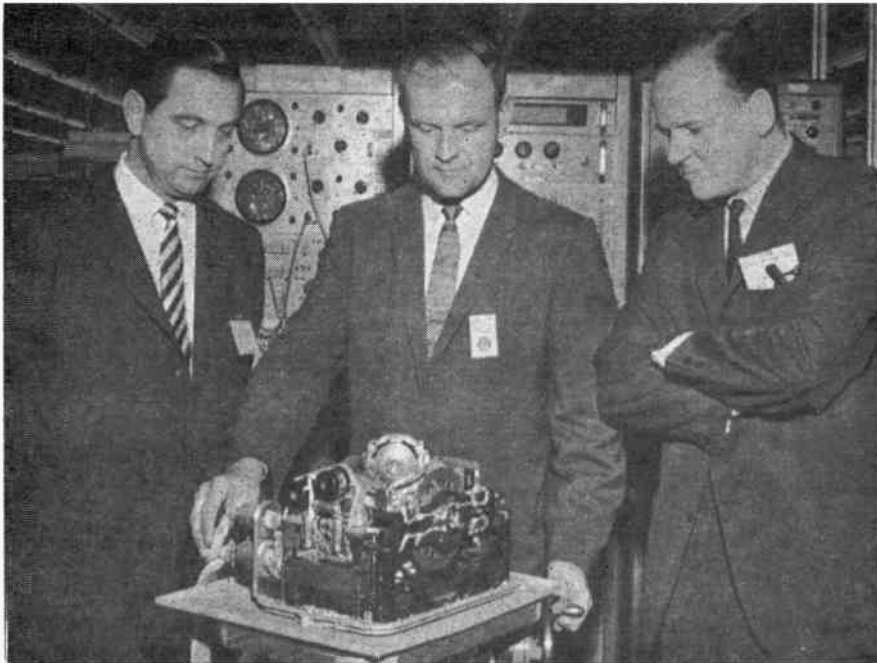
An industry reception and dinner for dealers and exhibitors will be held on Tuesday evening, October 17th.

New Canadian sales representative

Ace Electronics Associates, Inc., Somerville, Mass., manufacturers of precision potentiometers, has appointed David R. Beattie Sales Co., of 1415 Lawrence Ave. West, Toronto, Ontario, as sales representative for all of Canada except the far western area.

Canadian Research Institute moves into a new laboratory

The new production plant and research laboratory of Canadian Research Institute, have just been opened at 85 Curlew Drive, Don Mills, Ontario. This new building more than triples the space previously occupied, and will include offices, warehouse, laboratories, and manufacturing facilities. This completes the third and largest expansion in the company's 22 year history.



Observing the final test being conducted on the first LN-3 Inertial Navigation System for the RCAF's CF-104 supersonic fighter, are (right) Doug Belyea, Deputy Director, Aircraft Branch, DDP; (left) V. V. R. Symonds, Contracts Manager, Litton Systems (Canada) Ltd.; and Perry Luth, Manager, Electronic Production.

The feature of the premises will be a precision temperature-controlled room for housing electrical standards, permitting measurements to be made to an accuracy of plus or minus 0.001 per cent.

Appoints Can. distributor

Datafilter Corporation, Van Nuys, California, recently announced the appointment of Conway Electronic Enterprises as their distributor for Canada.

Scarborough plant for Wisconsin Electric

Construction has begun on a 53,500 sq. ft. plant for Wisconsin Electric Products Ltd., on Progress Drive.

Scarborough, it is announced by Finley W. McLachlan Ltd., general contractors.

The \$293,000 plant, designed by McLachlan for the production of motor control equipment, will also contain a conference room, display areas, offices and lunch room.

Advantages of proposed General Services Band

Considerable interest has been generated throughout the Canadian electronics industry in the new General Services Band recently announced by the Telecommunications and Electronics Branch of the Department of Transport. It is understood that provisional specifications covering equipment for this band will be released shortly. The DOT licensing policy will probably be announced during the coming summer with actual licensing to begin in October or November.

It is understood that there are to be no restrictions on the use of equipment approved by this band which is "a general service" band in the 27 mc. region. A license must, of course, be obtained. This will be a simple procedure, with the actual issuing being done by DOT District Regional offices. The licensee will, however, be required to record the make and type of type-approved equipment for which he seeks a license.



The Executive Committee of the 1961 IRE Canadian Electronics Conference: (sitting, left to right) F. A. Ford, Recording Secretary; F. J. Heath, General Chairman; A. P. H. Barclay, Past Canadian Region Director and representing Bertram R. Tupper, 1961 Region Director; and E. L. Palin, EIA Liaison; (standing, left to right) A. R. Low, Technical Program; T. M. Lynd, Finance; G. G. Armitage, Social Activities; Ross Willmot, Public Relations and Publicity; Grant Smedmor, Conference Manager; R. J. A. Turner, Toronto Section IRE (1959-60); E. Vanderpol, Conference Management. Absent: G. C. Eastwood, Exhibits; L. M. Price, Registration and Reception; T. W. Purdy, IRE Region 8 Liaison; L. C. Simmonds, Vice-Chairman; H. R. Smyth, Awards; and Stuart D. Browlee, EIA Representative.



(ACTUAL SIZE)

NEW "BOUNCE-FREE" SWITCH

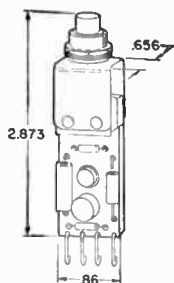
**Eliminates Contact
Bounce in High-Speed
Electronic
Applications**

A new compact switch device has been developed by MICRO SWITCH to eliminate the effects of contact bounce in applications which involve high speed electronic tubes that operate in less than a microsecond.

This new "Bounce-Free" Switch makes it possible for designers to save valuable engineering time otherwise required to develop special circuits to eliminate spurious voltage pulses caused by contact bounce. And, its compactness makes it possible to save valuable cabinet space in control consoles.

The new circuit may be actuated by any switch that has a normally open and normally closed position. It is an electronic switch triggered by a mechanical switch.

Write for Data Sheet 177 which describes the new "1PB2000." Honeywell Controls Limited, *Precision Components Division*, Toronto 17, Ontario.



Honeywell

M I C R O S W I T C H Precision Switches

OPERATING CHARACTERISTICS

There are four circuit types available. One produces a positive output to accommodate resistive loads of 100 to 500 ohms, another produces a positive output for resistive loads of 500 ohms or greater, and two produce

a negative output voltage at these loads. All circuit types have a voltage range of from 5 volts to 25 volts. The circuits are designed to produce an output voltage which has a maximum rise time of 1/2 microsecond.

For complete details check No. 29 on handy card, page 61

ARNOLD 6T CORES: PROTECTED AGAINST SHOCK, VIBRATION, MOISTURE, HEAT... AVAILABLE FROM STOCK

The hermetically-sealed aluminum casing method developed exclusively for Arnold 6T tape cores is packed full of advantages for you . . . *performance-improving and cost-saving advantages.*

It is compact: you can design for minimum space/weight requirements. It's extra-rigid to protect against strains. And it gives you maximum protection against environmental hazards. Arnold 6T tape cores are guaranteed against 1000-volt breakdown . . . guaranteed to meet military test specs for

resistance to shock and vibration . . . guaranteed also to meet military specs for operating temperatures. They require no additional insulation before winding, and can be vacuum-impregnated afterward.

And now a NEW Arnold service: immediate delivery on your prototype or production requirements for Deltamax 1, 2 and 4-mil Type 6T cores in the proposed EIA standard sizes (see AIEE Publication 430). A revolving stock of approximately 20,000 Deltamax cores in these sizes is ready for you

on warehouse shelves. Subject to prior sale, of course, they're available for shipment *the same day your order is received.*

Use Arnold 6T cores in *your* designs. Technical data is available; ask for Bulletin TC-101A and Supplement 2A (dated June '60). •Write *The Arnold Engineering Company, Main Office and Plant, Marengo, Ill.*

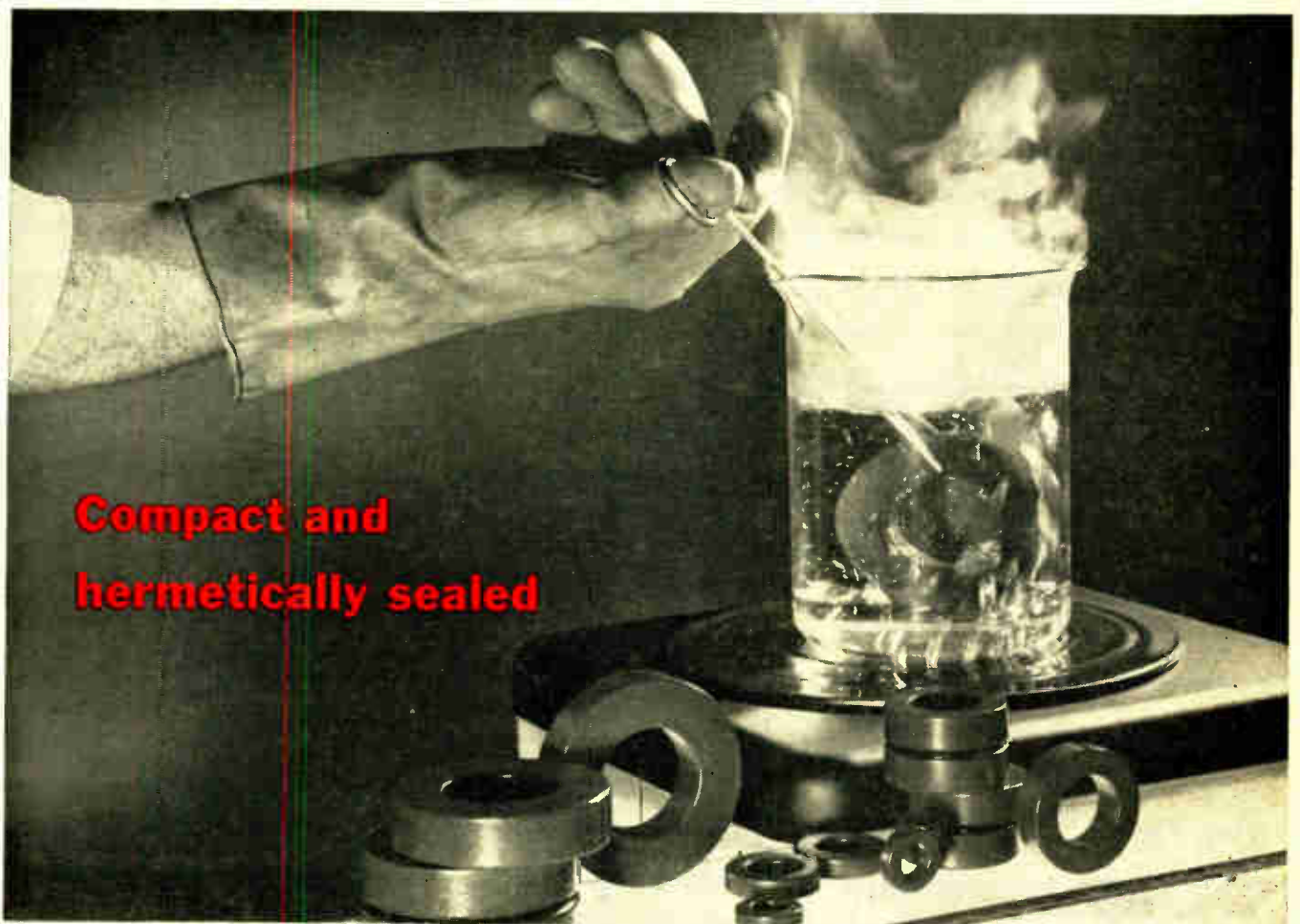
ADDRESS DEPT. EC-3



ARNOLD
SPECIALISTS In MAGNETIC MATERIALS

CANADIAN Representatives: Bayly Engineering Ltd., First St., Ajax, Ont. Telephone (Toronto Exchange): EMpire 2-3741

1936

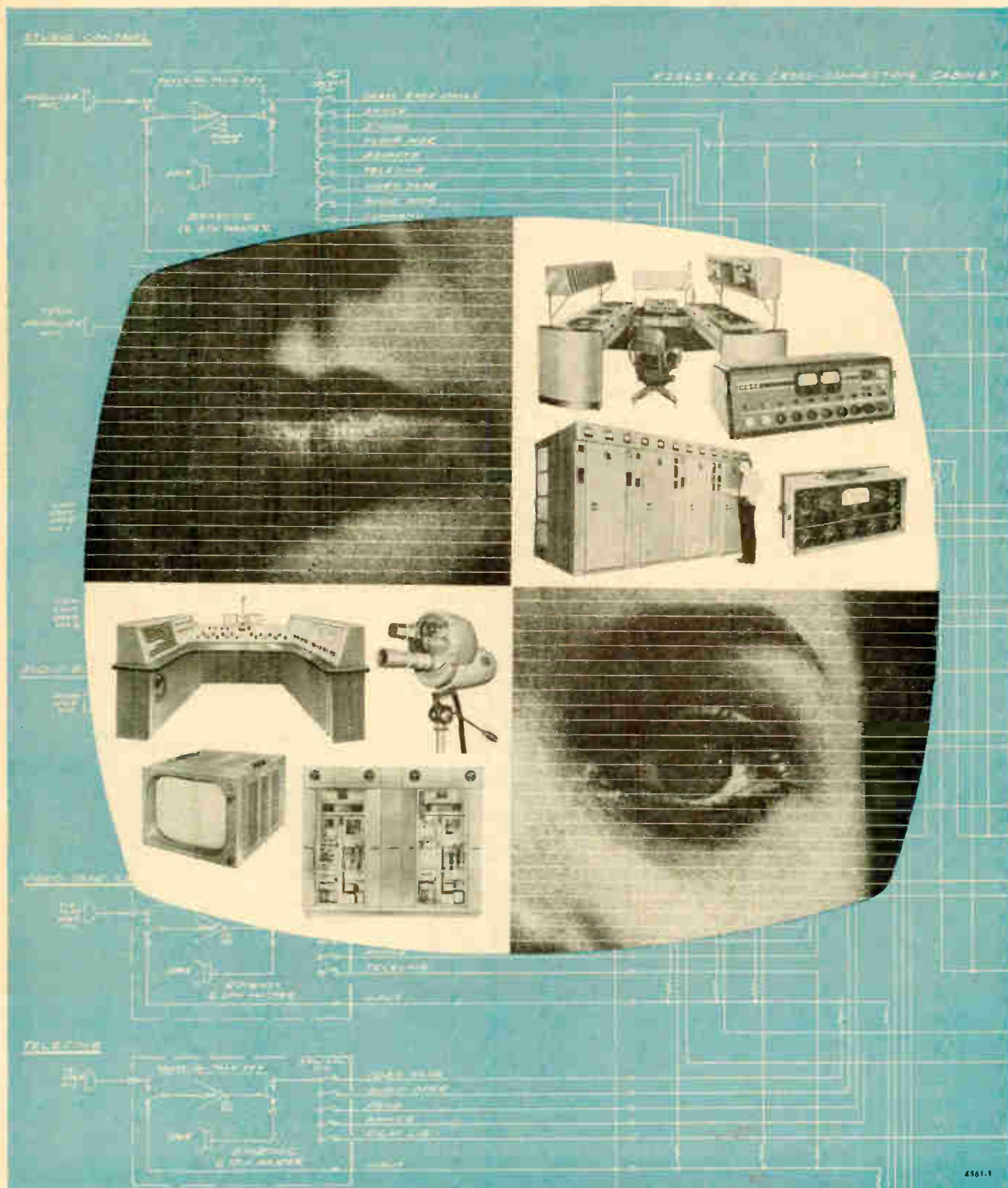


**Compact and
hermetically sealed**

For complete details check No. 3 on handy card, page 61

ELECTRONICS AND COMMUNICATIONS, March, 1961

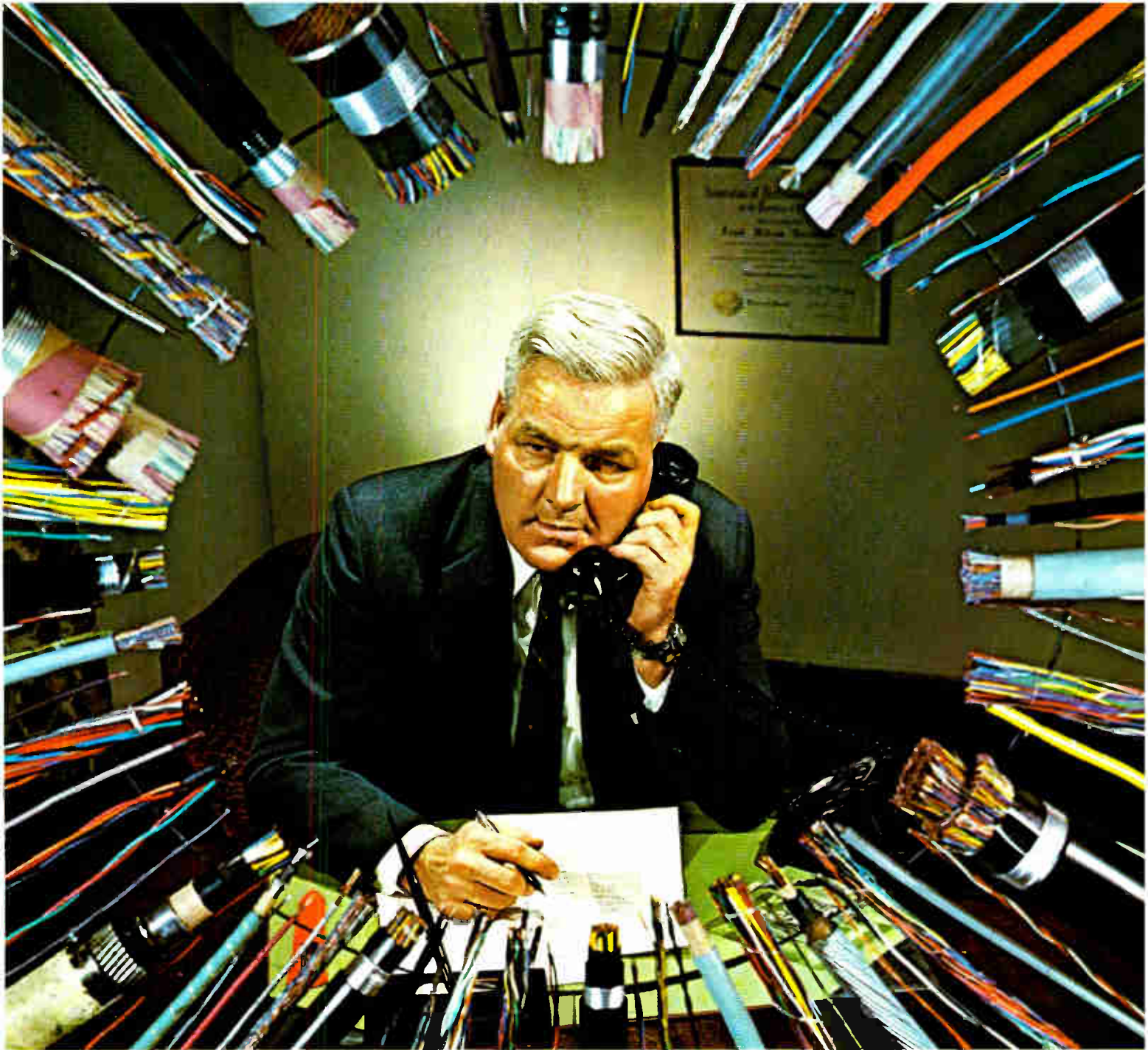
17



Serving Canada's Broadcast Industry
 ...with a diversified range of products that can be
 integrated by our engineers to satisfy the most
 exacting systems requirements. *Northern Electric*

COMPANY LIMITED

For complete details check No. 37 on handy card, page 61

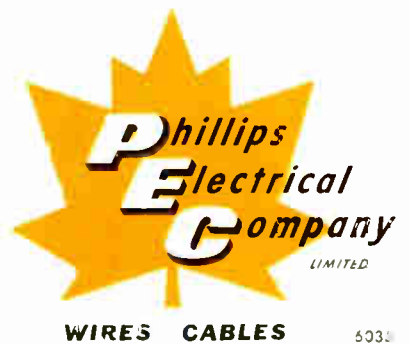


BEHIND THE MAGIC OF TOLL DIALING...

stands the existing network of specialized wires and cables that feeds the modern telephone system. The functioning of the entire complex depends upon the reliability of this wide range of conductors.

Almost as old as the communications industry it serves, Phillips has the experience, the manufacturing facilities and the advanced technical knowledge necessary to produce telephone wires and cables that are second to none!

Phillips Electrical Company Limited, Head Office—Brockville, Ontario. Branches—Halifax, Montreal, Ottawa, Toronto, Hamilton, Winnipeg, Edmonton, Vancouver. The Canadian affiliate of the BICC Group. Phillips Telephone Wires & Cables are also distributed in Canada by Automatic Electric Sales (Canada) Limited.



WIRES CABLES

5033

ALL CANADA OVERNIGHT

MILGRAY DELIVERS TEXAS INSTRUMENTS SEMICONDUCTORS TOMORROW!

Off-the-shelf delivery in quantities of 1 to 999 at factory prices. TI Semiconductors arrive faster from:

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 136 Liberty St., New York 6, N. Y.
 REctor 2-4400—TWX NY1—4013—
 FAX-FQF Zenith numbers in leading industrial areas.

For complete details check No. 34

C RTPB newsletter

Prepared by Canadian Radio Technical Planning Board

Report on stereo

The Sub-Committee on Stereophonic Standards has recommended that two-station stereophonic broadcasts be authorized, as an interim measure, to keep public interest in the medium alive and to permit broadcast station personnel to acquire experience in stereophonic broadcasting techniques.

The action is recommended in view of the difficulty being experienced in arriving at an early decision on recommended standards for FM multiplex stereo broadcasting in Canada. The complexity of the problems involved make it necessary for the Stereophonic Broadcast Sub-Committee to continue its study of stereo systems to try for conclusions on what systems or methods would be in the best interest for Canadian listeners.

The Sub-Committee told the Executive Committee that it would welcome an opportunity to examine properly engineered and controlled experiments for the purpose of acquiring useful data to be used in the formulation of stereo broadcasting standards. The Committee said that if such experiments were authorized care must be taken to see that program material would be chosen with due regard for minimum deterioration of monophonic listening on either channel.

The Executive Committee have accepted the recommendations and have asked the Department of Transport to consider them.

Combine scatter committees

A new Radio Relay Committee, combining the former Microwave and Tropospheric Scatter Committees, has been formed. The Chairman is J. H. Fletcher of RCA Victor Company, Montreal, who headed the Tropospheric Scatter Committee before the reorganization.

The Committee will meet soon to tackle a new agenda and to discuss the work of a sub-committee or task force to investigate base band parameters.

Frequency allocation chart revision

The Standards and Allocation Committee will be meeting in Toronto late in March to examine a revision of the Planning Board's frequency allocations chart. The present chart has been in circulation since 1954.

Among other important subjects which this committee will examine are the use of the UHF TV band for other services, suggestions for other uses in the FM band 88-100 mc/s, and space frequency allocation.

Speaking on the subject of space frequency allocations the General Technical Co-ordinator, Ralph A. Hackbusch, stated that the whole question of frequency allocation and spectrum conservation should be studied with a view to determining future industrial and commercial needs for channel space.

He said that such a study should bring out firm recommendations respecting the possible number of channels required for each service such as land-mobile, maritime-mobile, and point-to-point.

Mr. Hackbusch also pointed out that another very important part of the study should be concerned with space and satellite communications problems which will have to be met during the next five to ten years.

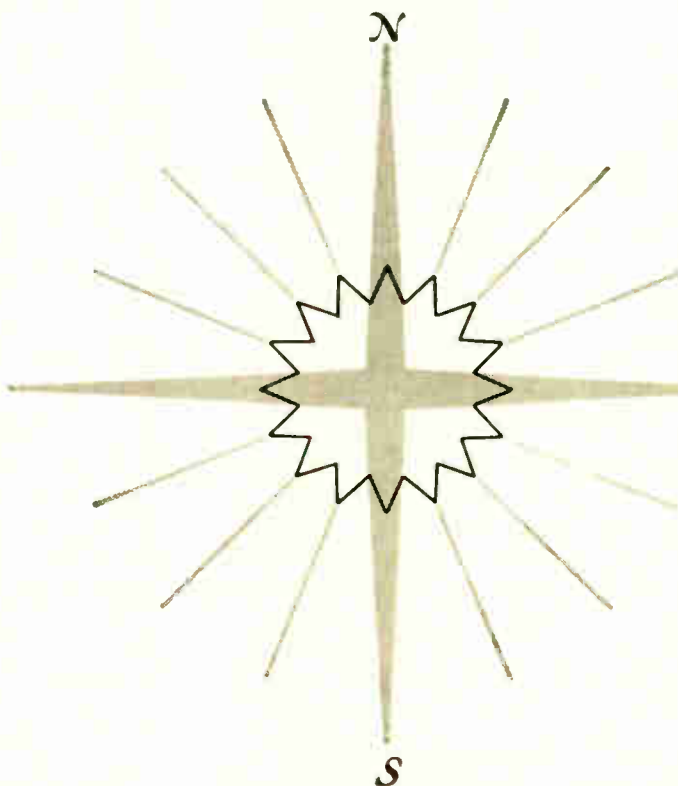
Weather radar for major cities

The Department of Transport has announced that short range weather forecasts for Canada's metropolitan areas will soon be possible.

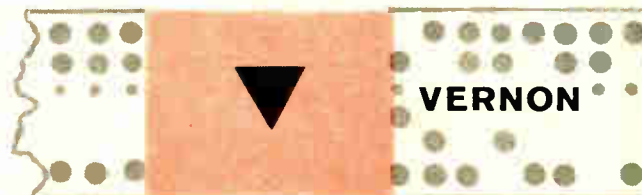
Five weather surveillance radar units are to be installed at Halifax in 1962 and at Winnipeg, Edmonton and Toronto in 1963. The fifth radar is to be used for research under the precipitation physics project, a study of the cause and effect of precipitation conducted in conjunction with various government and private agencies.

Meanwhile, the department is converting smaller radar sets to be used at London, Ottawa and Quebec as gap fillers between the larger units.

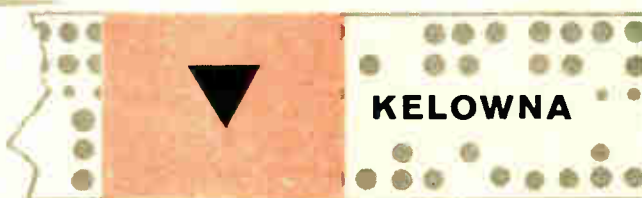
Radar is the only means of obtaining the detailed information required for accurate short-period forecasts for a specific area. Such forecasts are of particular value to aviation and shipping and to densely populated areas where sudden bad weather affects transportation and industry.



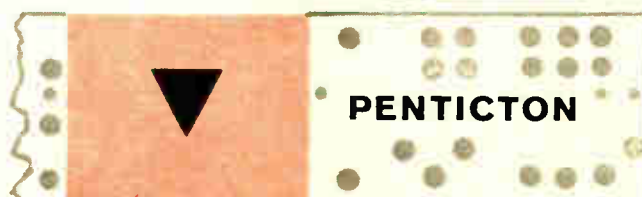
STROWGER



AUTOMATIC



TOLL TICKETING



Okanagan Telephone Company extends SATT services to three more communities

In May, 1960 AUTOMATIC ELECTRIC completed the first installation of Strowger Automatic Toll Ticketing in Canada at Penticton, B.C. Already, the Okanagan Telephone Company has expressed their pleasure with the installation, and underlined their favourable comments with installations in three more communities. These are Kelowna, Vernon and Salmon Arm. The equipment for the installations was made in Canada by AUTOMATIC ELECTRIC.

Savings in traffic expense and increased customer satisfaction are two reasons that make SATT popular. And SATT is compatible with all other switching

equipment in Canada and the U.S. Add to these advantages the fact that the efficiency and convenience of automatic toll ticketing and direct distance dialing will bring you increased revenues, and you can see why SATT is a wise choice for *your* DDD application.

SATT not only meets *all* the needs of today—but is designed for economical adaptation to *all* the needs of tomorrow. If you would like full information call or write Automatic Electric Sales (Canada) Limited, 185 Bartley Drive, Toronto, Ontario. Branches across Canada.

AUTOMATIC ELECTRIC

Subsidiary of

GENERAL TELEPHONE & ELECTRONICS



industry personnel



R. N. Fournier



J. McKerrow



C. A. Pipe



J. D. Campbell



G. Landstrom



J. R. Houghton

Houghton appointed to new post

J. R. Houghton, was recently appointed vice-president and general manager of the telephone contract division of Northern Electric Company Limited.

A graduate of McGill University in mechanical engineering, Mr. Houghton joined the company in 1935. He was appointed engineer of manufacture in 1956 and manager of the company's London Works in 1959.

Union Carbide director elected

Allen T. Lambert has been elected to the board of directors of Union Carbide Canada Limited according to an announcement made by A. A. Comming, company president.

Mr. Lambert is president of the Toronto-Dominion Bank and a director of a number of Canadian companies. He is a governor of York University and is actively interested in welfare and community organizations.

District sales engineer appt'd

Mark J. Weber has been appointed district sales engineer of Electronic Research & Development Company, and will manage the company's newly opened office at 381 Tillbury Avenue, Ottawa.

During the past four years Mr. Weber held a similar position in the company's Edmonton office. From his new post he will be responsible for marketing Erd-DuMont products in Ontario and Quebec.

General Instrument expands mfg. and sales organization

It was recently announced by John McK. McLean, vice-president and general manager of General Instrument Limited, that the semiconductor facility, established by General Instrument in Waterloo last year, is already being expanded to meet the needs of Canadian industry, and in addition, several high voltage silicon rectifiers and packaged units have been developed and are now in production at Waterloo.

At the same time, John McKerrow, manager of the Semiconductor Division, announced a major expansion in the sales organization with the appointment of Sol R. Mester, P.Eng., as sales manager for semiconductor and thermoelectric products, covering Montreal, Ottawa, and eastern Canada, and Cliff A. Pipe as semiconductor sales representative for Ontario.

The distributor sales organization has also been further expanded by the appointment of Wholesale Electronics Limited in Toronto, Wackid Radio Television Laboratories Ltd. in Ottawa, and Payette Radio Limited in Montreal.

Appointed to newly created post

The appointment of a Canadian engineer, W. J. Cheesman of Hamilton, to a newly created post as head of Canadian operations of International Telephone and Telegraph Corporation was announced recently from the system's New York headquarters by Dr. Louis T. Rader, ITT vice-president U.S. Group-Commercial.

As general manager, with headquarters in Montreal, Mr. Cheesman will direct operations of three Canadian companies; ITT Electronics Service Company of Canada Ltd., Royal Electric Company (Quebec) Ltd., and Standard Telephones and Cables Mfg. (Canada) Ltd.

Hamilton man named Canadian Westinghouse President

The election of John D. Campbell as president of the Canadian Westinghouse Company Limited was announced by the firm's board of directors. The 51-year-old Hamiltonian succeeds George L. Wilcox, who has been elected vice-president and assistant to the president of Westinghouse Electric Corporation, Pittsburgh.

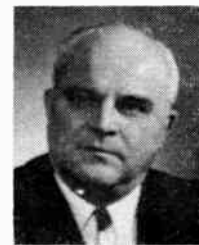
Mr. Campbell is a past president of the Electronic Industries Association and is a member of the board of governors of McMaster University, Hamilton.

Whittaker opened central Ontario office

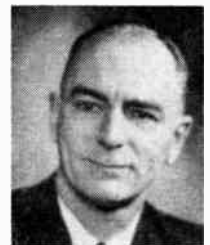
Whittaker Electronics Ltd. have opened a central Ontario office at 2 Neapolitan Drive, Scarborough, Ont. Al Ingram has been appointed central Ontario manager. Stocks will be maintained at the new office on the following items: Spectrol precision potentiometers, trimmers, and dials; Gudebrod lacing tapes and dial cords; Dressen-Barnes modular and laboratory power supplies; International Instruments subminiature and side indicating meters and control meters.

Hall assigned to project group

J. Murray Hall has joined the Engineering department of Lenkurt Electric Co., Inc., as an electrical engineer assigned to the firm's new Microwave Products project group. He is specializing in system and intermediate frequency amplifier design.



O. W. Rodomar



J. F. Hooper

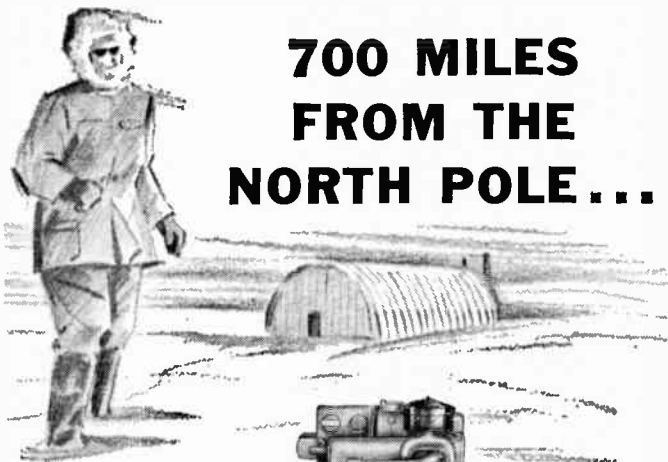


S. Mester

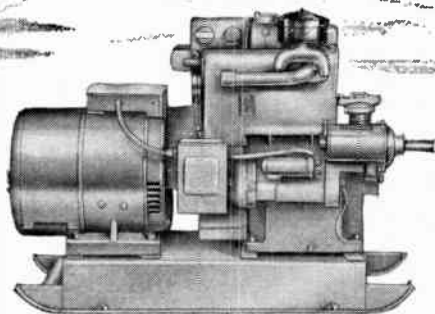


M. J. Weber

Continued on page 65



700 MILES FROM THE NORTH POLE...



Six Lister Air Cooled Diesels are providing "Happy Satisfaction"

Our polar continental shelf is being surveyed. Six Lister air cooled SL2 Diesel engines are helping out. They were selected because of quick starting in cold weather, lightness, simplicity of construction, and rugged reliability.

These Lister engines are in daily use—supplying power for electronic surveying devices and for the domestic needs of the men.

Here is an excerpt from a letter written by Mr. P. M. Gibbard, Decca Navigation Division of Computing Devices of Canada:

"Fuel consumption is quite encouraging. At the moment, we have only approximate averages based on 24 hour periods; at an average of 3.8 kW load per engine, our average fuel consumption is .42 of a gallon (Imperial) per hour."

Get On Top of the World—with the toughness, stamina and thrift of Lister-Blackstone Diesel Engines!

CANADIAN LISTER-BLACKSTONE LIMITED

1921 Eglinton Ave. E., Scarborough, Toronto 13, Ontario
25 St. James St., Ville St. Pierre, Montreal, P.Q.
3135 West Broadway, Vancouver, B.C.

In the U.S.: Lister-Blackstone Inc., 42-32 21st Street, Long Island City 1, N.Y.

For complete details check No. 12 on handy card, page 61
ELECTRONICS AND COMMUNICATIONS, March, 1961

For engineers . . . experimenters
. . . service men . . .

TEST EQUIPMENT by **HEATHKIT!**[®]



ISOLATION TRANSFORMER KIT (IP-10)

Model IP-10 \$76.95

The IP-10 presents a significant improvement in isolation transformers. Provides output voltage from 90-130v in .75v steps at 300 watts continuous duty, 500 watts intermittent duty, with 117v input — ample power for color TV servicing. Built-in meter continuously monitors output voltage with 1 volt accuracy (linear scale is electronically expanded to cover 90-140v). Power line input voltage can also be measured by operating spring-return slide switch on front panel. Fused primary.



VARIABLE-VOLTAGE REGULATED POWER SUPPLY KIT (PS-4)

Model PS-4 \$79.95

Ideal for experimenters and engineers in electronic design work. Supplies regulated B+ voltage variable from 0-400 VDC at 0-100 ma. 125 ma. max., bias voltage variable from 0 to -100 VDC at 1 ma. unregulated and 6.3 VAC at 4 amps. for filament voltage. 16 lbs.

For a free catalogue listing more than
200 high performance HEATHKIT products, write

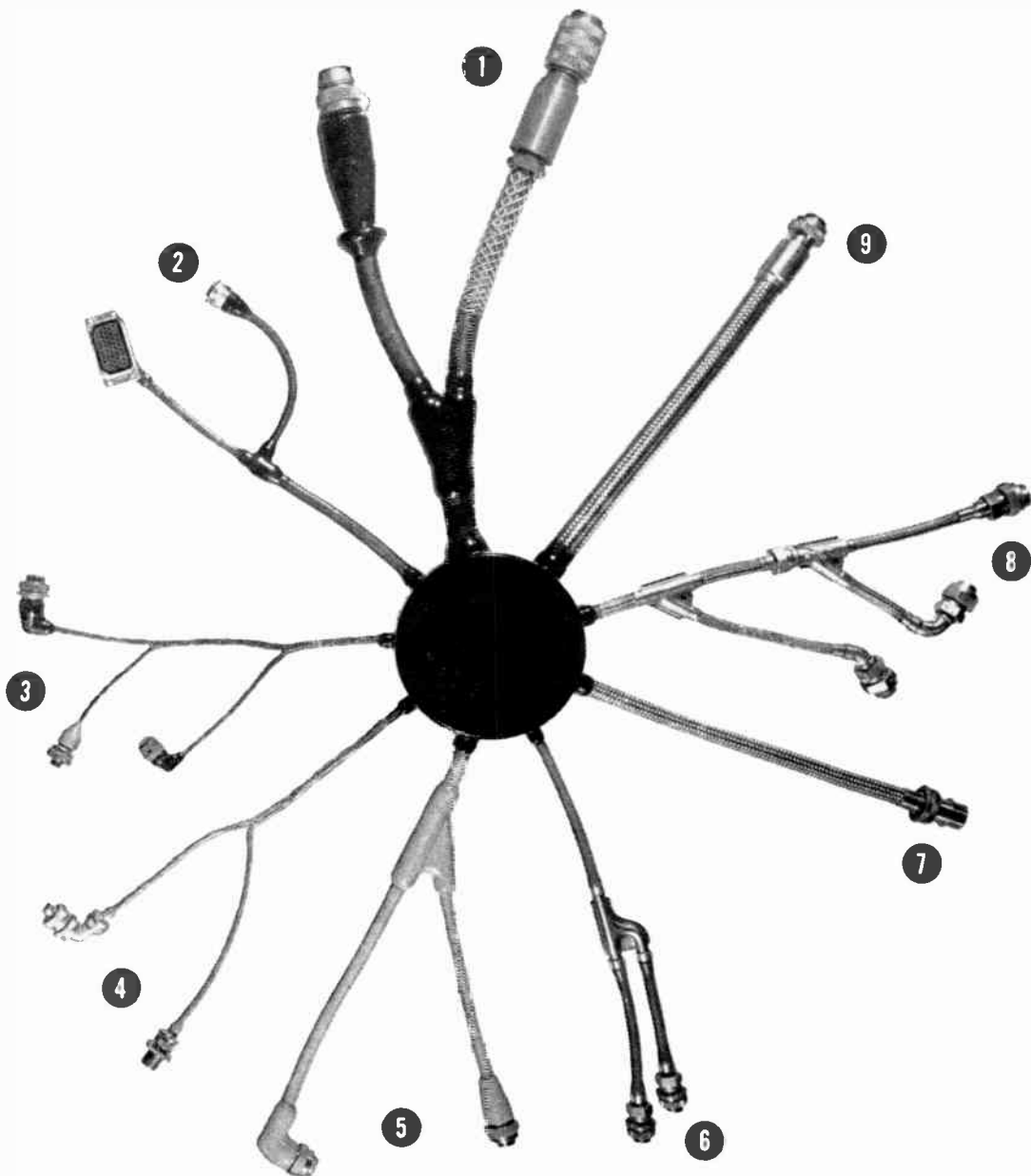
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6117

For complete details check No. 18 on handy card, page 61

23



TYPICAL BENDIX® SPECIAL-PURPOSE CABLES THAT SOLVE CRITICAL ENVIRONMENTAL PROBLEMS

- 1 Heavy Duty—Ground Support Cable
- 2 Benseal® Missile Control Cable
- 3 Fabric Braided—Aircraft and Missile Control Cable
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- 5 High Temperature—Radiation Resistant Cable
- 6 High Temperature—Lightweight—Missile Cable
- 7 "Wet Wing" Aircraft Fuel Cell Cable
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Bendix cables—products of over a quarter-century of design and manufacturing experience—are proving their complete reliability in a countless variety of applications involving critical environmental conditions.

BENDIX CABLES • BENDIX CONNECTORS

Designed together to work best together

For complete information, write:

Scintilla Division
SIDNEY, NEW YORK



For complete details check No. 11 on handy card, page 61

NEW FROM PHILCO

HIGH FREQUENCY NPN SILICON DIFFUSED-BASE TRANSISTORS

**30mc
PULSE RATE
SWITCHES**

Type Number	hfe	Typical Power Gain	Typical Switching Times (Saturated Test Circuits)
2N1199	12-60(DC)		tr 35 m μ sec ts 10 m μ sec tf 25 m μ sec
2N1267	6-18	25 db at 4.3 mc	
2N1268	11-36		
2N1269	28-90	25 db at 12.5 mc	
2N1270	6-18		
2N1271	11-36		
2N1272	28-90		

Maximum Vcb—20 V
Maximum temperature—150° C
Maximum dissipation—100 MW

**60mc
AMPLIFIERS**

2N1199

This high speed switch has exceptionally low saturation voltage (typically 0.125 V), permitting *practical* design of 5 mc pulse circuits, using conventional saturated switching configurations. 30 mc pulse rates are obtainable in *practical* circuits using non-saturating techniques.

2N1267-68-69

The high gain characteristics of these units make possible the design of high efficiency IF amplifier circuits for communications equipment. These devices have unusually low collector capacitance . . . typically 1.5 μ f . . . and are available with restricted beta ranges to simplify design problems.

*SADT . . . Trademark Philco Corp. for Surface Alloy Diffused-base Transistor

2N1270-71-72

The excellent high frequency response of these transistors makes practical the design of high performance communications systems at frequencies up to 60 mc. They have the same low collector capacitance and are available with restricted beta ranges.

Philco Corporation of Canada,
Don Mills, Ontario

Please send complete information on the SADT type transistors and descriptive brochure of all type transistors available.

NAME _____

ADDRESS _____

61-3-EC



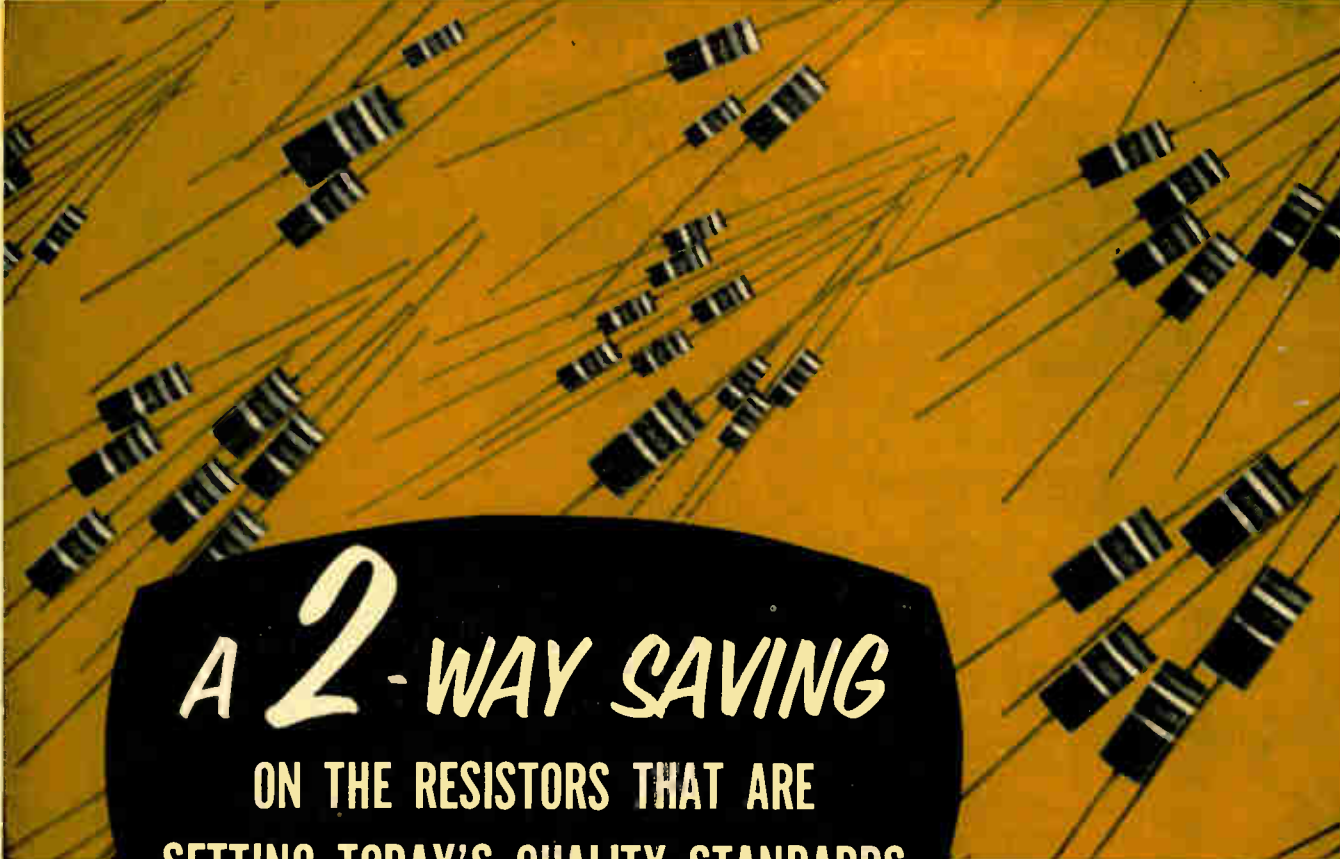
PHILCO government and
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PHILCO CORPORATION OF CANADA LIMITED, DON MILLS, ONTARIO

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For complete details check No. 40 on handy card, page 61

ELECTRONICS AND COMMUNICATIONS, March, 1961



A 2-WAY SAVING
ON THE RESISTORS THAT ARE
SETTING TODAY'S QUALITY STANDARDS

1. Now you can get resistors for today's most critical military requirements . . . direct from a Canadian Manufacturer . . . at favourable Canadian prices. They're Coldite 70+ Fixed Composition Resistors designed to exceed MIL-R-11 requirements and made by an exclusive cold moulding process that assures unmatched load life, moisture resistance, and other important performance characteristics.

2. No other resistors can match Coldite 70+ for production line efficiency — because their exclusive solder-coated leads makes them far and away the easiest

resistors to solder by any method. This saves your company money on their use.

Coldite 70+ Resistors are the latest development of a firm which, since the early days of radio, has been one of the largest, most dependable resistor suppliers. Laid end to end, the resistors Stackpole has produced would extend around the world so many times you'd get dizzy counting them!

Coldite 70+ Resistors are now made in Toronto by Canadian Stackpole Limited in the complete range of 5%, 10% and 20% "preferred" values in ½-, 1-, and 2-watt styles.

CANADIAN STACKPOLE LIMITED
550 Evans Avenue — Toronto 14, Ontario
Telephone: CLifford 5-2373



For complete details check No. 15 on handy card, page 61

STARKIT



MODEL 999
Dynamic Plate-Conductance Tube Tester. Versatile, Portable, Tests All Modern Tubes, Tests Shorts, Leakage and Quality. Special Self-Cleaning Lever Switches.
Kit \$69.95
Wired \$95.95



MODEL MK-3
Multi-Range Multimeter. 20,000 Ohms/Volt, Molded Case, Unbreakable Meter Front.
Wired \$29.95



MODEL SMG-37
Sweep Marker Generator. Continuous coverage from 2 to 260 MC. Complete with 4.5 MC crystal. Calibrated to 1% accuracy. Vernier dials.
Wired \$139.95

HIGH in accuracy
HIGH in quality

LOW ONLY IN PRICE



MODEL VMK-2
Vacuum Tube Voltmeter. 6" Full View Meter, Input Impedance 10.5 Megacycles. Proven Printed Circuit.
Kit \$44.95
Wired \$59.70



MODEL OSK-1
5" Oscilloscope Kit. 5" C.R.T., Push-Pull Horizontal and Vertical Amplifiers.
Kit \$59.95
Wired \$99.50



MODEL MHG-48
Marker Generator
Wired \$87.95



MODEL SWG-58
Sweep Generator
Wired \$97.95



MODEL TM-7
Pocket Multimeter
Wired \$29.95



MODEL 1001
Multi-Range VOM
Kit \$39.50
Wired \$49.95



MODEL VMK-1
Vacuum Tube Voltmeter
Kit \$39.20
Wired \$53.95



MODEL MK-2
VOM Pocket Meter
Wired \$14.95



MODEL MT-6D
Pocket Meter
Wired \$24.95



MODEL MK-1
Multi-Range Multimeter
Kit \$39.50
Wired \$47.50



MODEL PD-3
Pocket Meter
Wired \$13.95



MODEL RFG-3
Signal Generator
Kit \$29.95
Wired \$39.95



MODEL RFG-2
Signal Generator
Kit \$54.95
Wired \$67.85



MODEL LSG-10
Signal Generator
Wired \$39.95



MODEL BJ-1
Condenser Analyzer
Wired \$34.95



MODEL 5A-3
AC Radio Kit
Kit \$26.75



MODEL 5B-2
AC-DC Radio
\$19.95 Less Cabinet



MODEL KE-5
Audio Level Indicator
Wired \$6.95

MODEL KED
Stereo Level Indicator
Wired \$12.95

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STARK ELECTRONIC INSTRUMENTS LIMITED
AJAX, ONT.

The place of the particle accelerator in basic research

Notes on the application of particle accelerators in biological investigations

Released to Electronics and Communications for exclusive Canadian publication by High Voltage Engineering Corporation, Burlington, Massachusetts.

High-energy charged particles are of great value in the study of biological matter. The effects of ionizing radiation can provide information that is invaluable in the development of models to describe the structure and organization of living matter.

Energy-transfer mechanism

The basic mechanisms by which incident energy is transferred to the target material are of importance. These mechanisms include the "direct effect", which can be described by the target theory of Lea and others, and the "indirect effect" where the energy is absorbed by the solvent and subsequently transferred by radiation-produced intermediates to the solute. Both of these effects take place within the living cell, as shown by irradiation in the wet and dry states. A knowledge of the kinetics of the indirect effect can be important to consideration of the biological effects of ionizing radiation.

Effect of light and heavy particles

The physical structure of microorganisms such as bacteria and viruses has been studied extensively with ionizing radiation. Light particles, such as electrons or x-rays, are easily scattered in matter and may strike the organism from any direction. Analysis of the inactivation from this type of radiation can give a radio-sensitive volume.

Heavy particles, on the other hand, are not easily scattered and travel

in straight lines until they are stopped. Analysis of the inactivation data will give a radio-sensitive cross-section for the organism. From data of this type it has been possible to formulate models that agree with structures developed by other experimental methods.

Effects on man

In addition to fundamental studies on biological materials, there is a great need for better understanding of the effects of ionizing radiation on man. Extensive studies under way on

fulfillment of the ultimate promise of the atomic age.

Necessary equipment

The radiation equipment necessary to gain this knowledge depends on the major field of interest. The equipment should be variable in energy, should produce all of the particles which are of interest, and should have sufficiently high outputs to produce data in a reasonable period of time. The Van de Graaff® is such a tool. The energies and types of particles it can provide are shown in the table

Characteristics of particles obtainable from Van de Graaff accelerators

	electron	x-ray	proton	deuteron	neutron
Mev	μa	r/min—100cm	μa	μa	n/sec.
1	250	20	50	50	2 X 10 ¹⁰
2	250	75	50	50	10 ¹¹
3	1000	1200	200	200	1.2 X 10 ¹²
Typical particle trajectory in target material					

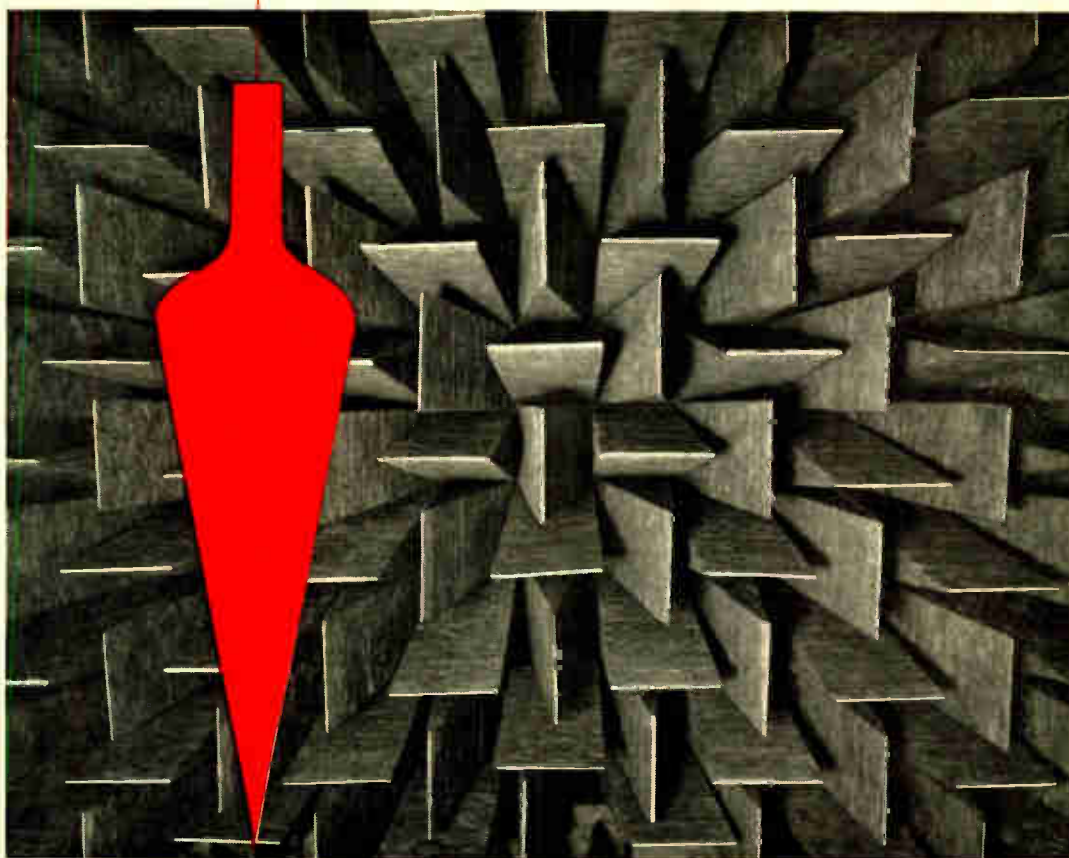
the effects of radiation on animals are providing data that, extrapolated to man, will help greatly in our current problem of providing protection for persons working in radiation environments such as radiation clinics, reactor facilities, and research laboratories. Knowledge of the tolerance dose and the relative biological effects of all the types of ionizing radiation is essential for our safety and for the

above, with diagrams of their typical modes of energy transfer in matter. The particle energy can be varied from the maximum shown to approximately one tenth of this value. The current is continuously variable from a remote control station. Installation is relatively simple, and the ease of operation and flexibility make it an ideal source of ionizing radiation for biological research.

IN SOUND, TO PLUMB NEW DEPTHS

Northern Electric Research and Development Laboratories built a floating anechoic chamber. Although the appearance of this room is weird, its purpose is perfection; for here, there are no echoes, reflections or vibrations to distort the accuracy measurements of sound waves. ■ Wedges of Fiberglas, five feet long, project towards the middle of the room from all six surfaces, so that the equipment under test is completely surrounded by a mass of sound absorbent material. ■ This anechoic chamber is being used to test microphones, speakers, telephone transmitters and receivers, intercom systems and other communications equipment. ■ The chamber is an important new asset, but it represents just a fraction of the total facilities and personnel dedicated to the quest for progress in communications at the Research and Development Laboratories of Northern Electric Company Limited.

■ RESEARCH AND DEVELOPMENT LABORATORIES



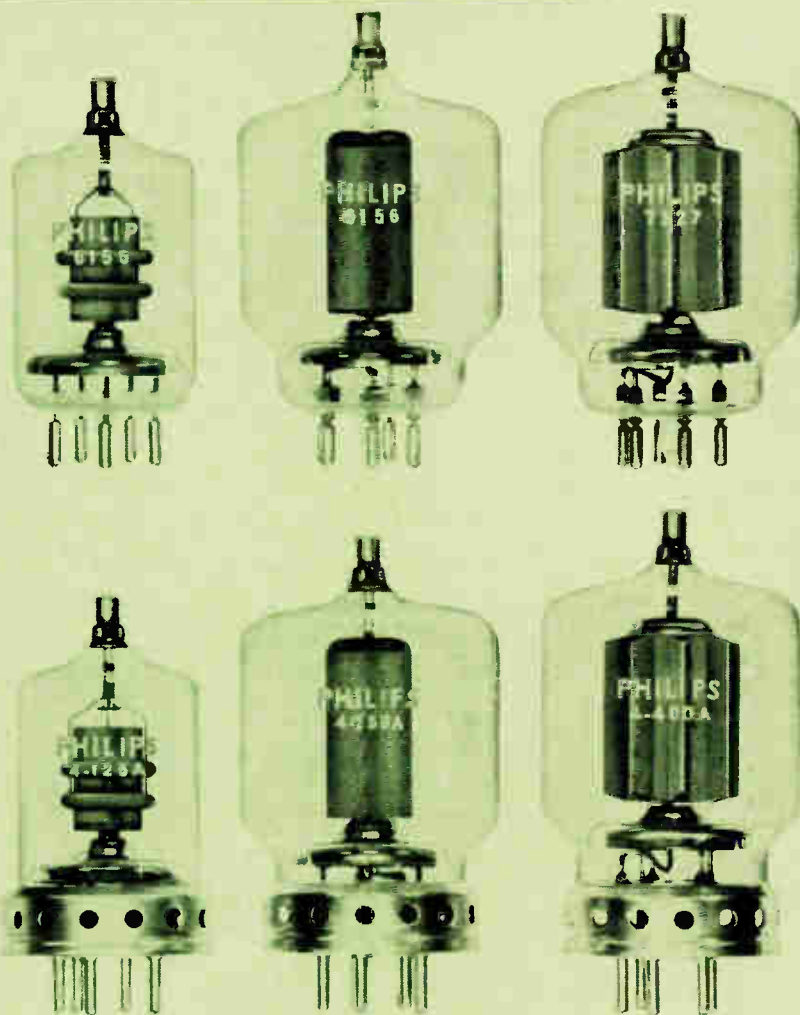
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PHILIPS

REFERENCE BULLETIN NO. 7



Philips tetrodes in six designs for original equipment or improved plug-in replacements

Here are 6 tetrodes from Philips that combine optimum performance and maximum reliability with an unrivalled latitude of selection. Available with powdered glass or standard metal base, these tubes feature massive zirconium treated graphite anodes to handle large, temporary overloads. The ruggedized sintered glass bases provide lower lead inductance, excellent heat dissipation characteristics and dimensional compactness. The standard metal bases insure a complete range of replacement types from which to choose.

Powdered Glass Base Types	Metal Base Types	Max. Diss. Watts
6155	4-125A	125
6156	4-250A	250
7527	4-400A	400

PHILIPS

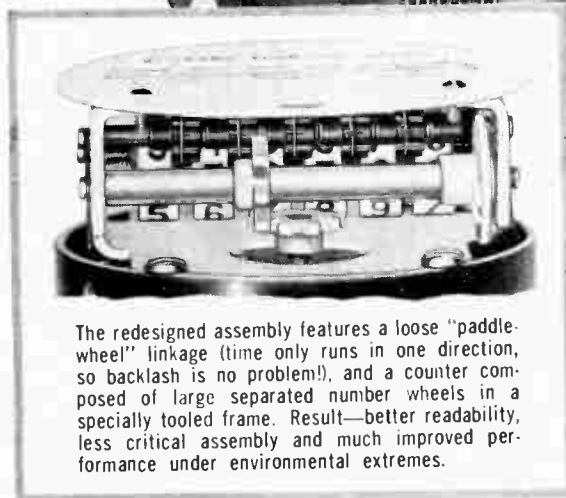
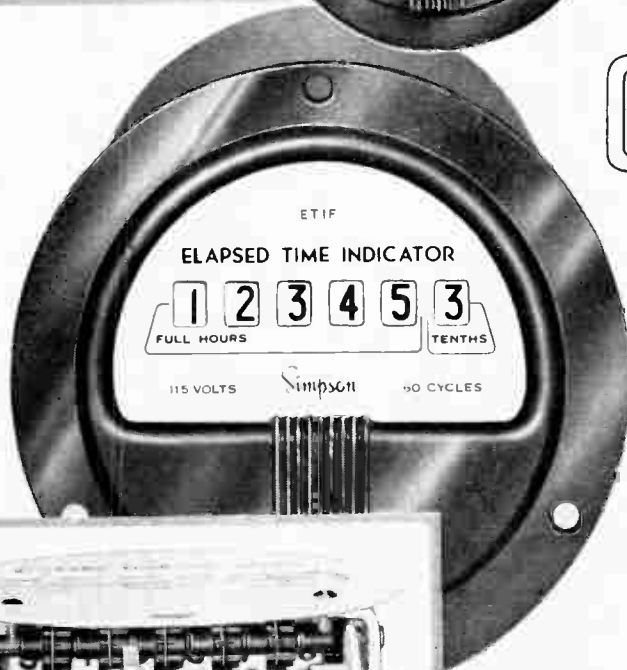


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The original version was a close tolerance assembly utilizing a small standard commercial counter, linked to the motor by a conventional bevel gear.



The redesigned assembly features a loose "paddle-wheel" linkage (time only runs in one direction, so backlash is no problem!), and a counter composed of large separated number wheels in a specially tooled frame. Result—better readability, less critical assembly and much improved performance under environmental extremes.

how does a GOOD product become BETTER ?

Well, we haven't any magic formula. But witness the case of our Elapsed Time Indicator, an example of Bach-Simpson's continuing effort in the field of product improvement.

Our original models, using conventional gears and counters designed for a variety of applications, found wide acceptance. However, increasingly rigorous operating conditions and the desirability of an easier readout dictated a shift to components especially designed for the job.

Ingenious design — rigorous testing — tooling — and precision production all under one roof have resulted in a substantially improved product, directly interchangeable with older models, at no increase in cost.

**New type available in standard Bach-Simpson styles, in 3" and 4" sizes. Ask for Model ETIF.*



"DESIGN AND ENGINEERING" A trained Engineering Staff brings a wide variety of experience to bear on electrical, electronic and mechanical problems.



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"TOOLING AND PRECISION ASSEMBLY" An outside toolroom and comprehensive production facilities permit design flexibility and closely controlled in-plant production of nearly all components.



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Dual-Beam Versatility

With the Types 551 and 555 Oscilloscopes (and Tektronix dual-trace plug-ins in both channels), you can display four different waveforms at once. You can select from 24 calibrated sweep rates—run all four traces at the same speed on the Type 551, or run each pair of traces at different speeds (or the same if desired) on the Type 555.

In addition, with the Type 555 you can control either or both beams with either time-base generator. Both are designed as plug-in units for easier maintenance. Or, you can operate one time-base unit as a delay generator, hold off the start of any sweep generated by the other for a precise interval—from one-half microsecond to 50 seconds. And you can select from two modes of sweep-delay: either Conventional—when the delayed sweep is started at the end of the delay period by the delayed trigger, or Triggered—when the delayed sweep is started after the delay period by the signal under observation.

Although excelling in waveform-comparison analyses, the Type 550-Series Oscilloscopes are extremely adaptable to many other laboratory applications. Operating in conjunction with any combination of 16 "letter-series" plug-in units, the two dual-beam oscilloscopes offer unique signal-handling versatility with simple, reliable performance.



Type 555

DUAL-BEAM OSCILLOSCOPE

Independent X and Y Deflection
Vertical response—DC-to-30 MC,
12-nanosecond risetime
with Types K, L, R, S, Plug-Ins

Type 555 Sweep Delay

Among many specialized applications, the delayed-sweep enables you to make precise incremental measurements along a complex waveform and to obtain high magnification of a selected portion of an undelayed sweep—with jitter-free magnifications up to 10,000 times.

Type 555 (without preamplifiers) ... \$2600
Includes Indicator Unit, Power Unit,
2 Time-Base Units, 4 Probes, Time-Base
Extension, 7 other accessories.

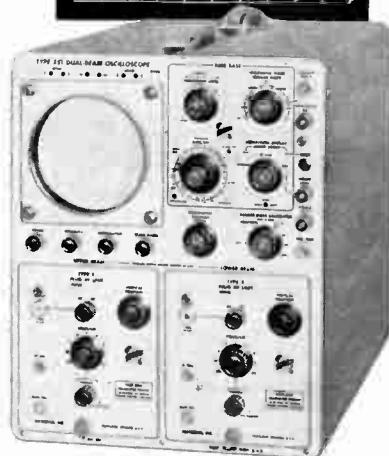
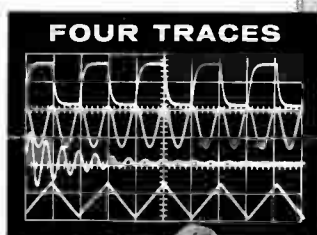
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Call your Tektronix Field Engineer for a demonstration of the Type 555 or Type 551 Oscilloscope in your own dual-beam (or single-beam) applications.

Tektronix, Inc.

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TWX—BEAV 311 • Cable: TEKTRONIX
Phone Mitchell 4-0161

CANADIAN FIELD OFFICE: Willowdale, Ontario
3 Finch Ave East • Phone: Toronto, Baldwin 5-1138



Type 551

DUAL-BEAM OSCILLOSCOPE

Common X—Independent Y Deflection
Vertical response—DC-to-25 MC,
14-nanosecond risetime
with Types K, L, R, S, Plug-Ins

Type 551 (without preamplifiers) \$1800
Includes Indicator Unit, Power Supply,
4 Probes, 7 other accessories.

Characteristics Common to Both Oscilloscopes

Adaptable Vertical System—accepts interchangeable plug-in preamplifiers.

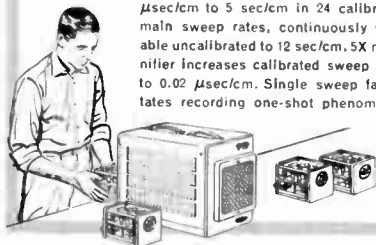
Versatile Sweep Features—wide range from 0.1 μ sec/cm to 5 sec/cm in 24 calibrated main sweep rates, continuously variable uncalibrated to 12 sec/cm, 5X magnifier increases calibrated sweep time to 0.02 μ sec/cm. Single sweep facilitates recording one-shot phenomena.

Complete Triggering Facilities—amplitude-level (manual) selection or fully automatic control.

High Writing Rate—10-KV accelerating potential provides bright traces at low repetition rates, 4 by 10 centimeter display for each beam, with 2 centimeter overlap.

Precise Amplitude Calibrator—with 18 square-wave voltages (from 0.2 mv to 100 v peak-to-peak) available at the front panel.

Separate Power Supply—electronically regulated.

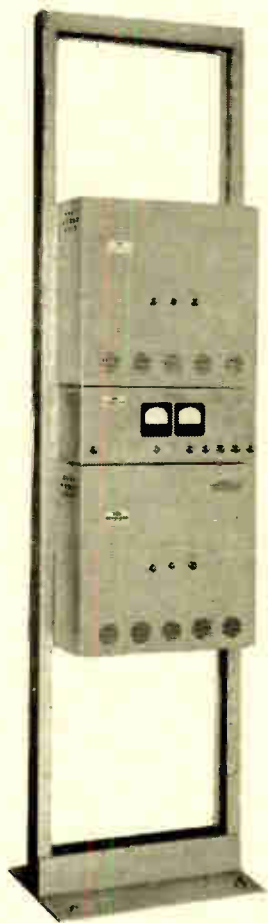


TEKTRONIX FIELD OFFICES: Albuquerque, N. Mex. • Atlanta, Ga. • Baltimore (Towson, Md.) • Boston (Lexington, Mass.) • Buffalo, N.Y. • Chicago (Park Ridge, Ill.) • Cleveland, Ohio • Dallas, Texas • Dayton, Ohio • Denver, Colo. • Detroit (Lathrup Village, Mich.) • Endicott (Endwell, N.Y.) • Greensboro, N.C. • Houston, Texas • Indianapolis, Ind. • Kansas City (Mission, Kan.) • Los Angeles Area (East Los Angeles, Calif.) • Phoenix, Ariz. • Philadelphia, Pa. • Pittsburgh, Pa. • San Diego, Calif. • San Francisco (Palo Alto, Calif.) • St. Petersburg, Fla. • Syracuse, N.Y. • Toronto (Willowdale, Ont.), Canada • Washington, D.C. (Annandale, Va.)

TEKTRONIX ENGINEERING REPRESENTATIVES: Hawthorne Electronics, Portland, Oregon • Seattle, Washington. Tektronix is represented in twenty overseas countries by qualified engineering organizations. In Europe please write Tektronix Inc., Victoria Ave., St. Sampsons, Guernsey C.I., for the address of the Tektronix Representative in your country.

For complete details check No. 51 on handy card, page 61

Roses are red . . .



. . . Violets are blue.

Why add a battery,
When a PYLON will do?

Write for further details to:



PYLON ELECTRONIC DEVELOPMENT company, Ltd.

Communications Systems and Equipment

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ELECTRONICS AND COMMUNICATIONS. March, 1961



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Wherever Hunt Etchants are used production rates jump.
HUNT R. C. E. (Rapid Circuit Etch) is a fast acting, specially balanced etchant for printed circuit board production.

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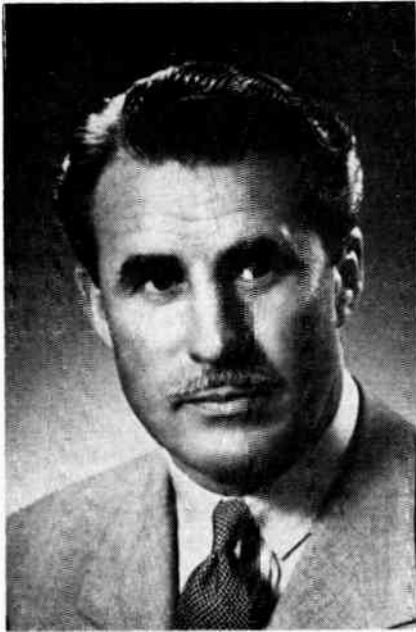
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For complete details check No. 30 on handy card, page 61



Foreign trade is vital to the health of our industry

by Hon. George Hees

Minister of Trade and Commerce

Canada's electronics industry has progressed at a phenomenal pace in recent years, and more particularly since the Second World War. I appreciate, therefore, the opportunity of commending the publishers of "Electronics and Communications" on their decision to produce a Canadian Export Issue, two thousand additional copies of which will carry a better understanding of our industry into more than twenty countries.

Foreign trade is vital to the health of our economy. It was gratifying, therefore, to note the considerable interest in the Export Trade Promotion Conference shown by representatives of the electronics industry. Among the 1,300 Canadian firms that sought interviews with 110 trade commissioners, recalled to Ottawa from forty-nine countries last December, fifty-five were from companies engaged in the manufacture of electronics equipment or associated with the industry.

Many of these firms were already in the export field, but came forward with information on new products they have for development. Others, recently established, revealed details of

equipment they considered suitable for sale in many lands. Some representatives of this industry, who were never previously interested in export sales, indicated they now wish to explore market opportunities with the help of our trade commissioners.

The response of the Canadian electronics industry to our invitation is most encouraging to all officers of the department, at home and abroad, whose services are freely available to firms that are genuinely interested in extending their sales efforts. Although it is not possible for trade commissioners to process fully in a few weeks all the inquiries they received during the Conference, they will provide firms with progress reports. The contacts established over a period of two weeks, during which an aggregate of 11,000 interviews took place, are invaluable, and a firm foundation for future business has been laid.

Production in the Electrical Apparatus and Supplies Industry increased from a value of \$235 million in 1946 to \$1,046 million in 1959, in which year telecommunication equipment valued at \$225 million was manufactured by 127 Cana-

Overseas purchasers of electronic equipment might well consider Canada as a source of supply on the basis of quality and price.

Canada's electronic industry

The annual dollar volume turnover in this industry is reported to be over \$400,000,000. Directly employed with the Canadian electronics industry are 18,000 people including production workers, engineers, scientific and administrative staff. There is over 7,000,000 square feet of manufacturing floor space throughout Canada.

Forty of the companies in the industry design and manufacture such equipment as transmitters, mobile radios, radars, etc., for both industrial and military applications.

Over 60 companies manufacture electronic components and accessories. Of these, six companies manufacture receiving tubes, picture tubes, and a wide range of semi-conductor devices.

There are also some 12 companies manufacturing radio and television receivers, phonographs, high-fidelity and stereophonic equipment.

The majority of electronics plants are located in Ontario and Quebec, in areas of densest population where skilled labor is available and where the supporting industries are located.

dian firms. This included radios and radio parts, record players, television sets, radar and other electronic equipment.

The growth in this section of the industry was due largely to the domestic demand for radio and television receivers, high fidelity record players and phonographs, though the defense program absorbed a high percentage of the equipment produced in this country.

Expansion in the past two years has levelled off, due to saturation in the television market and curtailment in defense spending. The future of the electronics industry appears bright, however, due to the anticipated demand for more modern television sets, second sets and increasing consumer interest in high fidelity and stereophonic equipment. Developments in broadcasting, general communication, industrial control, computers, instrumentation in the nuclear field, and missile tracking should provide additional impetus. The recent agreement between Canada and the United States on defense production sharing will also stimulate the industry to new achievements.

The National Research Council has cooperated with the armed services and associated

industries in the development, production and evaluation of new equipment. One of many examples is a polyurethane foam radome, designed and constructed to meet the exacting electrical specifications required for weather-proof covers for missile tracking and guiding radars. This radome is believed to be the first of its kind in the western world. A gauge, capable of measuring the atmospheric pressure existing at satellite altitudes, has been developed, and three have been installed in a United States satellite that is scheduled for launching late this year. Special equipment, designed in the electronic music laboratory, was supplied to the Faculty of Music in the University of Toronto, which established the first electronic music studio in Canada, the purpose of which is to provide composers with facilities for the realization of electronic music.

Overseas purchasers of electronic equipment might well consider Canada as a source of supply, and determine whether their requirements can be filled by this country on the basis of quality and price. Inquiries, placed with Canadian trade commissioners, will receive immediate attention.

weather conditioned microwave

ANDREW RADOME EQUIPPED ANTENNAS DEFY ICE...SNOW...WIND

Andrew radomes provide excellent 2-way year-round protection for Andrew microwave antenna systems. First, they protect feed and reflecting surface against the attenuating effects of snow, ice and debris accumulation. Secondly, for tower mounted antennas they reduce the effects of wind thrust by 35%.

All Andrew radomes are lightweight and easy to install—clip directly to the dish rim of existing antennas. Unheated radomes are suitable for all but exceptional cases. In areas where freezing rain occurs, heated radomes can be provided.

SPECIFICATIONS STANDARD RADOMES

Dia. Feet	Type No.	Attenuation @ 6 kmc. db	VSWR Contribution @ 6 kmc	Thrust at* 30 psf (Flats), lbs.
10	R10	0.4	0.02	1,990
8	R8	0.4	0.02	1,270
6	R6	0.4	0.02	714
4	R4	0.4	0.02	320
2	R2	0.4	0.02	75

*Including antenna

HEATED RADOMES

Dia. Feet	Type No.	Attenuation @ 6 kmc. db	VSWR Contribution @ 6 kmc.	Thrust at* 30 psf. (Flats), lbs.	Power** Reqmts.
10	HR10	0.7	0.02	1,990	3,400 watts
8	HR8	0.7	0.02	1,270	2,400 watts
6	HR6	0.7	0.02	714	1,200 watts
4	HR4	0.7	0.02	320	550 watts
2	HR2	0.7	0.02	75	150 watts

*Including antenna

**Power requirements for HR10 and HR8 are 3 wire single phase 60 cycle 220 volts.

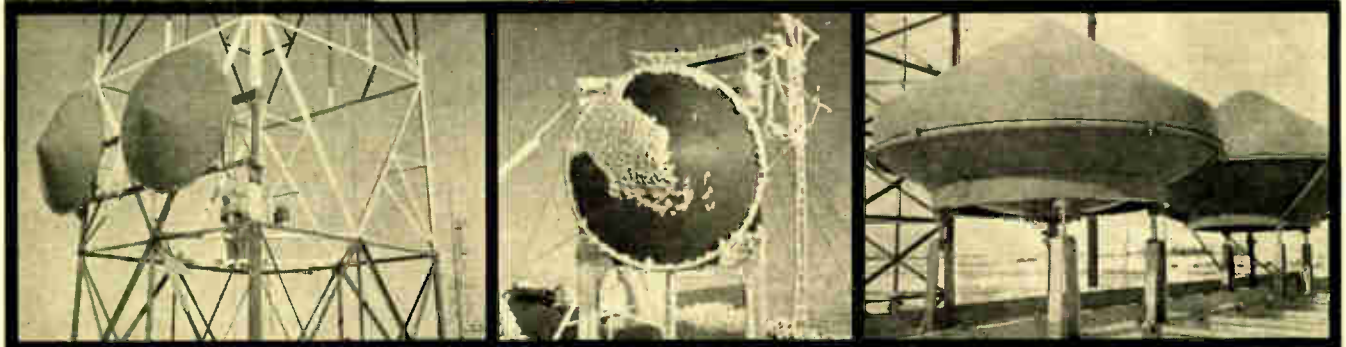
Power requirements for HR6, HR4 and HR2 are single phase 60 cycle 115 v.

For further details on ANDREW Microwave Antennas, Radomes, Wave Guides write for new Andrew Catalog CM.

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ANTENNA SYSTEMS
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"We have paid particular attention to antennas during extremely high wind conditions of gusts up to 40-60 m.p.h. It is very obvious that these radomes quite materially reduce the wind loading on the parabolas—due to their shape factor." (Police Broadcast)

"We have had up to four inches of ice on the radome with practically no reduction of antenna effectiveness. During high winds, radome reduces pressure on the dish. (AM-TV Station)

"Our field forces report that the radomes produce a signal loss of less than 1 db per antenna. Several radomes were removed and antennas inspected following a heavy snowstorm and no snow or ice was found in the antennas." (Gas Pipeline Company)

For complete details check No. 58 on handy card, page 61



has something new

IN MOBILE RADIO

The Systcoms I S L 148-174 Mc/s Mobile Radio telephone — the smallest . . . anywhere . . .

The unexcelled engineering skills of I S L electronic engineers and technicians have perfected this rugged line of transceivers to pass the rigid requirements of the Department of Transport of Canada, and the F. C. C. in the United States.

FEATURES:

Transistorized power supply

One to six channels

For mounting under the dash or in the cab of all vehicles

Narrow or Wide-band (30 Kc/s or 60 Kc/s channel spacing)

Size 4" high by 11" wide by 12" deep

(10 x 28 x 30.5 cms)

Weight 15 lbs. (6.8 Kgms)

Utmost in reliability, performance, low maintenance costs. Proved by year-long field tests under severe climatic and road conditions.

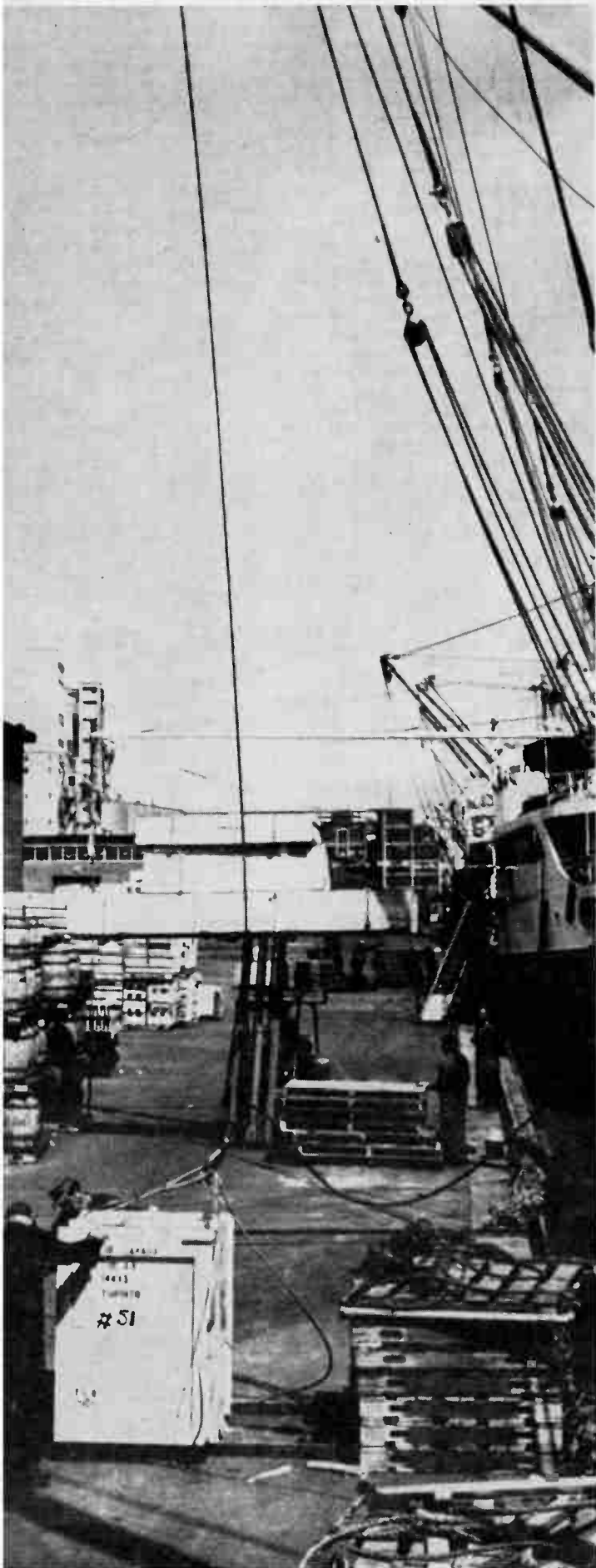
Write for complete specifications and description OF OTHER equipment. Fixed base and repeater stations and trunk-mount sets also available.



Inquiries invited from reliable agents; some territories still open.

Territoires encore non-couverts; agents responsables invités à faire application.

Solicitamos informes de firmas acreditadas; tenemos zonas disponibles.



A world market awaits Canadian made electronic products

Canadian electronic manufacturers are urged to orient their thinking in tune with the times, enter the hurly-burly of world competition and win for themselves a share of the business that awaits the enterprising businessman in the rapidly emerging nations of Asia, Africa and South America

by T. W. Lazenby, Editor

The Hon. George Hees, Minister of Trade and Commerce, recently admonished Canadian businessmen with words to the effect that Canadians would appear to think that the world owes them a living. The Minister suggested that if the Canadian business climate was to be advanced, then it would be necessary for Canadian business management and labor to put their heads together, such as has been done in many European countries, with the object of arriving at ways and means that would permit Canadian business to compete with foreign imports and at the same time make possible the export of Canadian goods to world markets.

Before any criticism of Canadian business methods is made, it must in all fairness be realized that Canadian business management is confronted with many aggravating and knotty problems that are not easy of solution. Despite these problems, however, there is

more than a modicum of truth in the words of Mr. Hees when he claims that Canadians would appear to think that the world owes them a living. This condition, as we see it, is not so much a result of Canadian business methods but rather the result of Canadian business attitudes.

As stated editorially in *Electronics and Communications* (September 1960) “. . . those engaged in secondary Canadian industry would appear to suffer from an inferiority complex. Their businesses have been established with the view to supplying domestic demands and the thought of winning export markets in competition with such countries as the United Kingdom, the United States and other exporting giants of the world seems to overwhelm them and crush any seed of aspiration they may ever have entertained in this direction”.

Insofar as the Canadian electronics industry is concerned there is little doubt, we believe, that it has been established on the basis of demand from two domestic sources only: (a) the home entertainment field embracing the manufacture of radio, television, hi-fidelity and other similar products and (b) the fulfilment of demands arising out of defense requirements. It is now common knowledge that the home entertainment market is well saturated and the only hope of revitalization in this area is the hope that the Board of Broadcast Governors will see fit at a not too distant date to approve the use of color television. The collapse of electronic defense contracts in Canada is a story that has been retold a thousand times. The hopes and aspirations of those engaged in the Canadian electronics industry with respect to the benefits that would result from the Canadian-U.S. defense sharing program have just not materialized, except for a few large Canadian (?) firms who possess the financial resources necessary to set up sales forces on the doorsteps of Uncle Sam's prime defense contractors.

The net result of this situation is that the Canadian electronics industry has been crooning the blues for the past two years with the situation being continually aggravated by the importation of electronic products from off-shore low-wage-rate countries.

Secrets of success in foreign selling

- Go into export to stay; don't be an "inner and outer". If necessary, set aside a certain percentage of production for foreign markets.
- Make use of various sources of printed information, statistics, etc., and of the Trade Commissioner Service in acquainting yourself with the size and the characteristics of each market.
- Follow up this market research by personal visits to the areas in which you wish to sell. Adapt your product if you can to the tastes and demands of the various countries.
- Pick your agents abroad with care, give them sales aids such as samples and promotion literature, and then back them up in every way.
- Make it easy for your customer to buy by quoting prices CIF whenever possible, or FOB plus transportation costs from port.
- Don't be afraid of spending money to make money; money spent in visiting the markets is well invested.
- Don't expect results too soon; it takes at least a year and sometimes three or four years, to build up a worthwhile business.
- Cultivate export markets while business is good at home, and you have the money to spend on promotion and opening up new territory.

Unless there lies below the business horizon some unforeseen circumstance that will lend emphatic impetus to general business conditions, new markets for Canadian electronic products must be found. Since there seems to be little likelihood of any increased domestic demand, business owners must direct their sights abroad and as strange as such an endeavor may appear to be for a large proportion of management personnel in the Canadian electronics industry, it can be said that this practice has paid off handsomely for



Rush shipments of RCA Victor 120 channel microwave equipment leaves the Montreal plant via lift-truck for re-shipment by boat to Brazil.

A \$140,000 order was recently placed with Philips Electronics Industries Ltd., Toronto by the U.S. Army Signal Corps for Oblique Ionospheric Sounders. F. H. Dickson (center), Director of U.S. Army Radio Propagation Agency, and H. L. Kitts (right), Project Manager of U.S. Army Signal Research and Development Laboratory, inspect the equipment while Fred Daniels, Section, Professional Equipment Division of Philips Electronics Ltd., explains some of the technical aspects.



those who have mustered enough initiative to try it. The greatest obstacle to the export of Canadian-produced electronic goods is not necessarily the cost, nor any difficulty in finding markets, but strangely enough the introverted modesty of the Canadian businessman who cannot bring himself to believe that off-shore buyers would take him seriously as competition for United States, Japanese, British or any of the other well entrenched exporting nations. While this analysis of the Canadian businessman's mentality may not apply so much to the larger companies, it most certainly applies almost across the board to smaller companies. Since it is the smaller companies that comprise the largest percentage of the Canadian electronics industry, export — as a means of future business — is an avenue that must be explored if the industry is to build a future for itself. As Mr. Hees has said, the world does not owe Canada a living but Canadians could earn themselves a better living if they went out to sell the world.

If the Canadian electronics industry is in a depressed state, as industry spokesmen claim it to be, then some consolation can be taken from the fact that this depression could not have occurred at a more appropriate time. A strange statement, perhaps, but considered in the light of international events — events that are reshaping and remaking the economic and social conditions of dozens of Asiatic and European

countries, all of which are clamoring for goods and services in the race to establish their own industries — there never was a more appropriate time for Canadian businessmen to embark on the adventure of export selling.

Apart from the opportunities that exist in the markets of these new and rapidly emerging nations of the near and far East, a closer look at the requirements of the English speaking world would be well worth while.

ELECTRONIC AND ELECTRICAL IMPORTS INTO THE UNITED STATES WITH CANADA'S SHARE OF TOTAL

	1958		1959	
	Total U.S. Imports	Imports from Canada	Total U.S. Imports	Imports from Canada
	(millions of U.S. \$)			
Lamps, electric, metal, filament, miniature	5.0	—	5.0	—
Lamps, electric, including neon and mercury	1.4	—	1.9	—
Generators and parts	5.2	.2	6.4	.1
Transformers and parts	7.7	.3	6.4	.1
Articles for controlling and rectifying electric energy	6.2	1.8	10.6	2.7
Switches, electric, over 10A fuses over 30A	1.6	.3	1.8	.5
Motors, not over 1/10 horsepower	—	—	1.5	—
Motors over 1/10 and under 200 horsepower	2.5	.1	4.0	.1
Radio apparatus and parts	28.2	2.8	72.7	2.3
Telephone apparatus and parts	3.4	1.2	6.4	2.3
X-Ray apparatus and parts	1.6	.2	1.8	.1
Photocells and electronic tubes	1.0	.2	1.4	.7
Storage batteries and parts, except lead-acid type	—	—	1.0	—
Other electrical machinery and parts	87.0	8.6	105.7	11.6

The above table includes 14 types of electrical and electronic equipment and parts that are being imported by the United States. Marketing authorities in Canada are of the opinion that Canadian manufacturers could increase their volume of sales of the above types of equipment to the United States.

Note that in 1959 the United States imported \$72.7 million worth of radio apparatus and parts and that Canada's share of this business amounted to only \$2.3 million.

ELECTRONIC AND ASSOCIATED EQUIPMENT IMPORTS INTO THE UNITED KINGDOM

	1956	1957	1958	1959
	millions of dollars			
Dictating machines, complete	2.9	4.2	5.5	7.5
Generators, including parts	2.5	2.1	2.6	2.7
Motors, including parts	2.8	3.1	3.0	4.3
Switch gear and switchboards	1.9	1.4	1.7	3.0
Valves, electronic, complete	4.8	4.2	6.0	8.0
Cathode ray tubes, complete	2.2	4.3	1.3	4.7
Radio receiving sets, domestic or portable	1.0	1.1	.7	1.1
Radio communication and navigational aid equipment, complete	7.3	7.3	10.4	12.6
Apparatus for telegraphy and telephony	4.1	3.3	3.9	3.4
Electro-medical apparatus	2.3	2.6	2.1	2.7
Scientific electrical instruments	3.0	4.0	5.4	4.9
Sound reproducing apparatus	3.6	4.9	9.3	15.1

The above table includes categories of electronic equipment imported into the United Kingdom and comprises types of manufactured goods that provides export opportunities for the Canadian electronics industry.

(Source: Accounts relating to Trade and Navigation of the United Kingdom and Ontario Department of Planning and Development)

The U.S. can be sold

Contrary to popular belief the United States offers opportunities that are all too often overlooked by reason of our southern neighbors' industrial greatness and manufacturing prowess. Nevertheless there are gaps in the vast American manufacturing complex that can be filled by Canadian export and indeed, which have been filled by enterprising Canadian businessmen in the electronics industry.

As pointed out by the Ontario Department of Planning and Development, too many Canadians, taught from early school years that the United States is singularly blessed with a varied geography and climate that provide self-sufficiency in natural resources, are often unmindful or unaware of the fact that our neighbors to the south are actually the world's largest importers. With United States imports at a record of nearly \$15 billion in 1959, an estimated 42 per cent of total imports by value were in the form of finished manufactured goods, while another 20 per cent were semi-manufactured goods.

With such a large percentage of finished and semi-manufactured goods consumed by our American neighbors in their total imports, it seems reasonable to assume that there are many additional and worthwhile export opportunities for the Canadian manufacturer to explore — opportunities that would help to balance Canada's deficit on merchandise account in her trade with the United States. In 1959, imports from Canada into the United States were valued at \$3,108 million. This figure, while representing 60 per cent of total Canadian exports in that year, represented only 20 per cent of total United States imports.

Although Canadian manufacturers ship a very wide range of products to the United States, the fact remains

that Canada's chief exports to the United States are primarily raw materials of forest, field and mine. Major groups of Canadian exports to the United States are wood, wood products and paper, accounting for 75 per cent of total American imports in that group; iron and its products, accounting for 15 per cent in that group; non-ferrous metals and their products, accounting for 54 per cent of total imports in that group; non-metallic minerals and their products, accounting for 10 per cent of the total; agricultural, animal and vegetable products, nearly 9 per cent; and chemicals and allied products, 24 per cent of total United States imports in that group.

The United States market by nature of its size and near proximity to Canada — not to mention the similarities in our standards of living, language, culture and tastes — should, despite tariff barriers and competition from products of lower wage countries, be able to absorb a much larger volume of Canada's manufacturing production than it does at the present time. This particularly applies to the realm of products where

Continued on page 63

An operator is shown at right working the rapid electronic catalog look-up system recently developed by Ferranti-Packard Electric Ltd. This Toronto firm recently received a \$150,000 order for this equipment from a Buffalo, N.Y., wholesale drug distributor.





Headquarters building of the Canadian Department of Trade and Commerce in Ottawa. Officials of this department are expert in the knowledge of export techniques and are prepared to offer assistance to Canadian businessmen.

EXPORT KNOW-HOW

Here's the score on how to obtain professional export assistance

Canada's Department of Trade and Commerce can take the drudgery and much of the guesswork out of the job of getting established in the export business. The following twenty services offered by the Department shows how.

Any lack of prior knowledge or experience in the business of exporting can not justifiably be used by any Canadian businessman as an excuse for side-stepping or avoiding participation in this promising field of business activity. A wealth of information on the many and varied aspects of export technique have been gathered over the years by the Department of Trade and Commerce and is available to anyone who seeks it.

It is not necessary for the Canadian businessman seeking to sell abroad to embark on an uncharted sea of business reefs and shoals. Possible trouble spots in the art of export have been well charted over the

years by officials in the Department of Trade and Commerce and the following 20 services offered by the Department will be of invaluable assistance to those who are seeking markets abroad.

Agency connections

The Department provides assistance to any Canadian firm seeking a representative in any foreign country. A firm wishing to establish an agency connection abroad should supply the Department with full information on each product or service involved. Trade Commissioners in all or selected markets will approach

several suitable firms, introduce the Canadian product or service to them, and determine their interest in representing the Canadian firm.

Buying connections

Businessmen may obtain assistance from the Department in contacting foreign buyers. Trade Commissioners continually report to the Department enquiries received from buyers in their area, and, upon request, will seek sales outlets on behalf of any Canadian firm.

Company information

A Canadian exporter naturally wishes to know something of the credit-worthiness and moral standing of a prospective buyer in a foreign country. The Department can help him get this information by asking the Trade Commissioner for a confidential report on any foreign firm. With this information, the exporter is in a better position to judge the terms of sale and the extent to which credit can be given.

Conversely, in order that reliable Canadian exporters may be known to the Trade Commissioner abroad, the Department maintains an Exporters Directory containing information on Canadian firms and their products.

The bulk of the information contained in this Directory is supplied to the Department on a voluntary basis by any firm wishing to be listed.

Export controls

The Export and Import Permits Act and affiliated strategic control measures in effect in Canada are administered by the Department. Copies of these regulations may be secured from the Transportation and Trades Services Division, which will also answer enquiries and provide additional information in connection with specific shipments.

Export credits insurance

The Export Credits Insurance Corporation provides export credits insurance at a nominal premium to persons carrying on business in Canada against risks of non-payment by foreign clients arising out of the export, manufacture, treatment or distribution of goods, or the rendering of engineering, construction, technical or similar services. The main risks covered include insolvency or protracted default on the part of the buyer, foreign exchange restrictions in the buyer's country preventing the transfer of funds to Canada, cancellation of an import license or the imposition of restrictions on the importation of goods not previously subject to restriction, the occurrence of war between the buyer's country and Canada, or of war, revolution, etc., in the buyer's country.

... Specific policies are also issued to cover engineering, construction, technical or similar service contracts entered into between Canadian firms and foreign clients.

Export documentation

Documentation for an export shipment has to be prepared carefully. Foreign countries levy penalties on shipments which are not documented in accordance with their regulations. In addition the supplier may have difficulty in receiving payment under his letter of credit if the documentation is incomplete or contains errors.

The Department maintains current information on the documentation requirements of foreign countries and is thus able to advise the exporter on the requirements of any given country.

Export financing assistance

To assist Canadian exporters in obtaining financing for export sales of capital goods, the Export Credits Insurance Act was amended in 1959. The Export Credits Insurance Corporation may now be empowered by the Government to give direct guarantees to any lender covering export transactions. It may also be empowered to buy and sell guaranteed instruments, and to lend money on the security of these guaranteed instruments. The direct guarantees to lenders are applicable to export paper issued in connection with contracts involving the export of goods or services for amounts of not less than \$250,000 and involving payment periods extending over a minimum term of two years. The guarantees may be unconditional and cover the financed portion of the export contract, normally not more than 80 per cent of the contract price. Additionally the guarantees may be provided in the currency of the contract of sale.

Export techniques

Sales to foreign countries require modifications of sales and distribution techniques employed in the

Plan your trip carefully

If you are planning a first visit to investigate foreign markets, here are some "trip tips" from seasoned business travellers:

- (1) Don't try to cover too much ground.
- (2) Don't tie yourself down to a rigid schedule.
- (3) Inquire about holidays abroad before you leave or you may find yourself twiddling your thumbs in a half-deserted city.

A Canadian export manager, new to the job, rushed off to Latin America and in 10 weeks visited 18 countries. He discovered that travel fatigue accumulated and his efficiency declined. Today he advises the novice to restrict himself to less than six weeks of travelling and not to cover more than four or five countries. To keep in top form he recommends about 3½ weeks.

Too much advance planning may be a drawback. This is especially true if you intend to choose agents. You shouldn't make a hurried decision because it may mean a wrong choice.

Veteran export managers have additional advice to offer: don't attempt to appraise a market too quickly while you are still immersed in the competitive situation there. Move on to the next country, sort out your impressions, and then reach conclusions and make recommendations. Your perspective will improve with distance. As one exporter said, "Record the facts on the spot, but analyze them and make your decisions elsewhere."

You should "record the facts" immediately. Most travellers find it essential to write down or dictate notes on business calls immediately while the conversation is still fresh in their minds. Few do more than this while they are still on the wing, but some airmail a fuller report, section by section, back to their home office. This serves as a draft of the final report.

Most companies supply report forms that include an "action box" for recording matters that require action immediately or within a short time. This makes follow-up easier.



Tactical scatter communications equipment valued at more than one million dollars is shown above being shipped by Canadian Westinghouse to the U.S. Air Force. Mobile and light in weight, the system combines good voice channel quality with high reliability for varied tactical situations.

domestic market. Channels of distribution, pricing, shipping, documentation, packaging, payment terms, advertising, and insurance against credit risks in export sales, are some of the factors which must be considered by firms engaging in export trade. Departmental specialists in the various techniques are always available for consultation on specific export problems.

Import controls

Many countries still maintain some measure of import control, which hampers the free movement of goods in international trade. However, these controls are gradually being eased and many markets which a few years ago were closed to an exporter are now accessible. The Department maintains an up-to-date record of all foreign import controls and is in a position to advise businessmen on how these controls might affect his particular commodity in any given market.

Labelling and marking regulations abroad

Labelling regulations enforced in foreign countries differ in many ways from domestic requirements, and exporters must therefore design their labels and marks

Did you know that —

- ... the United Kingdom is the world's second largest importer (10 per cent of the free world's imports) and Canada's second largest customer?
- ... the British economy is booming — and is receptive and eager for Canadian products?
- ... Canadian sales to Britain in the first eight months of 1960 were up 25 per cent over the corresponding period in 1959?
- ... import controls have been removed from practically all dollar goods?
- ... many Canadian manufacturer consumer items are for the first time, or once again, finding a good market?
- ... manufactured and partly manufactured goods are the most important component of Canada's exports to Britain?
- ... good sales prospects exist for high quality, attractively-presented Canadian merchandise in the United Kingdom market — a market which in many respects can be treated as an extension of our own?

to meet those requirements. The Department maintains current information on these requirements which is available from the International Trade Relations Branch.

Market information, foreign

One of the most valuable services the Department provides Canadian exporters is the collection, on a continuous basis, of information from all available sources on current business conditions and opportunities in foreign markets. Among the detailed data available on request are particulars of any trade developments affecting the sale of Canadian goods in any area, including local regulations, restrictions and entry requirements; information on current supply and demand for established products and on foreign exchange and payment prospects.

Market research, foreign

When appropriate, the Department will initiate potential of a company's product. This service includes enquiries in foreign countries to determine the sales reports on the local demand and any relevant preferences for particular goods or services, the size of the demand, all aspects of the competition to be met either from local production or imports, tariff duties and tariff preferences, import and exchange controls, other government regulations, terms of payment, sales and distribution channels, packaging requirements, and any unusual features of local trading that would affect the Canadian exporter's prospects.

Patents and trade marks abroad

Exporters are sometimes concerned about patent infringements on products which they wish to export. The Department can assist the exporter in this connection by ascertaining, through the Trade Commissioner, the steps to be taken to protect patents and trade marks in the foreign country.

Sales trips abroad

Assistance is provided Canadian businessmen in planning foreign sales trips through the provision of market data, travel information, letters of introduction, and hotel reservations. In the foreign country the Trade Commissioner will make appointments with local businessmen and government officials, perform introductions, and help with language barriers.

Tariffs

To assist Canadian firms in their export trade, complete and up-to-date information on the customs regulations and tariffs of all countries is compiled by the Department. Detailed information regarding the rate of duty on a company's products in a specific market and advice regarding the proper classification in order to receive the most favorable rate of duty can be obtained from the International Trade Relations Branch or the Trade Commissioner in the country concerned.

Trade fairs abroad

As an effective means of promoting the sale of Canadian products in other countries, the Department organizes Canadian participation in selected trade fairs abroad. The Department arranges for space, designs and constructs the exhibit, handles all arrangements with shipping, customs and trade fair authorities, provides advertising support and trade promotion material, invites foreign buyers, and provides administrative staff for the Canadian stand.

Transportation

Freight can prove a determining factor in export trade. The Transportation and Trade Services Division in the Commodities Branch assists Canadian firms with transportation problems. Firms encountering discriminatory ocean freight rates, or seeking advice on the best routes to any particular port and requiring assistance in arranging transportation to export markets, may call upon this Division for help.

Trouble-shooting

At times, Canadian firms engaged in export trade encounter unexpected problems. Through the Trade Commissioner located in the country concerned, assistance can be provided toward straightening out trade tangles which may arise from a variety of reasons, such as improper documentation, discrimination in the application of trade, exchange and tariff regulations, and disputes regarding the quality, delivery and price of products.

Visiting foreign buyers

Trade Commissioners maintain close contact with the businessmen in their area and are constantly encouraging them to visit Canada during their business trips abroad. The prospective buyer is directed in the first instance to the Department in Ottawa, where specialized officers discuss with him the availability of his particular needs in Canada and the advantages of buying Canadian. These officers then arrange for the buyer to visit Canadian producers of the commodities in which he is interested.

Watching briefs

In addition to providing market information and undertaking market surveys on request to assist Canadian firms in determining the sales prospects for their products, the Department, through the Trade Commissioner in the country concerned, will undertake to keep a firm posted on the developments which affect the continued sales of its products.

Merchandising opportunities abroad

International calendar of electronic events for 1961

One of the most effective means of selling goods to the export market is provided by the many trade fairs and exhibitions which are sponsored by the industry and professional associations.

It is perhaps safe to say that there

are more exhibitions and symposia associated with the electronics industry than in any other industrial field. Many of these exhibitions are of specialized nature which afford exhibitors the opportunity to display their products to a vertical audience.

A list of selected conventions and exhibitions relative to electronics and communications engineering and associated fields to be held between March 1, 1961 and November 1961 is published below.

March 1. Conference on Rubber and Plastics in Cables, Institution of the Rubber Industry and the Plastics Institute, London.

March 1-2. Symposium on User Experience of Large-scale Industrial Vacuum Plant, The Institution of Mechanical Engineers, Birdcage Walk, London, S.W.1.

March 16-19. 10th International Inventor's Exhibition, Brussels.

March 15-17. International Congress of Medical Photography and Cinematography, Cologne.

March 20-23. I.R.E. National Convention, New York.

March 21-25. 10th Electrical Engineers Exhibition, Earls Court, London.

March 27-31. Third National Symposium on Temperature, Its Measurement and Control in Science and Industry, Columbus, Ohio.

April 5-7. Symposium on Electrical Contacts, Institute of Physics and The Physical Society, Brunel College of Technology, London.

April 5-7. Symposium on Materials and Electron Device Processing, Benjamin Franklin Hotel, Philadelphia.

April 15-25. 45th Swiss Industries Fair, Basle.

April 17-19. Seventh National ISA Symposium on Instrumental Methods of Analysis, Shamrock-Hilton Hotel, Houston, Texas.

April 17-20. Annual Conference of the Ergonomics Research Society, Bristol.

April 17 to May 7. Fourth International Trade Fair, Tokyo.

April 20 to May 4. Engineering, Marine, Welding and Nuclear Energy Exhibition, Olympia, London.

April 22 - May 7. 36th International Trade Fair, Lille.

April 30 - May 9. German Industries Fair, Hanover.

April 30 - May 11. 34th International Industries Fair, Brussels.

April 24-26. 32nd Annual Meeting of the Aerospace Medical Association, Chicago.

April 30 to May 4. Seventh National Aerospace Instrumentation Symposium, Adolphus Hotel, Dallas, Texas.

May 3-13. 5th United States World Trade Fair, The Coliseum, New York.

May 3-13. British Columbia International Trade Fair, Exhibition Park, Vancouver.

May 6-14. 44th International Swedish Industries Fair, Gothenburg.

May 8-12. The National Industrial Production Show, Exhibition Park, Toronto.

May 9-17. International Exhibition of Measurement, Control, Regulation and Automation (Mesucora) and 58th Exhibition of French Physical Society, C.N.I.T., Paris.

May 15-19. Third International Automatic Vending Exhibition, Royal Horticultural Society's New Hall, Westminster, London.

May 15-20. 3rd International Hospital Equipment and Medical Services Exhibition, Grand Hall, Olympia, London.

May 15-27. 1st International Television Equipment Trade Fair, Montreux.

May 18-29. International Trade Fair, Paris.

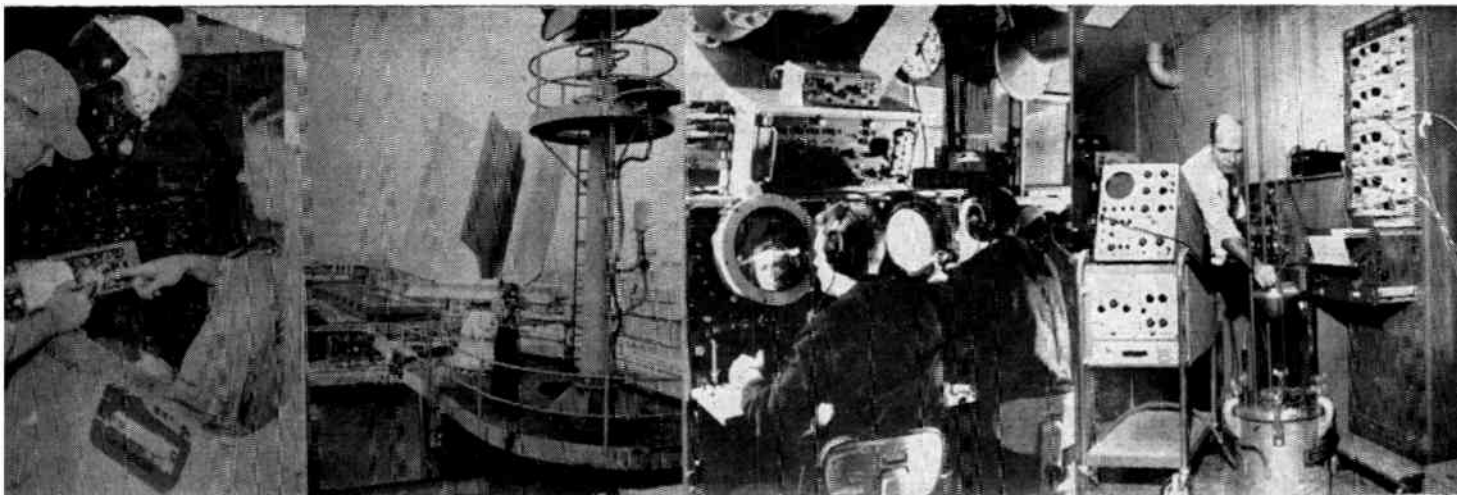
May 19-29. Industrial Fair, Budapest.

May 19 to June 4. British Trade Fair, Sokolniki Park, Moscow.

May 22-24. Tenth National Telemetering Conference, Hotel Morrison, Chicago, Ill.

May 22-26. American Society of Tool and Manufacturing Engineers' Annual Show and Convention (A.S.T.M.E.), The Coliseum, New York.

Continued on page 59



It is perhaps safe to say that there is a wider variety of electronic products manufactured in the New England area than in any other comparable area in the United States.

NEW ENGLAND'S ELECTRONIC INDUSTRY

A doorstep market for Canadian electronic products

Dramatic growth of electronic manufacturing in a region close to Canada may mean opportunities for supplying Canadian components, particularly for defense contracts

by **J. C. Depocus**

Consul and Trade Commissioner, Boston

New England has made a big contribution to the growth of the electronics industry in the United States, despite a lack of raw materials and the handicap of high transportation costs. Today, thanks mainly to development in Massachusetts, the area ranks high in the electronics field and in certain branches is the undisputed leader.

There are currently 700 electronics plants in the New England states, compared with 770 in an area including California and 10 other Western states. The area adjoining Boston has 500 plants, as against 461 in the Los Angeles area and 144 around San Francisco. Route 128, which runs in a semi-circle around Boston, has been nicknamed the "Main Street" of industrial electronics; the four-mile stretch along this route on the edge of the city of Waltham is known as "Electronics Valley". (Out of a total of 216 industrial plants, Waltham has 98 electronics factories.)

Two factors have proved important in the growth of the industry in New England. One is the good supply of skilled labor, both men and women, available at lower cost than in some other parts of the United

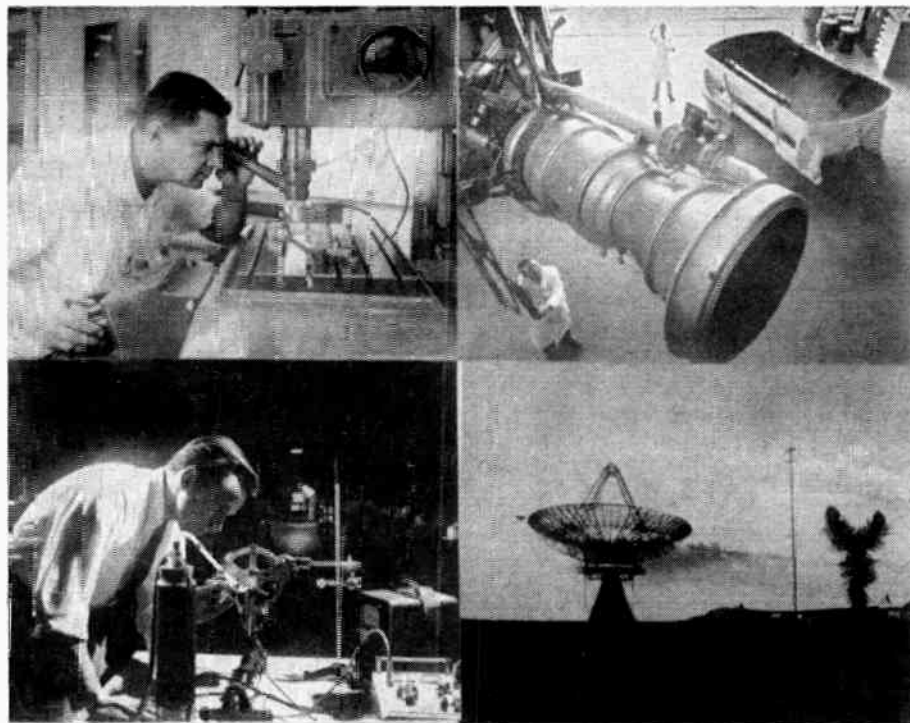
States. Second, such famous institutions as Harvard, M.I.T., Northeastern, Lowell Tech, and Worcester Polytechnic furnish a continuous supply of engineers and scientists. In addition, laboratories sponsored by these educational institutions are engaged in a substantial program of research and development for the Government.

Further development coming

The electronics industry, with 98,000 workers, now ranks third as an employer of New England labor, just after textiles and non-electrical machinery. Two-thirds of the industry is located in Massachusetts; Connecticut is in second place. However, the larger companies that are expanding now and have further growth in mind are looking northward; already Lewiston, Nashua, North Winstow, Woonsocket and Waldoboro are new points on the electronics map. Among the companies which are opening new plants or thinking of expanding are Raytheon, Sylvania, CBS Electronics, Itek, and Clevite Transistors Corporation.

The automobile industry is now entering the picture.

Statistics indicate that about half the loading of the U.S. electronics industry is in defense of which a good portion is concerned with the defense of the U.S.-Canada region.



New England's electronic industry situated on the doorstep of Ontario and Quebec is doing an annual business of nearly one billion dollars and holds promise as a large consumer of Canadian manufactured products

A.C. Spark Plug, a division of General Motors, is moving into Wakefield. Gabriel Co. of Cleveland, manufacturers of shock absorbers, will make microwave antennas and systems at Millis, Massachusetts. Ford has opened a small space-research laboratory in Natick. These are considered only the first steps by these firms which may be planning to develop their own products instead of limiting themselves to the manufacture of components for other companies' designs. Among the other non-New England firms in operation in New England are Avco Manufacturing Corporation of New York; Bomac Laboratories, a subsidiary of Varian Associates of Palo Alto, California; Dalumatic Corporation and Marion Electrical Co., both subsidiaries of Minneapolis Honeywell of Minneapolis; RCA of New York; Sigma Instruments, subsidiary of Fisher Pierce Co. Inc.; Western Electric, General Dynamics, etc.

Dependent on defense

One conclusion to be drawn from the figures for factory sales and future production, shown on the accompanying tables, is that New England has only a minor share of the business in consumer electronic products and this share is not expected to increase during the next decade because the difficulties which stand in the way cannot be easily overcome. New England manufacturers are comparatively remote from the large American markets. Consequently, transportation costs put them at a disadvantage in competing against manufacturers more centrally located.

The New England electronics industry is now prospering, but it cannot forget or ignore the fact that it

derives its strength from defense spending by the U.S. Government and that many of the fundamental decisions that affect it are not made locally but in the Pentagon. A decrease in defense outlays would vitally affect many industries in many parts of the country, but a reduction in government contracts would be more serious for the New England electronics manufacturers than, say, for those in California. Present plans for expansion may have to be modified if the situation changes, since New England firms depend so heavily upon military needs and cannot look to the manufacture of consumer goods to take up the slack.

Published statistics indicate that about half the loading of the U.S. electronics industry is in defense, of which a good portion is concerned with the defense of the U.S.-Canada region. The military co-operation of the two countries has involved the integration of defense systems and it has been more economical for major items to be supplied from U. S. companies, with a consequent increased defense expenditure by Canada in the United States. To offset this and permit Canadian participation in defense development and production, arrangements have been made to waive the Buy American Act and for the use of duty-free entry certificates for certain Canadian supplies.

Thus where Canadian industry has competence in items which can be used in defense, it has the opportunity to compete in the U.S. Such opportunities will be greater in the New England area because of its geographical proximity to the centers of the Canadian electronics industry.



Muscular arms of Mobot Mark II, mobile robot built by Hughes Aircraft Co., Culver City, Calif., embrace Colleen Adams. The remote-controlled handling machine was designed to substitute for man in dangerous places, such as radioactive areas.



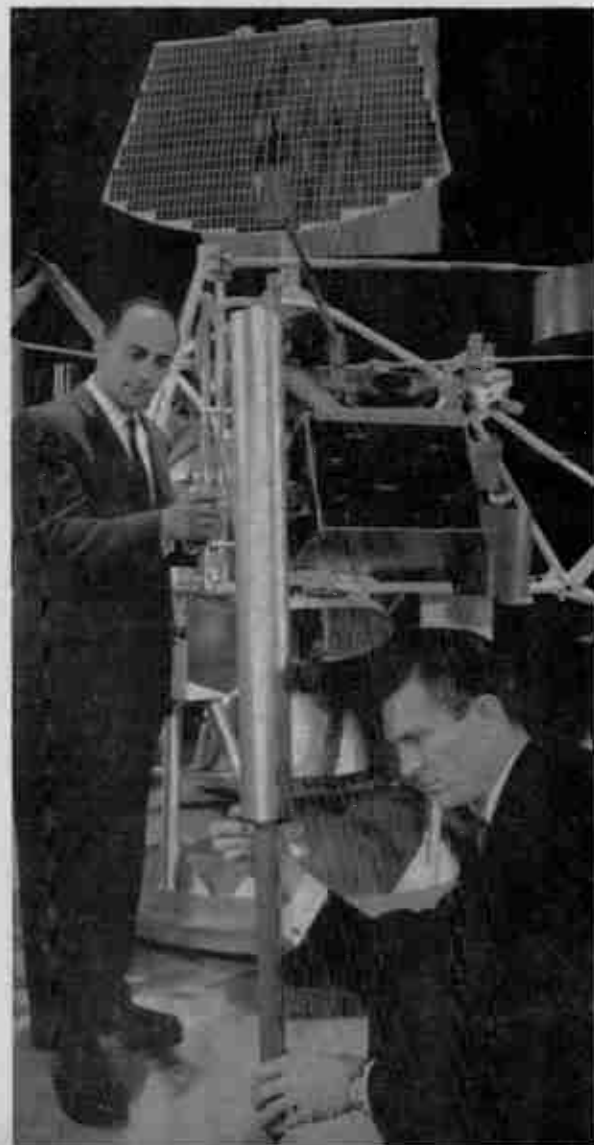
Preliminary adjustment of 2500Ω wire-wound resistors at Guildline Instruments Ltd., Smith Falls, Ontario. The resistors shown are for oil immersed volt ratio accuracy of 0.001 per cent.

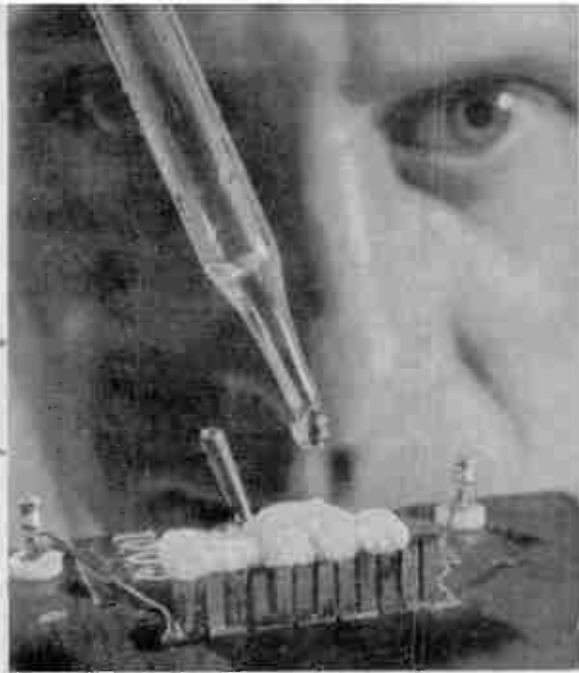
Scientists operate full-scale model of Surveyor spacecraft payload scheduled to make soft landing on moon. At right, Propulsion Laboratory Surveyor Project Manager, holds tip of probe designed to measure moon's surface characteristics.

close-up

looking lenswise at your industry in action

Unique high-temperature electric motor that will play a key role in throttle system of the U.S. Air Force's 2000-mph B-70 bomber, is checked by North American engineers before entering the environment oven.





Power from two flashlight batteries can freeze water by means of a recently developed thermoelectric device. When a switch reverses current flow, the device becomes a heater and in a few seconds the ice disappears in a wisp of steam. Scientists believe this device has many wide applications.



A three-dimensional display of lights for air traffic control, missile tracking, etc. was recently exhibited by International Telephone and Telegraph Corporation. The lights are visible from all sides and appear to hover or move through the display presenting a clear visual three-dimensional picture to the observer.



Two Convair T-29's have been modified for the specialized job of listening and talking aloft such as a missile would do. Convair's project engineer examines some of the miles of wiring connected with the electronic equipment which fills the cabin.



The world's largest man-made diamond produced by General Electric's Diamond-Making research program is shown beside a mound of small GE diamonds. The large carat-sized diamonds are dark in color and are not yet of sufficient strength for industrial applications.



Sonalgenic, a Canadian-made psychological unit, was designed with consultation of the dental and medical professions. This unit provides "white sound" which eases pain while dentists drill patients' teeth. The patient has full control through a compact hand unit which accommodates separate volume controls for music and "white sound".

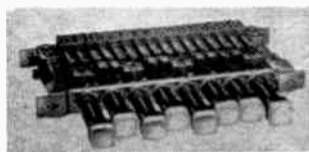
- instruments
- components
- materials

Product panorama

A guide to new electronic products

Illuminated "Multi-Switch" *Item 695*

A new "Multi-Switch", Series 21000, designed for use in computers, telephone apparatus, data systems and ground to air support equipment in the business machine, telephone, aircraft and missile and other allied industries, has just been introduced by Switchcraft, Inc.



This new series features a new, modern, square button design with a concave face. These buttons have side as well as front illumination and a large area for engraving identification. The buttons can be keyed in any of four planes for horizontal or vertical mounting of the switch frame.

Atlas Radio Corporation Ltd., 50 Wingold Avenue, Toronto 19, Ont.

Communications receivers *Item 696*

'Eddystone' Communications Receivers — Model 770S and Model 850/2, are now available in Canada.

The 770S covers the frequency range from 500 to 1000 Mc/s and the 850/2 from 10 Kc/s to 600 Kc/s. Thus, the 'Eddystone' range of Communications Receivers now cover the wide frequency range from 10 Kc/s to 1000 Mc/s.



the newly released 770S operates on both AM and FM as do the two companion Receivers of this unit — the Models 770R and 770U.

Conway Electronic Enterprises, 1514 Eglington Ave. West, Toronto 10, Ont.

New design in antennas *Item 697*

With the introduction of their new 30-50 mc "Hellipole" fixed station antenna, Andrew Corporation of Chicago has placed on the market the first basically new communication antenna to appear in the last 12 years.

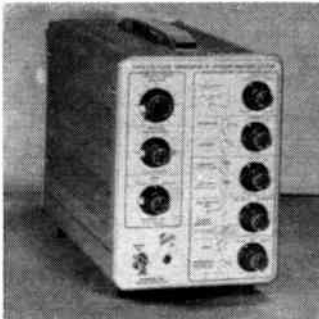
Type 902, Hellipole is a revolutionary design employing a bifilar helical element in the Fiberglas encased radiator. The ground rods utilized single helix conductors. Lightweight (13 pounds) and durable (30 psf with 1/2" ice), the Hellipole effects a size reduction of over 40 per cent when compared with conventional antennas at the same frequency.

Andrew Antenna Corporation, Ltd., 606 Beech Street, Whitby, Ontario.

Pulse generator *Item 698*

The Tektronix Type 110 Pulse Generator and Trigger Takeoff System facilitates measurement of amplifier linearity, and trigger sensitivity to amplitude or pulse-width changes. Pulse risetime is less than 0.25 nano-second. Repetition rate is nominally 720 pulses/second. Output impedance is 50 ohms. The system can generate alternate pulses of different lengths, amplitudes, and polarity.

An Independent Trigger Takeoff System provides stable triggering over a wide range of signal amplitudes. Flexible switching controls permit polar-



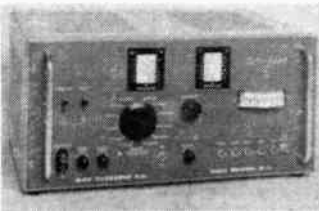
ity changes and trigger signal amplification. Trigger regenerator output (± 10 v, 4 nsec 50 per cent risetime, 225 nsec duration) is adequate for triggering oscilloscopes with relatively slow trigger responses and for starting a Tektronix Type N Sampling Unit — when the source cannot supply a suitable trigger.

Tektronix, Inc., P.O. Box 500, Beaverton, Oregon.

Vari-Sweep oscillator *Item 699*

Kay Electric Company has announced a new model of its well-known Vari-Sweep Sweeping Oscillator. Designated 860-B, the new model has two additional calibrated frequency bands for a total of twelve.

The main band switch oscillator assembly has been replaced with a precision teflon and coin silver turrent featuring simplicity of operation and maintenance. Individual plug-in units contain all circuit elements for each frequency band and may be easily removed for inspection and re-



pair. A self-contained strip holding the miniaturized RF oscillator tubes and associated circuitry is easily removed for inspection, repair, or replacement.

MEL Sales Ltd., 1969 Avenue Road, Toronto, Ont.

Background music reproducers *Item 700*

"Tape-Athon" long playing tape reproducers with associated amplifiers and speakers are now available at a moderate price, or may be leased for the reproduction of scientifically programmed "Magne-Tronics" background music tapes. This combination provides the perfect solution for background music "on-location". Program listings on "Magne-Tronics" tapes are also available.

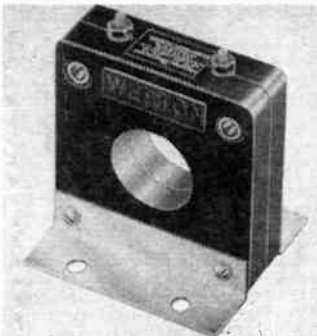
Instantaneous Recording Service, 40-42 Lombard St., Toronto, Ont.

Improved current transformers *Item 701*

Highly improved current transformers, available in a wide number of ranges and at lower cost than previous models, have been introduced by Daystrom Limited, Weston Instruments Division.

The new transformers, designated Models 605 and 607, replace the Weston Model 604 and offer many new advantages. Accuracy of the new units is such that they can be used with wattmeters as well as ammeters and conformance is to ASA-C57.13 standard accuracy classes.

Completely encased in molded high impact and abrasive resistant plastic, the transformers can be mounted using through bolts or right-angle brackets. A pair of brackets, with necessary



mounting hardware, is packed with each unit. In place of the former soldered connections, stud terminals are used.

Daystrom Ltd., 1480 Dundas Highway East, Cooksville, Ont.

RMS voltmeter *Item 702*

A true RMS Voltmeter capable of measuring a wide range of complex waveforms to 1/4 per cent accuracy is the latest in a line of ac measuring instruments by Ballantine Laboratories of Boonton, New Jersey.

Measurements with this new Model 350 are not limited to sine waves to obtain the accuracy. The instrument provides a 5-digit NIXIE read-out. The voltage range is 0.1 volt to 1199.9 volts. The frequency range of the input signal is from 50 cps to 20 kc with harmonic content to 50 kc.

Bayly Engineering Ltd., Hunt Street, Ajax, Ont.

Insulation resistance tester *Item 703*

Replacing the now obsolete crank type insulation resistance testers, a line operated tester is now available. This modern instrument costs less than the foreign made crank type, and of course much less to operate. This



type of instrument eliminates completely the costly and laborious cranking and leaves both hands free to manipulate test prods. Test voltages of 250, 500, and 1000 volts are available, all compensated for line voltage variation, utilizing a large 4 inch meter. Resistances up to 2000 megohms may be measured and 5 inch and 7 inch meters are optional.

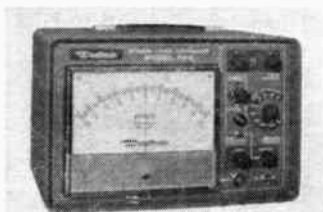
This instrument can be provided as an intricate part of a completely automatic test installation for production purposes, where other tests such as breakdowns, continuity, and leakage are required.

Canadian Research Institute, 85 Curlew Drive, Don Mills, Ont.

Strain gauge indicator *Item 704*

Accurate indication or recording of static and dynamic strain gauge measurements is achieved with the new Model 800 Strain Gauge Indicator.

Designed for maximum versatility as a research tool, the instrument provides features and adjustments to accommodate all commonly used gauge factors, gauge resistances, and transducer bridge configurations. Eight calibrated sensitivity ranges cover the normal requirements. Maximum resolution is



better than one micro-inch per inch. Accuracy of panel meter indication is 1 per cent of scale.

Electrical output is provided for operation of standard potentiometer recorders, cathode ray and recording oscillographs.

B. H. McGregor, P.O. Box 156, Station "H", Toronto 13, Ontario.

Transistorized power supply

Item 705

The model RS 40 power supply is a constant current supply designed for the testing of Zener diodes. It has 3 current ranges, 1-10 MA, 10-100 MA and 100 MA-1 amp. The guaranteed minimum voltage is 13 volts.

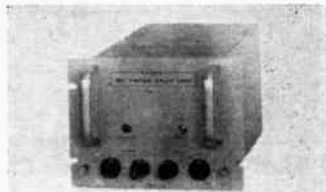
The stability of the output current is better than 0.5 per cent against load and/or ± 20 per cent line voltage variations. The ripple voltage for all settings is less than 20mV RMS. It is supplied as a 19" rack unit, with a panel height of 8 $\frac{3}{4}$ ", or in a cabinet.

Gomard Electronics Ltd., 180 Chatham St., Hamilton, Ont.

90° phase shifter

Item 706

This 90° Phase Shift Module (Model 401) features an accuracy of 0.01° over a frequency range extending from 50 cps to 50,000 cps. The operating frequency is selected by the changing of plug-in units which are each designed for the particular frequency of operation.



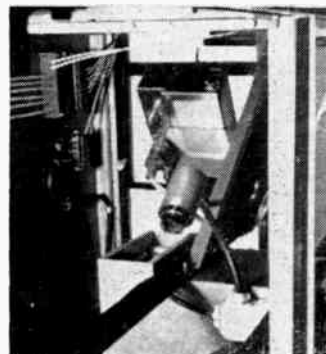
Each separate plug-in is provided with panel controls in order that the gain and phase shift may be calibrated to the required degree of accuracy. By using multiple phase shift modules, each phase shifter may be calibrated to an accuracy better than 0.01° by a primary method of calibration. Stability of the units assure long term accuracy.

Allan Crawford Associates, Ltd., P.O. Box 214, Willowdale, Ontario.

Flaw detector

Item 707

In the production of fine paper inspecting and sorting the sheets for flaws and defects is one of the most time consuming jobs. A mechanical method has been developed by the National Research Council of Canada in cooperation with the Provincial Paper Co. of Georgetown, Ont. The EA Automatic Flaw Detector consists of an inspection head assembly mounted over one of the initial rolls on the cutting machine. Lights within the inspection head flood the paper and one or more scanning arrangements scans the sheet in a transverse direction. The equipment is designed to operate at speeds up to 600 feet per minute, but equipment can be designed to operate at almost any required sheet speed.

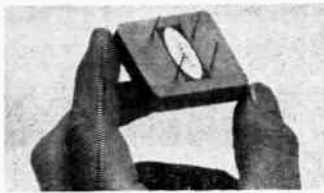


The sensitivity obtained is in no small measure due to the patented circuitry which allows very small flaws to be reliably detected. Electronics Associates Ltd., 4616 Yonge Street, Willowdale, Ont.

Voltage reference standard

Item 708

Designed to provide a voltage reference having a temperature coefficient of +.0005 per cent °C from 0°C through + 60°C, these Viking miniaturized Voltage Reference Standards are made specifically for printed circuit board



insertion. Operating directly from an unregulated DC power source, output voltages of 5.8, 8.5, or 10.5 VDC + 5 per cent are provided with a regulation of +.0005 per cent for a DC input variation of + 10 per cent.

The entire package measures 1 $\frac{3}{16}$ " x 1 $\frac{3}{16}$ " x $\frac{3}{8}$ " and is designed specifically for mounting on printed circuit boards with standard $\frac{1}{2}$ " board spacing.

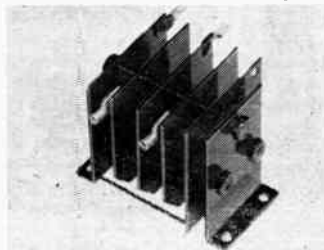
Douglas Randall (Canada) Limited, 126 Manville Road, Scarborough, Ont.

Trans-Sil silicon rectifier

Item 709

A series of double diffused silicon power rectifiers that will deliver up to 6 amperes in half wave and 30 amperes in full wave circuits has been announced by Trans-Sil Corporation.

These amplifiers are suitable for magnetic amplifier and power supply applications and can be used at ambient temperatures to 250°C with no detectable change in characteristics due to aging.



They are available in bridge and center tap assemblies and are completely assembled for wiring directly into the circuit.

The Glendon Company Limited, 603 Evans Avenue, Toronto 14, Ontario.

"Bi-Planar" photodiodes

Item 710

With the announcement of their "FW" series of "Bi-Planar" photodiodes, ITT Laboratories and Standard Telephones & Cables Mfg. Co. (Canada) Ltd. have given to industry and research a unique instrument for the detection of gamma rays, cosmic rays, nuclear, particles, ultraviolet and x-rays. The construction of the photodiodes provides for extremely close optical coupling of a flat scintillator disc resulting in a maximum use of the radiation.

The "FW" series is bi-planar and linear from 10⁻⁹ amperes to 25 amperes and standard units measure from 1 $\frac{1}{2}$ inches in diameter and 1 $\frac{1}{2}$ inches in length to 7 inches in diameter and 3 inches in length. Variations in physical or operating characteristic can be made to suit new performance requirements.

Although the characteristics vary in the different "FW" types the 2 $\frac{1}{2}$ " unit has a dark current output of about one billionth of an ampere with the anode at 2500 volts.

Standard Telephones & Cables Mfg. Co. (Canada) Ltd., 9600 St. Lawrence Blvd., Montreal 12, P.Q.

Signal generator

Item 711

A new RF Sweep Signal Generator (Jerrold Model 900-B) which offers a versatile combination of measurement functions and eliminates the need for much of the test equipment now required for RF sweep frequency measurements between 500 kc and 1200 mc, has just been announced by Jerrold Electronics Corporation.

Sweep widths as narrow as 10 kc and as broad as 400 mc; high stability; built-in attenuator, marker generator, and scope preamplifier; accurately, calibrated center frequency dial; metered output are among the features of the 900B.

Jerrold Electronics (Canada) Ltd., 50 Wingold Ave., Toronto 19, Ont.

Transistorized radio transmitter

Item 712

Motorola has introduced the first fully transistorized FM radio transmitter to operate on standard VHF two-way mobile communications frequencies.

The new unit, called the "Handle-Talkie" Pocket Transmitter, is designed for operation



on frequencies between 25-45 mc and 132-174 mc. It provides 500 milliwatts RF power output.

Eleven transistors in the various stages of the unit provide high reliability, low power consumption characteristics and compactness. The pocket transmitter weighs just 1 $\frac{1}{4}$ ounces, and measures 5 $\frac{1}{2}$ inches by 2 $\frac{1}{2}$ inches by 1 $\frac{1}{2}$ inch.

The transmitter is ideally suited for use by public safety, industry, and business organizations.

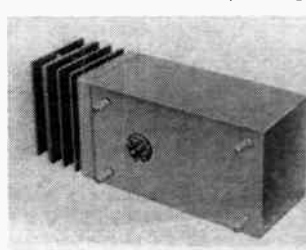
Canadian Motorola Electronics Ltd., 105 Bartley Drive, Toronto 16, Ont.

Regulated power supply

Item 713

Constructed in modular form, compact, and easy to maintain, the recently developed Model 101-D solid state power supply made by Viking Industries features 0.1 per cent regulation for any combination of input voltage or load conditions.

Ripple is less than 1 MV RMS. Input is 100 to 130V, 50 to 2000 cps. Temperature stabilization insures a maximum of + 0.01 per



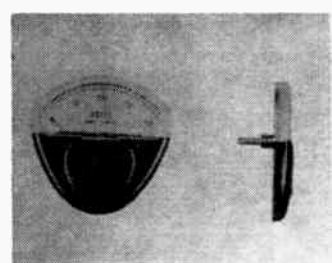
cent/°C drift. An output of 12 V.D.C. at 1 ampere is available over a temperature range of -25°C to + 45°C and is capable of operation up to + 71°C at reduced output current. Size 2 $\frac{1}{2}$ " x 6 $\frac{7}{8}$ ".

Douglas Randall (Canada) Limited, 126 Manville Road, Scarborough, Ont.

Panel meters

Item 714

The new line of surface mounting panel meters by Parker Electronic Instrument Corp. of Connecticut is now available in Canada. They feature a new type of printed circuit design which together with other safety features enables overloads on some models up to as high as 10,000 per cent without damage to the instrument.



The 3 $\frac{1}{2}$ " models are housed in an attractive Lucite case only $\frac{1}{2}$ " thick with combined terminals and mounting screws protruding from the back. Two $\frac{3}{8}$ " diameter drilled holes are all that are required in a panel to facilitate mounting these meters. AC and DC voltmeters, ammeters, and milliammeters are available in the popular ranges and others are available on special order.

L. J. Bardwell Co., Box 142, Station D, Toronto 9, Ont.

115-volt motor-generator

Item 715

Production of a new Size 8 Motor-Generator with both Servomotor and Generator wound for 115-volt, 400-cycle excitation is announced by Helipot Division of Beckman Instruments, Inc.

The new Beckman unit, called model 9008-1106-0, simplifies design problems for the control engineer working with 115-volt 400-cycle reference supplies. Both motor and generator operate from the same source . . . simplifying system circuitry which contributes to economy and reliability in the system as a whole.

Output of the new 115-volt generator is 0.30 volts per 1000 rpm, and phase shift is 0° \pm 10°.



The motor has a stall torque of 0.33 oz.in., no-load speed of 6000 rpm and an acceleration at stall of 70,700 rad/sec².

Helipot Division, Beckman Instruments, Inc., No. 3 Six Points Road, Toronto 18, Ont.

Bristol recorder-controller

Item 716

The Bristol Company is now offering a single-case time-program recorder-controller in its Series 500 instrument line. The incorporation of the recorder and the controller into a single unit affords a 50 per cent reduction in panel-space requirements.

The recorder chart and the program cam are independently driven. This makes it possible to record repetitions of the program on a single chart. The program time may be from 30 minutes to 30 days.

Various models of the instrument measure and control temperature, pressure (including absolute pressure), flow (mercury manometer or bellows-differential meter), liquid level, and humidity.

The Bristol Company of Canada Limited, 71-79 Duchess Street, Toronto, Ontario.

Strain Gage equipment

Item 717

A recent introduction by Brüel & Kjær has been a new Automatic Selector Type 1542 and a Twenty-Point Panel Type 1543 which is for use in conjunction with their already well-known Strain Gage Apparatus Type 1516.

Basically the Selector consists of a 50 position switch and sufficient terminals and R and C balancing components for the connection of 10 full or half strain gage bridges. Where numbers to be measured are in excess of 10 this has been catered for by the Twenty-Point Panel Type 1543. (To obtain 50 measuring points one 1542 and two 1543 are necessary.)

Ten-turn-wire-wound potentiometer in the bridge balancing units. This ensures a very high ohmic resolution giving quick and easy balancing even with a strain gage of a high resistance.

R-O-R Associates Limited, 1470 Don Mills Road, Don Mills, Ont.

Protector

Item 718

The No. 123A1B Protector has recently been introduced for use at non-protected cable terminals to protect a single cable pair against lightning or high voltage when connected to open wire or exposed service drops. It may also be used to protect buried wire when connected to open wire or single pair rural wire.

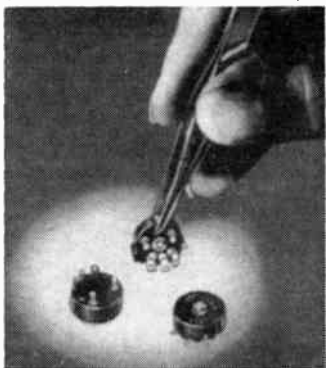
The No. 123A1B Protector is provided with two No. 2BIB Protector Units (6 mil air gap). A No. 150A Cover is available for use with the No. 123A1B Protector when located in an exposed position.

Northern Electric Co. Ltd., 1600 Dorchester Blvd. West, Montreal, Quebec.

Variable resistor

Item 719

A new high torque version of the Centralab Model 6 Variable resistor is now in production. This is an ultra miniature 1/10



watt composition control with a rotational torque of one inch ounce minimum. Since it will thus stay in adjustment under severe conditions of shock and vibration, it is ideal for military and industrial applications.

The high torque Model 6 is available in resistances of 500 ohms to 10 megohms. Change in resistance is less than 1 per cent under vibration test per MIL — STD 202; less than 0.3 per cent under shock test per MIL — 202A; and less than 0.5 per cent under acceleration test per MIL-R-94B. Mechanical rotation is 250°; effective electrical rotation is 220°. Rotation is smooth and noise-free.

Centralab Canada Limited, P.O. Box 400, Ajax, Ontario.

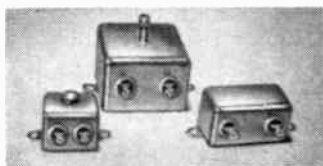
Octahedron towers

Item 720

Development of the octahedron tower with one-third greater load capability and six times greater torsional rigidity than conventional towers has been announced by Up-Right Towers. Lightweight and portable, the tower is an assembly of octahedral or eight-sided sections.

The tower is quickly erected using just two basic parts: identical struts and ball-shaped joints. Struts are available in aluminum alloy, steel or fiberglass of appropriate lengths, diameters and wall thicknesses for specific tower requirements. Components occupy an absolute minimum space for storage or transportation.

Up-Right Towers, 120 Russett Ave., Oshawa, Ont.



Polystyrene capacitors

Item 721

Plastic Capacitors, Inc. recently announced three new lines of Polystyrene Capacitors in bathtub cases. High stability with power factors at 1000 CPS of less than 0.05 per cent are claimed.

Type PV and Type PW capacitors are adjustable within the limits of plus-minus 1 per cent of the nominal capacitance.

Type PX are stabilized and available in capacitance tolerances of 1, 0.5, 0.25 and 0.1 per cent. Capacitance change per year of life is claimed to be less than 0.1 per cent.

Lake Engineering Co. Ltd., 123 Manville Road, Scarborough, Ont.

DC to AC inverter

Item 722

Two DC to AC inverters, using solid state components, were designed and built by R. H. Nichols Limited, to meet the requirements of a major mining company in Quebec, for their power development. These units will provide emergency standby power for two VHF transmitters (the communication link for Nichols' remote supervisory control system for three generators), the telemetering facilities, and sections of the supervisory control equipment.

Each inverter is constructed as a self-contained wall-mounting unit. The simple front panel contains an on/off switch and two indicator lamps to show whether the power source is the line (normal) or the inverter (emergency). An alarm relay provides an audible warning if the inverter should become inoperative. All circuits are designed to operate in an ambient temperature range of 0° to 50°C.

In service, the unit is left on continuously, fed by the station battery. The battery voltage may vary between 105 and 125V and at times may be as high as 140V because of the nature of the charging cycle. The load on the battery from other sources may vary between 20 per cent and full load. Input requirements for the VHF transmitter necessitated voltage regulation to achieve an output from the inverter of 117V (± 5 per cent) at 60 cycles.

R. H. Nichols Ltd., Box 500, Downsview, Ont.

Industrial 2-way radio unit

Item 723

The DK33 "Car-go-Call" industrial radio unit has been designed to supply the growing demand



for short-distance communications in industry. The unit is compact enough to be mounted directly on lift-trucks and other materials handling vehicles, yet rugged enough to withstand shock, vibration and impact.

It is a self-contained unit, gives adequate coverage, can be used as a dispatch unit, is all-aluminum construction, light weight, and has a drip-proof enclosure which minimizes electrical failure due to accidental exposure to dripping liquids.

The low power output and high receiver sensitivity of the equipment ensure excellent performance, while conforming to Department of Transport standards. Canadian Marconi Co., 2442 Trenton Ave., Montreal 16, P.Q.

TV translator transmitters

Item 724

Benco Television Associates Limited of Rexdale, Ontario, have just completed the design and manufacture of equipment for use with their Model T-1 and T-5 television translator transmitters enabling operators to leave transmitter sites unattended for extended periods (6 months or more).

The first system of this type now being installed at North Battleford, Saskatchewan, consists of a main and standby transmitter plus sensing units which continuously monitor the picture and sound carrier output of the antenna.

If for any reason a fault develops on the main transmitter, the standby unit is automatically put on the air and the main transmitter switched off.

It is felt that this method of operation enables transmitter sites to be chosen which would not normally be considered due to their inaccessibility.

Benco Television Associates Ltd., 27 Taber Road, Rexdale, Ont.

Electronic hardware

Item 725

Heldor Electronic Manufacturing Corporation manufacture



terminals of many types and sizes, including the new lock-in and hermetic seal terminals, stock sizes listed in Heldor catalog.

Mounting studs, inserts, and other similar articles of electronic hardware available in brass, steel, stainless steel.

H. C. Machin & Associates Limited, P.O. Box 34, Station K, Toronto 12, Ontario.

12-position rotary switch

Item 726

The new ESCO Type JM Rotary Multipole Switch is a sturdy, compact unit that can provide single-knob control of as many as 75 poles per switch. Available in any number of sections from one to twenty-five, and with a wide variety of contact arrangements, the Type JM switch is suited to complex-circuit controls as well as to tap, transfer, and selector service.

Sturdy detent action gives positive positioning at 30-degree intervals. Contacts and terminals are of silver for low contact-resistance. Switching action, which may be shorting or non-shorting, is wholly contained within the insulated enclosure formed by the molded section-elements.

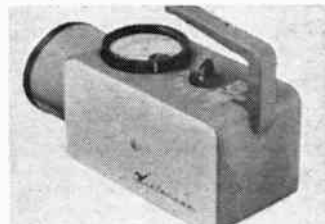
George M. Fraser, Ltd., 1554 Yonge Street, Toronto 7, Ont., or 1024 Notre Dame St., Lachine, P.Q.

Survey meter

Item 727

A new portable, low-energy survey meter of extreme sensitivity for detecting and measuring beta and gamma radiation over a broad energy range is announced by The Victoreen Instrument Company.

According to the announcement, the instrument makes it possible for the first time to provide accurate survey data for a wide range of applications subject to low-energy radiation. Among these are: dental X-rays, X-ray crystal spectrometers, radar sites, and similar installations.



The new Victoreen Model 440 Low Energy Survey Meter has an accuracy of 10 per cent with gamma energy dependence of ±15 per cent from 6.5 Kev to 1.2 Mev.

The Victoreen Model 440 uses an air ionization chamber, with a 1 mg/cm² Mylar window, which permits radiation to be measured directly in milliroentgens. Radiation entering the detector generates currents that measured by a vibrating capacitor which has capabilities that exceed those of conventional DC electrometer circuits.

Radionics Limited, 8230 Maynard Street, Montreal 9, Quebec.

Insulated cable

Item 728

A new construction of type A-16(A) asbestos insulated cable is being introduced by the Federal Wire & Cable Division of H. K. Porter Company (Canada) Ltd.

Now, Federal uses an asbestos braid, which has good abrasion resistance and does not open up on sharp bends. Also, the low insulation resistance values encountered with other types when exposed for periods of time to damp or humid conditions have been greatly improved with this new construction.

H. K. Porter Company (Canada) Ltd., Federal Wire and Cable Division, Guelph, Ontario.

Sub-miniature RF diodes

Item 729

A series of six subminiature silicon point-contact diodes with all-glass construction, and designed for convenient use in miniature RF circuitry is available from Microwave Associates, Inc. All-glass construction in these diodes (1N830 through 1N833 series) assures a very reliable hermetic seal, enables direct soldering to axial leads close to the diode shell, and also reduces shunt capacitance for improved RF bandwidth at microwave frequencies.

E. G. Lomas, 227 Laurier Ave. West, Ottawa 4, Ont.

Single turn A-C pot

Item 730

The first of a series of precision potentiometers for AC excited circuits is now available.

The new AC pot, a 3" diameter single-turn designated Model 5803, represents a major improvement over the use of conventional potentiometers in AC applications. It has high input impedance and low output impedance, thereby substantially reducing quadrature and loading effects. A new design concept also minimizes the chance of catastrophic failure, and provides exceptional



linearity that's stable over the entire life of the unit.

Model 5803 has an impedance range of 1,000 to 75,000 ohms and covers a frequency range of 400 to 1,000 cps.

Helipot Division of Beckman Instruments, Inc., No. 3 Six Points Road, Toronto, Ont.

Photo electric lighting control

Item 731

Industrial Electronics Division has announced the marketing of Model 1000 L-1 Automatic Lighting Control. The Dynalite will provide positive load control switching at low rates of change



in light intensity. A number of design features are incorporated to obtain stable operation with applied line voltages from 100 to 135 volts AC. Excellent stability in calibration is obtained over a temperature range extending from -45° to +140°F.

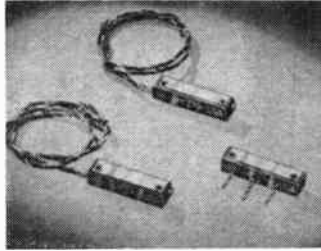
Environmental laboratory tests have marked the Dynalite as an outstanding development in a compact control for automatically switching incandescent, mercury vapor and fluorescent lighting loads up to 1000 watts capacity.

CTS of Canada Ltd., Streetsville, Ontario.

Linear motion variable

Item 732

Centralab's Model 7 Linear Motion Variable Resistors are now a standard industrial distributor item. These linear potentiometers have been manufactured by Centralab since 1956 for the direct military market, but expanded production facilities now make it possible to extend their availability.



Both commercial and military needs can be met by the industrial distributors stocking the Model 7. Factory prices prevail, and industrial quantities are on hand for immediate delivery.

General purpose composition and wirewound units, as well as high-temperature humidity proof wirewounds are included in the Centralab Linear Motion Variable Resistor group, which includes a total of 60 values. All are available with both Teflon and printed circuit leads. Composition units range in rating from 10K ohms to 2.5 megohms. Wirewound Model 7's are available in values from 10 ohms to 20K ohms.

Centralab Canada Ltd., P.O. Box 400, Ajax, Ontario.

Stud-mounted transistors

Item 733

A new line of stud-mounted silicon power transistors has been announced by Raytheon Company's Semiconductor Division.

The high-frequency, high-power units use standard stud-mounted rectifier hardware and mount firmly on a chassis through a single bolt. Their double-ended construction simplifies mounting and facilitates heat-sinking in multiple assemblies.

Providing excellent thermal conductivity, the new hermetically-sealed, fully-welded units will operate in an ambient temperature range of -65° to +200°C.

Raytheon Canada Ltd., 400 Phillip Street North, P.O. Box 8, Waterloo, Ont.

Self-contained projector

Item 734

A self-contained slide projector believed to offer more operating convenience than any other projector within its price range was introduced recently by Bell & Howell Canada Ltd. Easy editing and tray loading before the show is provided by a "look-&-load" device mounted above the projection lamp. This "first-of-its-kind" loading feature places the slide in the correct projecting position to avoid the embarrassment that results from upside-down projection during the show. The projector accepts 35 mm, Bantam, or Super Slides intermixed in the same tray.

Finished in fine wrinkle black, the sleek, low silhouette all-metal case of the 726 is accented with three shades of blue on the sliding panels in front and rear. The folding carrying handle makes the light-weight but sturdy Auto-Load as easy to carry as a portable typewriter. Its soft plastic feet will not mar the finest surface during projection or storage.

Bell & Howell Canada, Ltd., 88 Industry Street, Toronto 15, Ont.

Adding machine reduces errors

Item 735

A new tape punch adding machine designed especially for professional accountants has been introduced by Burroughs Adding Machine of Canada, Ltd.

Designed as a compact unit, with a self-contained tape punch unit, the P1110 is available with up to 13 columns of keys for listing dates, client number, source of entry and other information. Account number and amounts may be listed side by side, saving about half of the machine operations previously required and a proportionate amount of time.

Multiple control keys permit the printing, with appropriate identifying symbols, of totals, account numbers, accounting source, and other information. List keys which do not punch, enable like items to be summarized into a single tape entry, thus eliminating the possibility of operator error before punching the tape.

Burroughs Adding Machine of Canada Ltd., 752 Bay Street, Toronto, Ontario.

Closed circuit stereoscopic TV

Item 736

For the first time, Closed Circuit Stereoscopic Television is available as an "off the shelf" item.

The system has unlimited applications throughout industry in the fields of research, engineering and production.

Attachments are available to convert any existing system to stereoscopic viewing.

In the system offered, the stereoscopic effect is obtained by an assembly of mirrors at the camera position, and by a similar device attached to the monitor, so that the viewer experiences the same spatial perception that he would feel in the camera position.

Transmission Division, Pye Canada Ltd., Ajax, Ont.

Line damper test unit

Item 737

An instrument for the production measurement and calibration of the natural resonant fre-



quency of power line vibration dampers is manufactured by George Kelk Limited. The damper to be calibrated is placed in a foot-operated clamp and a meter indicates the frequency at which the damper vibrates. Dampers can be checked and calibrated at the rate of at least 60 per hour by an unskilled operator.

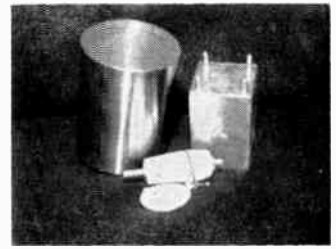
A variety of frequency ranges to accommodate different types of damper can be set up. A multi-position switch allows selection of the appropriate range for the particular type of damper under test. The device effects significant savings in the quantity production of line dampers.

George Kelk Ltd., 5 Lesmill Road, Don Mills, Ont.

Enclosures

Item 738

Heldor Electronic Manufacturing Corporation are suppliers of all types of drawn and fabricated



enclosures manufactured to MIL specifications. Covers for enclosures are supplied with studs, terminals, installed if required.

Full data is available from the Heldor catalog which is also an estimating manual.

H. C. Machin & Associates Limited, P.O. Box 34, Station K, Toronto 12, Ontario.

Receivers

Item 739

The Nems-Clark Type 2501-A Receiver has been designed specifically for measuring the Doppler shifts of incoming signals over a wide tuning range. Extensive use of these receivers is being made in satellite position determining stations.

The unit is continuously tunable from 55 to 260mc and features a low noise figure throughout the band. Two inputs are provided: one for the frequency to be measured, and a second input for a standard reference signal. In normal operation the reference input amplitude is adjusted to operate the detector in a linear fashion, and its frequency is offset by an amount slightly greater than the maximum Doppler shift expected. This produces detector action similar to a frequency mixer, the output being the difference frequency between the incoming signals. Operation in this manner produces an output signal in which the s/n has not been deteriorated due to detector action.

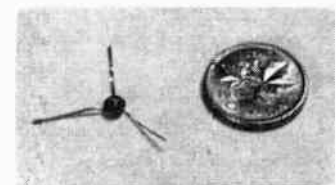
Electromechanical Products, Markham Road, Agincourt, Ontario.

Micro-transistors

Item 740

The first line of micro-transistors in all glass packages has been introduced by Transistron Electronic Corporation. The series of 45-volt silicon mesa devices have an operating current range of 50 microamps to 20 milliamperes and represent the first micro-transistors produced for small signal low level application.

The all-glass hermetic seal provides high reliability by reducing the possibility of leakage. The flat package is compatible with existing circuitry and is considered ideal for use in redesigning circuitry requiring reduced space. The devices can be inserted into printed boards.



The range of rcs is 100-200 ohms; cutoff frequency is over 50 megacycles; and the devices incorporate minimum diameter of .160 inches; and represents 1/20th the volume of the TO-5 package.

Transistron Electronic Corporation, 168 Albion St., Wakefield, Massachusetts.

Walk-in test chamber

Item 741

A new walk-in test facility for testing under simulated conditions of altitude, temperature and humidity, recently constructed by American Research Corporation, features an all-welded stainless steel interior which completely assures that no moisture from high humidity testing can infiltrate the installation.

The chamber will produce temperatures from -100°F. to +300°F., relative humidities from 20 to 95 per cent, and altitudes to 100,000 feet. It is provided with an oversized air mover to keep temperature gradients at an absolute minimum.

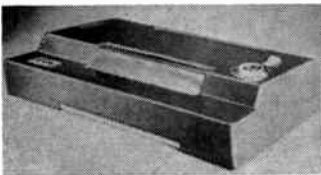
Computing Devices of Canada Limited, P.O. Box 508, Ottawa, Ontario.

Copymaker

Item 742

Apeco of Canada, Ltd. announced its entry into the copymaker field with a compact new unit, the Apeco "Century".

An important new feature of the twelve pound unit is that the



original document and copy paper are placed in direct contact with the exposure lamp, increasing exposure fidelity. The "Century" copies any document, regardless of original color, up to 8½ inches wide, in any length. Other features include an exposure control dial with the exclusive Apeco color band, nylon gears that never need lubricating, electrically-driven rollers that feed paper through the machine at a constant speed for consistent copying quality, and an impact-proof plastic housing.

Apeco of Canada, Ltd., 30 Dorchester Ave., Toronto 18, Ont.

Capacitor molded in epoxy

Item 743

Aerovox Canada Limited announced the availability of Cerafil capacitors molded in a rugged epoxy encapsulation for superlative reliability characteristics. Cerafil capacitors, in a non-molded construction, have been performance proven in every major missile and space-borne development. Their availability in a molded case provides superior mechanical strength and protection and makes them ideal for all automated assembly equipments.

Ultra-miniature Cerafil capacitors are still the only capacitors that offer extremely high capacities per unit volume. Molded units will be designated as MC80A types and will meet or surpass all the requirements of MIL-C-11015B when tested using Cerafil ratings. Units are rated at 100 VDC for 85°C operation and derated to 50 VDC for 125°C operation. They are available in capacitances from 10 mmf through .1 mfd in six physical sizes ranging from .087 diameter x .315 length to .277 diameter x .745 length.

Aerovox Canada Limited, Hamilton, Ontario.

Planar triode

Item 744

A rugged, high- μ , planar triode featuring compact, coaxial, ceramic and metal construction, has been announced by The Machlett Laboratories, Inc.

Particularly designed for use in grounded-grid service as a radio-frequency, amplifier-oscillator, or frequency multiplier for frequencies up to 4,000 Mc, the ML-6771 has an indirectly-heated, oxide-coated disc as a cathode and a heater which is electrically separated from the cathode, thus requiring a comparatively simple circuit.

Features, such as its low inter-electrode capacitances, low electrode lead inductance, and short electron transit time, make the tube well suited for efficient operation in the line-type and lumped-constant circuits at the lower frequencies as well as in the cavity resonators at the higher frequencies. Cooling of the tube's anode is by conduction and convection.

Raytheon Canada, Limited., 400 Phillip St. North, P.O. Box 8, Waterloo, Ontario.

Push-buttons *Item 745*

A new line of flush, oil-tight push-buttons with shallow contact blocks that permit stacking for multiple control circuits is the newest addition to the list of Canadian Westinghouse Industrial control products.

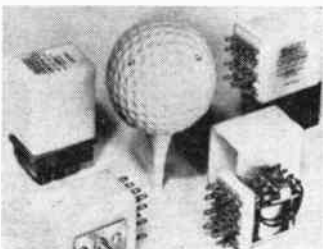
Space-saving design permits stacking of as many as nine contact blocks in tandem on panel mounting. When multiple operation is necessary, all circuits can be energized through a single push-button.

The many types available for a wide range of applications include: flush head; mushroom head; extended head; selector switch, push-to-test and indicating light. Interchangeable, chemical-resistant color plastic caps are available for flush, mushroom and extended head operators.

Canadian Westinghouse Company Limited, Aberdeen Ave., Hamilton, Ontario.

4PDT relay *Item 746*

A 4PDT relay that is only slightly larger than one cubic inch and features extremely long-life is now available from Potter & Brumfield Canada Ltd.



Designated the KHP Series, the relay has operated under a light load in excess of 100 million cycles with less than 5 per cent variation in electrical characteristics.

Standard KHP relays are equipped with pierced solder lug terminals conveniently spaced for fast installation. A single threaded stud provides an easy method for mounting. A socket with solder or printed circuit terminals is available for plug-in mounting applications.

Potter & Brumfield Canada Ltd., Guelph, Ontario.

"Therm-L" inductor

Item 747

"Therm-L" is a high-Q fixed inductor with extreme stability under temperatures from -55°C to 375°C exhibiting excellent inductance and Q over an extreme range of temperatures with good retrace characteristics. The unit is completely inorganic, employing one-piece construction for infinite reliability and compliance for Class C operation under MIL-C-15305-A.

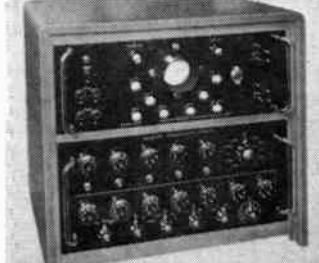
The "Therm-L" inductor is available in a close range of tolerances from 0.068 uH to 0.56 uH on an off-the-shelf delivery basis, at moderately low prices.

Essex Electronics of Canada Limited, Box 385, Trenton, Ont.

Transfer function computer *Item 748*

A radically new approach to the design of servo-control systems has resulted in a range of instruments which will greatly speed and simplify all design procedures which involve the use of transfer functions.

The first instrument in this range to become available is the Transfer Function Computer,



SA100. It is a self-contained instrument operating over the frequency range 0.01 c/s to 500 c/s or, alternatively, repetitive impulse functions, square-wave or triangular-wave outputs. The response of the system being analysed is fed back to the Computer.

Operation is extremely straightforward, involving only the adjustment of a few control knobs in sequence to reduce the display pattern on the c.r.t. from an ellipse to a line at 45° to the horizontal. The computer then provides directly the values of the coefficients belonging to the differential equation to the system. Thus the transfer function is immediately known, and, from this, the roots of the denominator can be extracted.

The Glendon Instrument Co. Ltd., 46 Crockford Blvd., Scarborough, Ontario.

Shipboard static inverter

Item 749

The EE-012 shipboard static inverter is designed to provide standby power for a ship's gyro compass in the event of failure of the normal supply. The unit contains means for effecting automatic transfer of gyro load in accordance with the prevailing power situation. From an input of 24V DC, the unit supplies 240VA at 115V AC RMS, 400 cps, three-phase.

Simple test and monitoring features are incorporated into the design. These comprise a button on the front panel for simulating a ship's-supply failure, a means for checking the frequency difference between the ship's supply and the inverter output, and neon indicators connected in each inverter phase to provide an indication of line voltage.

The De Havilland Aircraft of Canada Ltd., Downsview, Ontario.

Portable survey meter

Item 750

A new transistorized portable survey meter, offering interchangeable GM or scintillation



probes for detection and measurement of alpha, beta and gamma radiation, is announced by The Victoreen Instrument Company.

Three full-scale sensitivity ranges of 800, 8,000 and 80,000 cpm, corresponding to 0-0.2, 0-2.0 and 0-20 mr/hr of radium, and indicated on a large meter, give the Thyac II the finest statistical accuracy available in an instrument of this type. Ranges are readily selected by a single switch conveniently located on the top of the case.

Power is supplied by four D flashlight batteries. High voltage from an all-solid-state power supply is regulated at all times to maintain calibration. Circuitry ensures continuous, trouble-free operation.

Radionics Ltd., 8230 Mayrand Street, Montreal 9, P.Q.

Mirowave relay link

Item 751

With a baseband width of 5 mc. (7mc. is optional at small extra cost), a power output of 0.1 watt and operating in the range 10,500 to 13,200 megacycles, the complete 420A/420AR system made by Mechanical Products Inc. costs under \$7,000. A partial list of features includes "ruggedized" klystrons and premium-type tubes throughout; rack-mounting assembly or completely weather-proofed cases; the chassis removable without disturbing case positioning or parabola, the mount for which is self-contained on the case; plug-in i. f. for easy service-



ing or replacement; built-in test meter for all tuning and voltage measurements; built-in signal attenuator.

A calibrated variable-frequency wavemeter eliminates wavemeter replacement in changing the operating frequency. AFC action is reliable with pull-in range over the entire i. f. bandpass. Point-to-point FM transmission of television signals, one-way voice communication and data channels are among its uses.

Tele-Radio Systems Ltd., 3633 Dundas St. West, Toronto 9, Ont.

High frequency thermocouple

Item 752

With rated accuracy of 1/2 per cent f.s.d., 1 per cent for milliammeters and providing ambient frequency influence of 1 per cent at DC to 5 MC (Cat. #124201). An adjusted spare vacuum thermocouple is also provided. Supplied in fitted, velvet lined storage case at no extra cost, they



are available in 4 range units — 5 mA to 1000 mA, 15 to 150 volts. Stark Electronics Instruments Ltd., Ajax, Ontario.

Check digit verifier

Item 753

Burroughs Adding Machine of Canada, Limited has introduced a new electronic device — the A570 check digit verifier — which virtually eliminates human error in encoding account and other reference numbers into punched paper tape.

About the size of a portable radio, the verifier is actually a solid-state electronic computer. Designed to operate, cable-connected, to Burroughs accounting machines that produce tapes for subsequent data processing.

A mathematical computation which the verifier performs instantaneously upon account numbers to be entered into tape ensures the accuracy of each entry.

The verifier virtually eliminates the chance of wrong account numbers being keyed in by an operator in this way: The "check digit" is a single digit added to a regular account number. It is arrived at by working the so-called "double-add-double" calculation upon the account number.

Burroughs Adding Machine of Canada Ltd., 752 Bay St., Toronto, Ont.

Elapsed time indicator

Item 754

There has long been a need for a simple device to measure how long equipment has been in operation. The conventional methods of time measurements generally use a mechanical device such as a clock or an electrical motor. Both of these devices have considerable limitations in size and cost.

The Chronistor is a subminiature, elapsed time indicator which operates on the electroplating principle. It can be used for indicating the total number of hours during which any electrical instrument, appliance or component has been in operation. The minute amount of current required by the Chronistor is provided by the unit being timed. No auxiliary relays or switches are needed. Elapsed time is given as a direct scale reading.

Electrodesign, 9124 St. Lawrence Blvd., Montreal 11, P.Q.

Permits direct hookup

Item 755

As part of a consistent effort to improve the versatility and reliability of its existing products, Rotron, manufacturer of cooling equipment, has adopted a terminal lock on the 2 1/2" diameter motors which drive certain of the smaller axial fans and centrifugal blowers in their product line.

The terminal block, which is integral with the motor case, replaces pigtail lead wires. This permits hookup cables to be run directly to the motor's terminals and eliminates the material and labor previously required in dual harnessing to the motor as well as to a terminal strip in the vicinity of the cooling device.

The Hoover Company Limited, Hamilton, Ontario.

Oscillograph

Item 756

The Heiland Division of Honeywell Controls Limited has introduced a low-cost direct-recording oscillograph designed for use in normal laboratory testing and evaluation. Known as the 1406 Visicorder, the new model produces instantly readable records of up to six channels of scientific and test data simultaneously, the company said.

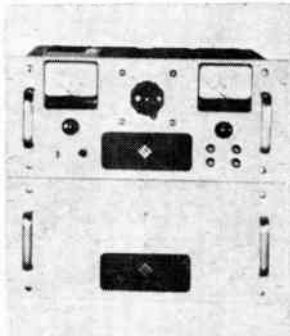
The model 1406 Visicorder may be ordered with a choice of galvanometers and record drive speeds, and is available with or without grid line and timing systems. It records variables from zero to 200 cycles per second; has paper speeds of up to 25 inches per second and utilizes an internal three-speed timer capable of putting time lines on the paper at desired intervals.

Honeywell Controls Limited, Vanderhoof Ave., Toronto 17, Ont.

Transistorized power supply

Item 757

High current output with close regulation and complete freedom from transients have been achieved in the Model ST18-35 transistorized power supply. Ratings are 0 — 18 V dc and 0 — 35 amperes dc, both continuously variable over the full range. Line regulation is 0.005 per cent and load regulation 0.05 per cent.



Recovery time for half current step changes to full current load is 100 microseconds.

Automatic protection against short circuit conditions is provided — the output current can be adjusted from 0 to 120 per cent so that the supply is cut off when the current exceeds a pre-selected value.

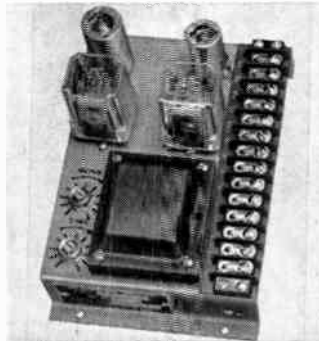
There is no overshoot when the supply is turned on and output voltage does not rise above the voltage setting when the line is interrupted, momentarily or permanently. Ripple is less than 500 microvolts.

Willer Engineering & Sales Co., 676 Richmond Street W., Toronto, 3, Ont.

Photoelectric scanner

Item 758

Combining a sensitive photoelectric scanner-relay and an adjustable electronic timer on the same chassis, the Farmer Type PE7 Scanner System is a versa-



tile control unit adaptable to such varied services as monitoring the flow of slow-moving parts on a conveyor, providing timed energizing of a reject gate for photoelectric inspection of parts, and providing a signal for counting while simultaneously scanning for jam-ups.

Sensitivity ranges are from two inches to 18 feet with adjustable time-delay ranges from 1.5 to 30 seconds. Scanning can be by direct or reflected light. Two separate single-pole double-throw relays have pull-in, hold-in, and drop-out characteristics that are determined by the way the unit is connected. Relay-contact ratings are 8 amperes non-inductive at 125 volts a-c.

John Best Company, 96 Kipling Avenue North, Islington, Ont., Canada.

Latch relays

Item 759

Struthers-Dunn have developed a new latch relay known as the 255 Frame. The relay is a mechanical latch electrical reset type utilizing the heavy duty 12 pin plug and matching Struthers-Dunn 27390 socket for convenient plug-in use.

The relays are designed where maximum economy, control simplification and minimum space are required.

Mechanical and electrical features include: (a) Rigid metal structure assuring exact positioning of the 2 interfering armatures. (b) High contact reliability throughout minimum life of ten million mechanical operations. (c) Contacts are 10 Amps at 115 V AC. (d) Relay plug-in socket withstands 150V AC dielectric test. (e) Available in three standard contact arrangements in a variety of AC and DC coil voltages.

Renfrew Electric Co. Limited, 349 Carlaw Avenue, Toronto 8, Ontario.

Trent electric heating

Item 760

A special industrial bake-out oven designed and developed by Trent, is now speeding production of electronic components at the plant of an internationally known manufacturer.

Used to help remove all traces of moisture and corrosive contaminants, and to speed up and improve gas filling and sealing operations, the bake-out oven fits over the components and is raised and lowered pneumatically. With its unique folded-and-formed electric heating elements, it can produce temperatures from 120° to 320°C for transistor processing, and to 400°C for planar-triode production.

Pioneer Electric Eastern Ltd., 2 Audley St., Toronto 18, Ont.

Retaining spring clips

Item 761

The Birtcher Corporation, Industrial Division has just introduced two new retaining clips for socket mounted TO-5 and TO-9 series transistors to comply with military requirements for retention of plug-in devices. The new spring clips, designated 3B-714-1 and 3B-714-2, provide a positive spring pressure retention on the transistor case top and easy access for service.

Mounting is accomplished by means of the screw or rivet which attaches the transistor socket to the chassis. A locking tab on the clip positions it and prevents twisting. Two heights are available; for transistors with mounting height dimensions of 13/64-in. and 21/64-in.

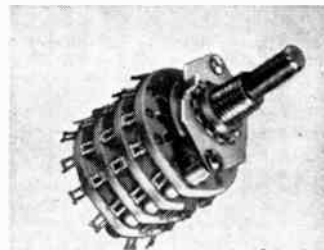
Lake Engineering Co. Ltd., 123 Mainville Road, Scarborough, Ontario.

Miniature ceramic switches

Item 762

A new line of switches that will withstand temperature to 175°C is now available from Centralab Canada Ltd. These miniature ceramic switches are designed on the same principles and mechanical specifications as Centralab's Series 20 units. However, they use specially developed high-temperature alloys and incorporate new assembly techniques that assure their high temperature operation.

Switches with standard materials are operable only to 125°C.



The new high temperature switches provide up to 22 terminals per section, each insulated from the others, thus frequently eliminating an entire switch section. Maximum switching combinations per section range from 1 pole, 2 to 12 positions to 6 poles, 2 positions.

Centralab Canada Ltd., P.O. Box #400, Ajax, Ontario.

Germanium alloy transistors

Item 763

A new series of PNP germanium alloy transistors for applications requiring high gain and low noise characteristics is now available from Canadian General Electric Company's Electronic Tube Section.

These new high quality devices are available from stock in production quantities.

The 2N1175 and the 2N1175A low noise devices are suited for a broad variety of industrial circuits where economy is an important consideration. Both types are derived from the highly reliable JAN 2N526 product line.

To assure reliable performance under severe environmental conditions, the transistors are hermetically sealed, subjected to a 100 per cent hermetic seal test and given 100 hours of high temperature bake. The devices are rated for operation in the minus 65°C to plus 85°C temperature range.

Canadian General Electric Co. Ltd., 214 King Street West, Toronto, Ont.



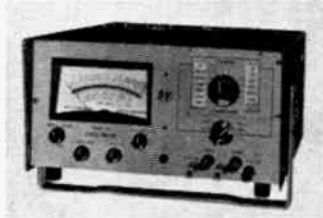
Electronics and Communications

CANADIAN EXPORT PRODUCT ISSUE

Multi-function meter

Item 764

An exceptionally flexible multi-function current, resistance, and voltage meter has been announced by Smith-Florence, Inc.,



Seattle, Washington, manufacturer of electronic instruments. Especially noteworthy is the current range on the new instrument, 10^{-9} to 10 amps., ± 2 per cent dc and ± 3 per cent ac. The resistance range is 10 ohms to 10 megohms centre scale, 5 per cent accuracy. AC voltages can be measured from 1 mv. to 1 kv. ± 3 per cent over the 20 cps. to 1 mc. range, and DC voltages can be measured from 1 mv. to 1 kv. ± 2 per cent.

The multi-function Model 810 combines functions and specifications heretofore available only in a number of separate instruments, costing more than three times the price of this instrument.

B. H. McGregor, P.O. Box 156, Station "H", Toronto 13, Ontario.

D.C. amplifier

Item 765

A new chopper-stabilized, DC amplifier that is said to have 2.5 times as much power output and five times as much voltage output as previous models in its line has been introduced by Honeywell Controls Limited.

The AccuData III is an all-transistorized DC amplifier that can step up low-level signals from a variety of transducers to 10 volts with a high degree of accuracy. It has both single-ended and differential input connections, but retains the compact size and performance standards of its predecessor, the AccuData.

Honeywell Controls Limited, Vanderhoof Ave., Toronto 17, Ont.

Electronic secretary

Item 766

A transistorized telephone answering set has been developed by Electronic Secretary Industries, Inc. The all-tape operated Model LP (Long Play) Electronic Secretary will record incoming messages of varied lengths up to one hour's duration (two-hour capacity also available). The unit, which connects to a telephone line, utilizes transistors to provide low power consumption and ease of maintenance.



A "time out" device allows automatic disconnect if the caller remains silent for as long as 12 seconds.

Automatic Electric Sales (Canada) Ltd., 185 Bartley Drive, Toronto 16, Ont.

Video distribution amplifier

Item 767

Completely transistorized distribution amplifier offers the following features: infinitely variable gain with fine and coarse controls; over 15 db overall gain; self-contained power supply integral with each amplifier; test jacks allow checking of input and output signal; compact design requires minimum panel space.

Central Dynamics Ltd., 147 Hymus Blvd., Pointe Claire, Montreal 33, Quebec.

Potentiometers

Item 768

Guild Line Instruments Ltd. has available two different potentiometers. Type 4363D measures 1.9 volts in steps of 1 microvolt or 0.19 volt in steps of 0.1 microvolt with an accuracy of $\pm (0.0015$ of reading + 1 μ V). It is intended for use in voltage and current measurements and for resistance or standard cell comparison.



Type 9144 is a temperature controlled six figure potentiometer measuring 2 volts in steps of 1 microvolt on four dials or 0.2 volt in steps of 0.1 microvolt. Linearity of the circuit is adjusted to ± 0.0002 per cent and it's usable to $\pm (0.001$ of reading ± 0.5 μ V). The instrument is usable for voltage and current measurements and as a resistance or standard cell comparator.

Guild Line Instruments Ltd., Box 99, Smiths Falls, Ont.

Magnet wires reduce costs

Item 769

Isobond and nythane magnet wires offer customers reduced costs due to a decrease in electrical failures in form wound



yoke coils and lower production costs due to good windability.

Isobond is a bondable film over polyurethane enamel. It is recommended for use in coils which are used in the manufacture of TV sets. Solderability of this material at low temperatures increases production, and its high cut-through resistance reduces the degree of electrical failures in the finished coil.

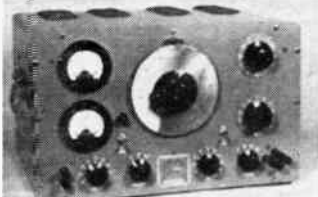
Nythane magnet wire is a nylon coating over polyurethane enamel. Its principal use is in automatic coil winding machines where its good windability enables its users to obtain faster production. It also boasts good solderability and is highly resistant to abrasion and chemicals. Nythane is rated as a class A magnet wire and is produced in natural or red finishes in regular, heavy or triple enamel thicknesses. It is available in sizes 13 to 31 AWG inclusive.

H. K. Porter Co. (Canada) Ltd., 265 Suffolk St., Guelph, Ont.

Audio signal generator

Item 770

Model TS-5008/U incorporates all the instruments required for



accurate gain or frequency response measurements into one compact unit. This audio signal generator brings new speed and ease to testing applications, supplying any desired frequency from 20 to 2000 CPS using a resistance tuned audio oscillator.

These frequencies are developed at any desired voltage up to 150 V. The TS-5008/U will supply 5 watts output with less than 1 per cent distortion, and thus is useful where sizeable amounts of power are required. It is well adapted to measuring frequency response and gain or loss of any network.

Stark Electronic Sales Company, Ajax, Ontario.

Audiomatic programmer

Item 771

This system, now in use at The Audio Shop Ltd., provides complete switching of stereo components in high fidelity showrooms. Four lever switches on the control panel, shown above, remotely control motor-driven rotary switches located close to components (tuners, amplifiers, record players, tape recorders).

Push buttons for instant loud-speaker comparison, headphone outputs (with balance control), individual "L" pads for each speaker, and a complete indicator light system are also incorporated in the system.

Dayrand Limited, 4612 St. Catherine Street West, Montreal 6, P.Q.

Transmitter for call system

Item 772

A battery-operated "baby" transmitter weighing only 3 lb. is the nucleus of a personal call system newly developed by Multitone of Canada Limited. Fully transistorized, and therefore independent of the power supply, the new system satisfies the need for an economical pocket paging system in smaller plants, hospitals, libraries, shops, offices, restaurants and hotels.

Depending upon the layout of the premises "radio" coverage varies from 40,000 sq. ft. to 300,000 sq. ft. The 15-channel arrangement provides either speech or private signal for a



total of 15 personnel carrying pocket receivers. It is an addition to the line of larger systems manufactured by the Company.

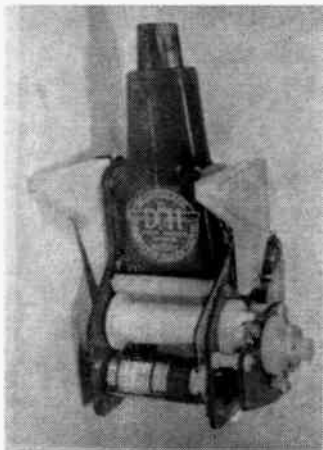
Multitone of Canada Ltd., 130 Merton St., Toronto 7, Ont.

Antenna erection unit

Item 773

The principle of the De Havilland Antenna Erection Unit is a simple one which can be applied in many different forms for a wide variety of applications, either as a structural mast or as a whip antenna.

The antenna tape material is stored on the antenna storage drum with thin Mylar tape of equal width interwound with it in such a way that when the Mylar tape is wound on to its



drum, the antenna material is pulled out through a guide sleeve. As the material extends beyond the sleeve, it takes on a tubular form. The two edges of the tape overlap by some 180° so that for a 2" wide tape the finished tube diameter is approximately 0.45".

Each Antenna Unit is a self-contained package, complete with its own drive for extension of the antenna. Provisions for power cut-off at completion of extension and for manual or automatic rewind are included.

The De Havilland Aircraft of Canada, Limited, Downsview, Ontario.

Cartridge tape recorder

Item 774

An entirely new, transistorized cartridge tape recorder for broad-



casters is announced by RCA Victor. The quality instrument incorporates unique features, including a cue signal for remote equipment control.

There are two units: the RCA BA-7A recording amplifier, and the RCA RT-7A playback unit. Both are compact and completely transistorized. The system is designed for industry compatibility, and will accept standard half-track cartridge tapes. There is provision for recording program material on one track, and cue tones on the second track. An oscillator in the record amplifier is used to key a tone on the cue track at the beginning of each recording. This tone will automatically cue each tape at the start of a program.

RCA Victor Co., Ltd., 1001 Lenoir St., Montreal 30, P.Q.

Two-way radio

Item 775

A new space-saving table model two-way radio designed for use by businesses, governmental agencies and military services, is now available from Canadian General Electric Company Limited. It costs less than larger, floor-model, cabinet-type base stations, and will be a boon to commercial firms and municipalities.

Units up to 60 watts are available in low band (25-54 mc. and 72-76 mc.), up to 50 watts in high band (144-174 mc.) and 15 watts in UHF (450-470 mc.). Depending on the frequency selected, power amplifying equipment can be obtained on an optional basis, providing 250/330 watts output.

Canadian General Electric Company Limited, 830 Lansdowne Avenue, Toronto, Ontario.

Data handling systems

Item 776

Canadian Aviation Electronics Ltd. has developed a line of basic solid-state devices with commercial applications. From these building blocks have evolved data handling systems for use in the



telegraph field and in gas and electric utilities. In addition, a development program is under way to produce process control systems for the chemical and pulp and paper industries.

The equipment is being marketed under the trade name "Telepath". This includes intercouples for automatic translation of alpha-numeric punch card data to serial code for transmission on teletype circuits, solid-state teleprinter relays, automatic relaying systems, selector units and multiple line regenerative repeaters.

In addition, CAE has now in production a telemeter and supervisory control system using the same solid-state systems and teletype technique for data transmission.

Canadian Aviation Electronics Ltd., Box 2030, St. Laurent, Montreal 9, P.Q.

Intercom amplifiers

Item 777

Completely transistorized intercom amplifiers for use in TV, film studios, theatres, public halls, etc., wherever highest quality intercom reproduction is a requirement.

Inexpensive units with trouble free long life and no heat dissipation problems. Both models, IMA-1011 83db pre-amplifier and



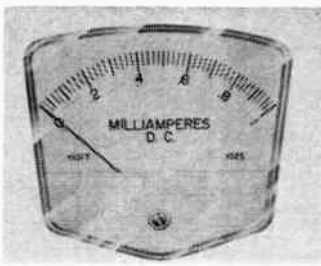
1AA-1011 5 watt amplifier, are available.

Central Dynamics Ltd., 147 Hymus Blvd., Pointe Claire, Montreal 33, Quebec.

Panel meter

Item 778

This new 2½ inch model in clear polystyrene is announced by the Hoyt Electrical Instrument



Works. The scale is said to be 20 per cent longer than on bakelite models of like size.

The case is static-free and available with a colored band across the lower front. Similar polystyrene models are available in 3½ and 6 inch sizes.

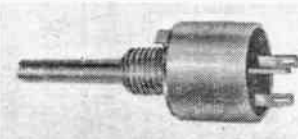
Hoyt Electrical Instrument Works, Inc., 42 Carleton Street, Cambridge 42, Mass.

Various-size controls

Item 779

The latest Canadian engineered achievement — a hot molded completely enclosed ½" diameter control rated at ½ watt, will exceed MIL-R-94B specifications. The design is based on long experience and assures high reliability by simplicity of construction.

Also available the ¾" diameter control which can be rated at 1 watt at 70°C, the standard model 1¼" diameter and the sub-miniature control completely en-



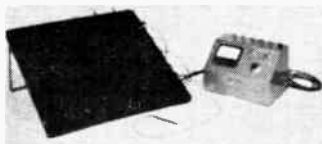
closed and only ¾" diameter — for printed circuit use. All controls have been built for high quality applications.

Precision Electronics Components (Canada) Ltd., 50 Wingold Ave., Toronto 9, Ontario.

Electric field plotter

Item 780

An Electric Field Plotter has been designed that allows the



solution by rheo-electrical analogy, of problems involving the Laplace field equation, such as those relating to heat and fluid flow and electrostatic or magnetic fields.

The equipment consists of a plotting board and a bridge unit. Conductive paper is placed on the board and the physical configuration of the subject under investigation is simulated by low resistance conductors painted on the paper.

A probe connected to a high-resolution null balancing circuit in the control unit is used to explore the conductive paper surface to plot electric field contours. The plotter offers a resolution of 0.1 per cent of the total field and 0.5 per cent bridge linearity. Power requirement is 115 volts, 60 cycles, 15 watts.

George Kelk Ltd., 5 Lesmill Road, Don Mills, Ontario.

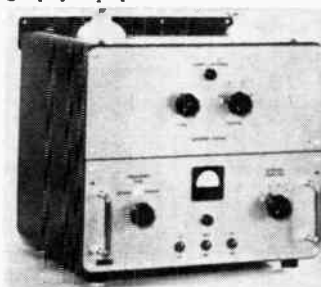
Telegraphy transmitter

Item 781

The 71 L 20 is a 135-watt transmitter designed for A1 or A2 telegraphy on eight crystal-controlled frequencies in the range 405-525 kc/s.

The transmitter is normally powered from a 24-volt emergency battery.

The 71 L 20 meets all international requirements in respect of emergency transmitters on the frequency of 500 kc/s for vessels required by law to carry telegraphy equipment.



The transmitter is well suited for use as emergency and standby transmitter for bigger vessels, and as a combined main and emergency transmitter for smaller vessels.

Biotronics Laboratories, P.O. Box 744, Station B, Montreal, P.Q.

Epoxy glass tubing

Item 782

Phenolite tubing grade G-11-3681 epoxy resin bonded glass fabric base material (NEMA grade G11) made by National Vulcanized Fibre Co., is used for insulating and mechanical components. It is much lighter than phenolic rod, for insulation, yet has equal or better mechanical and electrical properties.

In one switch mount model, the epoxy glass tubing, used as an actuating link, is connected to a solenoid and a vacuum switch shaft by means of an adhesive-bonded threaded metal ball and socket insert. For this application the excellent bonding qualities of the tubing are particularly useful.

Phenolite grade G-11 is made with inside diameters of .125-in. to 20-in. Maximum ratio of wall thickness to inside diameter is one-half.

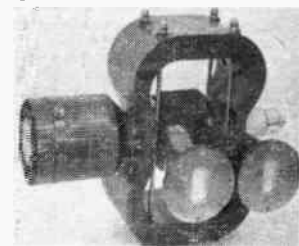
National Fibre Co. of Canada, Ltd., 107 Atlantic Ave., Toronto, Ontario.

Amplifier klystron

Item 783

Lightweight, air-cooled and compact, Varian Associates' new VA 834B amplifier klystron gives one kilowatt of CW power tunable from 4.4 to 5.0 kilomegacycles.

For transportable systems, air cooling and permanent magnet focusing of the power amplifier tube allows savings in weight. Heat exchangers, magnet power supplies and their control circuits are eliminated. Operating procedures are simplified by elimination of focusing and coupling adjustments.



The tube tunes over a range of 600 megacycles. Synchronously tuned a 4.4 kilomegacycles, a gain of 57 db is obtained. Tuned for wideband use, and bandwidth of 12 megacycles is obtained.

Tube Division, Varian Associates, 611 Hansen Way, Palo Alto, Calif.

Multi-point controller

Item 784

The new Thermo Electronic Multi-Point Temperature Controller provides accurate automatic two-position control for up to ten separate processes. It saves initial investment, panel space, and cuts installation, operation, and maintenance time.

The Multi-Point Controller combines a sensitive null-balance potentiometer measuring circuit with an electronic control system. It is adaptable to any installation requiring on-off control. Accuracy is 0.5 per cent of range. Calibrated range scales are available for all standard thermocouple materials.

Thermo Electric (Canada) Ltd., P.O. Box 10, Brampton, Ont.

Module power supplies

Item 785

These power supplies although small in size (3½" x 6½") offer extremely high regulation. The units are variable from 0-50 volts DC and offer .1MV load regulation. This along with a line regulation of .5MV, ripple & noise of 1MV RMS and a transient response of 20 US make for an extremely efficient unit.

In addition to this Valnor have also designed a new and exclu-



sive feature in to their module power supply. This feature is Remote error sensing at the point of the load in powering remote circuitry and Remote programming allowing output voltage to be adjusted from a remotest position.

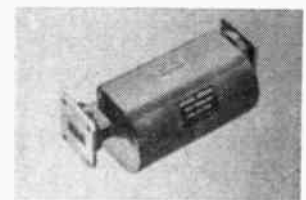
The customer can also get the exact voltage he wants in a fixed power supply module at no extra charge, which is another exclusive feature offered by Valnor Instruments. These units are available in both 60 or 400 cycles at 0.5 or 1.0 amp.

A. Deskin Sales Corp., 1091 Shorecrest Avenue, St. Martin, Montreal 40, P.Q.

Ferrite isolators

Item 786

DesMornay-Bonardi is in production on a new ferrite isolator designed for high performance



over the entire waveguide frequency range of 8.2 to 12.4 kmc.

A resonance absorption type isolator, the unit employs a low-loss ferrite developed specifically for this application. Insertion loss is 1.0 db maximum, with a minimum of 30 db isolation. VSWR is 1.15 maximum in either direction.

Designed with a short insertion length of 5¾ inches, the unit is equipped with RG-52/U size waveguide, and UG-39/U flanges.

B a y l y Engineering Limited, Hunt Street, Ajax, Ontario.



CANADIAN EXPORT PRODUCT ISSUE

Mercury battery *Item 787*

A low impedance multi-voltage reference source is now commercially available with the Voltage Reference Mercury Battery.

Designed as an ideal laboratory tool, it can be used as a reference source for instrument calibration; for speed, temperature and voltage measurements; thermistor bridges; bias circuits; pH testing; and to supply a stable direct current output for measuring, telemetering and control systems.

A unique chemical system provides accuracy approaching that of standard laboratory grade reference cells. It has an accuracy of plus or minus 1/2 per cent of stated open circuit voltage and it is temperature stable within 1 per cent from minus 20 degrees F. to plus 160 degree F. at drains up to 100 microamperes. For



short periods this reference battery is accurate to one part per million and to within plus or minus 1/2 per cent for three years or more at normal temperature.

Mallory Battery Company of Canada Ltd., 228 St. Helen's Ave., Toronto 4, Ont.

Low impedance diode *Item 788*

An extremely low dynamic impedance 6.2-volt temperature-compensated zener diode has been introduced by Motorola Semiconductor Products, Inc.

The unit, type 1N821A, is designed for ultra-stable reference applications in digital voltmeters, precision high-stability oscillators, analog to digital converters, and similar industrial applications.

With the low dynamic impedance characteristics, the diode minimizes voltage fluctuations due to changes in current. It has a maximum impedance of 10 ohms, and a typical value of 8 ohms. This precision device costs the same as the standard 1N821 now available, which has nearly twice the dynamic impedance — 15 ohms maximum.

Canadian Motorola Electronics Co., 105 Bartley Drive, Toronto 16, Ont.

Transistor tester *Item 789*

A transistor test set, suitable for low, medium and high power transistors is now offered by Levell Electronics Ltd. The TM5

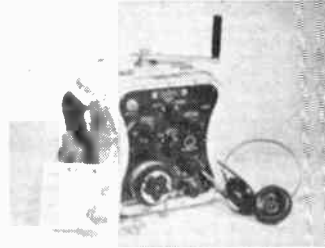


offers wide versatility coupled with low cost. Specifications of the unit are as follows: Current Gain: 100, 250, 500; Collector Current: 0.5, 5, 50, 500 mA; Base Current: 5, 50, 500, 5,000 uA; Leakage Current: 0.5, 5 mA; Resistance: 0-50 K ohms, 0-500 K ohms.

Conway Electronic Enterprises Reg'd., 1514 Eglington Ave. W., Toronto 10, Ontario.

Lifeboat radio *Item 817*

The transmitter operates on 500 kc/s (600 m) or 8364 kc/s (35.87 m). The receiver is fixed



tuned on 500 kc/s and is tunable from 8200 to 8800 kc/s. Two types of antenna may be used with the set: a kite-supported antenna or a conventional sailing-mast antenna. Longest range and best performance are obtained with the kite-supported antenna. MARINETTA 71A10 is provided with mast antenna only while Type 71A11 has also a kite and a kite antenna.

The entire equipment is powered by means of a built-in hand-cranked generator. To the case of the transmitter-receiver a belt assembly is affixed by means of which it is possible to fasten the unit on a thwart or between the legs of a sitting operator. A compact watertight floatable container houses the complete radio equipment.

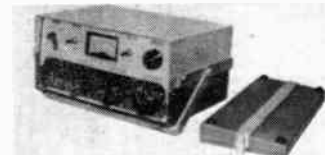
Biotronics Laboratories, P.O. Box 744, Station B, Montreal, P.Q.

Transistorized amplifier *Item 790*

A lightweight, low-drain portable broadcast amplifier with built-in studio quality and 100-per cent transistorization is now available from Canadian General Electric Co. Ltd.

It weighs only 19.5 pounds — approximately half the weight of an older tube model.

Designed for use on AM-FM-TV and recording audio applications, the amplifier's high quality per-



formance makes it particularly effective in broadcasts of sports events, spot news and music programs.

Canadian General Electric Co. Ltd., 830 Lansdowne Avenue, Toronto 4, Ont.

Trans-sil rectifiers *Item 791*

A series of stud-mounted high current power rectifiers handling up to 40 amperes at 150°C in half wave circuits has been announced by the Trans-Sil Corporation.

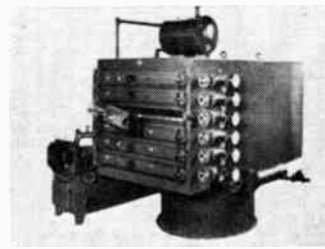
The new stud-mounted rectifiers are designed for reliable operation in electrical equipment, as well as high current electronic gear. They are designated Series MP, and feature double-diffused silicon junction construction. The peak inverse voltage capability of these rectifiers is from 50 to 800 PIV. In full wave circuits, currents up to 60 amperes can be obtained.

Trans-Sil Corporation, 55 Honeck St., Englewood, N.J.

Vacuum shelf dryers *Item 792*

A new design of vacuum shelf dryer, available in two types, is intended for the drying of delicate materials sensitive to heat and oxidation. As each dryer is composed of a number of independent compartments which can be operated semi-continuously, materials can be dried in one compartment while other compartments are being loaded.

The C-3, suitable for low moisture content materials such as granules and powders, operates from ambient temperature to 302°F and accommodates four non-jacketed trays in each compartment. Oil, heated by electricity, circulating around the outside of the compartments is the heating medium. Each compartment gives a drying area of 20 sq. ft. Standard sizes of dryers have 2, 4, 6, 8 and 10 compartments.



The C-51 type, particularly suitable for high moisture content and semi-liquid products, has sub-atmospheric steam jacketed trays with each tray having its own individual compartment. This gives high and even thermal conductivity due to direct contact, and results in very fast evaporation in a low temperature range of 95-195°F.

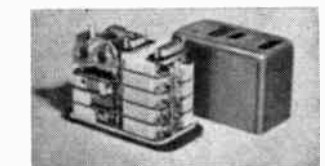
Canmark Services Limited, 131 Bermondsey Road, Toronto 16, Ontario.

Command receiver *Item 793*

Development of a highly reliable and extremely miniaturized Veri-Min command receiver for control purposes in drones, pilotless aircraft and satellites, and for destroy purposes in missile range-safety operations, has been announced by the Leach Corporation.

The Veri-Min is an exceptionally light (24 oz.) and small (17.9 cu. in.) solid-state, dual conversion, super-heterodyne set designed to receive tone-modulated FM signals in the frequency range of 406 to 450 megacycles.

It demodulates and filters the tone signals and uses them to actuate control relays. It has unusually low power consumption.

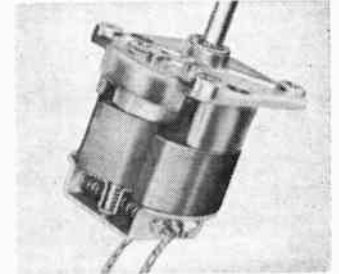


The Veri-Min, in its standard form, has four channels and contains four decoder assemblies, with supplemental packages to provide additional decoder channels.

Brian Engineering Ltd., 5275 Van Horne Avenue, Montreal, P.Q.

High torque motor *Item 794*

A high torque, lightweight, low speed Rotorac® motor with ex-



ceptional split second starting and stopping characteristics is now available from Airborne Accessories Corp.

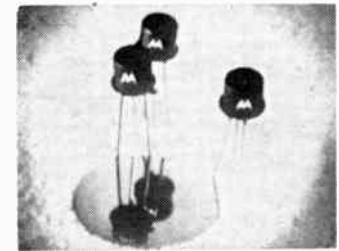
Operating from a 60 cycle power source, the Rotorac® motor can deliver 6 inch pounds of torque at 20 rpm for a .75 ampere 115 volt input. This torque is delivered for any angular rotation of the output shaft. Typical weight for the Rotorac® is only 10 ounces. Other features include the ability to sustain stall conditions without damage to the motor or the mechanism and the ability to accommodate reasonable adjustments to the speed-torque characteristic.

Airborne Accessories Corp., 1414 Chestnut Avenue, Hillside 5, New Jersey.

Epitaxial transistors *Item 795*

New silicon and germanium epitaxial mesa transistors have been produced.

The new epitaxial devices, both switch and amplifier types, are electrically equivalent to micro-



alloy types, but retain the high power capability and high reliability facets normally associated with mesa type transistors. Both these and other mesa types are being offered at new low prices and will make it possible to use mesa transistors economically in practically all high-frequency applications.

Motorola Communications, 105 Bartley Drive, Toronto, Ont.

Silicon stabistors *Item 796*

The addition of two new silicon stabistors was announced by Silicon Transistor Corp.

The new types, STC 135 and STC 235, are a practical and economical solution for those applications requiring forward conductance only. Their low dynamic impedance and controlled forward characteristics make them ideal for transistor base circuits, low level clipping or in reference and regulator service.

Temperature ranges are: —80 to +150°C for the STC 135 and 180 to +200°C for the STC 235. **ATR Armstrong Ltd., Box 38, Station D, Toronto 9, Ont.**

1961 calendar of electronic events

Continued from page 45

- May 23-25. Symposium on Large Capacity Memory Techniques for Computing Systems, Information Systems Branch, U.S. Office of Naval Research, Department of Interior Auditorium, Washington, D.C.
- May 25 - June 4. 13th International Fair, Luxembourg.
- May 26 - June 4. International Aeronautical Exhibition, Paris.
- May 29 - June 2. Fifth Biennial Meeting of the European Molecular Spectroscopy Group, Amsterdam.
- May 30 to June 2. Radio and Electronic Component Show, Olympia, London.
- June 4-8. Instrument Society of America Instrument-Automation Conferences and Exhibits, Royal York Hotel and Queen Elizabeth Hall, Toronto.
- June 8-18. General Assembly of the International Organization For Standardization, Finland.
- June 11-25. 30th International Fair, Poznan.
- June 12-17. I.E.F. Conference on Components and Materials used in Electronic Engineering, Central Hall, Westminster.
- June 15-24. Construction Equipment Exhibition, Crystal Palace.
- June 15-29. 8th Nuclear and Electronic Congress and Exhibition, Rome.
- June 21 - July 1. International Plastics Exhibition and Convention, London.
- June 25-30. 64th Annual Meeting, American Society for Testing Materials, Chalfonte-Haddon Hall, Atlantic City, N.J.
- June 26-28. European Symposium on Space Technology, The British Interplanetary Society, Council Room of F.B.I., 21 Tothill Street, London, S.W.1.
- June 28-30. Second Joint Automatic Control Conference, University of Colorado, Boulder, Colo.
- July 7-29. Russian Trade Fair, Earls Court, London.
- July 9-15. First International Bio-medical Electronics Exhibition, Waldorf-Astoria, New York.
- Aug. 1-12. Sydney Trade Fair, Royal Agricultural Society Showground, Sydney.
- Aug. 21 - Sept. 2. Tenth Pacific Science Congress, Honolulu.
- Aug. 22 to Sept. 9. International Trade Fair, Wellington, New Zealand.
- Aug. 23 to Sept. 2. National Radio and Television Exhibition, Earls Court, London.
- Aug. 25 to Sept. 3. German Radio, Television and Phonographic Industries Exhibition, Berlin.
- Aug. 30 - Sept. 10. St. Eriks Fair, Stockholm.
- Sept. 1-8. International Exhibition of Radio, Television and Electronic equipment (FIRATO), Amsterdam.
- Sept. 4-9. Third International Sessions of the International Association for Analogue Computation, Belgrade.
- Sept. 11. 20th International Congress of Navigation, Baltimore.
- Sept. 11-15. Instrument Society of America Instrument-Automation Conferences and Exhibits, Memorial Sports Arena, Los Angeles.
- Sept. 26 to Oct. 6. Heating, Ventilating and Air Conditioning Exhibition, Olympia, London.
- Oct. 4-6. Fifth Convention and Exposition of the Canadian Institute of Radio Engineers, Exhibition Park, Toronto.
- Oct. 14-29. 12th German Industries Exhibition, Berlin.
- Nov. 7-13. International Symposium on Numerical Weather Prediction, Tokyo.
- Nov. 8-10. Conference on Non-destructive Testing in Electrical Engineering, I.E.E., Savoy Place, London, W.C.2.
- Nov. 13-18. 2nd Engineering Materials & Design Exhibition, Earls Court, London.
- Nov. 13-18. 9th Factory Equipment Exhibition, Earls Court, London.

CANADA'S FIRST NAME IN VARIABLE COMPOSITION RESISTORS



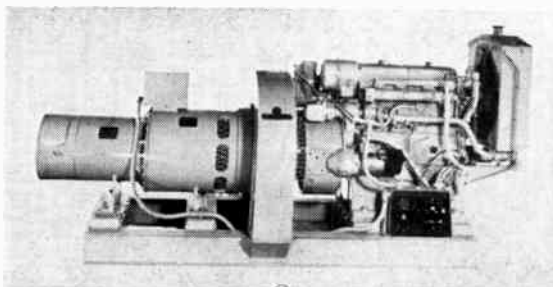
We specialize in the manufacture of high quality Variable Composition Resistors for industrial and military applications. We cover the whole range from the subminiature of $\frac{3}{8}$ " diameter up to $1\frac{1}{8}$ " diameter.

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For complete details check No. 42 on handy card, page 61

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For complete details check No. 33 on handy card, page 61

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We therefore wish to point out that we manufacture

- Low-power VHF Transmitters (Translators) VHF-VHF
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Berkner to address electronic conference

Dr. Lloyd V. Berkner, newly-elected president of the Institute of Radio Engineers, the world's largest engineering society, will be guest speaker at the IRE Canadian Electronics Conference banquet in Toronto, October 3.

His address, to be given at the Queen Elizabeth Dining Room at the Canadian National Exhibition, will be one of the high points of the three-day Conference. Dr. Berkner will speak on a subject appropriate to the theme of the Conference, "Progress Through Electronics".



Dr. L. V. Berkner

Dr. Berkner is now president of Associated Universities, Inc., New York, N.Y., and has held various other high offices and advisory positions in government, industry and education. He recently served on national and international committees for the International Geophysical Year. He was prominent in an IGY meeting of the International Union of Geodesy and Geophysics held on the University of Toronto campus in 1957.

Radionics Ltd. appointed Canadian rep

Radionics Ltd., Montreal, recently announced they were appointed the exclusive Canadian representative of Electro-Pulse, Inc., Los Angeles, California, a subsidiary of Servo-Corporation of America.

Radionics Ltd. will now supply Canadians with a broad range of single pulse generators, double pulse generators, word generators, pulse train and pulse code generators, time delay and gate generators, current generators and core testers, as well as measuring instruments.

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A world market awaits Canadian made electronic products

Continued from page 41

quality, design and packaging are equally or more important than price alone. The Ontario and Quebec manufacturer is ideally situated to take advantage of the American market, located as he is in provinces that border on eight states with a population in excess of 65,000,000 people. To the Canadian manufacturer who has the right product and the initiative and ingenuity to cultivate this rich market to the south comes the reward not only of increased sales but of cutting unit costs and becoming more highly competitive and efficient both at home and in export markets.

Opportunity U.K.

In addition to the export potential that exists in the United States there is also that other large English speaking market comprised of the United Kingdom and the British Commonwealth.

Here again we think it fair to say that the small Canadian businessman estimates the possibilities of selling to Britain much the same as he estimates the possibilities of selling to the United States and substantially for the same reasons. Britain is certainly no amateur in the field of manufacturing. In many respects, if not most respects, her engineering and scientific ability exceeds that of the United States, though this is a claim seldom voiced and less seldom admitted or agreed with on the North American continent. Nevertheless, as in the United States there are market areas in the United Kingdom comprised of buyers with a strong preference for Canadian goods, a preference based on many and varied reasons, Canadian styling, delivery dates, Commonwealth preferential tariffs, the recent removal of import controls from a wide range of dollar goods, to mention but a few.

B. C. Butler, Canadian Commercial Minister in London, England, has recently stated that Canadian businessmen should consider the United Kingdom market as an extension of the Canadian domestic market because of its proximity in terms of modern transportation making possible low freight costs and relatively low costs in money and time for sales visits, the increasing adoption of North American merchandising methods, the absence of a language barrier or serious labelling and packaging problems and the growing similarity of tastes, likes and dislikes between the Canadian and British peoples.

Today in dozens of countries around the world, countries with newly won independence, countries with a compelling urge to build and establish for themselves industries, utilities, and educational facilities to upgrade the social conditions of their peoples, there is an urgent need and a ready market for products of the secondary industries of the western world. There is no reason why Canadian secondary industries cannot have a fair share of this world market providing Canadians get out and sell it instead of waiting for the business to knock on their doors.

Already there are a few in the Canadian electronics industry who through initiative, imagination enterprise and a willingness to take a chance have established for themselves an export market of greater proportion than could ever have been won at home. Such opportunity is not restricted to the few but is available to all.

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WANT
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- 3 resistance ranges zero to 20 megohms
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ACCURATE • PORTABLE • LIGHTWEIGHT

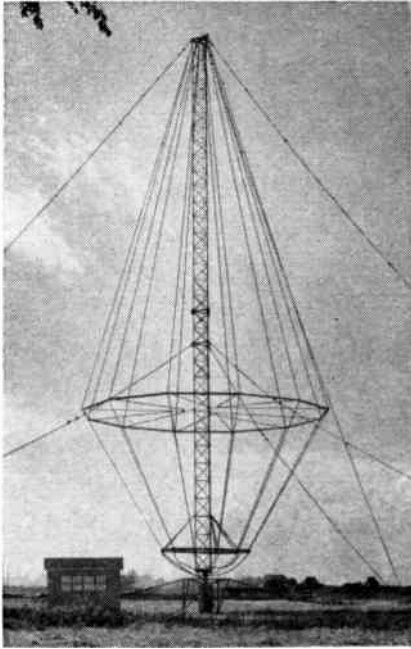
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For complete details check No. 54

EIA to be represented on IRE conference executive committee

An important new liaison between manufacturers and engineers in the electronics field has been created. Henceforth the Electronics Industries Association will be represented on the Executive Committee of the 1961 IRE Canadian Electronics Conference.

This new liaison supplements and strengthens existing links. Ralph A. Hackbusch, Director of Engineering of the EIA, sits on the Conference's Advisory Committee and Eric Palin acts as liaison with the EIA on its Executive Committee.

First appointee as EIA Representative to the Executive Committee is Stuart D. Brownlee, President of the Canadian Admiral Corporation Ltd.

and immediate past president of the EIA.

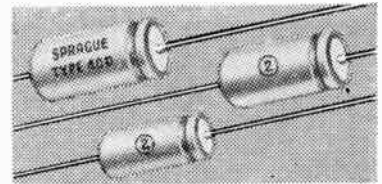
In announcing Mr. Brownlee's appointment, Fred J. Heath, General Chairman of the Executive Committee, said the closer liaison between the two associations would help create the most productive forum and display in the history of the electronics industry in Canada. The EIA is composed of Canadian electronics manufacturers, the IRE of Canadian electronics engineers.

Invitation issued for papers

An invitation for the submission of papers for presentation at the technical sessions of the IRE Canadian Electronics Conference has been issued. The Conference is to be held at Exhibition Park in Toronto this October 2, 3 and 4.

Authors are being asked to send Mr. A. R. Low at Conference Headquarters, 1819 Yonge St., Toronto, a 500 to 1,000 word summary of the proposed paper. Authors of selected papers will be asked to supply a 100-word abstract for inclusion in the conference program pamphlet and a biographical sketch.

The publication of a digest of the papers presented is being considered. This would be available at Conference registration. For such a digest, authors would be asked to submit diagrams along with a 500 to 1,000 word summary of the paper in a form suitable for direct photographic reproduction.



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2 KVA to 350 KVA
Models for every application

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For complete details check No. 31 on handy card, page 61

Industry personnel

Continued from page 22

Former president of Philips Industries dies

O. W. Rodomar, former president of Philips Industries Limited a division of Philips Electronics Industries Ltd., and one of the most warmly respected men in the electronics industry in Canada, died at the age of 60 in Toronto, January 30. He had suffered a long illness in the course of which, in January 1960, he stepped down as president and assumed the post of vice-president in charge of public relations of Philips Electronics Industries Ltd., a role in which he was still active up to his death.

Marier appointed manager

The appointment of John E. Marier as manager of the Vancouver Branch of Burroughs Adding Machine of Canada, Limited has been announced by the company's general manager, J. L. Rapmund.

Mr. Marier, a native of Toronto, joined Burroughs in March 1948. He held senior sales positions in Toronto until January 1, 1958 when he was appointed manager of the Burroughs branch office in Windsor, Ontario.

His successor in Windsor, Mr. Rapmund stated, will be John P. Bastien, formerly a zone sales manager in Toronto. Mr. Bastien was born in Montreal and joined Burroughs in 1952. Since then he has held various responsible sales positions in the company.

Giblett joins Raytheon

J. L. Turpie, commercial sales manager of Raytheon Canada Limited, announced the appointment of Robert T. (Bob) Giblett to the company's Commercial Sales Division at Waterloo, Ont. Mr. Giblett, who has had many years' experience in the Canadian electronic industry, will specialize in tube and semi-conductor requirements.

Appointments at Motorola

Changes in the national sales organization of Canadian Motorola Electronics Company have resulted in the appointment of John F. Hooper as manager — mobile sales.

Formerly Ontario region sales manager, Mr. Hooper assumes responsibility for coast-to-coast sales of all Motorola mobile communications equipment. He will remain at the firm's Toronto headquarters in his new capacity.

Gust Landstrom, formerly sales representative in Ontario, has been named assistant manager — mobile sales.

Far East representative appointed

The appointment of Dr. George C. Riley as its representative in the Far East was announced recently by Canadian Aero Service Limited, Ottawa, worldwide air survey company. Previously with the Geological Survey of Canada, Dr. Riley recently joined the staff of the University of Hong Kong. As a professor in its Department of Geology and Geography, he will head the Department's field geology program.

Dr. Riley's broad experience in petrology, photogeology, and his work in lead, zinc, copper and tungsten

areas are expected to be especially useful in planning air surveys for natural resources and development programs in the Far East.

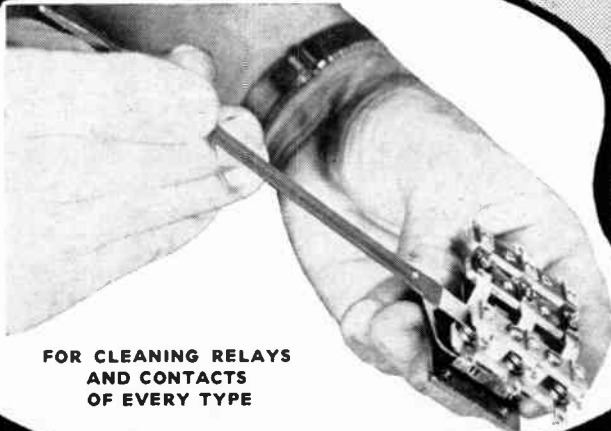
Vice-president appointed at CGE

R. N. Fournier has been appointed a vice-president of Canadian General Electric Company Limited, according to an announcement by J. Herbert Smith, president, following a recent meeting of the company's board of directors.

Mr. Fournier is general manager of the company's Wholesale Department, with headquarters in Toronto.

PAYETTE stocks

DIACROM DIAMOND SPATULAS



FOR CLEANING RELAYS AND CONTACTS OF EVERY TYPE

The Diacrom Spatula makes the cleaning of relays both practical and profitable. Because it has been specifically designed for this purpose, the Diacrom Spatula eliminates the problems usually caused by inefficient cleaning of relays, and adds a few advantages of its own. For example, one of the most important problems in cleaning any relay is to be sure that the normal gap is left unchanged. In this regard, the Diacrom Spatula, utilizing diamond particles as the abrasive element, requires so little pressure to do a thorough and effective cleaning job, that the gap is unaffected. Write for descriptive literature.

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Polyethylene, Polyfoam and Teflon
Dielectric Community Types.

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For complete details check No. 55 on handy card, page 61

CANADA'S NUMBER ONE GENERAL-PURPOSE RESISTOR...

IRC GBT $\frac{1}{2}$

This fixed carbon composition resistor with its handsome shiny green appearance, is unsurpassed in solderability, low operating temperature and excellent power dissipation.

NO HOT SPOTS

Exclusive IRC element is formed by depositing a carbon film of controlled thickness on special glass filament with continuous curing to prevent "HOT SPOTS".

RAPID HEAT DISSIPATION

Wire leads extend into resistance element to provide increased ability to dissipate greater heat more rapidly.

DUAL PROTECTION

Molded housing gives protection from moisture and mechanical damage and at the same time prevents any possibility of grounding.

ANCHORED LEADS

Leads withstand 5 lb. pull test even before molding. The special vanes anchored into the molding to prevent twisting.

For further information write for bulletin B1E



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For complete details check No. 45 on handy card, page 61

Clairtone sees \$20 million export of hi-fi to U.S.

By exporting to the United States, the Clairtone Sound Corporation Ltd., a recently-formed Canadian manufacturer of stereo hi-fi sets, visualizes an eventual \$20 million annual market there.

The company decided to display its sets in the U.S. for the first time at the 1959 American Music Show in New York City. Reaction was so favorable the company took the unprecedented step of setting up an American sales organization. Canada was then importing 300 radios for every one it exported.

However, by August 31, 1960, the company had sold \$75,000 worth of stereo hi-fi sets in the U.S., but this figure was almost trebled in the remaining four months of the year, when sales soared to well over \$200,000. The Clairtone line is now being carried by many of the best-known retailing names in America.

U.S. sales are anticipated to equal or surpass the Canadian figure in the next 18 months.

Other world markets such as Europe, Australia and South America are under consideration as future markets by Clairtone. The company's display at the Ideal Homes Exhibition in London, England, last year elicited considerable interest and inquiries.

The company will soon require larger quarters for its production facilities, and is considering construction of a new plant with completely automated production and warehouse facilities.

Canadian Research to rep for Moran Instrument

The Moran Instrument Corporation, of Pasadena, California, announce the appointment of Canadian Research Institute, 85 Curlew Drive, Don Mills, Ontario, as their exclusive Canadian representative, with the exception of British Columbia.

Canadian Research Institute will be responsible for the sales and service on Moran Instrument Corporation's broad range of electronic instruments, which will include digital servo data printers, self-balancing calibrators, precision power supplies, and many other major electronic devices.

Sola — Basic Products Ltd. Eastern Canada appointment

Appointment of R. (Bob) French as sales representative for all of Eastern Canada, was announced by J. R. McGovern, P.Eng., vice-president and general manager of Sola - Basic Products Ltd. Mr. French will operate from offices located in Montreal.

Broadband filters

Item 797

These Canadian engineered Erie broadband R.F. filters are designed for radio interference suppression in all types of electrical and electronic equipment. By the use of the latest solid state materials, they have developed miniature units having attenuation greater than 80 db from 20 to 2000 Mc.

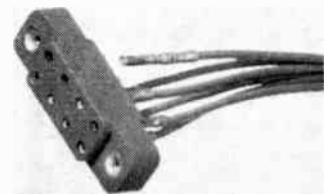
This new approach to these filters in major reductions in size, weight and D.C. resistance and increased attenuation. A simplified construction, which can be readily hermetically sealed, provides for high reliability and compliance with military environmental conditions. From the basic construction shown, filters can be designed to meet special requirements.

Erie Resistor of Canada Limited, Trenton, Ontario.

Relay socket

Item 798

Viking Industries, Canoga Park, California, announced an improved version on their standard micro — miniature relay sockets



for industrial and military use. These new sockets feature closed entry — rear entry, crimp type contacts.

These contacts have been tested successfully to applicable requirements of MIL-C-26636.

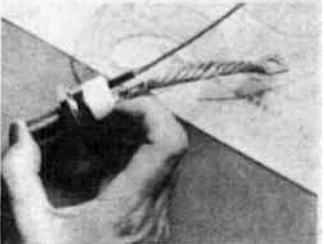
Douglas Randall (Canada) Ltd., 126 Manville Road, Scarborough, Ontario.

Silicon power transistors

Item 799

A family of silicon transistors ideally suited for use in high-current power supplies, regulators, amplifiers and high-power switching applications is available from Canadian Westinghouse. These transistors have maximum collector current ratings of 30 amperes power dissipation (P_c) of 250 watts and collector-emitter voltages (V_{ce}) up to 100, 150, or 200 volts.

The units are available in three series, with collector current (I_c) ratings of 10, 15, and 20 amperes respectively, at a current gain of 10. The devices have a low saturation resistance (r_{ce}). For example, the WX115 series of de-



vice with collector current of 10 amperes has a maximum saturation resistance of only 0.15 ohm at 25 degrees C.

Canadian Westinghouse Company Limited, Hamilton, Ont.

Stereo transcription turntable

Item 800

The new model of the world famous, British-made Connoisseur turntable is now available in Canada. The new Connoisseur offers studio quality performance



to meet the quality demands of the most discriminating audiophile. The 12" non-magnetic turntable is a lathe turned sand-casting, custom fitted to its individual spindle.

The heart of the unit is a synchronous hysteresis motor, which is virtually vibrationless, with minimum noise level and hum induction. Careful attention to dynamic balance and the provision of resilient mounts make these important features a fundamental part of the design. The unit is equally suitable for micro-groove and stereo recordings playing at speeds of 33 1/3 and 45 rpm.

Astral Electric Company Limited, 44 Danforth Road, Scarborough, Ontario.

Vacuum storage cart

Item 801

Designed to keep electronic components clean and dry and prevent them from absorbing moisture and gases prior to final assembly.

This is a mobile unit with its own self-contained vacuum pumping system. It has six storage compartments of varying sizes connected by individual mani-



folds to the evacuation system. The cart is 36" high x 24" wide x 42" long; and is mounted on rubber-tire, roller-bearing wheels. **F. J. Stokes Co. of Canada Ltd., 4198 Dundas Street West, Toronto, Ontario.**

Flexagage

Item 802

A new bending-separator gage has been put on the market which will separate and identify tensile strains and strains produced by bending moments on the surface of a structure. Major feature of the new device, called Flexagage, is that it can be mounted on one side of a structure only, thus eliminating the need for mounting strain gages back-to-back both inside and out-

side of such structures as pressure vessels, aircraft wings, etc.

Flexagages may be mounted with any solvent-free room-temperature curing strain gage adhesive.

Flexagages are currently available in three models and can be used with materials ranging in thickness from 0.040" - 0.320". Standard model gages can be supplied with special correction factors for use with other material thicknesses and custom configurations can be supplied on special order.

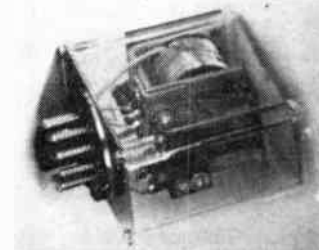
Budd Instruments, Ltd., 170 Donway West, Don Mills, Ontario.

Plug-in relay

Item 803

One of the most versatile general purpose plug-in relays is mounted in a clear plastic case. It's available in all standard coil voltages, AC and DC, and as plate circuit types with standard coils, 2500, 5000 and 10,000 ohms.

In addition, any special coil winding is available with sensitiv-



ity as low as 75 mw. per pole. All standard control combinations are available up to 3 form C rated up to 8 amperes, using octal plug-in bases, or special 4 form C contacts rated up to 8 amperes, using specially developed 14 pin plug and socket.

Special coil and contact combinations using up to 20 pin plugs and sockets are also available. **Osborne Electric Co., Ltd., 95 Wesley Street, Etobicoke, Ont.**

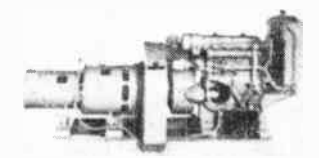
Uninterrupted power unit

Item 804

Electronic ground guidance systems for missiles require precise continuous power without interruption. To meet this need Mechron Engineering Products Ltd. have designed and manufactured uninterrupted power units.

The output voltage of the uninterrupted power unit remains within ± 5 per cent of rated voltage. The maximum instantaneous voltage transient does not exceed ± 10 per cent of rated voltage with recovery to within ± 5 per cent of rated voltage within 5 milliseconds. The output frequency remains within a band width of 60 cycles ± 2 per cent during these conditions.

Two units are supplied for each site and operate in parallel to



provide uninterrupted standby power. Each unit is capable of carrying the entire critical load.

Mechron Engineering Products Ltd., 2437 Kaladar Ave., Ottawa, Canada.

Sine-wave generators

Item 805

These instruments offer high power output over a wide range



of frequency with extremely low distortion. Model 512 covers 0.9 c/s to 510 Kc/s with an accuracy of ± 2 per cent over the best part of the range, the frequency response being $\pm 1/2$ db. The output power is 2 watts into 600 ohms with 50 volts unloaded output; distortion varies from 0.1 to 0.2 per cent.

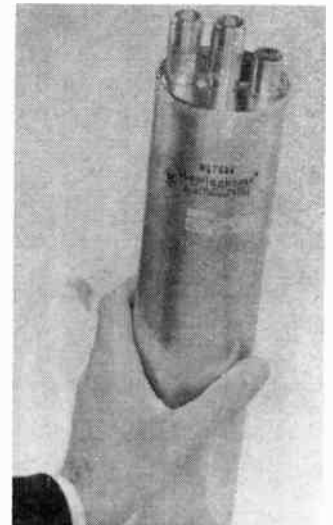
Model 512F is similar to 512 but covers frequency range of 0.5 to 510 Kc/s with 1 watt output below 1 c/s. Both models have dimensions of 9 1/2" x 7 1/4" x 11 1/2" and weigh only 18 lbs. each.

The Glendon Instrument Company Ltd., 46 Crockford Blvd., Scarborough, Ontario.

High-temperature neutron detector

Item 806

A new high-temperature ionization chamber is available from Canadian Westinghouse for detection of thermal neutrons in the



range 2.5×10^4 to 2.5×10^{10} neutrons per square centimeter per second. Neutron sensitivity of the boron-lined tube — type WL-7606 — is 4.4×10^{-11} amperes/Roentgen/hour. Gamma sensitivity is 5×10^{-11} amperes/Roentgen/hour.

Most notable of the tube's properties is the ability to operate continuously at temperatures up to 500°F. The WL-7606 also employs guard ring construction to minimize signal leakage through insulators and is equipped with type HN connectors.

Canadian Westinghouse Company Limited, P.O. Box 510, Hamilton, Ontario.

CANADIAN EXPORT PRODUCT ISSUE

U-shaped wedges *Item 807*

Three new sizes have been added to the Glastic line of U-shaped stator wedges for electric motors. The additions have widths of 5/16", 11/32" and 3/8". They bring to 11 the number of Glastic U-wedges available, in widths of 3/16" through 1/2" and standard lengths of 36".

Their special one-piece molded construction of polyester reinforced with woven fiber glass provides higher strength and



easier driving than wood or fibre wedges, and their space-conserving design allows greater coil cross-section. Dielectric strength for all sizes is 3,000 volts minimum.

H. P. Ruggles and Co., Ltd., 88 Caroline St., Hamilton, Ontario, Canada.

Counter with a memory

Item 808

Continuous readout is a G-R exclusive. The "memory" in this counter constitutes an important new operating aid. Four of the instrument's eight decades are used for storage and continuous display, while the remaining four decades count continuously. At the end of each counting interval, the total accumulated by the counting decades is transferred automatically and quickly (only 100 μ sec) to the storage and display decades. Continuous counting offers many advantages — information is sampled more often; frequency adjustments become easy; analog recording is greatly simplified; and operator eye fatigue induced by the dancing lights of intermittent displays is eliminated.

Unsurpassed reliability is achieved by: new decade codes and high-speed counting circuits; circuits designed to operate properly under the worst combination of cumulative tolerances imposed by tubes, component values, and voltage levels; use of proven "hard bottoming" multivibrator dividers that make for exceptional stability — eliminate need for periodic adjustments of time-base circuits; elimination of critical voltages; neither plate nor filament supplies are, nor need be, regulated.

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

Wirewound resistors

Item 809

These high temperature resistors are recommended for power applications where a stable resistor is required. Type "DR" resistors are available in ratings from 2 to 20 watts at values up to 10,000 ohms. Of solid construction features include: rectangular "steatite" case, fibre glass cores,



uniform windings and special bonding between case, element and terminations.

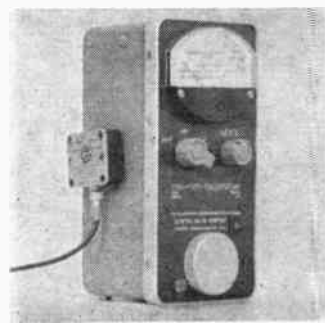
Douglas Randall (Canada) Limited, 126 Manville Road, Scarborough, Ontario.

Calibrator for vibration pickups

Item 810

A compact battery-operated vibration calibrator (Type 1557-A), with which one can calibrate accelerometers, vibration pickups and vibration meters, as well as other vibration-measurement systems that use small, crystal-type accelerometers as sensing elements, has been announced by the General Radio Company.

Consisting of a transistorized electromechanical oscillator and a battery-operated cylindrical shaker, the instrument provides a standard acceleration for 1 g (rms) at 100 cps. Acceleration output appears at two pillbox-shaped 50-gram discs mounted on an internal cylinder extending through the instrument and projecting at the sides. The pickup to be calibrated is attached to,



or in place of, one of these discs. Acceleration accuracy is ± 10 per cent; frequency accuracy is ± 1 per cent.

General Radio Co., 99 Floral Parkway, Toronto 15, Ont.

Error-free dictation

Item 811

A new concept in dictation, called "Executory", uses a magnetic belt allowing an executive to correct his dictation immediately.

About the size of a Hi-Fi tuner, the "Executory" will be sold in units especially constructed for the secretary, for the executive,



and constructed so that both could use the same machine.

The distinguishing feature of the new IBM product is that the "Executory" utilizes a magnetic belt for recording the voice. Instead of instructing his secretary to eliminate or cross out the unwanted portion of the dictation, the dictator merely has to review what he has said and then dictate over the portion on which he has erred. The old dictation is automatically erased and the new dictation is recorded.

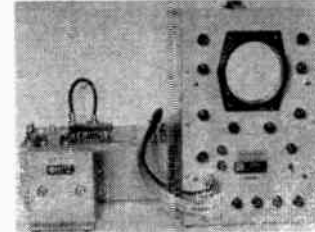
Another advantage is that the magnetic belt can be used thousands of times, just by erasing the old recording. From the overall cost standpoint, the magnetic belt is the least expensive of all recording media.

International Business Machines Co. Ltd., Don Mills Road, Toronto 6, Ont.

Automatic impedance plotter

Item 812

Higher and lower frequency ranges than were covered by earlier models, are provided in the new AMCI Type 14 Automatic Impedance Plotter. At the low end, an additional range of 0.1 to 2.5 mc facilitates measurement



of crystal-transducer impedances as well as other measurements in sonic and ultrasonic investigations.

At the high end, an additional range of 1100 to 1700 mc increases the overall utility of the equipment. With two intermediate ranges of 2.5 to 250 and 180 to 1100 mc, this equipment gives complete frequency coverage from 0.1 to 1700 mc.

Aiford Manufacturing Company, 299 Atlantic Avenue, Boston, Massachusetts.

Trimmer resistors

Item 813

CTS of Canada, Ltd. has added a new 42-turn 1/2" square trimmer resistor (Series 170) and a new 25-turn rectangular trimmer resistor (Series 180) to its metal-ceramic CeraTrois line. Extreme reliability and high safety factors at rated wattage are achieved by using a unique CTS-developed metal-ceramic element fired at temperatures exceeding 600°C, resulting in a rugged, hard surface, low contact resistance element.

The units are designed to meet the increasingly stringent reliability and stability requirements of complex electronic systems. Both units have infinite resolution, complete resistance range from 100 ohms through 1 megohm and extreme stability under all environmental conditions.

CTS of Canada, Ltd., Streetsville, Ontario.

Hermetically-sealed micro-diodes

Item 814

The first true hermetically-sealed micro-diodes have been developed by Transitron Electronic Corporation and are now being marketed. Using new techniques — high temperature glass is melted directly around the diode to assure a hermetic seal. Transitron's new process solved the problem of having silicon withstand direct contact with molten glass during manufacture.

The first units offered are eight types of voltage regulators, with the same characteristics as more conventional micro-diodes. Other hermetically-sealed micro-diodes



now in development include high conductance diffused silicon diodes; fast switching diffused silicon diodes; stabistors; and a very fast switching diode.

Transitron Electronic Corporation, 168 Albion St., Wakefield, Mass.

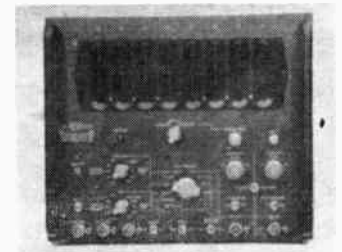
Spectrum analyzer

Item 815

Polarad Electronics Corporation, the leader in microwave spectral analysis equipment, has developed an extremely wide band Spectrum Analyzer having a display of up to 4,000 mc.

The Model WSA covers the frequency range from 10 mc to 40,000 mc in 20 bands which are contained in one unit. The extreme wide band display can be used to simplify field intensity measurements by displaying the entire range of each frequency band, for testing r-f transmitters and signal generators for "holes" throughout their tuning range, checking out broadband jamming systems, observing and measuring sidebands associated with modulated signals, and to determine pulse widths and pulse shapes by spectrum analysis techniques.

Features: rapid band selection by illuminated push button switches; a frequency marker up



to 4,000 mc; end-markers to indicate frequency limits of each band; a center-marker allowing the operator to switch from wide band to narrow band without hunting for the r-f signal; automatic fail-safe circuitry to protect backward-wave oscillators; 7-inch cathode-ray tube; synchronization either internal, line frequency, or external; dispersion 1 mc to 25 mc in narrow band and 50 mc to 4,000 mc in wide band; resolution is 20 kc in narrow band and 1.5 mc in wide band; sweep repetition rate is adjustable from 1 to 30 cps.

MEL Sales Ltd., 1969 Avenue Road, Toronto 12, Ont.

Coaxial crystal mounts

Item 816

AEL has just added to their line of broadband, octave band, narrow band, and single frequency mounts, a new low cost, general purpose, video detector mount. The Model CNB-302A, to be used for many general applications where the utmost in sensitivity is not required.



These mounts have a nominal minimum tangential sensitivity of -40 dbm, from 50 to 12 kmc, using an AEL10 or selected 1N23B crystal. Using an AEL10 crystal from 50 mc to 7 kmc, tangential sensitivities as high or greater than -50 dbm have been recorded.

The Model CNB302A is offered with type N male input connectors, or either BNC, miniature, or TNC female video connectors. The mount can be delivered from stock, and sells for \$20 without a DC return or \$30 with a DC return.

Conway Electronic Enterprises, 1514 Eglinton Ave. West, Toronto 10, Ontario, Canada.

D.D.P. contracts

Following is a list of unclassified electronic defense contracts for \$10,000 or more awarded during the period December 16, 1960, to January 15, 1961, to Canadian firms by the Department of Defense Productions.

- Ahearn and Soper Co. Ltd., Ottawa, Ontario, electronic tubes, \$10,010.
- Anton Electronic Laboratories Inc., Ajax, Ont., radiometers, \$19,536.
- Bayly Engineering Limited, Ottawa, Ont., test sets, \$12,335.
- Canadian Applied Research Ltd., Toronto, Ont., electronic components, \$12,090.
- Canadian Curtiss-Wright Ltd., Toronto, Ontario, ultrasonic cleaners, \$21,719.
- Canadian General Electric Co. Ltd., Toronto, Ont., pre-production engineering for electronic test equipment for aircraft \$993,147.
- Canadian General Electric Co. Ltd., Toronto, Ont., radar spares, \$15,789.
- Canadian Westinghouse Co. Ltd., Ottawa, Ont., electronic tubes, \$39,684.
- Collins Radio Co. of Canada Ltd., Toronto, Ont., antenna, \$16,851.
- Computing Devices of Canada Ltd., Ottawa, Ont., test equipment, for position and homing indicators, \$346,857.
- Allan Crawford Associates Ltd., Willowdale, Ont., electronic equipment, \$16,612.
- De Havilland Aircraft of Canada Ltd., Downsview, Ont., design, development and installation of electronic equipment, \$23,060.
- Honeywell Controls Ltd., Toronto, Ont., test equipment for automatic flight control systems, \$449,250.
- Honeywell Controls Ltd., Toronto, Ont., test equipment for automatic flight control systems, \$3,750,000.
- International Instrument Sales, Montreal, P.Q., sphygmomanometers, \$10,260.
- Lake Engineering Co. Ltd., Scarborough, Ont., electronic tubes, \$11,895.
- Lenkurt Electric Co. of Canada, Ltd., Vancouver, B.C., spares for multiplexing equipment, \$18,135.

Continued on page 70

Soldering is *EASIER FASTER BETTER* with American Beauty Soldering Tools

American Beauty electric soldering irons are the highest quality made. The finest engineering, best materials and on-the-job experience since 1894 is yours with every American Beauty. There is a right model, correct tip size and proper watt input to do any soldering job easier, faster and better.

TEMPERATURE REGULATING STANDS
Automatic devices for controlling tip temperatures while iron is at rest—prevents overheating of iron, eliminates frequent retinning of tip, while maintaining any desired temperature. Available with perforated steel guard to protect user's hand.



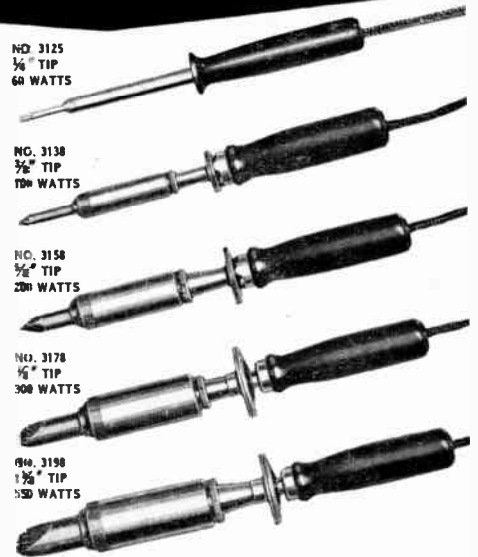
NO. 3125
3/8" TIP
60 WATTS

NO. 3130
3/8" TIP
100 WATTS

NO. 3150
3/8" TIP
200 WATTS

NO. 3170
3/8" TIP
300 WATTS

NO. 3190
1/2" TIP
450 WATTS



WRITE FOR 20-PAGE ILLUSTRATED CATALOG CONTAINING FULL INFORMATION ON OUR COMPLETE LINE OF ELECTRIC SOLDERING IRONS—INCLUDING THEIR USE AND CARE.

AMERICAN ELECTRICAL HEATER COMPANY

DETROIT 2, MICHIGAN



For complete details check No. 2 on handy card, page 61



DESIGNS AND MANUFACTURES A DIVERSIFIED LINE
OF SONAR AND ASW SYSTEMS FOR THE
SHIPS OF THE ROYAL CANADIAN NAVY



Edo

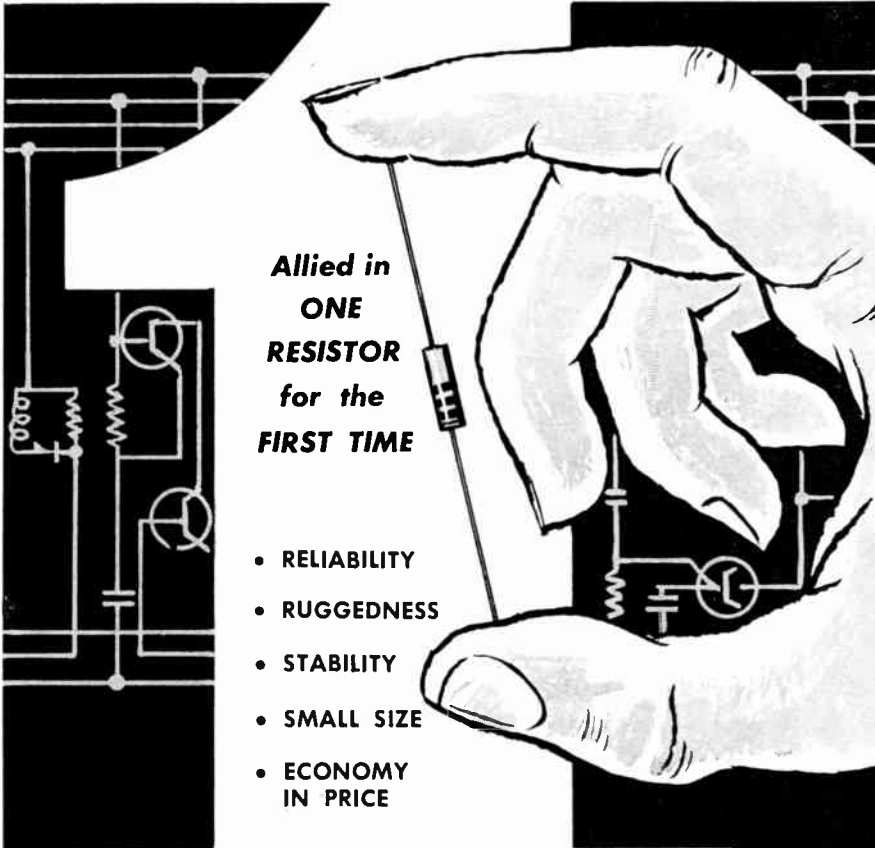
(CANADA) Ltd. Cornwall, Ontario

For complete details check No. 20 on handy card, page 61

METOX

TYPE
F-20

MINIATURE MOLDED OXIDE RESISTORS



**Allied in
ONE
RESISTOR
for the
FIRST TIME**

- RELIABILITY
- RUGGEDNESS
- STABILITY
- SMALL SIZE
- ECONOMY
IN PRICE



RELIABILITY — Failure rate is better than one per ten million hours.

STABILITY — Under full load, the stability is better than 2% after 10,000 hours. Subsequent rate of change will not exceed 0.1% per thousand hours.

TEMP. COEF. — Will not exceed $\pm 0.05\%$ per $^{\circ}\text{C}$.

NOISE — Less than 0.5 $\mu\text{V}/\text{V}$ applied.

TOLERANCE — All MIL - R - 11C values at $\pm 5\%$.

SIZE — Same as the Mil Type RC20.

SPECIFICATION — Exceeds materially Mil - R - 11C.

PRICE as compelling as the performance and related to 5% carbon composition resistors.

Type	Rating (at 70 $^{\circ}\text{C}$ Ambient)	Mil Type	Rated Voltage	Minimum Resistance	Maximum Resistance	Dialectric Strength
F20	1/2 Watt	RC20	350V	10 Ohms	500 K	1000 Volts



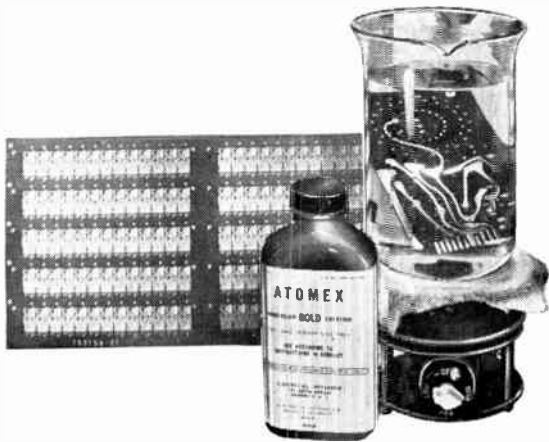
For complete data and specifications write to
Welwyn Canada Limited

1255 BRYDGES STREET, LONDON, ONTARIO

D.D.P. contracts

Continued from page 69

- Litton Systems (Canada) Ltd., Toronto, Ont., spare parts for aircraft navigation systems, \$931,783.
- Litton Systems (Canada) Ltd., Toronto, Ont., ground support equipment for navigation system, \$1,666,325.
- Northern Electric Co. Ltd., Ottawa, Ont., spares for field test equipment, \$50,000.
- Northern Electric Co. Ltd., Ottawa, Ont., teletype spares, \$128,527.
- Northern Electric Co. Ltd., Ottawa, Ont., spares for tele type equipment, \$22,991.
- Northern Radio Mfg. Co. Ltd., Ottawa, Ont., multiplex tele graph equipment, \$21,879
- Perkin Elmer (Canada) Ltd., Montreal, P.Q., spectropho- tometer, \$17,699.
- RCA Victor Co. Ltd., Ottawa, Ont., electronic equipment, \$16,578.
- RCA Victor Co. Ltd., Ottawa, Ont., electronic equipment, \$21,559.
- RCA Victor Co. Ltd., Ottawa, Ont., spares for antenna mast, \$12,697.
- Sperry Gyroscope Co. of Canada Ltd., Montreal, P.Q., electronic tubes, \$22,824.
- Standard Telephones & Cables Mfg. Co. (Canada) Ltd., Montreal, P.Q., trans- mitter, \$45,268.
- Standard Telephones & Cables Mfg. Co. (Canada) Ltd., Montreal, P.Q., trans- mitter, \$46,502.
- Standard Telephones & Cables Mfg. Co. (Canada) Ltd., Montreal, P.Q., trans- mitter equipment, \$79,301.
- Standard Telephones & Cables Mfg. Co. (Canada) Ltd., Montreal, P.Q., trans- mitter equipment, \$120,875.
- Standard Telephones & Cables Mfg. Co. (Canada) Ltd., Montreal, P.Q., installa- tion of beacon, \$20,564.
- Sylvania Electric (Canada) Ltd., Montreal, P.Q., trans- formers, \$17,389.
- TMC (Canada) Ltd., Ottawa, Ont., transmitter equipment, \$133,639.
- TMC (Canada) Ltd., Ottawa, Ont., transmitter equipment, \$175,058.



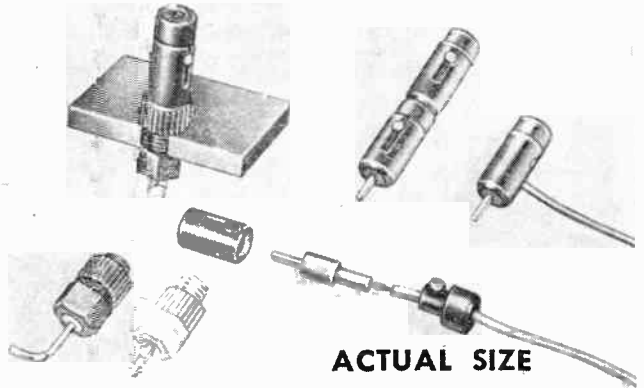
IMMERSION GOLD COATING FOR ELECTRICAL AND ELECTRONIC PARTS

Use Atomex gold immersion solution for more permanent, less expensive coating of printed circuits, metalized plastics, etc. with complete assurance of tarnish resistance and electrical resistivity. In a simplified immersion process, 24K gold is deposited by ionic displacement in a thin, dense, uniform protective layer. • Atomex is the first practical gold immersion solution containing no free cyanide. It eliminates need for costly analytical controls. Write for technical data.

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For complete details check No. 23 on handy card, page 61

NEW . . . From BELLING & LEE England MINIATURE PLUGS AND SOCKETS that do a BIG JOB



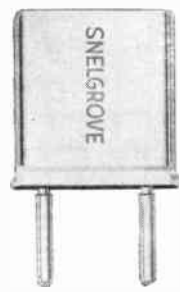
ACTUAL SIZE

- use them for . . .
- TEST POINTS
 - PATCHCORD ASSEMBLIES
- Ideal for all applications where space is at a premium, and . . . Belling & Lee Miniature Plugs and Sockets offer these extra features:
- Moulded in Nylon
 - Silver or Gold plated
 - Contact resistance less than 1.5 Milliohms
 - Insulation resistance greater than 100 megohms.
- For complete information and brochures

ASTRAL ELECTRIC CO., LTD.
44 DANFORTH ROAD, SCARBOROUGH, ONTARIO

For complete details check No. 4 on handy card, page 61

DO YOU WANT CRYSTALS WITH PROVEN RELIABILITY??



If your frequency control requirements are in line with to-morrow's trend, don't compromise with anything less than crystals designed and built to tomorrow's specifications.

Frequently we are asked by customers, how we are able to make so many good crystals — The answer is simple — we just take a little more time, exercise a little more care, use better methods and processes to assure that the crystals we ship are the cream of the crop. In other words, we don't just try to make crystals, we concentrate on making good crystals.

C. R. Snelgrove CO. LIMITED

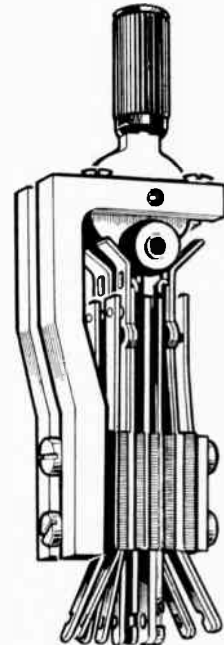
141 Bond Avenue, Don Mills, Ont. Phone: HI. 4-1107

For complete details check No. 47 on handy card, page 61

PLUNGER TYPE
CONTROL KEY SWITCH

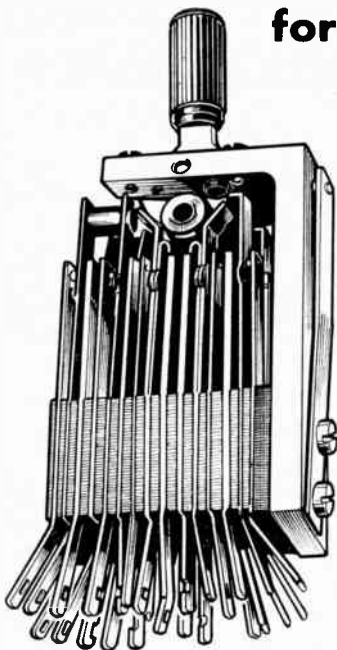


LEVER TYPE CONTROL
KEY SWITCH (SMALL)



CONTROL KEY SWITCHES

for LOW VOLTAGE MULTIPLE SWITCHING



LEVER TYPE CONTROL KEY SWITCH (LARGE)

T.M.C. CONTROL KEY SWITCHES, Precise in design and robust in construction, are today performing their vitally continuous work in varying apparatus all over the world.

Operators feeling the clean and positive "Make and break" action in any of the fifty standard spring combinations forget any fear of failure.

The contact springs made of nickel silver operated by hard plastic rollers on steel cams and silver contacts, ensure perfect performance.

Platinum or other metal can be supplied for special operating conditions.

Telephone EM. 6-5314 or write for T.M.C. Control Key Catalogue giving full technical data to:

TELEPHONE MANUFACTURING CO. LTD.

SAXONY BUILDING

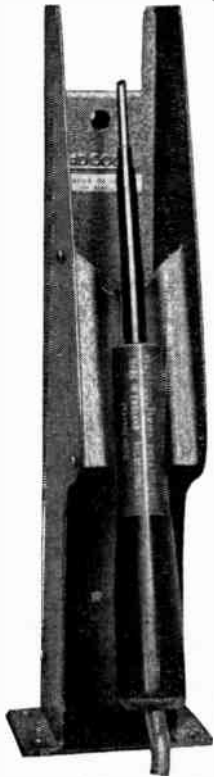
26 DUNCAN ST., TORONTO

TEL. EMpire 6-5314

1/8" Bit L. No. 70
Shield L. No. 68

ADCOLA
(Regd. Trade Mark)

L. No. 64
3/16" Bit



**C.S.A. APPROVED
SOLDERING
INSTRUMENTS**

Designed in Three Sizes
1/8" 3/16" & 1/4" Bits.

Manufactured for
All Supply Voltages
6/7 to 230/50 v.

Instruments maintain
soldering temperatures
and thorough jointing
is achieved in all the
fields of soldering, from
pin point to general
work in all sound equip-
ment.

Insulation standards are
approved in all leading
countries.

All Designs Cover the
Demands for Continual
Bench Production
Assembly.

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ADCOLA PRODUCTS LTD.
BOX 103, WESTON, ONT.

For complete details check No. 1 on handy card, page 61



**PRECIOUS METAL CONTACTS
FOR HIGH-RELIABILITY**

Precious metal contacts in pure or alloyed forms of silver, platinum, palladium and gold provide unmatched resistance to atmospheric corrosion, deformation, arc erosion, binding and metal transfer. Baker high-reliability 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.

ENGELHARD
INDUSTRIES OF CANADA, LTD.

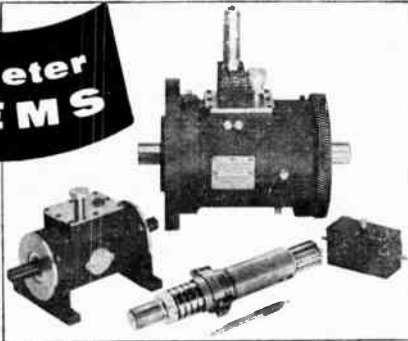
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512 KING STREET, EAST • TORONTO, ONTARIO, CANADA

For complete details check No. 24 on handy card, page 61

**Torque Meter
SYSTEMS**

designed
to meet
your
specific
needs



B & F offers the only complete line of Torquemeters and Indicators with individual models designed to satisfy specific industrial Torque measuring requirements. Principal of operation is basic, easily incorporated into rugged housings capable of continuous high speed industrial applications. Quality high-signal transducers provide accurate linear readings with negligible hysteresis in high speed and variable temperature operations.

Standard models cover ranges from 0.5 in. oz. full scale through 30,000 in. lb. full scale. Torquemeters are available with foot mounted housings and AND-type housings with splined shaft-ends for use on pump test stands and for testing engine accessories. These models are designed to mate with and support pumps, generators, starters, etc. and can be air-purged and pressurized for use in hazardous atmospheres.

NEW miniature Models "D" and "E" cover the in. oz. and low in. lb. ranges required to evaluate servo motors and other low inertia systems.

In Canada: Electromechanical Products,
Markham Rd., Agincourt, Ont.

B & F instruments, Inc.

3644 N. LAWRENCE STREET
PHILADELPHIA 40, PA.

other products:

STRAIN GAUGE CONTROL UNITS, ACCELEROMETERS

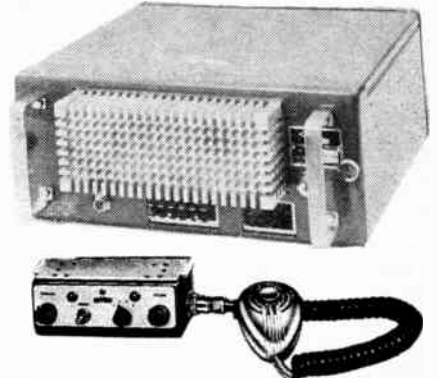
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ELECTRONICS AND COMMUNICATIONS, March, 1961

Dependability...

WHEN YOU NEED IT MOST!

You can count on Du Mont 2-Way Radio when you need it most under emergency conditions. It's always ready to operate at full rated power, even under the most adverse conditions. Du Mont equipment is designed for maximum performance with minimum maintenance.

Superior design, quality components, and the electronic skills of Du Mont team up to offer you the very finest in dependable, high-performance 2-Way Radio Equipment.



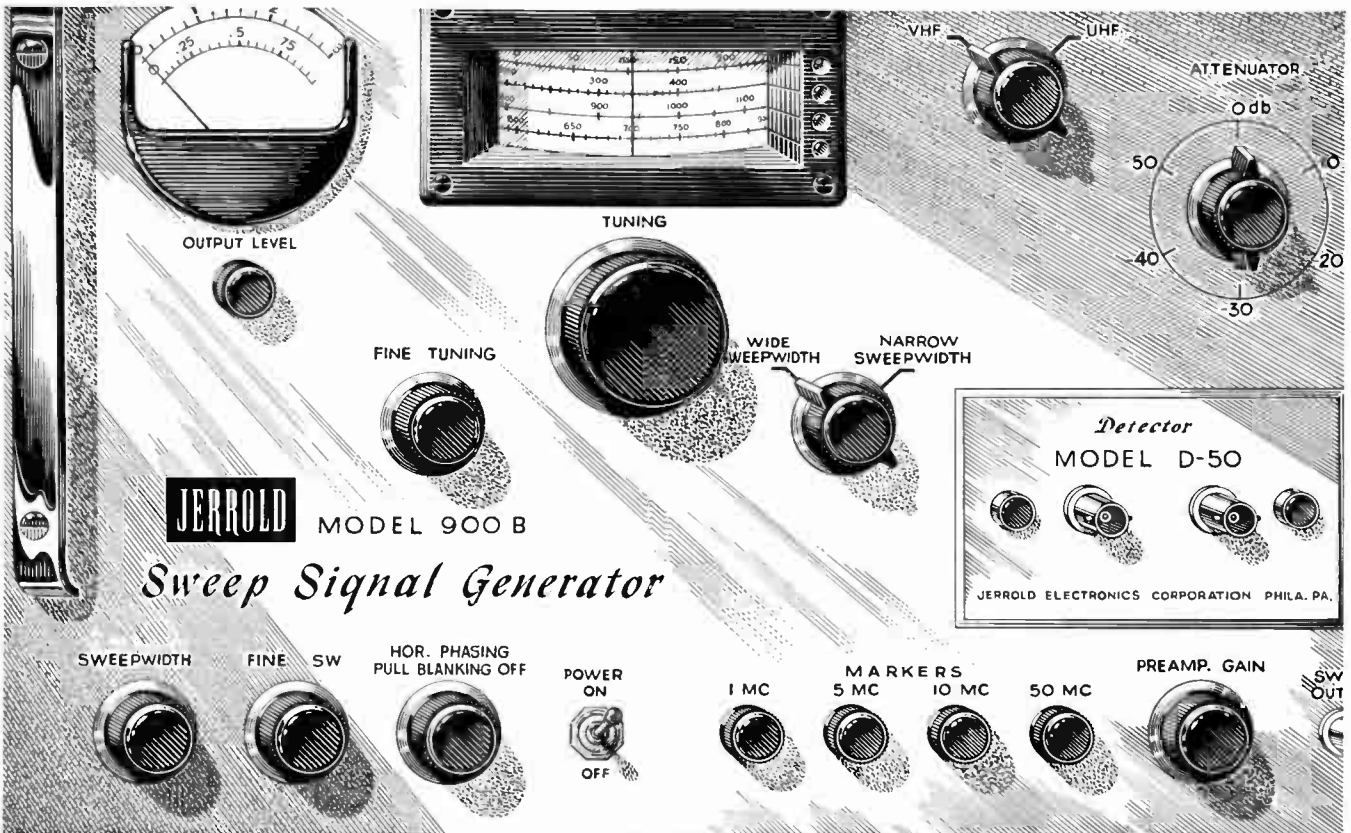
For the finest radio equipment specify Du Mont.
Write for complete details . . .

DU MONT 2-WAY RADIO

Manufactured in Canada By
ELECTRONIC RESEARCH & DEVELOPMENT CO.
Division of Mandrel Industries Ltd.

Box 887, Calgary, Alberta
EASTERN SALES OFFICE — 381 TILLBURY AVE., OTTAWA 3

For complete details check No. 21 on handy card, page 61



Sweep Signal Generator

UNUSUAL STABILITY IN SWEEP WIDTHS
FROM **10 KC** TO **400 MC**

New Jerrold WIDE PLUS NARROW SWEEP SIGNAL GENERATOR MODEL 900 B

Here's a generator that follows in the footsteps of Jerrold's famous wide band sweep—900 A. By adding narrow sweep capabilities and many of the features found only in signal generators, Jerrold has produced a new, unusually stable and extremely versatile Sweep Signal Generator. The 900 B is one instrument that can handle practically any sweep signal requirement from 500 kc to 1200 mc. Your VIDEO, IF, VHF and UHF communication requirements can all be serviced by the 900 B.

Price \$1880.00* f.o.b. Philadelphia

FEATURES:

- Sweep widths as wide as 400 mc; as narrow as 10 kc. Frequency coverage $\frac{1}{2}$ mc to 1200 mc.
- Accurately calibrated frequency dial.
- Built-in crystal controlled harmonic markers (at 1, 5, 10 and 50 mc intervals).
- Each marker output individually controls from front panel.
- Built-in dc coupled oscilloscope pre-amplifier.
- Built-in precision attenuator 10 db steps—zero to 50 db.
- High level, metered output.

See, examine and get the facts about this versatile instrument at
IRE BOOTHS 3904-3906 or write for complete technical data.

JERROLD

ELECTRONICS (CANADA) LTD.

50 WINGOLD AVENUE, TORONTO 19

Jerrold Electronics Corporation, Industrial Products Division
Dept. ITE-93, The Jerrold Bldg., Phila. 32, Pa.

PRICES F.O.B. PHILADELPHIA — F.O.B. TORONTO PRICES ON REQUEST

*Prices and specifications subject to change without notice.

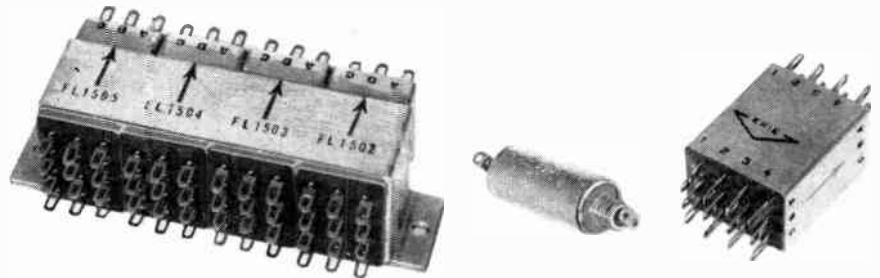
Any change in your address?

If the address on the front of this magazine is in any way incorrect, please fill out and mail the card on page 61. In doing this, you will help us to keep our mailing list up-to-date and will also ensure the regular and prompt delivery of your copies of:

**ELECTRONICS &
COMMUNICATIONS**

SPECIALIZATION

in Broadband R. F. Filters

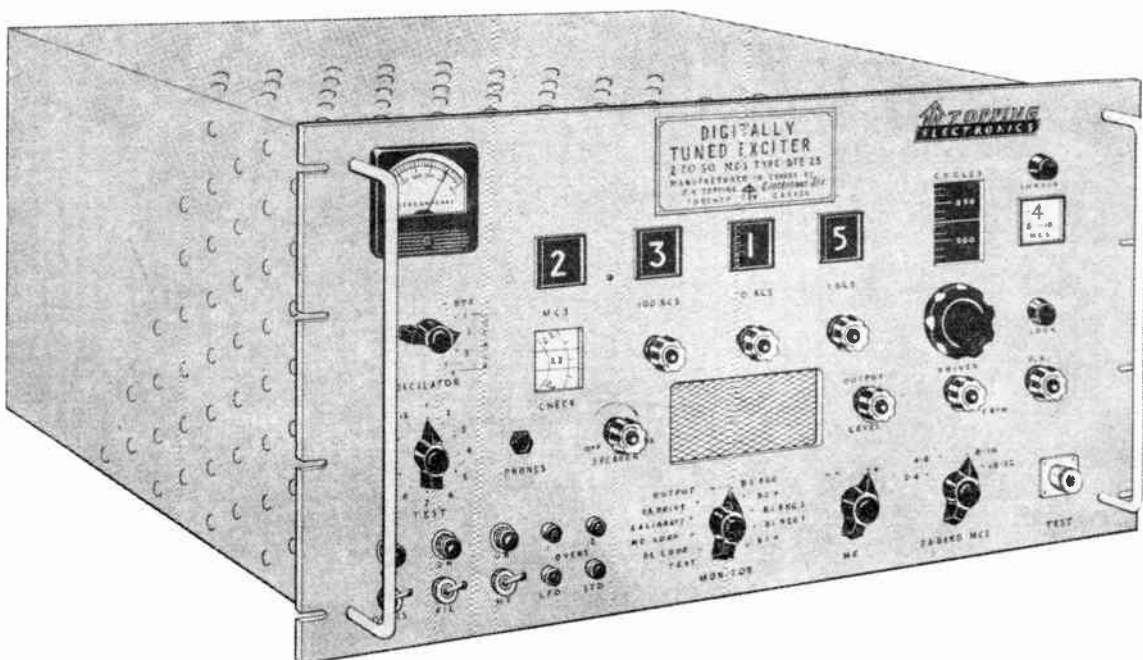


Canadian engineered Erie Broadband R.F. Filters are designed for radio interference suppression in all types of electrical and electronic equipment. By the use of the latest solid state materials, Erie engineers have developed miniature units having attenuation greater than 80 db from 20 to 2000 Mc. This new approach to these filters results in major reductions in

size, weight and D.C. resistance and increased attenuation. A simplified construction, which can be readily hermetically sealed, provides for high reliability and compliance with military environmental conditions. From the basic construction shown, filters can be designed to meet special requirements, using advanced techniques in the most modern equipment.

ERIE RESISTOR OF CANADA LIMITED
TRENTON, ONTARIO

For complete details check No. 25 on handy card, page 61



DIGITALLY TUNED EXCITER



F. V. TOPPING • *Electronics Ltd.*

94 Laird Drive
Toronto 17, Ont. HU 7-1546

CONTINUOUSLY VARIABLE — STABILITY $\pm 0.00025\%$

Fundamental frequency range 2.0-4.0 Mc/s from digitally tuned locked oscillator OR from one of four CR 27/U crystals.

Automatic multiplier and P. A. tracking, self checking, self contained. Standard 19" Rack Mount.

Type DTE-23, 2 to 30 Mc/s.

For complete details check No. 57 on handy card, page 61

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 Classified Editor of **ELECTRONICS AND COMMUNICATIONS**, 450 Alliance Ave., Toronto 9, Ontario.

REPRESENTATIVES WANTED

Well-established Canadian electronic equipment component company requires representatives in Vancouver, Calgary, Winnipeg and Halifax areas. Applications will be considered from firms or individuals now in these areas. Please address your reply to:

Box 5058

Electronics & Communications
450 Alliance Avenue, Toronto 9, Ontario

CANADIAN REPRESENTATIVES REQUIRED

U.S. corporation with sales in excess of \$1 million during 1960 requires responsible representatives in . . .

Quebec

Ontario

Western Canada

for the following line of components:

Low, High and Band Pass Filters (up to 450 Mc/s) — Crystal Filters — Military Transformers — Magnetic Amplifiers — Toroids — Precision Wire wound resistors.

Preference will be given to established representatives in the areas mentioned not handling competitive component lines, allied products.

Box 5057

Electronics and Communications
450 Alliance Ave., Toronto 9, Ontario

TECHNICAL SALES REPRESENTATIVE AVAILABLE

Over 15 years experience calling on Electronic Parts Distributors and Industrial Manufacturers in Toronto and throughout Ontario. Will consider sales position with Electronic Manufacturer where established contacts would be of value.

Box 5059

Electronics & Communications
450 Alliance Avenue, Toronto 9, Ontario

SALES ENGINEER

To sell range of electronic and electro-mechanical instruments. Applicants must be between 25 and 35 years of age and have a good electrical engineering background and an aptitude for this type of work. The position is salaried and has excellent prospects for advancement. A car will be provided and an expense allowance paid.

ASSISTANT ELECTRICAL DEVELOPMENT ENGINEER

Write stating age, education, experience and salary required to:

Box 5062

Electronics & Communications
450 Alliance Avenue, Toronto 9, Ontario

SALES MANAGER

for a large, internationally known electronics corporation. Must have a successful record in sales management of electronic products and components; experience in the marketing of military and commercial electronic products; capable of evaluating market and product potential; know competition and methods of distribution; an outstanding manager and developer of sales personnel is necessary; and he must be able to evaluate operating reports and financial statements to develop realistic sales budgets.

The man we are looking for should be aggressive, alert, enthusiastic and profit motivated; should have a B.S.E.E. with some training in business administration. Starting salary is between \$15,000 and \$18,000.

Box 5064

Electronics & Communications
450 Alliance Avenue, Toronto 9, Ontario

TELETYPE EQUIPMENT

Original Teletype Chicago. Models 15, 14, etc. Maintenance Spares, Rectifiers, etc. At very competitive prices. Lists on request.

Suplex Lamps Ltd.

239 High Holborn, London, W.C.1, England

SALES MANAGER

Sales Manager with executive ability to assist in General Management, is required in a well established Canadian components manufacturing firm. This position offers excellent opportunity with possibility of eventual ownership participation.

Box 5056

Electronics and Communications
450 Alliance Avenue, Toronto 9, Ontario

CANADIAN AGENT WANTED

Progressive well established epoxy resin formulator — seeking Canadian agent or affiliation. Complete line-dips, casting resins, impregnants, coatings and auxiliaries.

Isochem Resins Company

221 Oak Street
Providence 9, Rhode Island

SALES TECHNICIAN OR ENGINEER

Experienced personable sales technician or sales engineer is required due to greatly increasing business. To sell Electronic and Electrical Instruments to industrial and government organizations. Very fine career opportunity for right man. Call or write:

Conway Electronic Enterprises
1514 Eglinton Avenue West
Toronto 10, Ontario - RU 3-6376

MARKETING DIRECTOR

for a large, internationally known electronics corporation. Must have successful record in high level marketing and sales management of electronic products and components; thoroughly acquainted with planning and execution of large national sales programs; must have experience in marketing military and commercial electronic products as opposed to consumer products; must be suited for effective marketing management at corporate staff level; must be able to provide guidance and counsel through advisory means to marketing staffs in corporation divisions; must have experience with and ability to supervise advertising, sales promotion, market research, product planning, etc.; must be aggressive, alert, enthusiastic and profit motivated.

This man should have a B.S.E.E. and possibly an M.B.A. Starting salary is \$25,000 to \$30,000.

Box 5063

Electronics & Communications
450 Alliance Avenue, Toronto 9, Ontario

SENIOR EXECUTIVE AVAILABLE

General Management — Sales. Graduate electrical engineer; 24 years experience — engineering, manufacturing, sales and general management — communications, data processing, radar and components; accustomed to dealing with top executives and government personnel. Desires challenging future with progressive organization.

Box 5060

Electronics & Communications
450 Alliance Avenue, Toronto 9, Ontario

ELECTRONIC SALES REPRESENTATIVE

Required to assist Sales Director of Montreal firm of importers and manufacturers' Agents, selling to the Electronic Industry. Must have technical and sales background in this field. Some travelling required. Mature and responsible. Excellent remuneration for right party.

Write giving full details to

Box 5061

Electronics & Communications
450 Alliance Avenue, Toronto 9, Ontario

SALES MANAGER

Young executive, able to offer unique background of 14 years in industry, experienced in all phases of sales and marketing of electronic components and equipment; seeks challenging position with dynamic company.

Box 5055

Electronics and Communications
450 Alliance Avenue, Toronto 9, Ontario

EMPLOYMENT WANTED

Engineering Technician desires responsible position, design and development in semiconductor or tube circuitry. Write:

Robert H. Rempel

518 Main Street, Saskatoon, Saskatchewan

TYPEWRITER SPECIALS

Remington, Underwood, Royal Standard, regularly new \$175.00, now \$39.50. Remington and Underwood noiseless, all latest features, originally \$225.00, with typing desk \$59.50. New portables with case \$49.50. Adding machines, adds to \$99,999.99, subtracts, \$19.95. Cheque writers \$19.95. Each fully guaranteed. We ship c.o.d.

Crown Typewriter Limited,
1011 Bleury St., Montreal, Quebec

ELECTRONIC ENGINEERS
for production of
INERTIAL GUIDANCE SYSTEMS

Litton Systems (Canada) Limited has openings for several engineers with experience on airborne navigation or allied equipment. Excellent opportunity for challenging work in the early stages of a long term contract involving new equipment using the most advanced techniques. In addition, Litton requires Field Service Engineers with appropriate experience. Successful applicants should be prepared to accept out-of-plant assignments.

Write to: Personnel Manager
Litton Systems (Canada) Ltd.
123 Rexdale Blvd.
Rexdale (Toronto), Ontario

ELECTRICAL ENGINEER

of supervisory caliber desires position in industrial plant or consulting firm. Location preferences: South Central, South Eastern Ontario or South Central, South Western Quebec. Other locations considered. Four years' experience equipment engineering, telephone company. Four years' experience pulp and paper mill. Complete résumé sent with reply.

Box 5066
Electronics and Communications
450 Alliance Avenue, Toronto 9, Ontario

PRODUCTION TECHNICIAN

seeks position. Factory experience in producing electronic components, with good mechanical and electrical knowledge. Able to set up winding machines, assembly jigs, fixtures and test equipment. 31 years of age, married. Willing to re-locate.

Box 5068
Electronics and Communications
450 Alliance Avenue, Toronto 9, Ontario

DISTRIBUTOR SALES

Experienced and energetic man required for distributor sales division of a leading Canadian Electronic Components Company. Reply in strict confidence giving full details of background, salary required, etc.

Box 5070
Electronics and Communications
450 Alliance Avenue, Toronto 9, Ontario

SALES ENGINEER

Required by rapidly expanding company, good prospects for right man with background in semiconductors or instrumentation.

Apply giving full details, age, education, experience to —

Box 5069
Electronics and Communications
450 Alliance Avenue, Toronto 9, Ontario

SALES REPRESENTATIVE

Wanted by Canadian manufacturer of electrical and electronic components for the Maritime Provinces. Some technical knowledge necessary. Reply giving full details to:

Box 5067
Electronics and Communications
450 Alliance Avenue, Toronto 9, Ontario

MICROWAVE ENGINEER

Engineer required by a Canadian microwave manufacturing facility. Degree in electrical engineering or engineering physics preferred. Manufacturing experience required. Cost estimating experience preferred but not essential. Reply giving résumé of experience and personal information to:

Box 5065
Electronics and Communications
450 Alliance Avenue, Toronto 9, Ontario

COMMUNICATIONS ENGINEERS

Department of National Defence — Army
Ottawa, Ontario
\$7,620 — \$9,800

Attractive opportunities are available for two professionally qualified Engineers in the Communications field for:

- Engineering evaluation of electronic equipment
- Designing electronic equipment for instrumentation
- Supervising the production of prototypes
- Preparing technical literature.

For complete details and application forms, write to:

Civil Service Commission of Canada, Ottawa
Please ask for Information Circular 61-1153.

PROJECTS OFFICER — SEMICONDUCTOR DEVICES

required by
Canadian Military Electronics Standards Agency
Department of National Defence (Air)

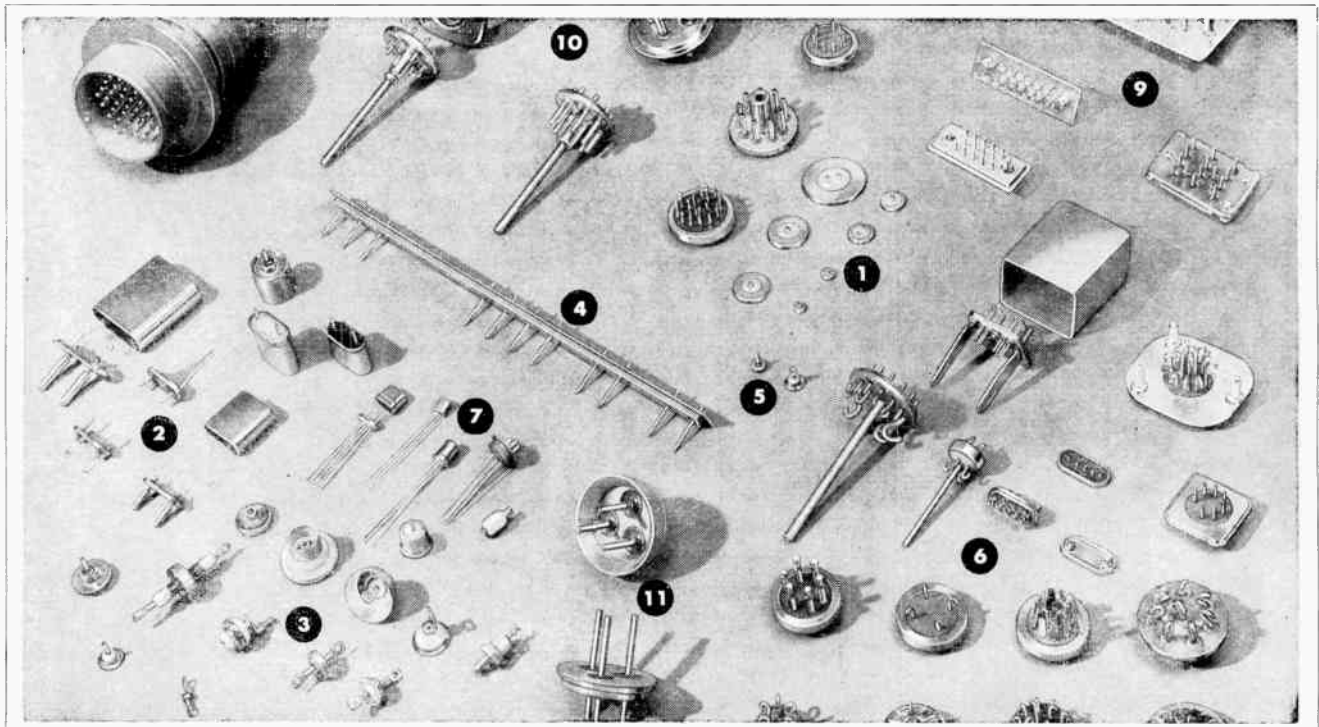
O T T A W A
\$6,420 — \$7,140

The appointee to this position will act on assigned semi-conductor projects, as joint service representative in liaison with Canadian, foreign and international committees and agencies to ensure technical acceptability of specified development, production, procurement and application aspects of Canadian interest.

Candidates for this position must possess many years of recent experience in this particular field.

Details and application forms available at main Post Offices, National Employment Offices and Civil Service Commission Offices.

Glass to Metal Seals HERMETIC SEALS for every electronic use



Made in Canada by Canada's
only manufacturer of
Hermetic Seals

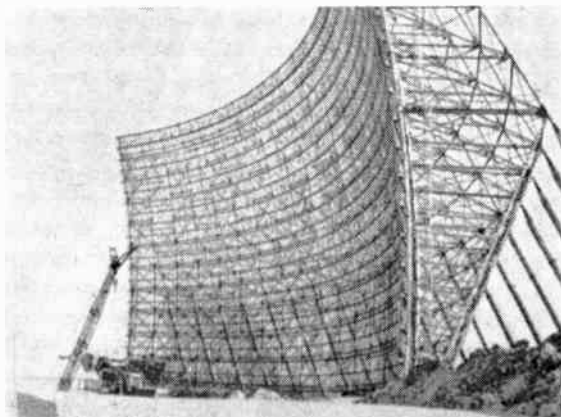
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| 1. Tubular Button Seals | 6. Multi-Terminal Headers |
| 2. Crystal Holders | 7. Transistor and Diode Enclosures |
| 3. Individual Terminals and Feed Throughs | 8. Rectangular Plugs and Connectors |
| 4. Terminal Strips | 9. Polarized Plugs |
| 5. Stand-off Terminals | 10. Refrigerator Seals |

QUALITY HERMETICS LIMITED, 45 Hollinger Road, Toronto 16, Ontario. PLymouth 7-2869

ASSOCIATES — Hermetic Seal Corp., Newark, N.J., Hermetic-Pacific Corp., Rosemead, Calif.

For complete details check No. 44 on handy card, page 61

editorial



Ballistic Missile Early Warning installation on Canadian territory provides early warning for the United States.

Canada — sacrificial goat?

Canadian consensus on the matter of Defense Production Sharing is that it is not working as well as it should.

At the present time a considerable percentage of Canada's manufacturing capacity lies idle despite the efforts of government and industry officials to get a larger share of orders for American defense equipment placed in Canada's factories.

Defense Production Sharing has been a lop-sided affair from the word go — an arrangement that weighs heavily in favor of the United States.

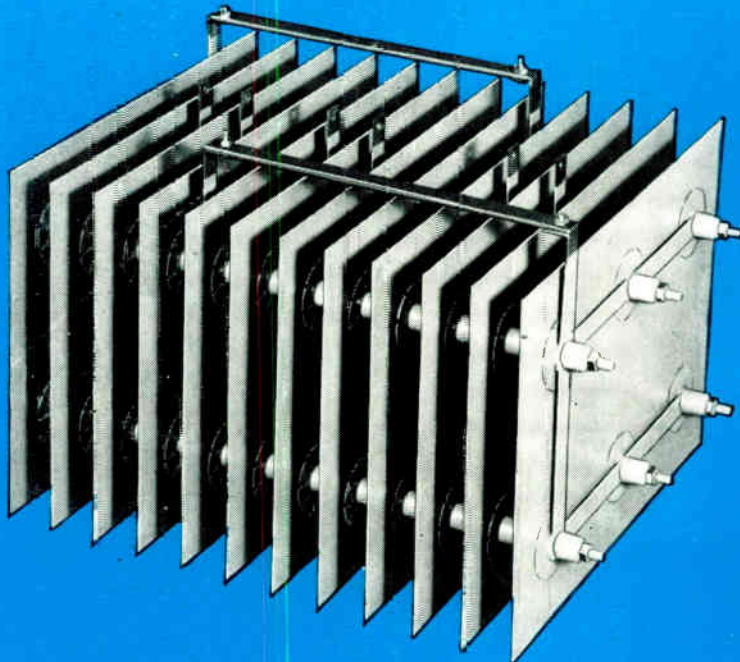
This is especially so when it is considered that Canada, in order to provide the United States with a fifteen minute warning against aerial attack has permitted the construction of military installations in her Northland that automatically renders Canadian territory fair game for aerial attack. In addition Canada has conceded the use of her air-space as an aerial battleground for the defense of American property.

These are facts, we believe, that should be driven home hard and often to United States authorities. We further believe that they constitute a justifiable reason why Canada should be granted a definite and equitable proportion of United States defense orders completely isolated from and unhampered by American competition and official red-tape.

If Canada is expected to offer herself as a sacrificial goat — a first line of defense for the United States — then a Canadian demand for a definite block of defense production is surely within reason and the United States should be so told with increasing emphasis. The validity of such a claim, we believe, could not long be ignored by American authorities.

EDITOR

NOW!



**an important
product...**

**for reducing
telephone office
maintenance**

LORAIN **DRY** CEMF CELLS

UNRESTRICTED RANGE OF VOLTAGE AND CURRENT RATINGS

- **no routine maintenance**
- **light weight, portable**
- **mounts in any position**
- **not damaged by freezing**
- **non-corrosive**
- **obtainable in any size**

Now available in all sizes, Lorain Dry CEMF Cells eliminate the maintenance problems associated with liquid-filled cells. Their light weight, portability, safety, and their unrestricted range of voltage and current ratings also adapt them for use as voltage regulating elements in many applications in which wet cells could not be used. They do not give off gases, do not employ liquids, are relatively insensitive to shock, and do not require maintenance or periodic attention. Lorain Dry CEMF Cells, therefore, can be installed wherever most convenient, making possible considerable economies in wiring,

mounting racks, and floor space. Lorain Dry CEMF Cells are selenium covered metal plates, specially treated so their internal resistance decreases rapidly as the current flow through them increases, making them effective as voltage regulators. The amount of voltage drop is determined by the number of plates connected in series. Bulletin 176 lists representative sizes; assemblies to meet individual specifications are readily made to order. Specific recommendations will be made upon receipt of the current and voltage limits to be met, and the preferred mounting arrangement.

POWER EQUIPMENT FOR COMMUNICATIONS AND INDUSTRY

LORAIN *Products (Canada) Limited*

ST. THOMAS, ONTARIO

DISTRIBUTED BY: AUTOMATIC ELECTRIC SALES (CANADA) LTD., TORONTO, ONT.

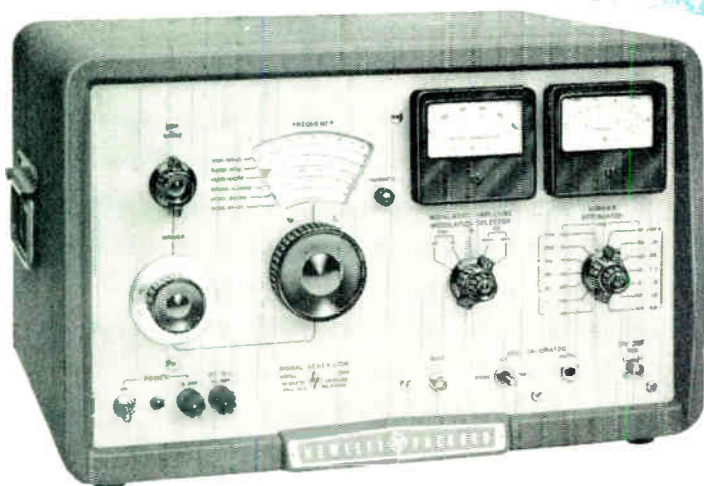
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FLOTROL
PARTNERS IN DEPENDABILITY
SUB-CYCLE

NOW!

Constant output level
Constant modulation level
3 volt output into 50 ohms
Low envelope distortion

**50kc
TO
65MC**



New -hp- 606A HF Signal Generator

Here at last is a compact, convenient, moderately-priced signal generator providing constant output and constant modulation level plus high output from 50 kc to 65 MC. Tedious, error-producing resetting of output level and percent modulation are eliminated.

Covering the high frequency spectrum, (which includes the 30 and 60 MC radar IF bands) the new

606A is exceptionally useful in driving bridges, antennas and filters, and measuring gain, selectivity and image rejection of receivers and IF circuits.

Output is constant within ± 1 db over the full frequency range, and is adjustable from +20 dbm (3 volts rms) to -100 dbm (0.1 μ v rms). No level adjustments are required during operation.

SPECIFICATIONS

Frequency Range: 50 kc to 65 MC in 6 bands.

Frequency Accuracy: Within $\pm 1\%$.

Frequency Calibrator: Crystal oscillator provides check points at 100 kc and 1 MC intervals accurate within 0.01% from 0° to 50° C.

RF Output Level: Continuously adjustable from 0.1 μ v to 3 volts into a 50 ohm resistive load. Calibration is in volts and dbm (0 dbm is 1 milliwatt).

Output Accuracy: Within ± 1 db into 50 ohm resistive load.

Frequency Response: Within ± 1 db into 50 ohm resistive load over entire frequency range at any output level setting.

Output Impedance: 50 ohms, SWR less than 1.1:1 at 0.3 v and below.

Spurious Harmonic Output: Less than 3%.

Leakage: Negligible; permits sensitivity measurements to 0.1 μ v.

Amplitude Modulation: Continuously adjustable from 0 to 100%.

Internal Modulation: 0 to 100% sinusoidal modulation at 400 cps $\pm 5\%$ or 1000 cps $\sqrt{5\%}$.

Modulation Bandwidth: Dc to 20 kc maximum.

External Modulation: 0 to 100% sinusoidal modulation dc to 20 kc.

Envelope Distortion: Less than 3% envelope distortion from 0 to 70% modulation at output levels of 1 volt or less.

Spurious FM: Less than 0.00017 or 20 cps, whichever greater.

Spurious AM: Hum and noise sidebands are 70 db below carrier.

Frequency Drift: Less than 0.005% or 5 cps, whichever greater.

Price: (cabinet) \$1,350.00 (rack mount) \$1,335.00

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

HEWLETT-PACKARD COMPANY, 5023G Page Mill Road, Palo Alto, California, U.S.A. Cable "Hewpack". DAVenport 6-7000 • Hewlett-Packard S.A., Rue Du Vieux Billard No. 1, Geneva. Cable "Hewpacksa". Telephone (022) 26, 43, 36. Field Representatives in All Principal Areas.



world's most complete line of signal generators

For complete details check No. 28 on handy card, page 61