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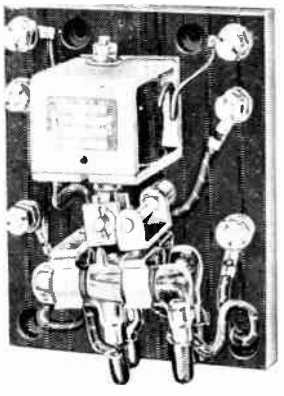

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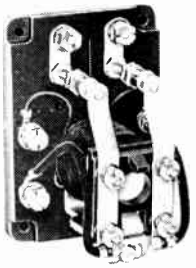
BIXXB	NC-DP-SB
BIXAX	DT-SP-SB
BIXHX	DT-SP-DB
BIXBX	DT-DP-SB
(3 pole base size — 2 1/2″ x 3 1/2″)	
AICXX	NO-3P-SB
AIXXC	NC-3P-SB
AIXCX	DT-3P-SB



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84XXH	NC-DP-SB	5 x 3
8XAX	DT-SP-SB	4 1/4 x 3
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84XBX	DT-DP-SB	6 1/4 x 3
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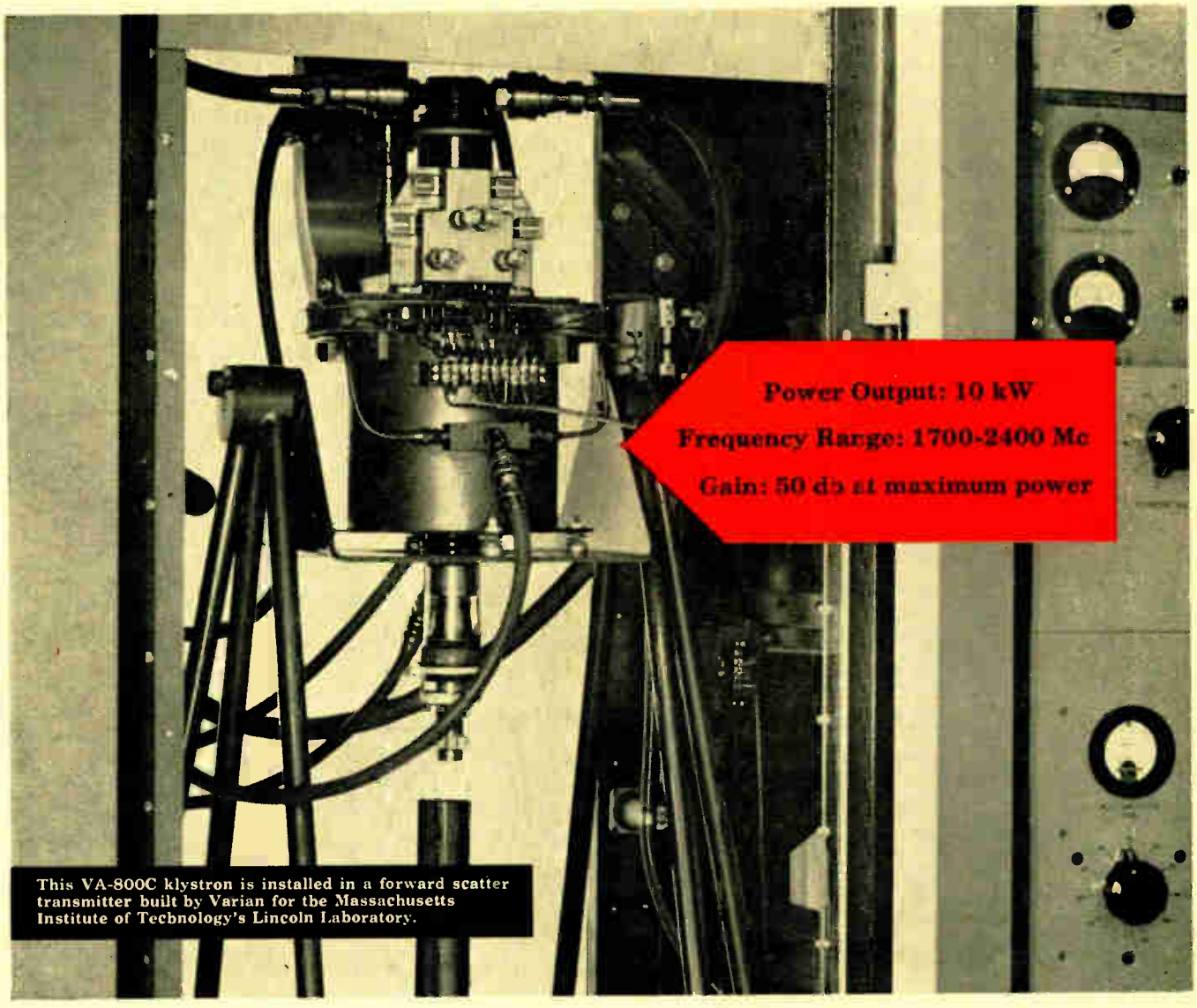

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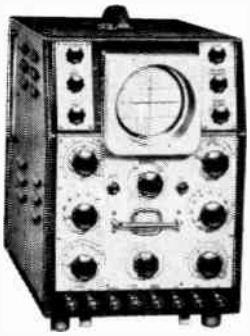

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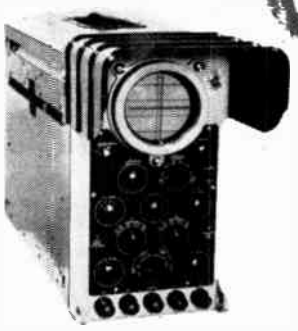

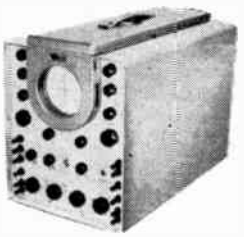

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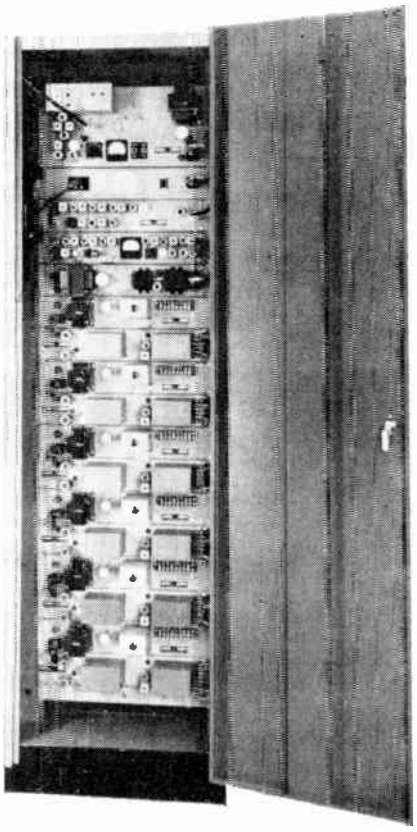

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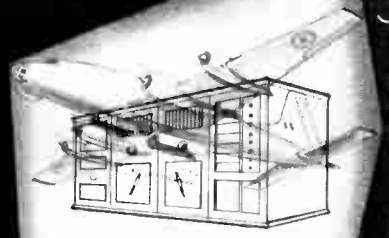
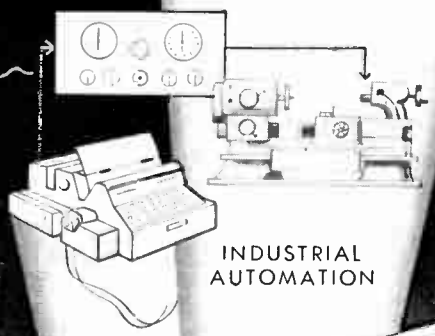

SIMULATION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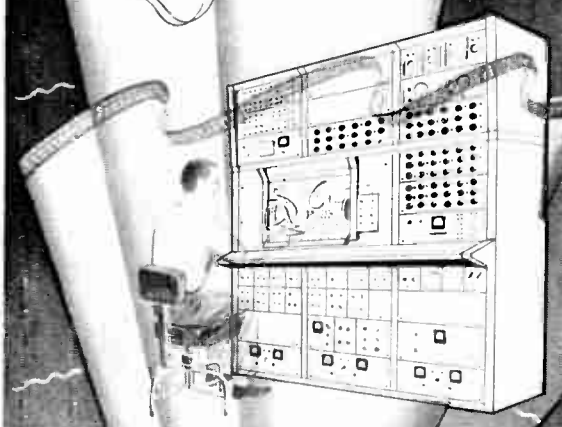
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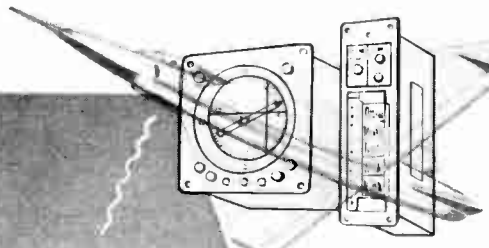
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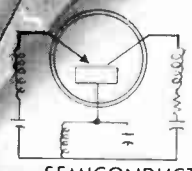
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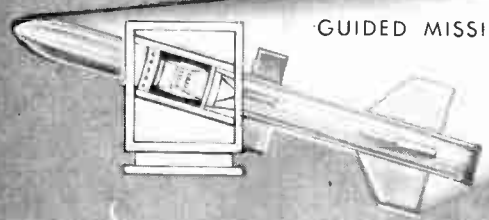
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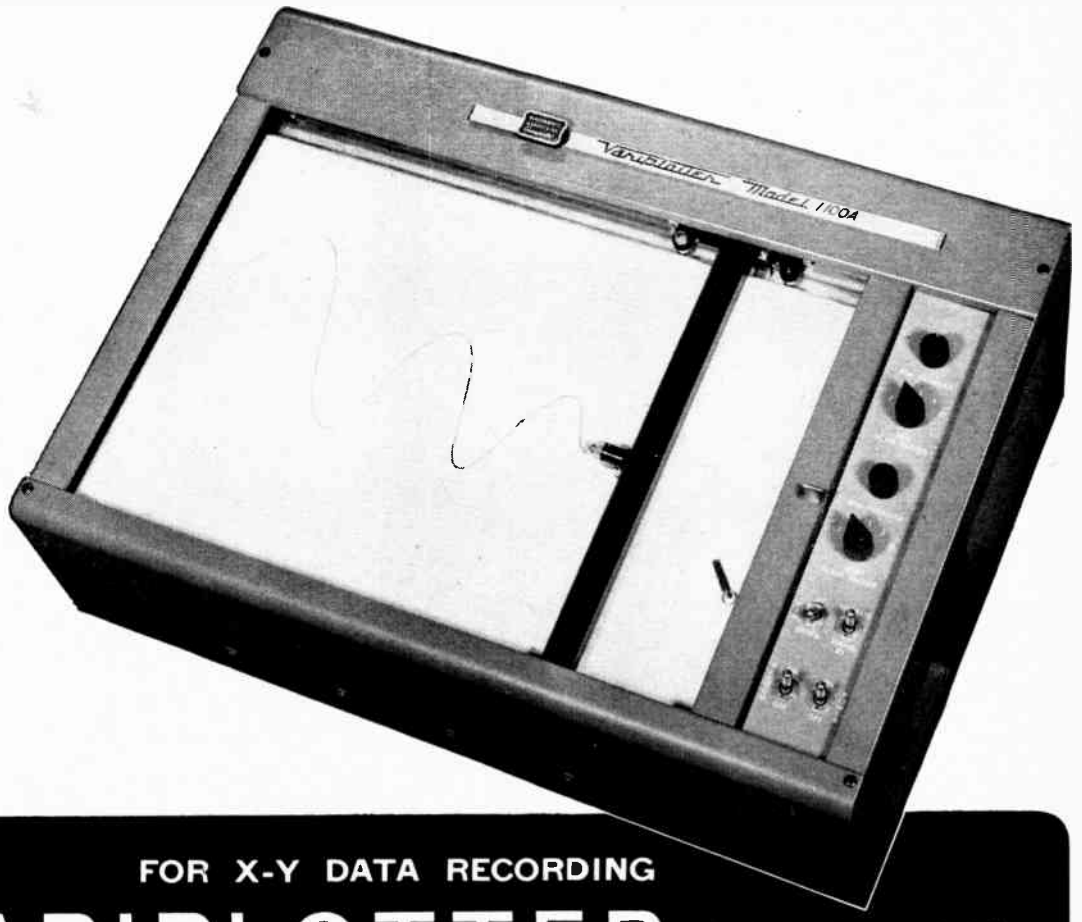

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JUNE • 1956
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RETMA REPORT

A Monthly Bulletin Of Association Activities
Prepared For Electronics And Communications
By
BASIL JACKSON

Canada's Atomic Head Addresses RETMA

"Your ability to meet the future challenges will depend above all on the emphasis you are prepared to put on research and development."

These words, by W. J. Bennett, president of Atomic Energy of Canada Limited, reiterated the need for research and development by industry in Canada.

Mr. Bennett was speaking at the 27th Annual Meeting of the Radio-Electronics-Television Manufacturers Association of Canada held on June 7th and 8th at Ste. Adele-en-haut, P.Q.

Mr. Bennett noted that the atomic energy program in Canada was classified under two headings – Research and Development directed toward the peaceful uses of atomic energy, which was the responsibility of Atomic Energy of Canada Limited, and raw materials, or the production of uranium, which was under the direction of Eldorado Mining and Refining Limited. The broad objectives of the research and development program were the development of the economic use of atomic energy and the production of radioisotopes for use in medicine, industry, and research.

He outlined the three component parts of the first of these objectives. These were, firstly, the carrying on of fundamental research in physics, chemistry, biology, physical metallurgy, and associated sciences. Secondly, the testing of fuel systems, materials and components in the NRX reactor. Thirdly, the undertaking of design and feasibility studies with supporting engineering development program for power reactors. He emphasized that all of these three activities, although described separately, were in fact very closely related. Dealing with the participation of Canadian industry in power reactor development, the speaker said that from the inception of the atomic program in Canada two basic principles have been recognized – firstly, that nuclear power plants will be operated by the public utilities, and secondly that these plants and their components will be designed and built by Canadian manufacturers. These general principles have determined the manner in which the program is being carried out in Canada. At Chalk River, Atomic Energy of Canada Limited had recently established an Industrial Assistance Office. The function of this office was to handle enquiries from manufacturers and to make arrangements for visits and discussions. Mr. Bennett mentioned that a number of members of RETMA had already visited Chalk River but that they had not had a visit from the Association as a whole, and he extended a formal invitation for RETMA as an Association to visit Atomic Energy of Canada Limited as he felt that such a visit would be of great mutual benefit.

The participation of industry in the design and fabrication of reactor components was the second and obviously the most important stage in the partnership with the manufacturers.

Mr. Bennett emphasized the importance of the Canadian Electronics Industry in supplying electronic instrumentation equipment for the control of atomic energy. Instrumentation was extremely important, not only in the operation of reactors, but in the carrying out of scientific and engineering experiments which provide the data on which reactor designs are based. This particular requirement was a constant challenge to the designer of electronic equipment. He quoted an example of the way in which instrumentation for atomic energy purposes quickly became outdated – experimental physicists now use equipment for sorting pulses which is commonly known as a kicksorter. At present the standard kicksorter deals with 6 channels simultaneously. It contains 200 vacuum tubes and consumes ¾ of a kilowatt of electricity. The physicists are now asking for a 400 channel kicksorter and are talking about a kicksorter having 2,000 channels.

Continued overpage

World Radio History

He mentioned that at Chalk River there was an Electronics Division of Atomic Energy of Canada Limited. The primary purpose of this Division was to design and develop the wide variety of special instruments required in research and development in the atomic energy field. In some cases the instruments designed at Chalk River were now being manufactured as standard equipment, and members of RETMA had participated in the development program on such items as wide-band amplifiers, computers, simulators, kicksorters and other equipment. He mentioned that Atomic Energy of Canada Limited had dealings with about sixty of the member companies of RETMA in either the development or manufacturing phases of the electronics and instrumentation program, and that they look forward to a continuation of this relationship. It was the role of Atomic Energy of Canada Limited to pose the problems and to furnish the basic information which was needed for their solution, while the manufacturers' role would be to produce a workable instrument.

In conclusion Mr. Bennett said that there was no single branch of industry which had a larger or more comprehensive role in the atomic energy program than the Canadian Electronics Industry.

Transformer Engineering Panel

The Transformer Engineering Sub-Committee of the RETMA Parts and Accessory Engineering Committee held a technical session at the Collins Hotel, Dundas, Ontario on May 16th. Instead of the usual committee meeting, the session took the form of a "Group Dynamics" panel discussion dealing with the important question of the manufacture and supply of silicon steel for transformer laminations.

To ensure that the iron and steel industries of both the United States and Canada were fully represented, there were no less than seven panelists from various steel companies. These were C. W. Stoker, of the United States Steel Corporation, G. H. Cole, Armco Steel Corporation, J. H. Crede, Allegheny-Ludlum Steel Corporation, W. L. Kimball, Algoma Steel Corporation Limited, W. R. Weir, Dominion Foundries and Steel Company, J. C. Snedde, Steel Company of Canada, and L. L. Anderson, Republic Steel Corporation. The moderator was Ronald Little of the RETMA Transformer Engineering Sub-Committee, and W. White, chairman of the Sub-Committee, presided.

The panelists were asked some questions of great interest to audio and power transformer designers and manufacturers. Among these were questions on the further trend of steel thicknesses for cold rolled oriented steels for both power and audio transformers, the relationship between oriented grades and permeability and what could the Canadian transformer manufacturers expect the steel producers to supply in silicon steels having uniformity of coating, core loss, camber, edge burr, and flatness.

The panel was asked about the publication of testing and grading results in chart form. It was suggested that steel companies include the American Iron and Steel Institute "M" type grades in addition to plotting the silicon content and density characteristics.

It was suggested that the permeability factor rather than core loss form the basis of specifications for audio transformer laminations. The panel replied that steps are being taken along this line but the grades of steel to be covered are not currently known. The American Society of Testing Materials was studying the problem. A report by the ASTM is expected to be made this month (June) and a two year waiting period will be given to allow the industry and transformer manufacturers to comment on the report.

After the technical session, those taking part toured the Dominion Foundries and Steel Company's plant in Hamilton, Ont., arranged by the courtesy of A. L. Stopps, RETMA Director and President of El-Met-Parts, of Dundas, who also provided a reception and dinner in the evening. The RETMA film entitled "Electronics In Canada" was shown to a large gathering, and the guest speaker of the evening was J. R. Montague, Director of Engineering, Hydro-Electric Power Commission of Ontario, who gave a slide-illustrated lecture on the "St. Lawrence Power Project".

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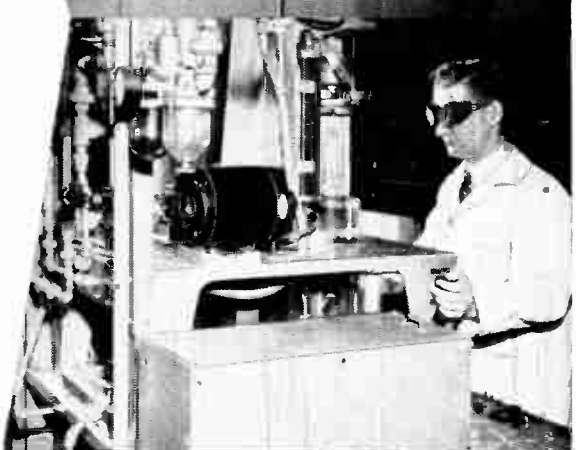

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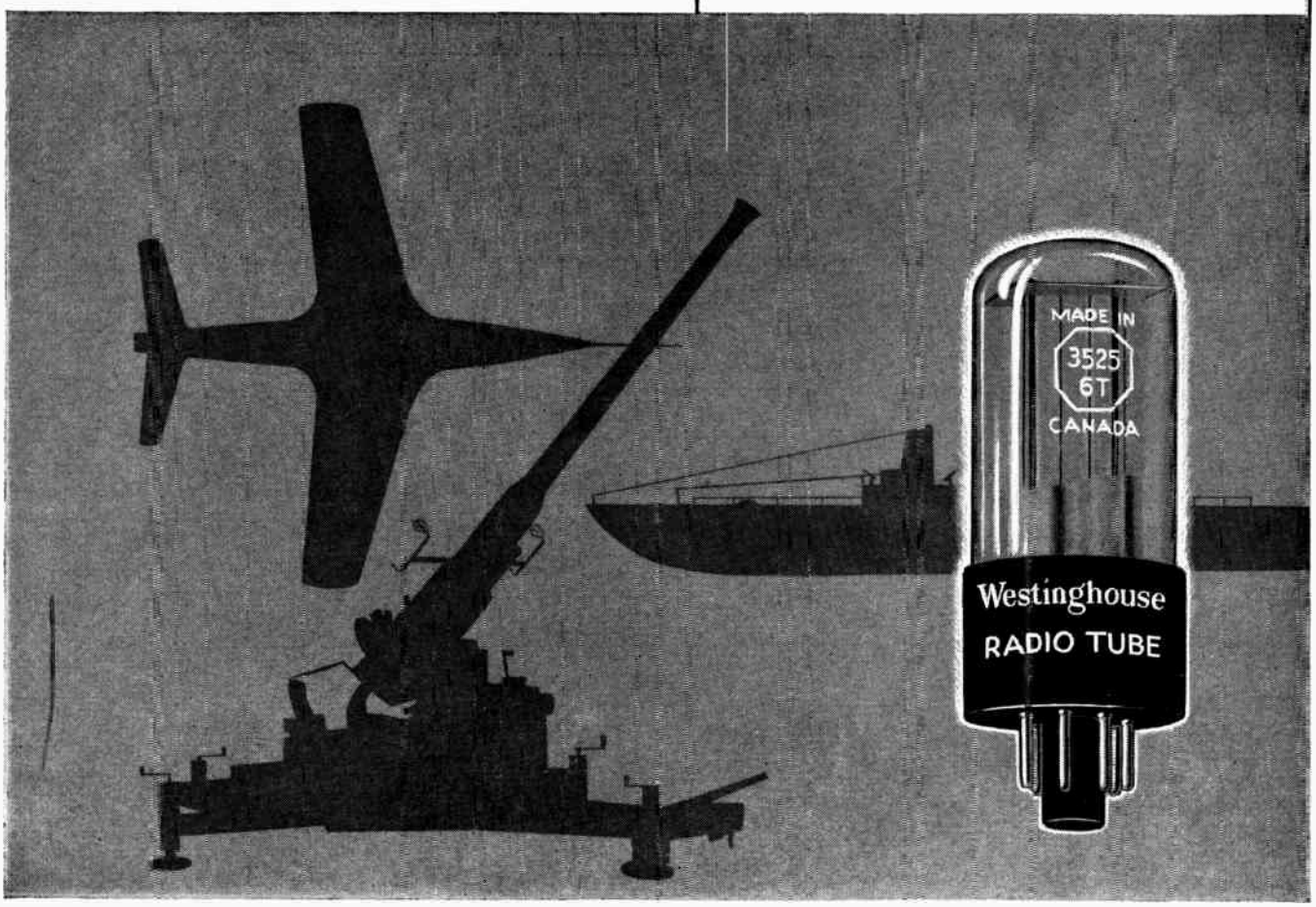
ST. JOHN'S, NFLD. HALIFAX SYDNEY MONCTON SAINT JOHN, N.B. FREDERICTON CHICOUTIMI QUEBEC CITY TROIS RIVIERES SHERBROOKE ROSEMONT MOUNT ROYAL MONTREAL OTTAWA VAL D'OR KINGSTON TORONTO O'CONNOR DRIVE KITCHENER HAMILTON ST. CATHARINES LONDON SARNIA KIRKLAND LAKE WINDOSR TIMMINS SUDBURY SAULT STE. MARIE FORT WILLIAM WINNIPEG BRANDON REGINA SASKATOON MEDICINE HAT LETHBRIDGE CALGARY EDMONTON TRAIL PENTICTON VERNON PRINCE GEORGE NEW WESTMINSTER VANCOUVER VICTORIA

2056-1

World Radio History

TOP SECRET



in the air – on land – under the sea

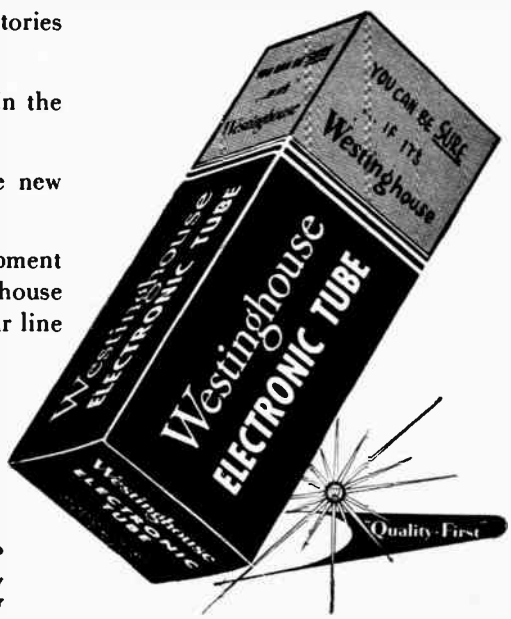
Westinghouse tubes are at work

From the Top Secret files of Westinghouse Electronics research laboratories come plans for Canada's future defence weapons.

Right now, Westinghouse tubes are working electronic magic — in the air — on land — on and under the sea.

These tubes pour out of Westinghouse Tube Works to activate new electronic devices for Canada's defence.

This same engineering skill and modern, up-to-the-minute equipment produce the tubes you receive for home TV and Radio use. Westinghouse Tubes are completely reliable for the first line of defence and for your line of work!



YOU CAN BE SURE...IF IT'S **Westinghouse**

CANADIAN WESTINGHOUSE SUPPLY CO. LTD.

Halifax • Quebec City • Montreal • Ottawa • Toronto • Hamilton • North Bay
Fort William • Winnipeg • Regina • Saskatoon • Edmonton • Calgary • Vancouver

For further data on advertised products use page 79.

World Radio History

VOLUME 4, NUMBER 5 • JUNE 1956

ELECTRONICS & COMMUNICATIONS

Electronics In Industry

In the past twelve months there has been a rapid unveiling of Soviet achievements in all spheres of science and especially in the field of nuclear physics with its many applications of electronic control apparatus.

There is little reason to doubt that the degree of progress in the field of science which has been made known to the Western world over the past year or so has, or should have, removed any lingering doubts that may have remained in the minds of Western scientists that Soviet research and knowledge are of a caliber capable of commanding respect from all quarters.

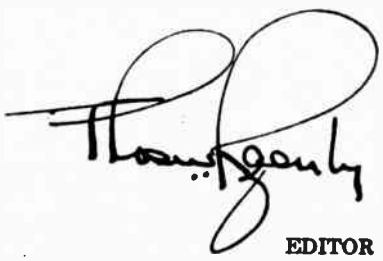
According to the Sixth Five-Year Plan under which Soviet authorities are working at the present time, it is evident that the most important objective in so far as scientific pursuits are concerned is the advancement of science on behalf of peaceful applications. Point Six of the objectives set for the Central Administration on Atomic Energy directs Russian scientists as follows: "In every way to promote work on the further utilization of radioactive rays in industry, agriculture and medicine, specifically for the control over the quality of materials, for direction of production processes and automatic regulation of these processes, and also for diagnosis and treatment of various diseases." Point Eight of the directive guides them as follows: "To considerably increase the manufacture of dosimetric and radiometric apparatus of instruments for control and regulation."

In effect these two points largely exhort Russian scientists to concentrate on furthering what we may call in this country the application of electronics in industry.

In Canada the application of electronics in industry has met with wide approval and acceptance in the past ten years, but although hundreds of firms have taken advantage of this new aid to industry, its use has not been as widespread as it might have been. This by reason of the fact that major Canadian manufacturers of electronic apparatus have been pre-occupied over the past decade since the outbreak of the Korean War with the production of electronic equipment of a military nature, and a large portion of our electronic manufacturing capacity has been engaged in the production of television receivers in order to meet the public demand for this commodity.

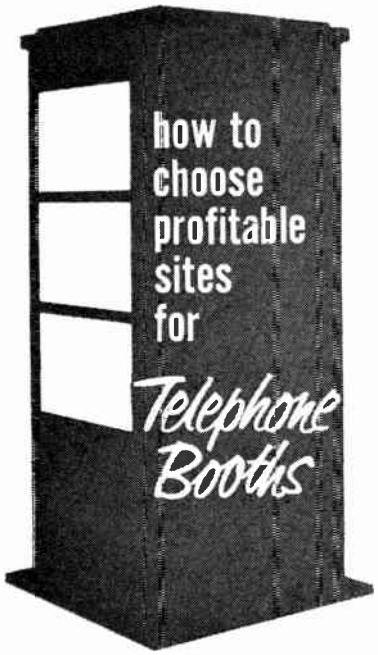
There can be no criticism of the Canadian electronic industry on either of the foregoing counts and, without State directives, as is the case in the U.S.S.R., manufacturers may choose at will to manufacture whatever product they wish. With the rapid industrialization in this country, however, there is a growing need for more electronic industrial control and process equipment and with industry, in most instances, pressed to capacity there is every reason to believe that there exists a ready market for equipment that will increase efficiency and production volume.

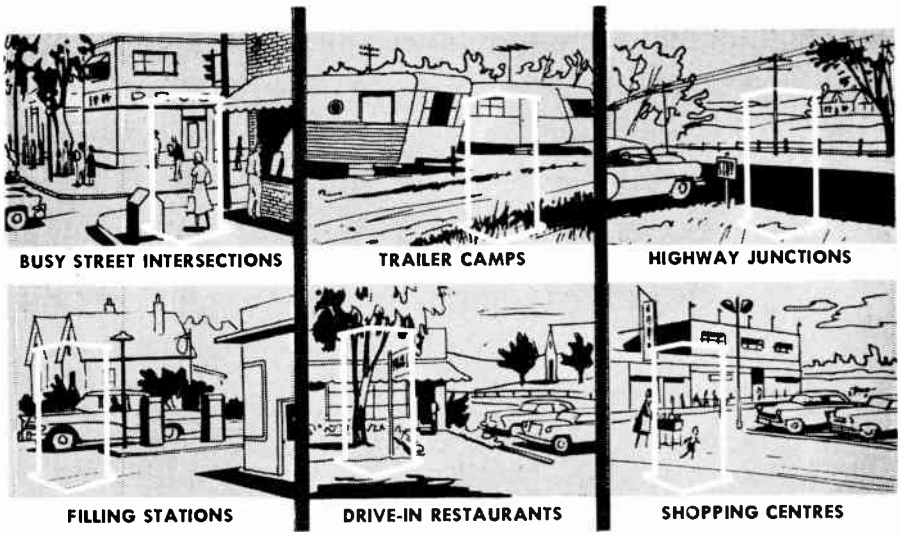
With the slackening of the "cold war" state it is likely that Canadian manufacturers hitherto engaged in the production of military equipment will devote more detailed study to the needs of industrial electronics in which field they are certain to find lucrative financial rewards and the means of maintaining full employment and production when the need for military equipment tapers off.



EDITOR

World Radio History





1 **LOOK FOR POTENTIALLY PROFITABLE LOCATIONS**
Choose sites similar to those which have proved profitable elsewhere. Here are six areas that can be big revenue producers. How many do you have of each?

2 **EVALUATE YOUR LOCATIONS**
Draw up a survey sheet for each location as indicated here. Carefully compare the completed sheets to determine the revenue potential of each site.

3 **THE CHOICE OF BOOTH**
After establishing the most profitable locations, you will need to consider the booths themselves. They should be neat in design, well ventilated, easily recognized and a pleasure to use. Here are two that fulfil these requirements and will also save you money.

Address and description of location .....

Are there already booths at or near this location .....

Will any signs be required .....

Will zoning regulations allow booths in this location .....

Is the proposed location easy to see from street .....

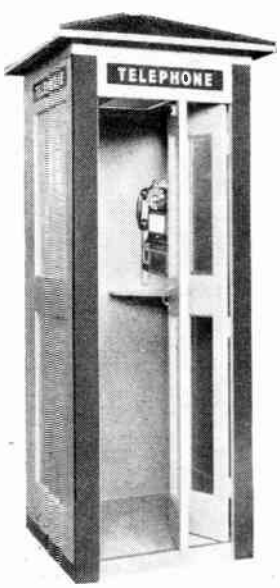
Will installation cause a traffic hazard .....

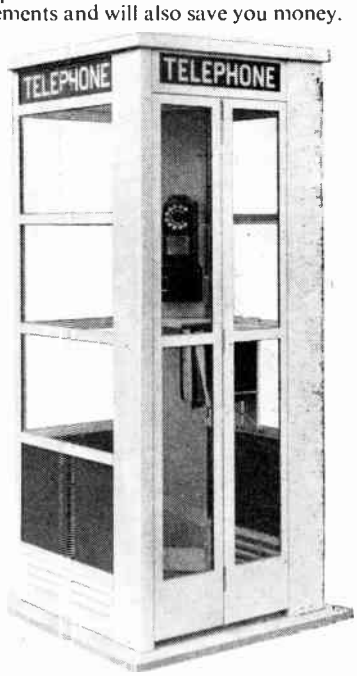
During what hours are nearby businesses open .....

Do terrain conditions make construction unusually expensive .....

Can change be secured from nearby establishments .....

Is location dry	Is surrounding area free from trash .....
Is electric power available	Vehicle traffic count .....
Is parking area available	Pedestrian count .....
Will flood lights be needed	Time of day and length of time count was made .....





DOUGLAS FIR BOOTH

A sturdy, but very low cost booth of selected Douglas Fir. It has proved to be hard wearing in all types of climate. The roof is furniture steel, welded at the seams and joints. Brackets are provided for anchoring and levelling. The interior light also illuminates the three telephone signs.

For further information and advice on booths or sites, contact your nearest office of Automatic Electric Sales (Canada) Limited. Head Office: 185 Bartley Drive, Toronto 16, Ontario. Branches in: Montreal • Ottawa • Brockville • Hamilton • Winnipeg • Regina • Edmonton • Vancouver.

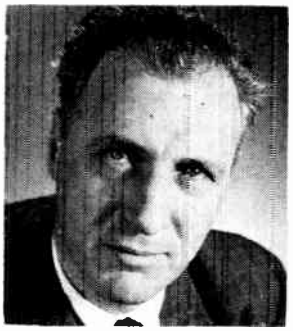
AUTOMATIC ELECTRIC
SALES (CANADA) LIMITED

ALCOA ALUMINUM BOOTH

There is a tremendous "Sales Appeal" in this big, roomy, clean-looking, colourful booth. You save on maintenance because the Alumilite finished frame never needs painting and always looks spotless. You also save on transportation charges because of the lighter weight of aluminum. All necessary accessories are part of the standard booth. These include fluorescent lights, wire inlets, integral kick plates, door closing device, spring door stop, directory shelf and racks. 5561

For further data on advertised products use page 79.

World Radio History



The EDITOR'S PAGE

"Television set manufacturers, distributors and dealers are going to be under a terrible handicap if we sit back and let those responsible for broadcasting policy take the dog-in-the-manger attitude that they will not allow any color television in Canada until they are ready and willing to produce Canadian-originated shows." This, according to Stuart D. Brownlee, Executive Vice-President of Canadian Admiral Corporation, who made the statement to a gathering of the Ontario Association of Radio, Television and Appliance Dealers.

Mr. Brownlee went on to say that manufacturers and dealers are completely uninformed as to when broadcasters will be allowed to make the relatively inexpensive changes in transmitters for the purpose of telecasting color programs.

Mr. Brownlee suggested that if the authorities in charge of regulating telecasting in Canada would announce a date on which they would permit color to be shown in Canada, manufacturers could plan the production of color receivers in order to have them available to the public at the right time. He warned that television in Canada will lag years behind the United States unless the present negative policy is changed.

Brownlee stated that color TV programming and broadcasting has already reached the second plateau in the United States with over 300 stations converted to broadcast network color programs. One Chicago station has commenced a permanent, all-color TV schedule with network programs and local color originations on film from their completely equipped color studios.

The Canadian Admiral Corporation official said "There is nothing but outdated broadcasting regulations in Canada that prevents any of our independent TV broadcasters from doing the same thing here."

When United States manufacturers are producing hundreds of thousands of color receivers every year and have been able to accomplish lower prices by mass production, Canadian manufacturers will be unfairly criticized, as they were in the early days of black-and-white television, because the price of color sets to the Canadian consumer is higher than in the United States.

The Canadian Admiral executive said that the conversion of existing transmitters to color would not cost more than $30,000 or $40,000 per station and that this amount was "peanuts" when one considers that the excise tax on sales of black-and-white television receivers and replacement tubes provided revenue of over 23 million dollars in the past year.

The most ridiculous statement of the year was that color broadcasting in Canada would be considered only when the price of color receivers to the Canadian market was less than $500.00. This, Mr. Brownlee claimed, is the most negative type of thinking that could be imagined and is an outstanding example of the chicken-and-the-egg situation, which would conceive the Canadian manufacturers producing, and dealers selling, a sufficient number of color television receivers to permit production costs to be reduced sufficiently to provide a unit selling at less than $500.00. Mr. Brownlee pointed out that this line of thought was taken before there are any color television programs for the consumer to view.

If those responsible for setting the broadcast policies in Canada wait until color receivers are less than $500.00, we will never have color television in Canada, Mr. Brownlee said.

In conclusion, Mr. Brownlee reminded his audience that it is fundamental, when selling a product that requires outside service to enable it to render its designed function, that the outside service must be there before you can get volume sales of the product at any price. You cannot, for instance, sell automobiles in areas where there are no roads on which to drive and enjoy them, nor electric ranges or refrigerators in areas not served by power lines, and you cannot sell color TV receivers without color programs.

Television in Canada is the second most desired means to better living, coming only after the automobile, and we are dealing, therefore, with something for which there exists a known demand, Mr. Brownlee said.

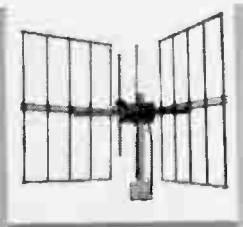
We are very much in accord with the observations of Mr. Brownlee and there can be little doubt that the procrastinating policy of the CBC with respect to color television in Canada is an obstacle to the progress of the Canadian television manufacturing industry. While the CBC has rendered a useful service to the country it sometimes appears regrettable, in the light of recent developments, that the original conception of the CBC did not envisage it purely as a regulatory body similar to the Federal Communications Commission in the United States leaving program production and play acting in its proper element. Why in Heaven's name a government department should be spending taxpayers' money engaging in show business is beyond reasonable comprehension. The argument that it should, in order to assure a reasonable percentage of Canadianism in its program content, is not entirely tenable since this condition could be assured by a regulatory body *per se* without the added and expensive luxury of dabbling in a field that may better be left to the theater and show business, or if you will, private enterprise.

Operating in the sphere of private enterprise Canadian radio and television would, it is reasonable to assume, grow and prosper under the healthy incentive of competition, as all industries should, without the frustrations that have hindered it in the past. Under such conditions, we believe, Canadians would now be enjoying color television instead of waiting for decisions from Ottawa.

* * *

Further relaxation of government controls on atomic energy developments in Canada is evidenced by the establishment of an Industrial Assistance Office at Chalk River which is headed up by Dr. W. R. Livingston. Purpose of the office is to encourage private industry to take a more active part in the development of atomic energy. Since electronics is closely associated with atomic energy developments the electronics industry in Canada may benefit significantly by close liaison with the new branch of Atomic Energy of Canada Limited at Chalk River. As pointed out by W. J. Bennett, president of Atomic Energy of Canada Limited, there is no single branch of industry which has a larger or more comprehensive role in the atomic energy program than the electronics industry.

World Radio History



BARGAINS in POWER

No single piece of radio equipment can equal the antenna for economically increasing effective power.

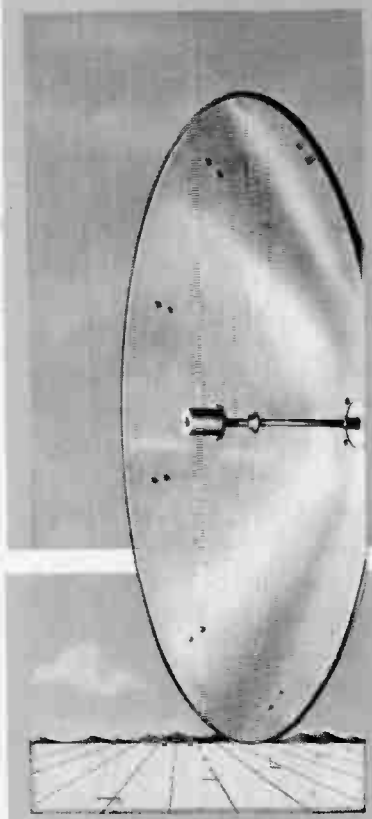
One of the less expensive components in a radio communications installation is the antenna. Yet the antenna, which usually represents less than ten per cent of the total equipment cost, can multiply the effective power of every transmitter in the system *several hundred per cent.* Equally true, a poorly designed or inappropriate antenna can waste the power produced by the costly equipment behind it.

Manufacturers of the UNIPOLE, High Gain, Corner Reflector, Parabolic and Yagi Antennas

In planning a new system, selection of the proper antenna often will allow a lower power transmitter to achieve desired signal range. For existing systems, the use of a higher gain antenna will reduce "dead spots."

Andrew is a pioneer in designing and developing antennas. We make over 30 standard types for microwave, broadcast and mobile communications. Special models or adaptions of standard models are readily made to order.

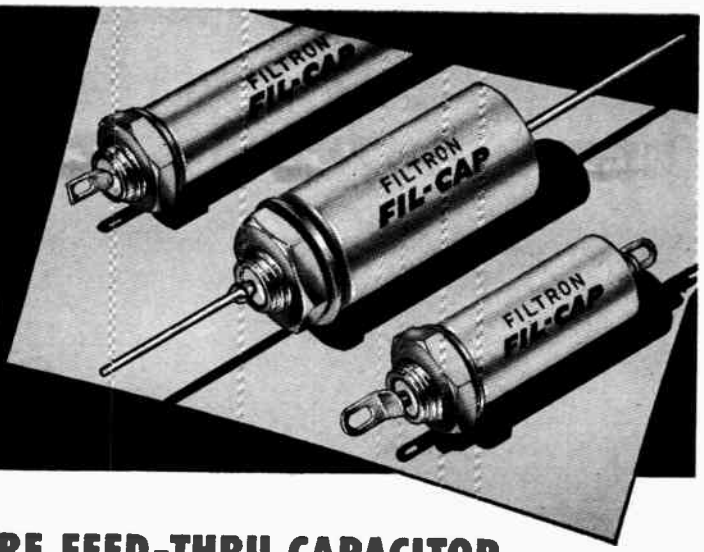
Write or phone Andrew for a dollars-and-cents evaluation of the type of antenna that can give your installation the greatest bargain in power.



Andrew
ANTENNA
CORPORATION LTD.
P. O. BOX 971 · WHITBY, ONTARIO

World Radio History

the Difference is INSIDE the FIL-CAP®



FILTRON'S NEWEST SUBMINIATURE FEED-THRU CAPACITOR SETS A NEW STANDARD OF RF ATTENUATION PERFORMANCE

1 For the first time—a complete line, ratings for 5 AMPS & 10 AMPS, continuous duty

2 Advanced internal circuit design . . . specially processed impregnant

3 Meets Spec MIL-C-11693 (proposed) for suppression capacitors

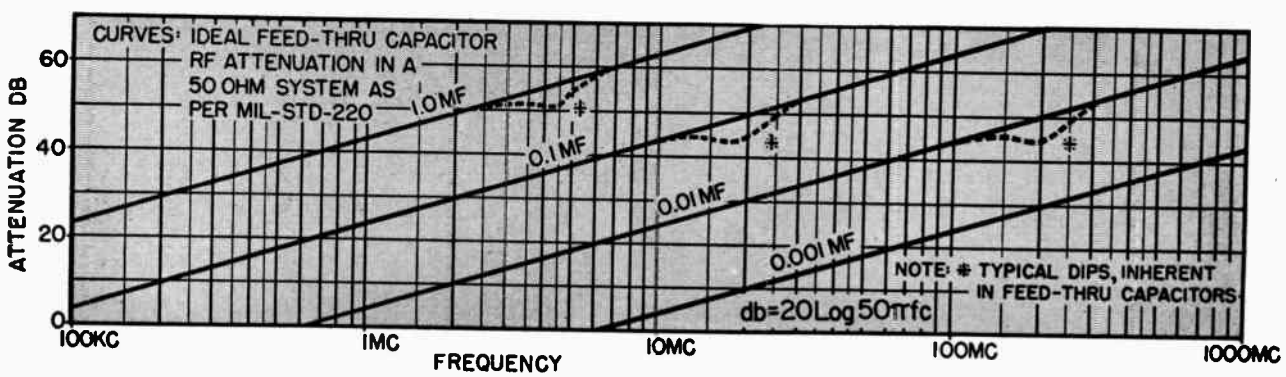
4 Closely matches theoretically ideal attenuation characteristics

An unusual internal circuit arrangement, precision mechanical components, and a specially processed silicone impregnant combine to afford outstanding electrical characteristics and stability—unobtainable in conventional feed-thru capacitors ordinarily used for interference suppression in electronic equipment.

Basically, FIL-CAPS are a four-terminal network inserted in the current-carrying line. The power line to be filtered must be broken, and each end connected to an insulated terminal of the capacitor. The feed-thru ground-plane mounting prevents mutual impedances between input and output terminals. The FIL-CAP design includes compression glass insulated terminals, and milled flats on the threaded mounting neck, to prevent rotation during installation and under service conditions.

Type FV is rated for 5 amps AC-DC continuous operation, and Type FX is for 10 amps AC-DC continuous operation. Both types are available in operating voltages of 100, 200, 300, 400 and 600 volts DC; 125 and 250 volts AC; 0 to 400 cycles.

All FIL-CAP subminiature feed-thru capacitors are 100% tested and inspected before shipment.



If your requirements call for greater attenuation than is obtainable with feed-thru capacitors, Filtron also manufactures a complete line of RF interference filters. More than 5000 filter types are offered for military, industrial, nuclear and commercial applications. Filtron is the world's largest manufacturer of RF interference filters. Details and literature furnished on request.

For complete engineering data and installation diagram, ask for Filtron Catalog FV, and FV Supplement for FIL-CAP equivalents to MIL-C-11693 military designations.

Main Plant, Flushing, New York

FILTRON CO., INC., FLUSHING, LONG ISLAND, NEW YORK
PLANTS IN FLUSHING, NEW YORK, AND CULVER CITY, CALIFORNIA

Canadian Representative: Aircraft Appliances & Equipment Ltd., 585 Dixon Side Road, Toronto 15, Ontario.

World Radio History

business briefs & trends

★ Burton Browne, head of the advertising agency of Burton Browne, Chicago, has reported that the agency's clients engaged in the electronics business sold 208 million dollars' worth of electronic components and equipment during 1955.

* * *

★ Technological development with major implications to the design of electrical motors and other electrical equipment through use of lightweight anodized aluminum wire has been disclosed by the Aluminum Company of Canada Limited. Company officials have revealed that its metallurgists have developed a new process of anodizing aluminum wire with alternating current to give it a ductile oxide coating which, in effect, becomes an electrical insulation.

* * *

★ Attorney-General Roberts of Ontario says that more radar units for measuring the speed of automobiles will be put into use in Southern Ontario soon. The Attorney-General stated that, where these units have been used over the past eight months, the accident rate has been reduced.

* * *

★ A major development in the Canadian electronics industry is reported to be in the cards for Bell's Corners, Ontario, where Computing Devices of Canada now have their head office, and finishing touches are being put to a 75,000 square feet manufacturing plant. J. A. Norton, vice-president and secretary-treasurer of the company, anticipates that five more buildings will be added in the future. The facilities will be known as Electronic Park when completed.

* * *

★ C. D. Howe has told the House of Commons that no decision has yet been reached as to what guided missile model will be built in Canada. The decision rests with Department of National Defense officials, and it is expected that their choice will be one of the U.S. Navy's Sparrow missiles.

* * *

★ The Semi-Conductor Division, RCA, have developed a new high-frequency alloy-junction germanium transistor which is capable of being manufactured by mass production methods. The transistor is presently in pilot production and production facilities will be increased when RCA's Semi-Conductor Division is established in its new plant at Somerville, N. J.

* * *

★ Consideration is presently being given to putting hi-fi product advertising on an industry-wide standards basis in the United States. Plans for the project are being worked out by RETMA's high fidelity sub-committee.

* * *

★ A formal application has been placed with Ottawa by New Brunswick provincial authorities for consideration in the matter of constructing an atomic plant in the province. The development of atomic energy as a means of electric power is being followed closely by officials of the New Brunswick Electric Power Commission.

* * *

★ The British Columbia Telephone Company has placed orders for 52,000 telephone services to meet its 1956 requirements. The type of instrument ordered, known as Type 80 Monophone, is a unit reportedly designed by telephone men in the field and is being manufactured by Automatic Electric (Canada) Limited.

* * *

★ Frank M. Folsom, president of RCA, told the National Retail Drygoods Association that American retailing is on the threshold of an entirely new era in mass merchandizing as a result of the development of color television.

* * *

★ The use of computers is growing rapidly in Canada. At the present time five large computers are being used by industry and government and presently existing orders for 20 more of these units are on the manufacturers' books. It is anticipated that in another year 50 of these units will be operating in Canada.

* * *

★ Orders placed by the Department of Defense Production for electronic equipment between March 1 and March 31, 1956, amounted to $2,485,904.

* * *

★ A sales promotion meeting for the Mutual Benefit, Health & Accident Association was conducted recently by telephone, linking 13 Canadian cities. Cities included in the hook-up were: Vancouver, Edmonton, Fort William, Sudbury, Windsor, Kitchener, London, Burlington, Toronto, Peterborough, Ottawa, Montreal and Halifax. Duration of the conference was one hour.

* * *

★ According to telephone statistics of the world, Canada had 25.05 telephones per 100 population in 1954, placing it in third position among countries with the most telephones per capita.

* * *

★ A Canadian Marconi experimental tropospheric scatter link is to be installed in July this year between Montreal and Ottawa, which will operate initially in the 2,000 megacycles band. 1 KW u.h.f. terminals and large antennae will be used to scatter signals for satisfactory reception over a distance of approximately 86 miles. Later, experiments will be carried out on the 900 megacycle band during which teletype and facsimile traffic will be passed and a rigid check kept on the equipment's performance.

* * *

★ In April an optical microwave link was manufactured and installed by Canadian Marconi Company for the Canadian Overseas Telecommunication Corporation. Operating between the Corporation's stations at Drummondville and Yamachiche, this system uses the 900 megacycle frequency range and the radio equipment is duplicated and automatic change over and fault alarm facilities are provided.

* * *

★ RETMA officials in the United States report a steady increase in the sale of transistors. A total of 1,897,309 units have been sold during the first three months of 1956.

* * *

World Radio History

A WORD ABOUT COPPER . . . ELECTRICALLY SPEAKING

Good copper is a product of many processes. The pure electrolytic copper used in the electrical industry today has inherently high electrical and mechanical characteristics. These properties are further developed during its manufacture into wires and cables.

In the first stage, shown below, the wire bars are heated in preparation for the rolling process. During this operation, the cast structure of the bars is transformed into a denser crystal form of high malleability, which is ideal for the cold working processes which follow.

When this copper is drawn, it produces wires with optimum electrical properties and the desired mechanical characteristics. After annealing, a dead soft copper, free from springiness is obtained. These qualities are of prime importance—particularly for Magnet Wire users.

The fine quality of Phillips' copper combined with their high standards of workmanship and technical skill have earned for Phillips products the reputation they hold today.

Phillips Electrical Company Limited, The Canadian Affiliate of the B.I.C.C. Group. Head Office—Brockville, Ontario. Sales Offices—Montreal, Ottawa, Toronto, Hamilton, Winnipeg, Regina, Edmonton, Vancouver. 5601

SEE BACK OF THIS PAGE

Phillips

WIRES & CABLES

World Radio History

"To some, electronics means radio and radar — to some it means television — and to others still, it means computers and giant brains, but to everyone it means the foundation of a new industry and products which will ultimately enable unlimited communications between humans and the absolute, calculated and instantaneous control of all machines, processes and operations".

— K. R. Patrick, President,
Canadian Aviation Electronics Limited
To The Royal Commission On
Canada's Economic Prospects.

ELECTRONICS IN INDUSTRY

A Special Presentation Of The Many Applications In Which Electronics Is Serving Modern Industry And Business

Vest Pocket Walkie-Talkie Offers Personal Paging System

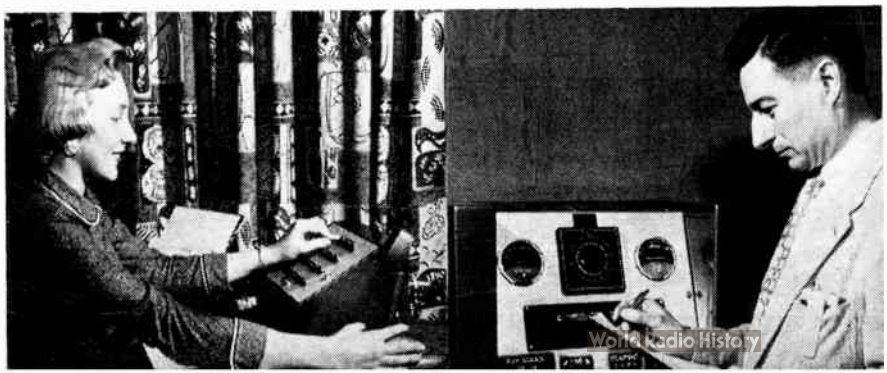
A new selective radio paging system for plants, hospitals, hotels and other institutions is one of the latest products of the electronics industry designed to increase the efficiency while reducing the steps of personnel.

Simply by touching a selector button and speaking a few quiet words, a switch-board operator can single out and pass a voice message to a particular manager, maintenance man, doctor, teacher or other person. When the operator presses the button an alerting buzz sounds in the tiny 10 ounce Radio Pager which the person carries in his pocket or on his belt while all other receivers remain silent. The voice message is then passed on by the operator.

Even in the presence of x-ray equipment, diathermy machines, welding apparatus and other electrical devices, the message is plainly heard, yet is distinguishable only to the person paged. For exceptionally high noise levels, there is provision for using a hearing aid type earpiece or a personal lapel type speaker in addition to the built-in speaker.

Key people are free to move anywhere their activities take them — in basements, shops, on roof tops, even in nearby outdoor areas such as parking lots — with the assurance that their paged messages will reach them.

The Radio Pager is of particular interest to the medical profession, which has long felt the need of a reliable "private" voice paging system. Any one doctor or nurse in hospital or clinic can be paged instantly. Emergency situations can be handled smoothly and privately. No one else is aware of the message, not even others who carry Paging units. Use of the Pager in hospitals has been temporarily approved by the Department of Transport and an announcement regarding other applications is expected shortly.



● *Left:* Operator singles out and passes voice message to superintendent in remote part of plant. *Right:* Key people can move freely in the factory, showroom, basement or office with assurance that their paged messages will reach them.

Vibration Testing For Better Production

Vibration analysis is now widely used both during the development of new designs and for the routine testing of products leaving the assembly line. Products incorporating rotating parts are now generally tested with modern dynamic balancing equipment whose operation is based on measuring the vibration caused by the unbalance. High-grade ball bearings are tested functionally by means of vibration meters. Other products are tested initially for excessive vibration by using a sound level meter. The operation of any noisy assembly is then analyzed more fully with a vibration meter, to pinpoint the exact cause of the trouble. For instance, multi-cylinder engines are first graded for smoothness by noise analysis and the "rough" operation of individual cylinders is subsequently detected by applying a vibration pick-up, which is more selective than the microphone employed for sound measurements.

A mains operated instrument which has recently become available for this class of work is known as a vibration meter, and uses a moving-coil pick-up which is sensitive to the velocity of the vibrating member under test. Measurements of acceleration and displacement can be made by switching in the differentiating and integrating circuits provided for this purpose.

The selection of the most suitable parameter is determined by the circumstances of individual cases. Velocity is widely used since this determines the magnitude both of the impact forces involved and of the noise emitted by a given design. For very high rotational speeds, measurement of acceleration has definite advantages since the reading obtained goes up as the square of the frequency.

The accuracy of acceleration measurements is paralleled by the practical importance of this quantity at high speeds. The amplitude of vibration of a gas turbine will, for instance, be only a fraction of that of a slow running steam engine, but the high frequency of the vibration can make it extremely dangerous.

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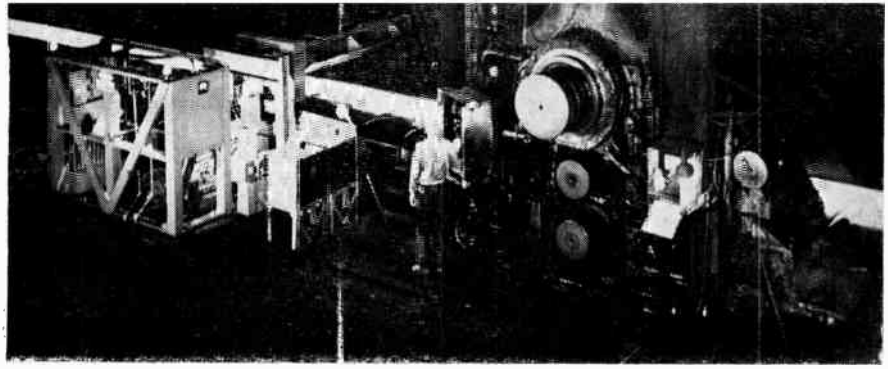


● Uniform thickness of steel strip is assured by X-ray gaging.

X-Ray Gaging Assures Accuracy Of Steel Runs

Manufacturers of hot and cold strip steel, steel pipe, nonferrous and nonmetallic sheet products need no longer be concerned with the prospect of having to scrap long runs of off-gage material caused by delays in detecting errors in thickness. Ofttimes in the past, with the old method of taking manual micrometer readings, it was found that large quantities of material had passed through the rolling mills before errors in the thickness of the stock were detected. At the best, the old manner of taking micrometer readings gave only an indication of the overall thickness of the stock as edge readings of the material could only be taken with micrometers.

In the manufacture of cold steel strip magnetic micrometers designed to have a continuous contact with the stock were used for some time but this system of gaging became unreliable as the speed of rolling mills was increased. The answer to the need for a non-contacting type of gage has now been found by use of radiation gages. Two types of this unit have been developed and are in use. One of the units operates on X-rays and the other on beta rays. Both types employ radiation energy which is directed on to one side of the stock being manufactured. In the case of the X-ray gage energy is obtained from an X-ray tube while the beta ray application employs radioactive isotopes as the means of energizing it.

The method of gaging stock thickness is simple and is based on the knowledge that the stock to be measured absorbs a known amount of the propagated energy. That part of the energy which passes through the stock is picked up by a measuring device which affords a continuous gage reading of the stock thickness. Not only does this type of gage give continuous readings but readings which show the thickness of the entire width of the stock being produced.

Spectrophotometry In Chemical Analysis

The analysis of chemical compounds has been greatly speeded up through the medium of a modern optical instrument known as the Spectrophotometer. The chemist is able to do more and better work in less time, consequently manufacturers are able to make a better product at less cost.

The applications of this indispensable tool are manifold. During World War II the instrument was used in the automatic and continual analysis for the amount of butadiene, which is the principal ingredient in the production of synthetic rubber.

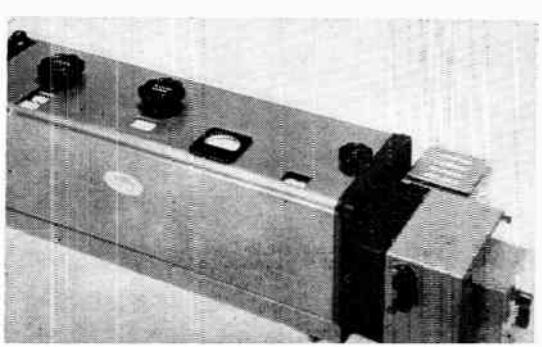
In diagnosing the cause of sickness, doctors depend on the results of analyses of body fluids, which can be determined accurately by means of the instrument.

Bottle makers have found it ideal for rapid analyses of glass, as it has been proved that automatic bottle-making machines operate properly only when the glass has the proper "working" properties.

Police and coroners' laboratories find that the Spectrophotometer aids them in identifying various poisons in the blood.

As a safeguard to public health, the instrument is used to investigate the effects of powerful insecticides and pesticides, used in growing crops, upon milk, vegetables, fruit and other agricultural products.

● The Spectrophotometer an invaluable aid to chemists.



Detached Operations Aided By I-T-V

A closed circuit television system — similar to the type used to beam championship fights into theaters — is helping the Armstrong Cork Company ensure top quality production of linoleum and plastic floorings.

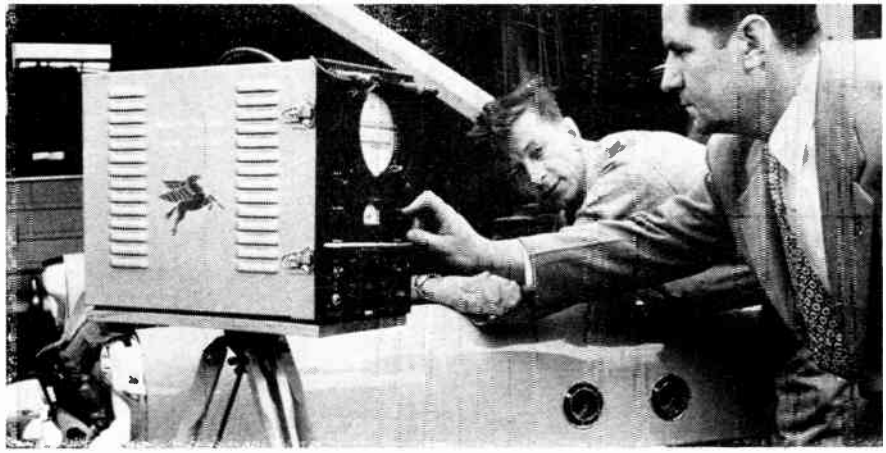
The TV setup bridges a three-storey gap in the linoleum operations at the company's floor plant. On the third floor, a workman shovels linoleum mix into a hopper. On the way downstairs the raw ingredients undergo intensive mixing, are combined with color pigments and emerge in granule form at huge calender rolls which form the mix into sheets of flooring material. It is important that the mix enter the rolls uniformly.

Normally a workman at the first floor operation signals upstairs, by means of a bell system, to stop or start shoveling on the third floor. Now a TV camera focuses on the mix and the image is flashed upstairs on a receiver, which allows the workmen to keep an eye on the operation below and regulate shoveling accordingly.

Although still in the experimental stage, the system has worked out well and there is a possibility similar setups will be installed in other departments on a full-time basis.

● TV receiver allows workmen to observe operation three floors below and govern supply of material accordingly.

World Radio History



Electronic Doctor Diagnoses Troubles Of Ailing Engines

An electronic instrument that will diagnose 65 different engine ailments common to the internal combustion engine has been developed by research scientists primarily for use in the Socony-Vacuum Laboratories, but now made available for commercial use in garages and automobile manufacturing plants.

This engine analyzer or "doctor" resembles a portable television set and weighs less than 60 pounds. It "televises" engine performance through a TV-like cathode-ray tube on an oscilloscope screen. Connected to an automobile ignition system by two simple lead wires, it gives simultaneous pictures of the behavior of each cylinder in an operating engine. In less than one minute it diagnoses faults in an automobile ignition system.

The analyzer detects virtually all ignition system troubles and, in addition, it will diagnose pre-ignition faults as well as troubles caused by noise and vibration or combustion knock. The instrument may also be used to check ignition timing and operation of intake and exhaust valves.

In all, picture patterns depicting about 65 different engine ailments have been observed and identified by engineers.

News-Photo Service For Mid-Ocean Passengers

An electronic engraving device that produces halftone plates from photographs received by a ship's radio photo equipment is able to bring spot news photos to readers of the ship's newspaper.

The apparatus is called the Scan-A-Graver and it has already been installed on a luxury liner.

The engraver contains two cylinders. On one a sheet of special plastic is placed while the photograph to be engraved is placed on the other. Light reflections from the highlight and shadow portions of the original copy are translated by a photo cell and a subsequent amplification system into electronic energy, so that a vibrating motor can direct a stylus in cutting craters in the plastic plate to form the halftone dot pattern.

Records Calls When Office Is Empty

A versatile electronic device, that answers telephone calls and takes messages while the subscriber is away, is a tireless assistant known as the "Electronic Secretary", and can operate 24 hours a day, taking calls, receiving orders, making appointments, recording names, messages and telephone numbers. It may also hold calls or transfer them to another number.

Operation is simple. Before going out the subscriber puts a three way switch to "Automatic". The "Electronic Secretary" then goes to work and can record up to 240 calls in his absence. On his return he sets the switch to "Playback" and the messages are repeated. A volume control is available to bring normally inaudible signals to a loud clear pitch.

The device can be installed completely in 10 minutes, and can fit anywhere in the office. The "Electronic Secretary" in no way interferes with normal telephone use, and is fully approved by the AT and T.

Fast Card Checking By TV

By using closed-circuit television, a bank has avoided duplicating more than 17,000 signature cards four times — one for each teller in its new motor bank located two blocks away from the main bank building. In addition, the closed-circuit TV system speeds up balance and interest statement checking and makes "stop-payment" order processing a matter of seconds.

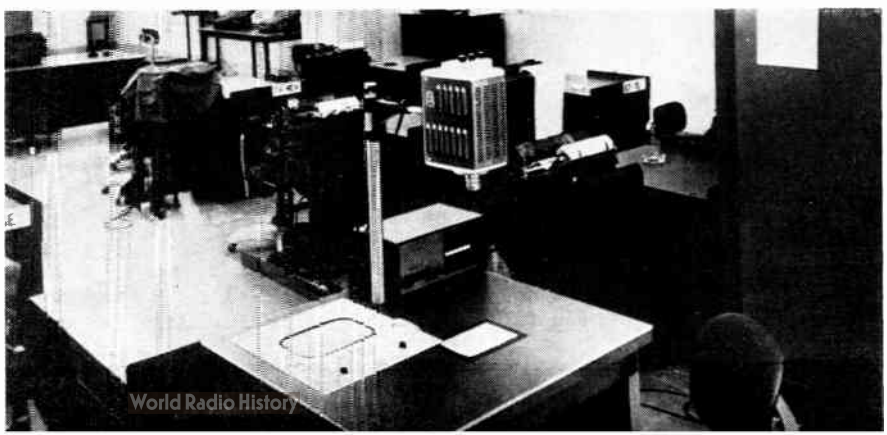
In two days, a television camera and five television receivers were installed.

Basically the system provides a TV hook-up between the main bookkeeping department located in the main bank building and the motor bank two blocks away.

A television camera next to the main files in the bookkeeping department transmits signatures and records to TV receivers in each of the four teller booths at the motor bank. A fifth receiver in the bookkeeping department is for the camera operator. The tellers talk to clerks in the records department through a separate intercom system.

In operation, the system works simply: when a customer presents a withdrawal cheque at the motor bank, the teller asks the bookkeeping department in the main building for the signature card kept in the files, and the customer's signature is then checked against the image on the TV screen.

● **Television camera mounted on desk below transmits records in second to TV receivers located in teller booths.**



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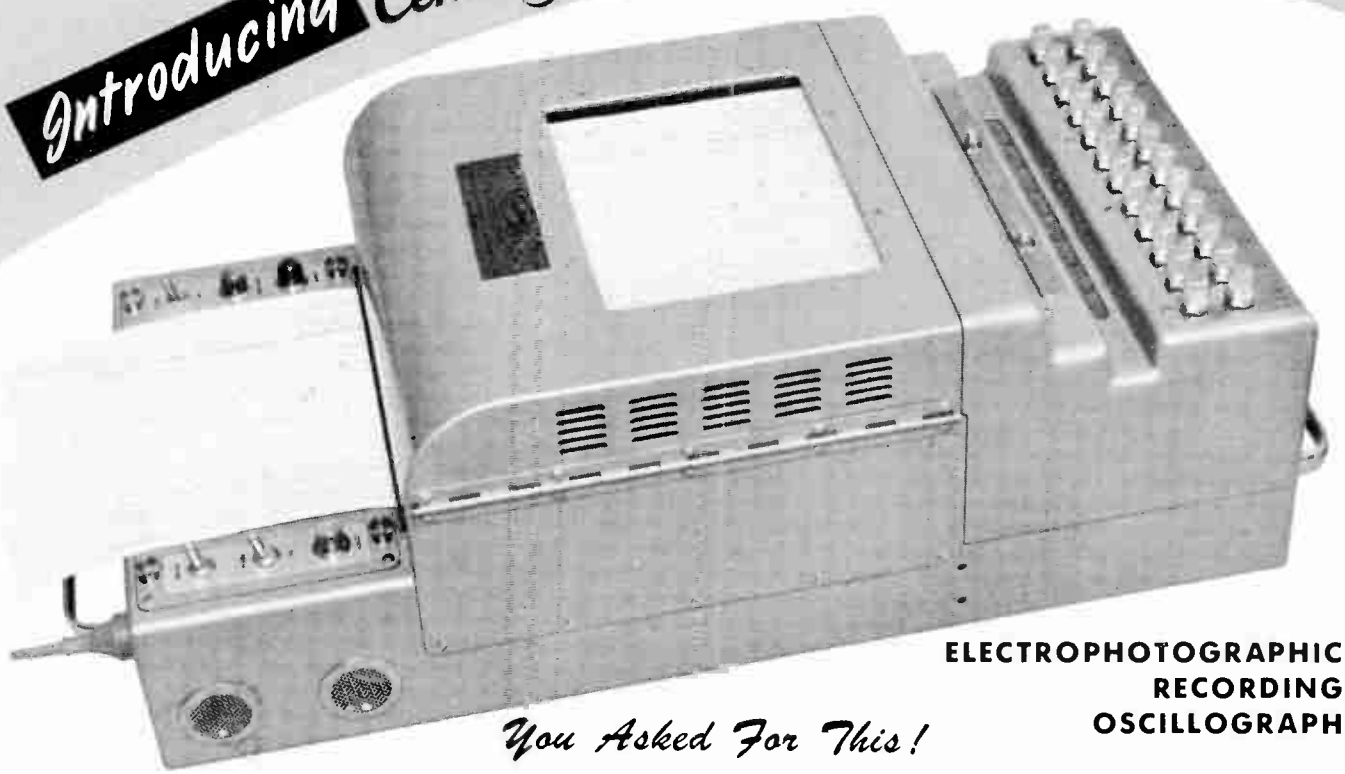
NOW! FOR THE FIRST TIME

DIRECT WRITING CONVENIENCE WITH PHOTOGRAPHIC ADVANTAGES!

Introducing Century ELECTROGRAPH MODEL 420



ELECTROPHOTOGRAPHIC RECORDING OSCILLOGRAPH

You Asked For This!

ONLY THE REVOLUTIONARY CENTURY ELECTROGRAPH OFFERS THESE FEATURES

- ***Permanent instantaneous oscillograms***
- ***Eliminates need for messy liquid chemicals***
- ***No darkroom required***
- ***Automatic continuous dry processing***
- ***View oscillogram while recording***
- ***Utilizes sensitive light-beam galvanometers***
- ***Up to 24 traces on eight inch paper***
- ***Traces can overlap***
- ***Precision timing lines***
- ***Low power consumption***

Century's engineers are the first to accomplish the long dreamed-for wedding of photographic recording and completely automatic dry processing to eliminate the need for costly darkroom facilities and liquid developing, rinsing and fixing.

The greatest advancement in the technique of multi-channel oscillograph recording in over 20 years, the CENTURY ELECTROGRAPH is essentially a direct-writing recording oscillograph utilizing the RADICALLY new technique of Electrophotography combined with light-beam galvanometers.

NOW investigate CENTURY ELECTROGRAPH—the most modern approach to simplified oscillographic recording — when planning your instrumentation program whether for research, engineering, test, quality control, process control, or any other analog recording requirement.

COSTS NO MORE THAN OLD-FASHIONED METHODS

Century

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EXPORT OFFICE: 149 BROADWAY, NEW YORK CITY — TEL.: BARCLAY 7-0562

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World Radio History

● This portable, desk-size computer, the LGP-30, is fully automatic and handles up to 500 operations per second.

Compact Computer For Engineering Laboratories

A simplified electronic computer is proving to be of special value to all types of engineering laboratories, who do not need the "giant brain" type of digital computer, and to universities responsible for training the engineers of the future.

Smaller than an average desk, this easily-operated engineering tool possesses the memory capacity and problem solving ability of computers vastly greater in size and far more costly.

The memory unit is a magnetic drum capable of storing 4096 words, 31 bits (30 binary digits plus sign) in length, along 64 tracks around the drum's circumference.

Rotating at a speed of 3600 r.p.m., the drum is scanned or read by 64 read-record heads. Access to any given word may be accomplished in a maximum of 17 milliseconds, although an access time of 2 milliseconds is more typical, in actual operation. The unit can add, subtract, multiply, divide and make decisions as instructed by internally stored programs.

An electric typewriter equipped to produce and be operated from punched paper tape, is used as the input-output device.

Having fewer components, time lost on repairs and maintenance is materially reduced on this small-size, streamlined computer.

"Smog" Reduction

A mass spectrometer — an automatic electronic instrument that has found wide application in the fields of science, medicine, and industry in recent years as a device for chemical analysis — makes it possible to reduce air pollution at sulfur-recovery plants.

During tests it was found that this instrument, by continuously analyzing the sulfur-recovery process, gave plant operators control information that led to a 35 per cent reduction in air contaminants, while at the same time adding 1.2 tons a day to the plant's sulfur production.

Sulfur-recovery plants are being built by smog-conscious refineries and natural-gas treating plants because hydrogen sulfide, an odorous chemical removed from gas and petroleum, contributes to air pollution when burned. It was discovered that converting this hydrogen sulfide to sulfur, by first burning part of it to sulfur dioxide with air, would cut down sharply on the amount of pollutants released into the atmosphere. However, air pollution still resulted, although not as extensively, when the ratio between the air and the hydrogen sulfide was allowed to vary during the burning process. The problem was then to find a method of continuously controlling this ratio.

It is claimed that the mass spectrometer, a "molecular sleuth" that identifies and measures the elements of complex gas and liquid mixtures by literally sorting and weighing the molecular particles, is the answer to this control problem.

Intercouplers Save Aircraft Firm $40,000 Annually

A step toward automation in office accounting techniques has been taken with the development of two electromechanical intercouplers, each of which links a posting machine and a unit for punching cards. One employe can operate both machines.

They are expected to save Convair (San Diego), a Division of General Dynamics Corporation, which has recently installed the units, more than $40,000 annually. The intercouplers are among the first installed in industry, and will enable a clerk, in a single operation, to complete regular posting work of material control records on automatic posting machines and at the same time turn out key punch cards.

The electronic intercouplers can be disconnected for single operations.

With production of the punched out cards, the system gives a rapid and flexible readout method when needed. Convair material control department has nearly 65,000 records of all items used in the plant from pencils to aircraft engines. Some 130,000 posting transactions are handled each month.

● T. C. Tudor, material control general supervisor at Convair-San Diego, holds cover open to show electromechanical intercoupler linking posting machine to punch card machine.

The punch cards are valuable in assembling financial reports, checking inventories, preventing surpluses and for cost accounting information. Varied information contained on regular record posting cards may be obtained swiftly by simply running the key punch cards through a sorting operation.

World Radio History

TRANSHORIZON TERMINALS ON WHEELS

Collins portable Transhorizon Terminals provide the same reliable and efficient circuits as a system with fixed stations. Two UHF tropospheric scatter propagation Terminals serve as a complete communication circuit or may be used to augment other systems up to 150 miles in length during periods of maximum loading or emergency.

The portable Terminal is housed in a 30-foot van, and includes transmitter, receivers, RF diplexing filters, exciter-modulator and voice multiplex and telegraph channeling equipment. Collins 15-foot diameter parabolic antenna and supporting towers fit together compactly for transport in the van and are erected easily on location. Each terminal is self-sufficient and ready to operate except for primary power source.

The Terminals are also used to demonstrate the practicability of Transhorizon circuits and to evaluate proposed circuit paths.

Collins **CREATIVE LEADER IN COMMUNICATION**

COLLINS RADIO CO. OF CANADA LTD.
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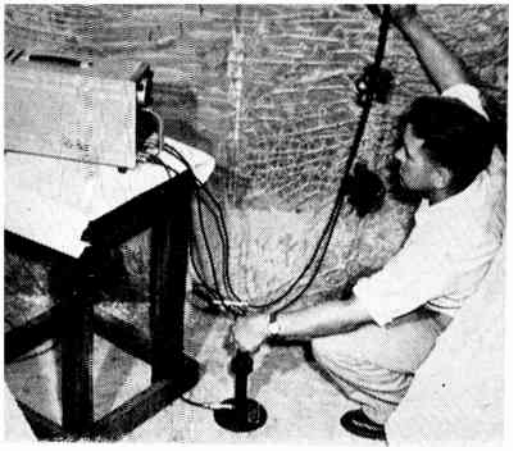


● Flow Detector In Use.

High Accuracy Flaw Detection With Ultrasonics

The use of ultrasonic flaw detectors is now long established in many industries which require non-destructive methods of testing parts of their equipment. Flaw detectors will show up clearly, tiny cracks buried below the surface of the metal, cracks which have been passed through X-ray examination undetected and often cracks which are too small to be seen by all but the most powerful microscope.

Porosity in metal hair line cracks, slag inclusions, blow holes, lamination, fatigue cracks and welding flaws are among the many defects which can be detected by this equipment. Its use is not confined to metals for it can be applied to many homogeneous solids such as plastics provided that, in general, they are of regular shape.

The principle of operation of this flaw detector is that it sends out an ultra-frequency pulse (at from roughly 0.5 mc/s. to 5.0 mc/s.) from a quartz crystal probe at a frequency best suited to the material being tested. The pulse from the transmitting probe travels through the test-piece to the opposite side and returns to the receiving probe.

When the pulse leaves the transmitting probe a small peak is traced on the cathode ray indicator. Its return from the opposite face is also traced on the indicator so that the distance between the two traces on the C.R.T. time base is directly proportional to the thickness of the test piece.

Any flaw between the face on which the probes rest and the opposite face causes some of the transmitted energy to be returned to the receiving probe and this is traced on the C.R. tube. The size of this trace is normally an indication of the size of the flaw.

Measuring Wall Thickness From One Side Of Material Only

Micrometers and their many derivatives have long been regarded as the ultimate form of workshop measurement. Unfortunately these "mechanical" gages require access to both sides of the component whose thickness is to be measured. This is often only possible either by destructive methods or by the use of long arms or linkages which introduce play, deflection, and other uncertainties into the resultant reading.

Electronics has now produced an ingenious solution of this problem, using the principle of resonance: whatever the wall thickness of a component, it has a characteristic and well defined resonant frequency. If an ultrasonic signal of variable frequency is fed into the component, the signal amplitude will increase sharply when its frequency coincides with the resonant frequency.

Use is made of this effect in the Visigage. The varying frequency is applied to the horizontal axis of a cathode-ray tube while the signal amplitude is plotted vertically. The resonant frequency is very clearly defined by the rise in amplitude, and is shown as a sharp peak in the trace. To simplify operation, a scale calibrated directly in thickness is placed over the CR tube. All the operator has to do when taking a reading is to apply the probe, moistened with a little liquid to give a good acoustic coupling, to the surface of the workpiece. The wall thickness is then read off as indicated by the peak in the trace.

The illustration shows this gage being used during the manufacture of aircraft propellers from fabricated steel tubing. In view of the very high operating stresses involved, it is necessary to ensure that the correct wall thickness has everywhere been maintained during the manufacturing process. This can only be done non-destructively by means of such an electronic instrument, which enables readings to be taken to micrometer accuracy on even the most awkwardly shaped components of which only the outer surface is accessible.

Other products now being gaged by this type of instrument include seamless gas cylinders, the sheathing of electric cables, integral wings for aircraft and tapered sheets. A Visigage is also employed to detect lack of bonding in rubber-to-metal sandwich material used for flexible mountings.

● The Dawe Visigage enables the wall thickness of hollow tubular propeller blades to be measured easily and accurately. Normal mechanical gages or micrometers cannot be used.

World Radio History

Closed Circuit TV For Airport Traffic Control

A remotely-controlled closed circuit system offers a solution to the growing problem of controlling aircraft traffic at military airfields as well as commercial airports. Need for such a system is becoming more apparent due to the longer runways required for the larger, speedier propeller and jet aircraft.

This system, which has recently been installed at a naval air station, contains several unique features. Complete control of the system is executed from the control tower, with camera panning through 350 degrees to control the azimuth and tilted 45 degrees above or below rest position to control the elevation of the camera. The speed of pan and tilt can be varied by the operator so that an aircraft may be followed in flight or along the runway.

When a surveillance problem has been completed the camera, by means of pushbutton control, may be returned at high speed to a normal "home" position determined by mechanical cams pre-set at the camera.

The camera is seated in a special weatherproof housing containing heaters and a cooling system thermostatically controlled for all-weather operation. The housing is equipped with windshield wipers for wet weather and a K2 filter which can be lowered in place in front of the camera lenses under haze conditions.

Switchboard efficiency to meet your needs!

No. 555

PRIVATE BRANCH EXCHANGE

This is a modern switchboard with the new "plug-in" type units, permitting actual service requirements to be closely met.

Available in capacities of

60 and 120 Station Lines
14 Central Office Trunks
15 Cord Circuits

Two positions may be installed side-by-side to increase the maximum capacity to 240 lines.

The low design makes it convenient for attendant-receptionists to converse with employers' visitors or client over the top of the switchboard.

No. 507

PRIVATE BRANCH EXCHANGE

A small compact switchboard with a capacity of

12 Station Lines
5 Central Office Trunks
5 Connecting Circuits.

Requires about the same amount of space as the average typewriter.

Convenient and simple to operate by an attendant with other duties.

Northern Electric
COMPANY LIMITED
44 BRANCHES THROUGHOUT CANADA

2053-1

For further data on advertised products use page 79,

World Radio History

Tape Recorders Play Important Part At The United Nations

● Three Ampex magnetic tape recorders presently installed in a studio control room in the United Nations headquarters in New York City are shown in the photo.

Magnetic tape recorders are appropriate for use in conventions and large gatherings such as those conducted by the United Nations.

The equipment can be located in a combination recording and master control room and be used for recording the original and English translations of all speeches made during sessions, and also for recording broadcasts of all meetings. In one particular instance, a radio line was provided from New York to San Francisco and two of the machines were used for feeding excerpts of speeches and other material back to New York for translation into other official languages.

The United Nations has more than 25 tape machines installed in its New York headquarters. Seven studio control rooms are each equipped with three machines for recording purposes. Others are used for tape-to-disc dubbings and tape-to-tape dubbings.

Electronic Detection Aid To Commercial Fishermen

Fishing craft which depend on the lighter shoals which provide much of the potential catch may now operate more accurately with a specialized equipment known as the "Fishfinder". This instrument is sensitive enough to detect any fish which are present in quantities sufficient to make trawling worth while. The instrument can transmit at the maximum possible speed for any given depth, so that at normal trawling depths it repeats fast enough for the echoes to appear as a steady picture, and small echoes can be seen more clearly. An added advantage is that any echo seen can be expanded for examination and depth measured almost to the nearest foot.

The ultrasonic transmitter is a magneto-striction transducer, operating at 30 kc/s, which transmits successive short pulses at the maximum p.r.f. for a given depth. These are reflected back by the water, any fish, and by the sea bottom, and echoes are received by a second transducer at various time intervals in accordance with the depth. These echoes are displayed on a 5 inch cathode-ray tube as horizontal deflections on either side of a vertical trace.

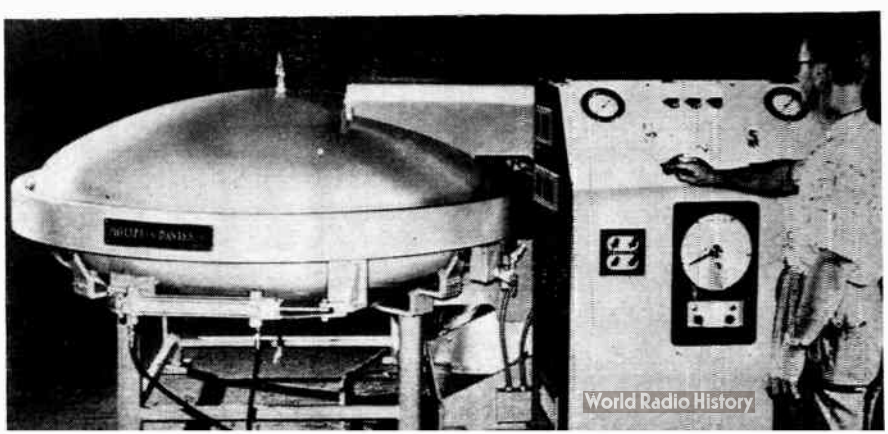
The time base speed is synchronized with the p.r.f. so that as the time base speed is increased for decreased sounding depth, so also is the repetition frequency to the maximum for that depth. It is found in practice that, at depths of less than about 100 fathoms, the p.r.f. is high enough to provide a steady picture.

Automation For Batch Temperature Processing

An autoclave, with a "packaged" control cubicle, is providing completely automatic operation in such industries as (1) aircraft — for metal-to-metal resin bonding; (2) rubber — for vulcanizing and curing; (3) glass — for laminating; and (4) plastics — for laminating and processing.

This autoclave is designed for batch processing at pressures up to 100 p.s.i. and temperatures up to 500 F. The control cubicle, installed near the unit, monitors a complete program of heating, controlled "hold" at the desired temperature, and cooling. Even the closing and opening of the pressure-tight lid is automatically controlled through hydraulically-operated "arms".

● View of P & D autoclave with lid closed. Control cubicle is at right with L & N recorder and accessory controls to monitor entire process.



Push-button operation of the autoclave frees the operator from tedious watching of the repetitive process at every stage. One man and a helper can easily operate a group of up to eight autoclaves. A better finished product results from rigid control of every step in the procedure.

The desired control temperature is set by knob adjustment and maintained by a "duration-adjusting" type of electric control.

The chart record of the temperature instrument provides permanent file data of the actual temperature during the complete batch process. Equally important, it provides plant management with a record of machine downtime.

World Radio History

***EXTERNAL FIELD REDUCTION OF 10 TO 1** is measured, above, using a magnetic pickup coil and a meter. The housing cover is removed exposing the terminal board. This new stabilizer, like all Sola Constant Voltage Transformers, is a static-magnetic regulator, has no moving parts and requires no manual adjustments or maintenance. It provides automatic, instantaneous voltage regulation within ±1%, even with primary voltage swings of ±15%.*

New Sola Constant Voltage Transformer Reduces External Field by 90%

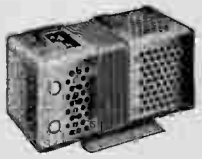
An improved Sola Constant Voltage Transformer design retains all the advantages of the Sola CV principle while providing a 90% reduction in external field and up to 53% lighter weight.

In applications employing "magnetic field-sensitive" electronic equipment, such as high-gain audio circuits, the new Sola CV design offers important advantages. Cathode ray tubes—high-gain amplifiers—microwave plumbing—may be mounted close to the transformer; usually magnetic shields may be eliminated.

The new housing has a smooth overall contour which minimizes dust accumulation. It is finished in attractive gray hammerloid.

The new Standard Type Sola CV transformer is available in 3 capacities—250, 500, and 1000va. For specific advice on your particular application, contact your Sola representative listed below.

SOLA *Constant Voltage* **TRANSFORMERS**



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World Radio History

Noise As A Guide To Quality

● Mechanic checking effectiveness of overhaul by noting reduction in noises emitted by engine. The compact Sound Level Indicator can be used in the most confined spaces.

Many manufacturers are now using noise measurements to give a rapid overall check on the quality of their products. First used on domestic appliances, air conditioning equipment and general electrical gear such as fluorescent ballasts, this method now finds wide application in the manufacture of machine tools, automobiles and many other products.

The theory is that only a product on which all parts are correctly machined and assembled will run at a minimum characteristic noise level. Experience soon shows what is a "good" noise level for a given design, and any rise above this figure indicates a fault at some stage of manufacture.

Although noise is not yet universally restricted by law, many people bring vehicles to service stations because they find them too noisy for comfort. Even if noisiness is not complained of, noise checks are still very useful. The difference between the readings taken on the indicator "before" and "after" servicing often gives a good indication of the quality of the repair work carried out. Actual readings of noise level are also valuable evidence in case of subsequent complaints by awkward customers, as well as providing a useful method of diagnosis for the mechanic.

The indicator is ideal for this class of work on account of its accuracy, complete portability and pocket size.

Because of its simplicity of operation, this instrument is now widely used for carrying out noise surveys in factories and public buildings and similar locations. Similar instruments are used by the police in various countries, such as Switzerland, Germany and some cities in the U.S.A., where the noise level of automobiles is limited by law.

Ultrasonic Gaging Of Fabricated Components

The rapid growth of fabrication has given rise to many difficulties in measurement and gaging. This is particularly true of large pipe bends, spun and pressed ends, and similar shapes where the dimensions are too great to enable mechanical gaging to be employed either accurately or conveniently.

In a shop engaged on the manufacture of stainless steel plant for the food industry one problem was to ensure that the welds were maintained at a safe thickness after they had been dressed down to provide a polished and easily sterilized surface. The illustration shows the domed end of the body for a road tanker vehicle at this factory being gaged for thickness by means of an ultrasonic thickness gage.

● Checking Road Tanker Body.

In operation, an ultrasonic signal is supplied from an oscillator in the gage to the crystal transducer probe, by which it is fed into the component. The signal then travels through the material and is reflected by the far wall. The frequency of the signal can be varied by altering the setting of the oscillator by means of the knob seen under the operator's hand. When the wavelength of the signal is equal to or a sub-multiple of the path length (twice the wall thickness), a resonant condition arises and the buzzing noise in the headphones increases sharply. The wall thickness can then be read directly off the calibrated scale with a guaranteed accuracy of three per cent under normal conditions. An accuracy better than one per cent can be consistently obtained on smooth surfaces.

The outstanding feature of this method is that measurements can be taken where only one side of the component is accessible. For instance, the thickness of the wall of the tanker shown could be measured even if the tank is full of acid or oil, without affecting facility or accuracy of the readings. The gage is therefore widely used for corrosion surveys on steam boilers, on petroleum refinery plant, water mains, and similar plant, without in any way interfering with its operation.

Automation Unit For Small Business Firms

Automation is available to small business owners as well as to the larger organizations. An example of this is a high-speed electronic media sorter that operates from a standard typewriter keyboard and is capable of handling original forms in various weights and sizes.

The "Rapid-Sort" can process thousands of forms per hour. Unlike conventional punched card sorting equipment, it sorts directly such original media as sales checks, tax bills and job tickets.

The operator glances at the top copy to determine the alphabetical or numerical classification. As the proper typewriter keys are depressed, the media are whisked to the appropriate bins. Less than a third of a second is required for the complete cycle.

Electronic controls select the proper letter or number bins automatically, stacking the original forms in neat piles ready for any subsequent routine operation.

Manufacturers of the equipment have produced models ranging from an 11 bin model to as many as 51 bins. The sorter accepts original forms measuring five-and-a-half to eight-and-a-half inches long and two-and-three-quarters to four-and-a-quarter inches wide. It will feed various weights of paper stock ranging from 15 to 90 pounds.

A testing of the equipment proved that it could handle in one day a job that, with manual labor, would formerly have taken six days to complete.

World Radio History

this is SPERRY

History is a build-up of circumstances.
Sperry came to Canada to fill a war-created need;
remains to fill the more lasting needs of peace.
While still engaged in the manufacture of
instruments for defence purposes, Sperry experience
and skills are now directed to the wider
aspects of commerce in the development of
control mechanisms for technical processes
of all kinds. In this work of applying
"the invisible power" to Canadian production needs,
Sperry now serves Canada in peace as it did in war.

The technical knowledge and manufacturing facilities of
Sperry are readily available for the solution of problems
involving methods of automatic operation and
monitoring in all types of industry; and the development
of new mechanisms to meet new conditions.

Sperry in Canada is Sperry at your service.

SPERRY

SPERRY GYROSCOPE COMPANY OF CANADA, LTD.
P.O. BOX 710 MONTREAL, QUE.

For further data on advertised products use page 79.

World Radio History

Stroboscope Measures High Speeds

Rotating anodes have recently extended the effective life of X-ray tubes and have enabled the power of X-ray tubes to be considerably increased. Unfortunately this design requires great care in manufacture if satisfactory radiographs are to be obtained. Not only must the anodes rotate uniformly in a highly evacuated atmosphere in which normal lubricants are unusable but there must be a complete absence of "bounce" to maintain sharpness and definition.

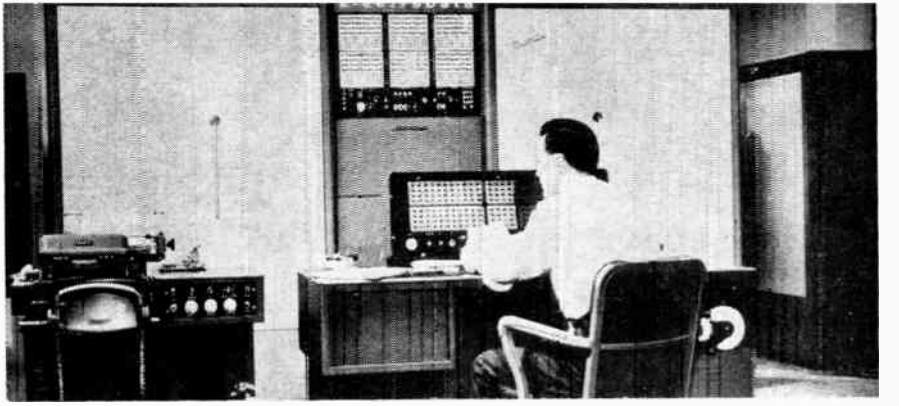
Meticulous care is taken at every stage in the production of these tubes to ensure that their operation is satisfactory. The finished tubes are then stringently tested to eliminate any tube having the slightest defect, since a human life may well depend on the result of radiographic diagnosis.

An important part of the inspection is based on the use of a stroboflash. This mains-operated instrument contains a built-in oscillator which enables cyclical events to be studied in slow motion or to be "frozen" into apparent immobility. It can also measure rotational speeds between 600 and 100,000 r.m.p.

In the present case, the anode is first run up to speed and the flash rate of the stroboflash is raised until the anode appears to be stationary. The rotational speed can then be read directly off the scale calibrated in r.p.m. Any lack of smoothness or bounce in the anode is shown up by movements of the "stationary" image. The operation can be studied in more detail by reducing the flash rate very slightly so that the anode appears to be rotating forward in slow motion (actually at the difference between the true speed and the flash rate which can be adjusted as required).

Finally, the acceleration of the anode from rest is measured as a test for correct machining and assembly of all the constituent parts. The stroboflash is first set to a given speed. The tube is then switched on and the time taken for the anode to attain the "freezing" speed is measured with a stop watch. In this way, quantities which would be impossible to obtain by almost any other method are measured very rapidly by an operator who need know nothing of the electronic circuitry on which the stroboflash is based.

● Measuring the speed of rotation of the anode in an X-ray tube.



● Insurance Company Data Processing Equipment.

Data Processing Equipment Speeds Paper Workloads

High-speed electronic data processing equipment has become increasingly important to such organizations as insurance companies, in taking over paper workloads in billing, rerating and accounting for thousands of agents and policyholders.

One such digital computer has been installed in a special all-glass room by a fire-and-casualty company. The system includes several magnetic tape storage units, each holding the equivalent of 50,000 punch cards. These devices cut storage space 93 per cent, in addition to making file maintenance rapid and automatic.

Policyhandling for certain types of automobile insurance — a task involving over 200,000 biannual renewals — is one major area of computer application. The equipment calculates new rates at a speed of 1.5 seconds per policy, and in one day the same number of renewals can be processed which formerly took an employee six months to complete.

All detail material is transferred to magnetic tape, thus speeding the job of report compilation. The computer's "memory" capacity enables it to process as many as 10 company reports at once — financial, production or underwriting. The faster the reports can be prepared, the faster action can be taken to lower or raise rates, emphasize select lines of insurance, etc.

Radar Designed To Meet Needs Of Small Boats And Purses

The east coast scallop dragger, the Elaine W. is one of the smallest vessels in Canada's Atlantic coast equipped with a newly developed radar, designed specifically for small boats and pocket books.

Previous units took up one entire room aboard ship. Not so with the unit on the Elaine W. The main power unit is attached to the wall over a bunk in the cabin. It is about 12 by 18 by 6 inches. In the wheel house is a display unit with a 7-inch cathode ray tube, something like a miniature TV set.

The other units are located on top of the ship and in the engine room taking up no valuable move-about space. A slotted wave guide scanning unit — the original principle of which was developed by Professor E. W. Guptill, of Dalhousie University — sits on top ship and rotates like the older parabolic scanner. To change the ship's 32-volt D.C. current to 115 volts A.C., a motor alternator is located in the engine room.

The entire unit uses 600 watts, the same wattage used by an ordinary toaster or flat iron.

World Radio History

NEW Tektronix Portable Oscilloscope

gives you Laboratory Performance ...in the FIELD!

The Tektronix Type 310 is fully capable of performing much of your laboratory work, yet has the physical characteristics desirable for work away from your bench. It handles easily and fits into tight spots, simplifying field maintenance of complex electronic equipment. The high performance of the Type 310 can help you speed up your field work... its low weight and small size can ease your equipment handling problem.

Complete accessibility to tubes and components is maintained by a unique step-chassis construction, hinged at the rear. Accurate calibration and excellent linearity permit reliable quantitative measurements—you read time and amplitude directly from the screen. Functional panel design and versatile control system contribute to operator convenience, making this new oscilloscope an easy-to-use field and lab instrument.

IN THE FIELD

IN THE LAB

TYPE 310 CHARACTERISTICS

Portability
Overall dimensions—6¾" wide, 10" high, 17" deep.
Weight—only 23½" pounds.

Transient Response
Risetime—0.09 μsec.

Sensitivity
DC to 4 mc—0.1 v/div to 50 v/div in 9 calibrated steps, 0.1 v/div to 150 v/div continuously variable. AC-Coupled—3 db down at 2 cycles. AC-Coupled only, 2 cycles to 3.5 mc—0.01 v/div to 0.1 v/div in 3 calibrated steps.

Versatile Triggering
Internal, external, line... ac- or dc-coupled, and AUTOMATIC TRIGGERING.

Flat-faced CRT
3WP with 1.8-kv accelerating potential. Edge-lighted graticule with ¼" divisions.

Wide Sweep Range
0.5 μsec/div to 0.6 sec/div, continuously variable. 18 calibrated sweeps from 0.5 μsec/div to 0.2 sec/div. Accurate 5-x magnifier extends calibrated sweep range to 0.1 μsec/div.

Horizontal Input
Sensitivity—1.2 v/div.

Voltage Calibrator
Squore wave, approximately 1 kc—0.05 v to 100 v in 11 steps.

Jewel Warning Light
Indicates when controls are at non-calibrated settings.

Power Requirements
105 to 125 v, 60 to 800 cycles, 175 watts.

DC-Coupled Unblanking

All DC Voltages Electronically Regulated

Type 310 Cathode-Ray Oscilloscope—$595
f.o.b. Portland (Beaverton), Oregon

Please call your Tektronix Field Engineer or Representative for complete specifications, or write to:

Tektronix, Inc.

P. O. BOX 831 • PORTLAND 7, OREGON
CYpress 2-2611 • CABLE: TEKTRONIX

World Radio History

● Intercom Measures 8″ x 4″ x 4″.

Intercom With Style

Designed with modern living as its theme, a wireless intercommunication system is recommended for use as an immediate method of two-way conversation in the home, business, farm, or office. It can also be employed as an electronic baby sitter, for its sensitivity picks up slightest sounds. To reduce phone costs and save time, the system may be operated between buildings on the same power line up to a mile apart.

Other features include: two or three wire line selector switch to match all types of house wiring, a silencing control that eliminates power line interference, "dictate" position on "talk-listen" switch for baby sitter use, four-tube and germanium diode powered amplifier, neon pilot light, and provision for additional stations if desired.

U.L. approved and of all metal construction, the unit is obtainable in two styles: Model FW-20 has standard ebony black cabinet with antique gold panels: Model FW-20D has deluxe brushed brass cabinet with white panels. Each unit measures 8″ x 4″ x 4″. The two units comprising a complete two-station system weigh 9 lbs.

Supermarket Directory

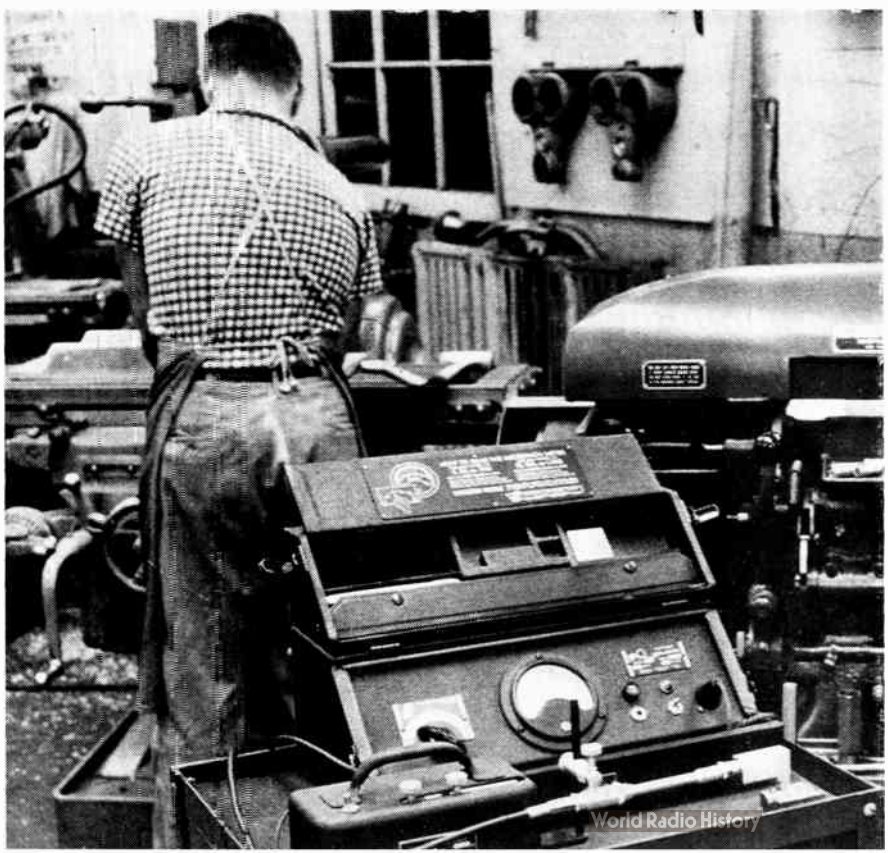
A supermarket has installed an information-giving apparatus which helps to eliminate eye-strain and fatigue for the busy housewife shopper.

Seven panels studded with push-buttons are part of this "talking directory" system. In operation, it works something like this: a shopper walks up to one of the panels and presses the button labelled "cocoa". "Cocoa is on table 19," responds a tape recording. Then the recorded voice slips in a quick sales talk by enquiring "How about some marshmallows with your cocoa? Try Snow-white Marshmallows, they're on table 25, bottom shelf."

The message is given at the other six stations also, imparting the same information to most of the customers in the store.

Surface Irregularities Measured With Profilometer

As demands on equipment performance have become more exacting, so has the necessity increased for precision measurement to be applied in the manufacture of machine parts. Dimensional measurement alone is no longer sufficient for the production of machine components. Today manufacturers have to work to measurements of roughness which may be invisible to the human eye.



Surfaces produced by machining and finishing operations are highly complex and irregular in character, no matter how smooth or uniform they appear to be to the eye or the sense of touch. A study of many surface profile records has shown that most surfaces have thousands of modern irregularities per square inch, and in the manufacture of modern equipment this roughness has to be gaged and measured and kept within certain allowable limits.

On any given surface the roughness irregularities vary greatly in spacing, height and shape. It is not practicable to take all of these variables into account and arrive at a figure that represents surface roughness. Roughness must be stated in definite numerical terms, and the most practical way of doing this is to measure one of the characteristics of the roughness and take an average value.

A mechanical-electronic instrument that will measure roughness in machine parts is the Profilometer, which permits the detection of dimensional errors before they occur, permits closer size control, eliminates unnecessary production operations and makes possible the sharpening of cutting tools to produce more consistent finish and longer tool life.

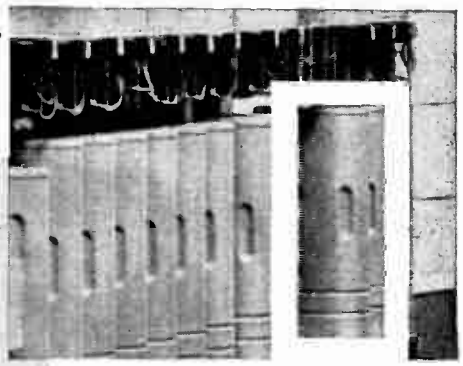
With the measurement of roughness now made possible through the application of electronics, faster production and lower costs are obtainable. The Profilometer is another example of how electronics permits the saving of time, money and labor in industry.

● Profilometer Front View.

World Radio History

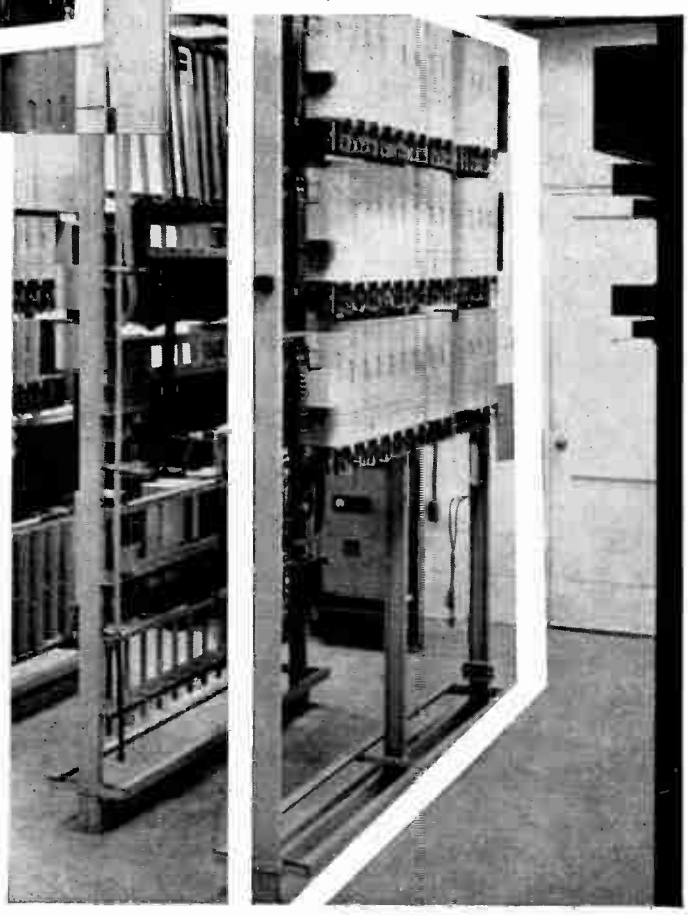
Strowger Type 11 M-A-X
GROWS WITH YOUR COMMUNITY–ECONOMICALLY!

Add a Switch and you take care of moderate growth, quickly, easily. Just jack it into place on one of the numerous extra banks provided with your initial equipment. No wiring. No soldering!



Add a Shelf of switches when larger growth occurs. Each shelf is complete with pre-wired banks. Your men can install it quickly and inexpensively.

Add a Frame with as many shelves of switches as you need, to meet heavy growth. There are no capacity limits to Strowger expansion.



For installations up to 400 lines, with prospects of expansion, a Strowger Automatic Type 11 M-A-X is your best investment by far. Experience proves it expands economically to meet any need.

You will have no technical worries when you expand, no capacity limits to fret about. Merely order additional equipment when you need it—and put it in. It's as simple as that! Economical too, when you consider that each switch, each shelf, each frame is a pre-wired *unit*—made so more can be added with minimum time and labour.

5602

Arrange for a consultation today!

AUTOMATIC ELECTRIC (CANADA) LIMITED

Distributor in Canada

AUTOMATIC ELECTRIC SALES (CANADA) LIMITED

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For further data on advertised products use page 79.

World Radio History

● A synchronous magnetic recorder recently installed is here seen transferring a recording to optical film.

Synchronous Magnetic Recorder Speeds Studio Production

The increased demand for films of various descriptions by the extension of television services, increasing use of films by industry, and the expansion of visual aids to education, has created an urgent requirement for speedy and economical facilities in sound recording studios.

This need has been met by the introduction of a synchronous magnetic recorder which provides the facilities required.

The new synchronous recorder will be of great advantage on location where it will be synchronised to the camera. Playback facilities being immediately available means that the wanted take only will be used, thus affording considerable economy in this type of filming.

The new recorder is designed to use 16 mm. single perforated stock and is driven by a synchronous motor so that when used in conjunction with any camera fitted with a similar motor, perfect synchronism between sound and picture can be maintained throughout any shot regardless of duration. Although primarily designed for use with 16 mm. cameras, its use is not limited to this gage provided that editing facilities for handling mixed gages are used. The power consumption of the equipment is low so that, although designed for alternating current mains supplies, it can be run economically from a battery driven rotary converter.

There are two basic units, each housed in stout wooden cases with durable leatherette coverings. The *Recorder Unit* consists of the drive motor and film transport mechanism together with the magnetic heads. A removable panel permits the recordist to see the film path during operation through a transparent window without opening the lid. Apart from loading and unloading of recording stock, this unit is operated entirely from the Control Unit.

Printed Circuit Prototypes In 30-40 Minutes

A time-saving, easy-to-operate unit for making production prototypes of printed electronic circuits, is short-cutting development time by weeks. Despite its small size (60 inches long by 50 inches wide by 45½ inches high), the Protomaka is capable of producing an average printed circuit in 30 to 40 minutes, and circuits up to 10 inches by 16 inches in size can be manufactured.

With two simple connections, the unit is ready to operate: the machine is plugged into a standard 110 volt line, one hose is connected to a cold water faucet and another to a waste drain.

The Protomaka produces etched wiring by the photographic process. Copper clad material is coated with photo-sensitive resist on a whirler. The board is held by a pair of quick-acting clamps while the solution is poured on the surface. Centrifugal force spreads the resist evenly, any excess flowing into the aluminum bowl in which the whirler spins. An infra-red lamp dries the resist as the piece rotates.

The circuit board is then exposed on the light table where the negative is placed under the resisted panel, and pressed firmly to it by the vacuum frame table top. Exposure time is only 30 seconds. A developing tank with an overflow water rinse is conveniently located to complete the printing cycle.

If a plated surface is desired, the copper is cleaned, in a built-in reverse current alkali and hydrochloric acid tank, each with its own rinsing chambers.

Two etching baths are fabricated into the top assembly, both having air agitation and heating elements. Ferric chloride is available for plain copper surfaces and silver plated circuits, while the chromic acid tank is used on panels resisted with solder plate. The latter tank has a lead antimony liner. Here again overflow water rinses are situated next to each etching element.

The remaining area of the top is utilized by a sink used in stock preparation. A water spray nozzle is installed next to the sink together with an air hose for drying.

All controls are mounted on the panel which divides the two rows of tanks. Each operation is regulated by controls immediately above its particular section. The air compressor, vacuum pump, rheostats, etc., are located in the base of the apparatus, with additional space provided for chemical storage.

Automation For Printed Circuit Mfg.

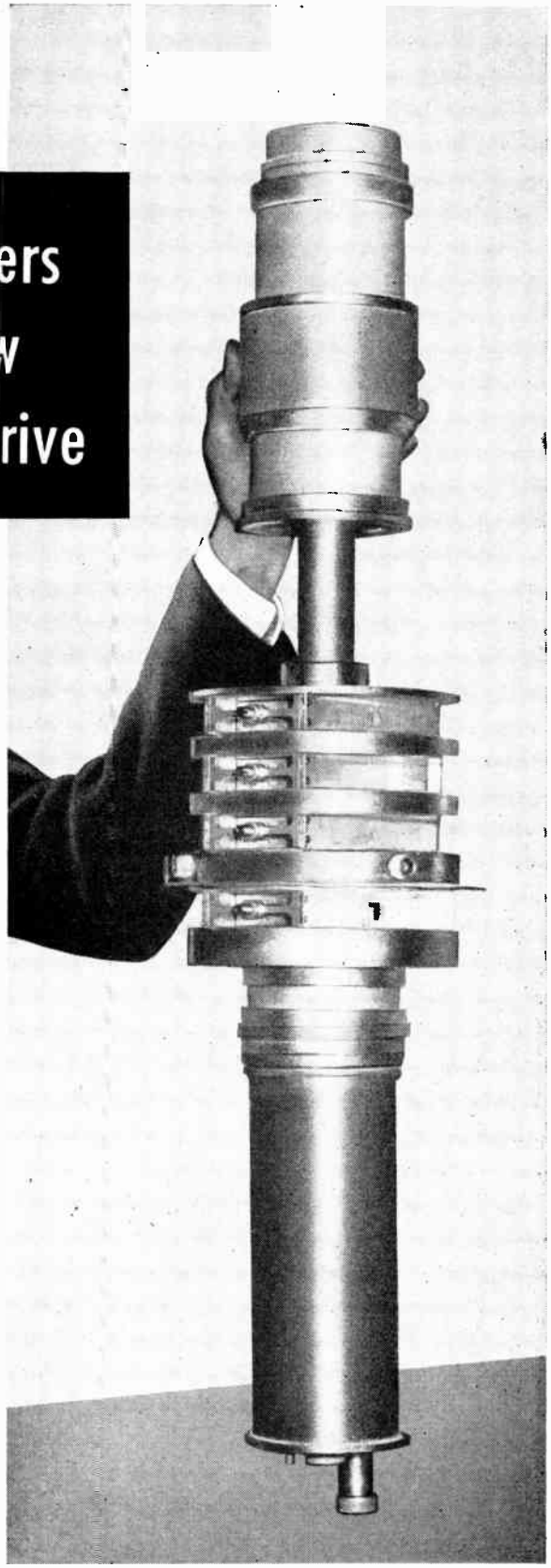
A newly developed automatic machine makes it possible to insert almost any number of terminals into a printed circuit board in two stages within a three-second cycle. Insertion is accomplished simultaneously in any symmetrical or non-symmetrical pattern. Since the terminals or pins are self-retaining, they will not vibrate loose during additional assembly or other operations prior to permanent soldering.

Operation is completely automatic. Terminals or pins in chain form are fed from two reels simultaneously through the die into the printed circuit board feeding mechanism.

Said to be one of the most important advancements toward printed circuit automation, the machine has wide application in radio, television, electrical/electronic, aviation, automotive and related industries. It can be engineered to meet any particular application or production requirement, in accordance with specifications as requested.

World Radio History

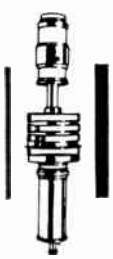
EIMAC X600 Klystron covers 1700-2400mcs at 10kw/cw with less than one watt drive



Delivering 10 kilowatts at 1700-2400mcs., the Eimac X600 opens another portion of the spectrum to high power forward-scatter communications. This new four cavity klystron operates at 40% efficiency with power gains up to 50 db.

Exceptionally wide range tuning over 700mc., giving one tube coverage between 1700 and 2400 megacycles, and a large, conservatively rated oxide cathode are bonus features of the Eimac X600. The exclusive Eimac modulating anode makes it desirable for pulse and amplitude modulation applications.

As is the case in all Eimac UHF klystrons RF circuitry is completed outside the vacuum envelope giving equipment manufacturers the exclusive advantages of readily adjustable input and output coupling and individual intermediate cavity loading. Users benefit through accessible tuning elements, ease of maintenance and operating economy.



For information on the X600 and other Eimac klystrons for high power tropospheric scatter and MTI radar systems, contact our Application Engineering Department.

Eimac

EITEL-McCULLOUGH, INC. SAN BRUNO, CALIFORNIA

The World's Largest Manufacturer of Transmitting Tubes

Represented in Canada by

THE **AHEARN AND SOPER** COMPANY LIMITED P.O. Box 715, Ottawa, Ontario

For further data on advertised products use page 79.

World Radio History

● A special recorder installed in an Electro-Encephalograph at a hospital for nervous diseases.

Transient Phenomena May Now Be Recorded Instantly

Until recently the only means of providing an immediate record of many types of transient or oscillatory phenomena was by means of an oscilloscope or by photography. Now this can be accomplished by the use of a high-speed pen recorder. The moving coil recorder used in these instruments is so efficient that it can be driven by a simple valve amplifier yet has a sufficiently high natural period to allow the deflection of the stylus across the paper record in as little as 2½ milliseconds. This remarkable speed of response enables records of high speed phenomena to be presented for immediate inspection in a dry and permanent form.

The design of the stylus suspension also renders the instrument very robust and so insensitive to external vibration that it can be used in aircraft or vehicles.

In this range of instruments Teledeltos dry electrolytic recording paper is employed giving an instantaneous and permanent record. This record consists of a fine, easily readable black trace on a light grey ground.

Single, two and four channel ink writing equipments employing a trouble-free controlled flow ink writing system are used with these instruments.

Weight Variation Check Used For Wool And Fabric Test

An instrument which accurately measures and permanently records on paper the variations in weight per unit length of yarn, roving and sliver has been devised jointly by the Institute of Textile Technology, Charlottesville, Virginia, and a large manufacturer of electronic equipment. With the help of this uniformity analyzer, wool and fabric manufacturers, faced with the problem of producing material of constant weight per unit length, have found an easy solution to their problem.

The new instrument is small enough to be carried by hand. Easy to read, it provides the operator with the same average peak-to-peak readings that would otherwise be obtained from chart calculations. Then, not only is there direct correlation between data obtained from both chart and the instrument, but defects in the material, which might be averaged out in area reading devices, are shown in their proper perspective with the use of the analyzer.

With this new development an operator can obtain complete non-uniformity data from a 1,000 foot sample of yarn in three and a half minutes, practically eliminating the need for time-consuming chart calculations.

Sound For Industrial Film

An important step forward for the film industry is the development of magnetic sound-on-film for use in producing color or black and white films in the field of industrial motion pictures.

An Auricon Camera, fitted with a "Filmagnetic" unit, permits lip-synchronized talking pictures and music of quality, on 16 mm black and white or color film pre-striped for magnetic sound before it is exposed to light. This sound-track film receives both optical-picture and synchronized magnetic sound-track at the same time.

Television Successfully Used In Teaching Dentistry

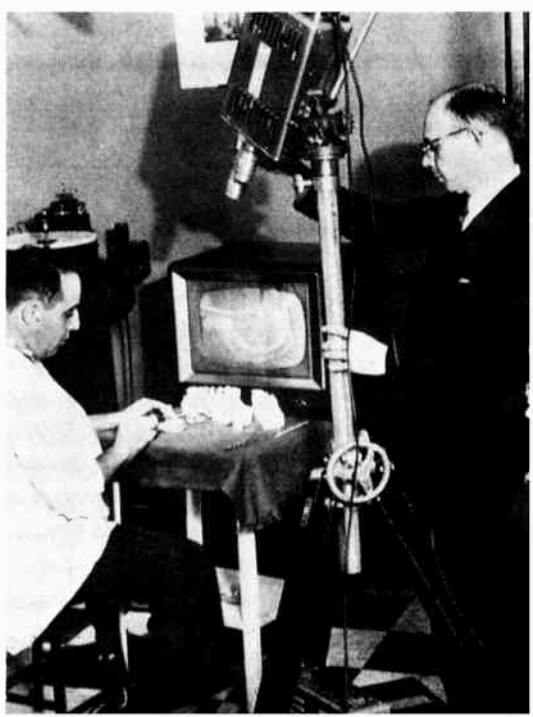
Two and one-half years ago, the School of Dentistry of Loyola University, in Chicago, pioneered in the use of closed-circuit television to help teach dental students.

Every floor and every classroom is now wired for closed-circuit TV reception, with programs originating in either surgery or the school's TV studio. Two clinical floors of the building, three laboratories, a post-graduate room and two amphitheaters also are connected to the closed-circuit system to facilitate transmission of visual and audio impressions throughout the school.

An example of television's tremendous value to dental instruction is evidenced by its use in conjunction with a once-a-week sophomore lecture-demonstration course in operative dentistry conducted by Dr. Frank M. Amaturo, Faculty Secretary and Associate Professor of Operative Dentistry.

Because of the inherent smallness of materials under discussion, the TV camera is used to project close-up images on large-screen receivers placed in the lecture hall.

● TV camera provides greatly enlarged image, thus aiding instructor to get point across to class of students assembled in adjacent amphitheater.



World Radio History


INDUSTRIAL 2-WAY RADIO


OIL LUMBER

THERE'S AN ENTIRE FAMILY OF G-E COMMUNICATIONS EQUIPMENT

G-E Communications Equipment Covers the Range

30 KC to 2,000 MC • 0.5 watt to 50,000 watts

G.E. offers outstanding consulting facilities and a complete line of communications equipment — from audio to microwave—for municipal, oil, forestry, industrial, railway telegraph, utility, telephone company, and civil and national defence applications.

System Consulting—C-G-E communications specialists and consulting engineers, with extensive experience in development, installation, manufacturing, testing, and system design, provide an unsurpassed Canadian facility available as an aid in the solution of communication problems.

2-Way Radio Communications—G-E 2-Way radio steps up production—increases profits. Industrial, public safety, and emergency personnel use it for better co-ordination of activities.

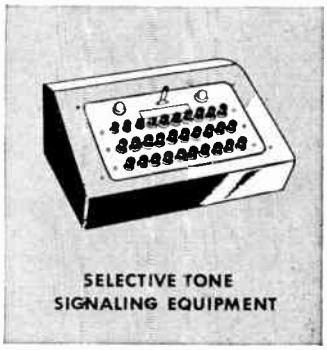
Microwave—G-E Microwave equipment offers dependable communication over long distances and difficult terrain areas. Up to 720 channels available for heavy traffic use.

- **For full information on G-E Communications Equipment and System Consulting, call the C-G-E office nearest you, or write to: Electronic Equipment Sales, Canadian General Electric Co. Ltd., 830 Lansdowne Ave., Toronto.**


POLICE & FIRE DEPTS.


2000 MC LONG HAUL MICROWAVE RELAY


UP TO 720 CHANNELS


SELECTIVE TONE SIGNALING EQUIPMENT

G-E 2-WAY RADIO FEATURES:

- **FREQUENCY STABILITY AND SELECTIVITY** guaranteed for life
- Narrow or wide band operation — 6/12 volt operation
- Low battery drain—cooler running equipment
- Quality components—G.E. makes more of its 2-way radio components than any other manufacturer

ELECTRONIC EQUIPMENT

ELECTRONIC EQUIPMENT OFFICES LOCATED IN:
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VISIT OUR EXHIBIT AT THE OCTOBER CANADIAN I.R.E. SHOW

MR-1056

CANADIAN GENERAL ELECTRIC COMPANY LIMITED

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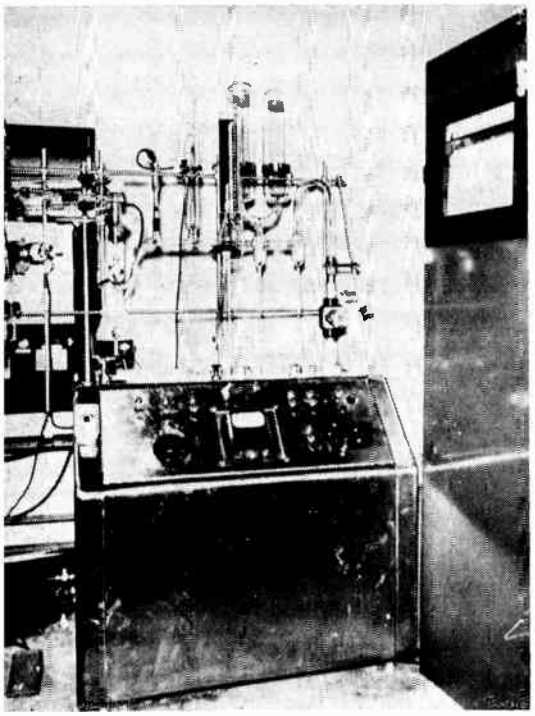
World Radio History



● Model 917 Hydrogen Analyzer.

Analyzer For Quality Control And Research

Those concerned with hydrogen embrittlement of titanium may be interested in the introduction of Model 917 Hydrogen Analyzer. Equally suitable for either quality control or research, this analyzer is a laboratory analytical apparatus for the rapid and precise determination of the hydrogen content of titanium, zirconium and similar metals and alloys.

Using approximately 0.25 gram samples in any solid form such as sponge, chips, or drillings, the equipment has a precision of better than plus or minus 5 per cent over the range from 5 to 700 parts per million. A complete analysis takes from three to ten minutes.

Simple to operate and maintain, Model 917 Analyzer can be run by any competent laboratory technician.

Sensitive Control For Small Industry

An instrument for the control of temperatures in furnaces, dye vats, heat exchangers and many other industrial applications and processes is a series of controllers which includes two position and compound action types and is suitable for solenoid valve or motor operation (gas and oil fired furnaces) or contactor operation (electric furnaces). Using a common chassis and unit construction, thus facilitating quick servicing and replacement, this inexpensive range of controllers enables the smaller industrial organisation to reap the benefit of sensitive control without adding to normal maintenance personnel.

A micro-switch relay is operated by a sensing unit which consists of two inductively coupled coils positioned by the temperature setting pointer, and a screening vane attached to the indicator pointer, which passes between them so as to give an instantaneous de-coupling action. A fine accuracy of control is thus achieved with absolute reliability of relay operation.

Wire Stripping Technique Eliminates Hand Operations

A wire stripping technique that reduces wire preparation costs by over 50 per cent is now available. All wire retwisting and retinning operations are completely eliminated by this method.

This equipment, known as Reevelec, is placed between the roll of wire and the stripper and automatically senses the points along the wire where cutting and stripping will occur. It applies a short pulse of R.F. heating energy to these points as the wire travels into the wire stripping machine. The R.F. heat energy melts the tin on the individual strands, effectively soldering them into a solid bundle that will not fray under the strain of cutting and stripping. The wires can then be fitted into tight terminal lugs or other small orifices without retwisting or resoldering.

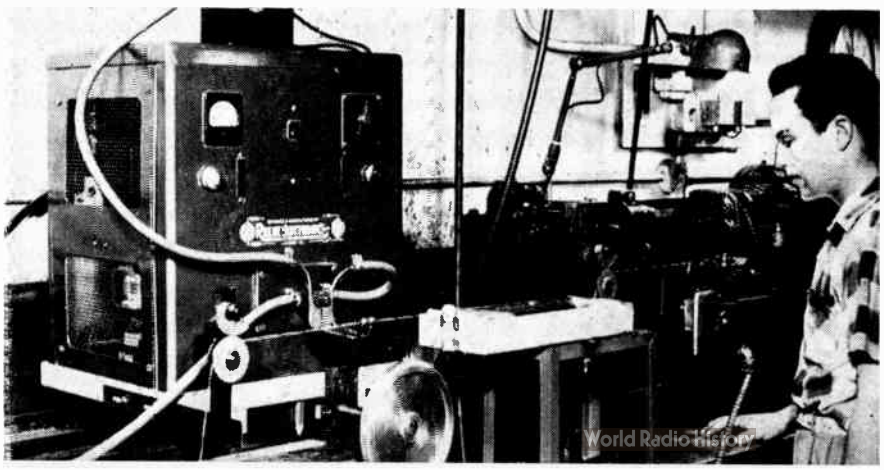
Any length or size of wire can be handled. The process is limited only by the capacity of the stripping machine being used.

The equipment is compact and can be set up on the same work table as the wire stripper.

A precision electronic timer, triggered by the wire stripper, controls the heat cycle with great accuracy, so that no overheating discoloration of wire or deformation of even low temperature plastic jackets occurs.

One user reports that this equipment has eliminated the duties of four girl operators retwisting and solder tin dipping of cut and stripped wires.

● Reevelec wire stripping machine is compact, easy to handle and cuts costs.



World Radio History

Intercom System Saves Time and Steps

A simple intercommunication system to answer the door has become as popular in lower-priced homes as in large mansions. Instead of having to run up or down stairs or from the back of the house every time the front doorbell rings, today's housewife merely flicks a switch to find out "who's there".

Besides saving many needless trips to inspect the unwanted wares of door-to-door salesmen, the intercom is a safety device as strong as the front door and is especially valuable for "screening" callers at night, without unlocking the door.

The Teletalk combination for the home consists of a pair of two-way, flush-mounting units made of weatherproof brass. One is set into the outside wall next to the front door. It has a separate pushbutton which connects with the doorbell, chimes or buzzer. The other speaker-microphone can be installed anywhere in the house, preferably in the front hall or kitchen.

Additional installations to include up to 10 stations can be placed throughout the house to help save the housewife steps.

How

ATLAS RADIO

INSTRUMENTATION DIVISION

Can Help YOU

Complete facilities at our Toronto Plant include:

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Instrumentation Division

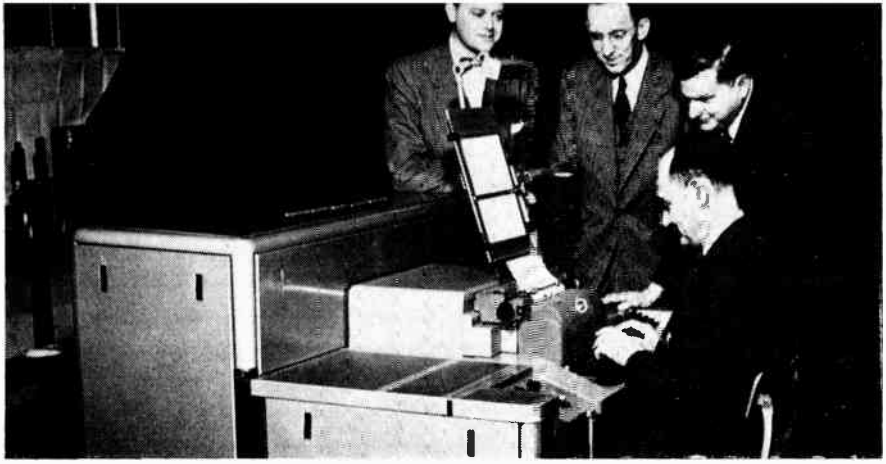
50 Wingold Ave. **Toronto 10, Ont.** **Telephone RU. 1-6174**

in Western Canada

505 McIntyre Block, Winnipeg 2, Man.
Telephone 9-38707

For further data on advertised products use page 79.

World Radio History



● Compactness and clean lines of the Higgonet-Moyroud composing machine are clearly shown in the attached illustration.

Electronic Typesetting Process May Eliminate Use Of Lead

An important development in the art of printing has been brought about by the invention of two French telephone engineers, Rene A. Higonnet and Louis M. Moyroud, who have devised an electronic typesetting machine which might conceivably lead some day to the elimination of the use of lead in the printing industry.

Unlike the conventional linotype machine, the Higgonet-Moyroud electronic typesetter has the appearance of an electric typewriter set on a stenographer's desk.

More than 1400 type characters are contained in 16 fonts which are available for the use of the operator. The design of the machine makes it possible for the operator to change from one font to another by means of a push-button. Type face characters and point sizes can be mixed without the necessity for making alignment adjustment, which is automatic.

As the machine is operated it photographs letters from a glass matrix disc and transposes the image on to film. The usual length of film is approximately 100 feet which can be developed either as negative or positive galleys. After development the film can be engraved on metal or used for proofs for make-up. The glass matrix disc weighs roughly two pounds and takes the place of approximately 4000 pounds of ordinary linotype magazines.

It is claimed that an average of 10 standard book pages an hour can be turned out by the machine, which has been fully tested in the production of a complete book.

The development of the Photon, or photographic type composing machine, was sponsored by the Graphic Arts Research Foundation, whose desire is to aid researches designed to develop and produce entirely new processes in the field of printing.

Loud-Speaking 'Phone Permits Free Movement

A revolutionary development in intercommunications is the Loud-Speaking Telephone, which permits a remote party to address his remarks to an entire gathering, thus enabling absent members to participate in board meetings and conferences.

The Loud-Speaking Telephone allows complete freedom of both hands and facilitates the recording of notes. This "hands free" convenience has many advantages. It permits busy executives, bankers, editors, lawyers, doctors, homemakers, who like to continue working as they talk, to proceed with their tasks. It is a great boon to people who have had to cradle the telephone between chin and shoulder, while looking through records. As a conference telephone, it has been proved especially useful, as any number of people may join in the conversation, simply by gathering around the table.

The equipment consists of a modern telephone and a loud-speaker; a control unit is mounted inconspicuously under the desk. The telephone has clearly marked "ON" and "OFF" buttons, a compact microphone, a volume control knob and a signal light.

The caller presses the "ON" switch, the signal light glows, and the caller then dials the number. The ringing sound is heard over the loudspeaker until the party at the other end answers. At the close of the conversation, when the other party has hung up, the signal light continues to glow as a reminder to press the "OFF" button.

For privacy, the telephone may be used in the conventional manner by lifting the handset.

Contact Meter Relays For Wide Range Of Control Operations

By virtue of television, radio and newspaper advertising the AccuRay method of controlling the quality of cigaret manufacturing is pretty widely known. Contact meter relays used in the equipment for controlling the manufacturing process of cigaret making provide sensitive control of virtually any chemical process or mechanical operation through alarm and automatic shut-off or continuous on-off control.

Other applications for the contact meter relays are: bearing temperature alarm and shut-off on turbines and steam generators, automatic speed controls for machines and conveyors, shut-off when voltage varies on computer power supplies, warning and control in radiation measuring equipment, automatic switching of standby equipment in microwave communications, continuous control of pH and use in radar warning systems. Standard contact meter-relays are designed for high limit control, but they are available also with low limit and both high and low limit contacts. Meters give full scale current ranges from 0/20 microamperes and voltage ranges from 0/5 millivolts. All ranges provide very close control on changes of less than one per cent of the full scale value. Differential between make and break is less than one per cent.

● AccuRay equipment used in cigaret making.

World Radio History

There will be plenty to Hear and See

AT THE

CANADIAN I.R.E. CONVENTION and EXPOSITION

IN TORONTO

OCTOBER 1st to OCTOBER 3rd, 1956

BE SURE TO ATTEND!

¶ ELECTRONICS AND COMMUNICATIONS aims to keep you fully informed and up to date as the months go by, about this unusual coming event which can be of so vital importance to the development of the rapidly expanding industry and market it serves.

¶ ELECTRONICS AND COMMUNICATIONS considers it a privilege and opportunity and a duty to do so.

¶ The September issue of ELECTRONICS AND COMMUNICATIONS — published prior to the Show — will be a pre-convention and pre-show issue that will stress — what to see — what not to overlook — at the Exposition or in the conference meetings.

¶ Keep up to date on Convention and Show news through ELECTRONICS AND COMMUNICATIONS — and of course look forward to its "Preview of the Show" Number in September.

ELECTRONICS and COMMUNICATIONS

31 - 35 WILLCOCKS STREET TORONTO 5, ONTARIO

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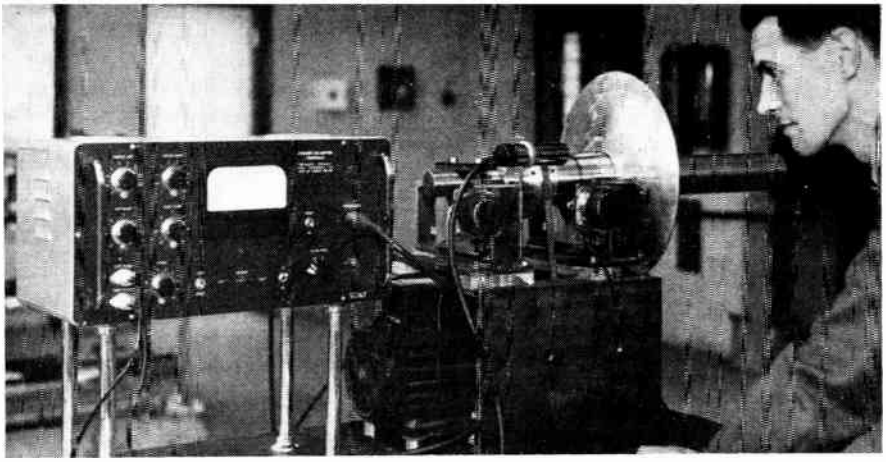
World Radio History



● This special spindle for "Terylene" synthetic fiber production is dynamically balanced by this compact electronic equipment. Its various units can be combined to balance components of any size or shape.

Electronics Speeds Production Of Man-Made Fibers

The trend in all modern production equipment is towards higher operating speeds. Typical is a special machine for the production of the man-made fiber called "Terylene", which is based on the use of a spindle rotating at 6,000 r.p.m. At this speed, an eccentricity of only 0.005 in. in the position of the center of gravity of a 75 lb shaft would give rise to an unbalance force of 383 lb, or roughly five times the weight of the component.

To avoid harmful vibratory effects from such unbalance forces, it proved necessary to balance the rotor dynamically during manufacture, and after certain periods of operation. The accompanying illustration shows that this could not be performed on a conventional dynamic balancing machine, since the whole rotor assembly must be balanced as a unit while being rotated by its own drive. Balancing is now successfully effected with dynamic balancing equipment. This equipment is comprised of measuring and sensing elements used in conjunction with the existing mountings and drive of the component being balanced.

Since dynamic balancing involves the addition or removal of material in any two convenient planes, the equipment employs two moving-coil pick-ups which can be seen plugged into the main control panel. These pick-ups produce a signal directly proportional to the amount of vibration caused by the unbalance, and hence to the magnitude of the correction required. Electronic computer circuits convert these signals into meter readings showing directly the actual amount of correction required in the two selected planes.

A stroboscope plugged into the control panel indicates the position of the necessary correction. This lamp is triggered by the signal from the pick-up so that the component appears "frozen" against a pointer.

The technician in the illustration is just setting up the equipment, after which complete determinations of unbalance can be made by an operator unfamiliar with electronics at a rate of perhaps 60 seconds per component. The centre of gravity can thus be brought to within about 0.000025 in. of the axis of rotation of the component.

General-Purpose Electronic Computer

A medium-speed, low-cost electronic computer, designed to meet the varied requirements of business data processing. automatic systems and scientific computation, is making needed computing services available to a previously overlooked segment of industry, science and business.

In addition to its low initial cost, the physical design of the computer keeps maintenance problems to a minimum. A competent technician, trained in the basic operation of digital computers, can efficiently maintain the equipment.

One of the important features of the unit is its automatic floating decimal point operation, which speeds up programming procedure by reducing the number of commands the computer must follow to complete a given problem or routine operation.

The machine can readily be adapted to data handling equipment already in use in many organzations. Instructions and data can be fed into it by means of electric typewriters, punched paper tape or magnetic tape, or through IBM cards, which it will accept at the rate of 100 cards per minute.

The computer can reproduce its output data in several forms, including typed copy or punched paper tape on electric typewriters at the rate of 10 characters per second or on magnetic tape.

"Mechanical Brain" Accounting Machine

A versatile accounting machine, designed to bring big machine features to business organizations at low cost, is now being used to advantage by modern business establishments.

The machine fits smoothly into existing bookkeeping systems and does not necessitate extensive changes in established office procedures. It can be set to provide either an original ledger and original statement with proof tape; a collated statement and ledger with proof tape; or a collated statement and ledger with journal distribution. All essential accounting records are produced automatically with any of these three variations.

Among the outstanding speed features of the machine are its high speed natural sequence 10-key keyboard, direct subtraction, automatic balances and totals, adjustable front feed form chutes and new rear lateral form guides, adjustable horizontally for different width forms to ensure fast, positive form insertion and alignment.

In addition, the machine's "mechanical brain" enables the unit to handle such accounting functions as payroll, accounts payable, inventory and others, which is an advantage to small and medium sized business where one machine is often called upon to handle several different applications.

The machine is finished in special "tantone" shades with an interesting multi-colored keyboard.

● "Mechanical brain" accounting machine eases bookkeeping problems.

World Radio History

MEMO to Electrical and Electronic Engineers

RELAYS MADE IN CANADA TO MEET MIL. SPEC. 5757-B

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CLIMATE
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WE'LL SOLVE YOUR RELAY PROBLEMS

Does your relay problem involve questions of size in relation to space, insulation resistance or dielectric strength? Whatever the difficulty, we have the answer at our finger tips.

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IMPROVED RADIATION MONITORING INSTRUMENTS

GEIGER AND SCINTILLATION MONITOR

- For X-ray Cobalt 60 installations and other uses.
- ALARM FEATURE, preset by operator, indicators open shutter or over dosage.
- Meter indicator of 0.5 to 50 MR/HR.
- Designed for EXTREME RELIABILITY — no thernionic tubes.
- Provision for external recorder.
- Handle PROBE cables up to 30 feet.
- Indicates 0 to 20,000 CPM in 5 ranges.
- Time constants of 3.5, 14 and 56 seconds.

MODEL 1374

do YOU use X RAYS? ISOTOPES?

- Adjustable ALARM FEATURE.
- Incorporates power supplies for remote precamp and photomultiplier.
- Probe cable may be up to 100 feet long.
- All controls are located on the front panel and are equipped with a protective cover.
- Accepts negative input pulses over a wide range of amplitude and duration.

•

Write for Information on these and other Nuclear Instruments

MEL

MEASUREMENT ENGINEERING LIMITED
ARNPRIOR ONTARIO
INDUSTRIAL - ELECTRONICS - COMMUNICATIONS

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World Radio History

● The Supertester finds radio and television set defects speedily.

The Supertester Simplifies Repair Work

Radio and television set defects can now be detected automatically and corrected on a routine basis by means of a scientific measuring instrument known as a Supertester.

Operated by a complex assortment of motors, shafts and switches, the Supertester is plugged in to a radio or television unit. A starting button is pressed and individual voltages, currents, connections and variable functions are checked at a rate of several per second — taking about five minutes to check a complete set. The machine automatically prints a ticket which shows what the trouble may be.

Basically, the tester was produced to make checks of this type on complete equipment as it is manufactured. Its use, however, can be extended because factories will be able to supply their service dealers with the special attachments fitting the procedure to their particular sets. A service organization, by having different attachments for each type, will be able to run these checks on widely different types of sets by simply interchanging the attachments on the one basic instrument they will require.

Diagnosis and correction of sets by this new procedure will bring the kind of scientific accuracy to set repairs that present-day instruments have imparted to the automobile servicing field.

The instrument provides facilities in a standard model for as many as 400 individual automatic sequence tests. The tests themselves can be distributed as required among the following six basic types: continuity, leakage, d.c. voltage, a.c. voltage, resistance and impedance. In addition, derivative characteristics such as gain, frequency response, phase relationships, and noise levels are determined automatically through the combination of two or more of the standard tests. Circuitry is included to allow manual dialing to any one of the tests at will.

Facilities are also provided for utilizing accessory signal generators, dropping resistors, etc., to permit tests at frequencies or voltages outside the scope of the standard instrument.

TAKE A LOOK!

You'll Find The Successful Businessman Reading The Publication In His Field.

Fill in the Card on page 79 and return.

THIS ONE INSTRUMENT

QUALITY · ACCURACY · FLEXIBILITY

The Budelman Frequency Deviation Meter 17A.

A versatile Frequency Deviation Meter, Test Oscillator and Field Strength Meter for the land-mobile services.

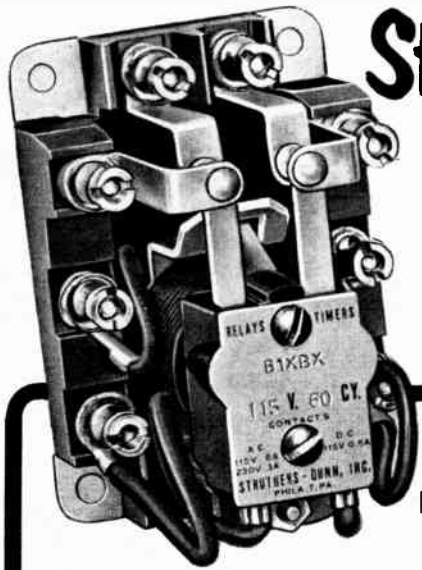
Measures: Carrier Frequency Deviation - Frequency Swing - Relative Power Output of FM Transmitter.

Features: A 50-ohm Coaxial Outlet and Control for receiver testing and alignment - Compact size - Portable (Battery-operated) - Highly stabilized circuits keeps initial accuracy throughout instrument's life - 25-960 mc., one to four calibrated frequencies.

PYE CANADA LIMITED

82 Northline Rd. Toronto, Ont.

Struthers Dunn Relays



NOW STOCKED BY ELECTRO SONIC!

There is a Struthers-Dunn relay to suit EVERY requirement – whether it be for automation machinery or for electronic equipment. No matter what type of relay you require, Electro Sonic can supply it NOW. Write today for full technical information.

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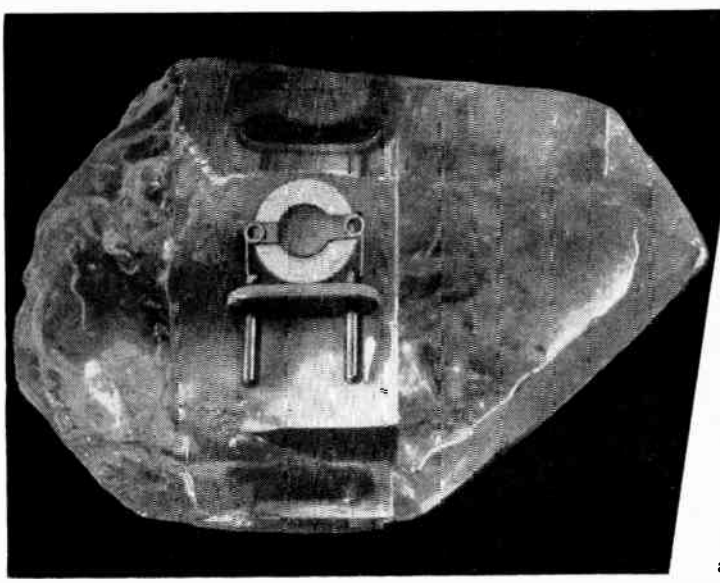

EVERYBODY KNOWS IT...

Everybody knows — or should know what to look for in a crystal, and Snelgrove spells it out for you — builds complete dependability into every Snelgrove crystal.

Exacting Snelgrove pre-tests prevent field failures, assure resistance to wide temperature changes, reduce crystal ageing to a minimum.

Snelgrove's extra security precautions guarantee the durable, dependable crystal quality you need — *and must have*. Make sure — with Snelgrove. It costs no more.

QUARTZ CRYSTALS

(PRECISION LOWDRIFT)

All Types and Frequencies for Every Application.

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FAST • ACCURATE • DEPENDABLE SERVICE

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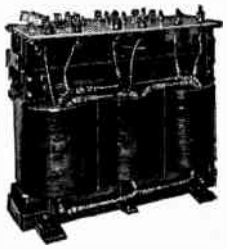
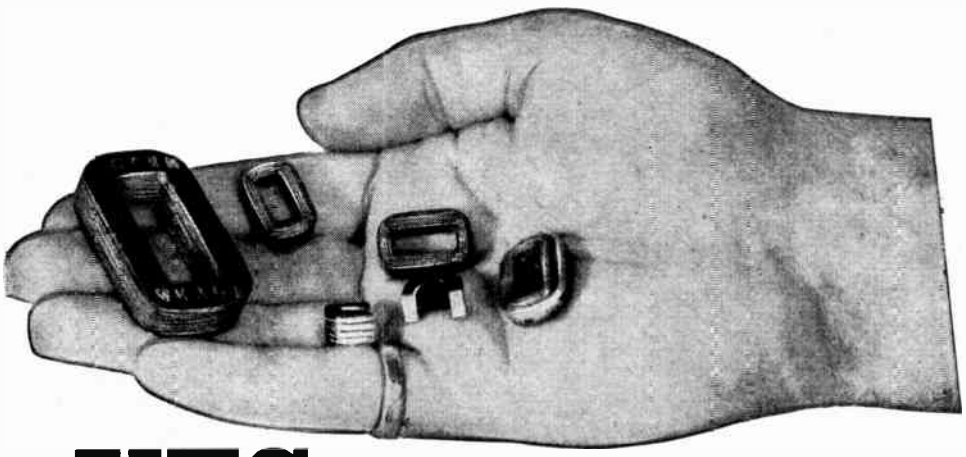
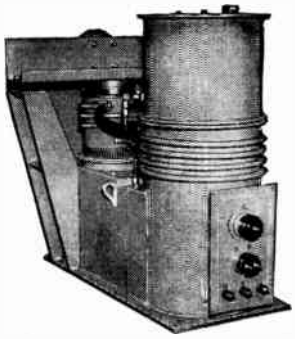




YES...

No core too small—No transformer too large!



Illustrated above and reading counter-clockwise: HyperCores, Chokes, Power, Pulse, Filament, and Plate Transformers.

565

MOLONEY ELECTRIC COMPANY OF CANADA LIMITED

Factory and Head Office: 213-219 Sterling Road, Toronto 3, Ont., Regional Offices: Montreal, Calgary

World Radio History

Smoke Control Pays Big Dividends In Plant Operation

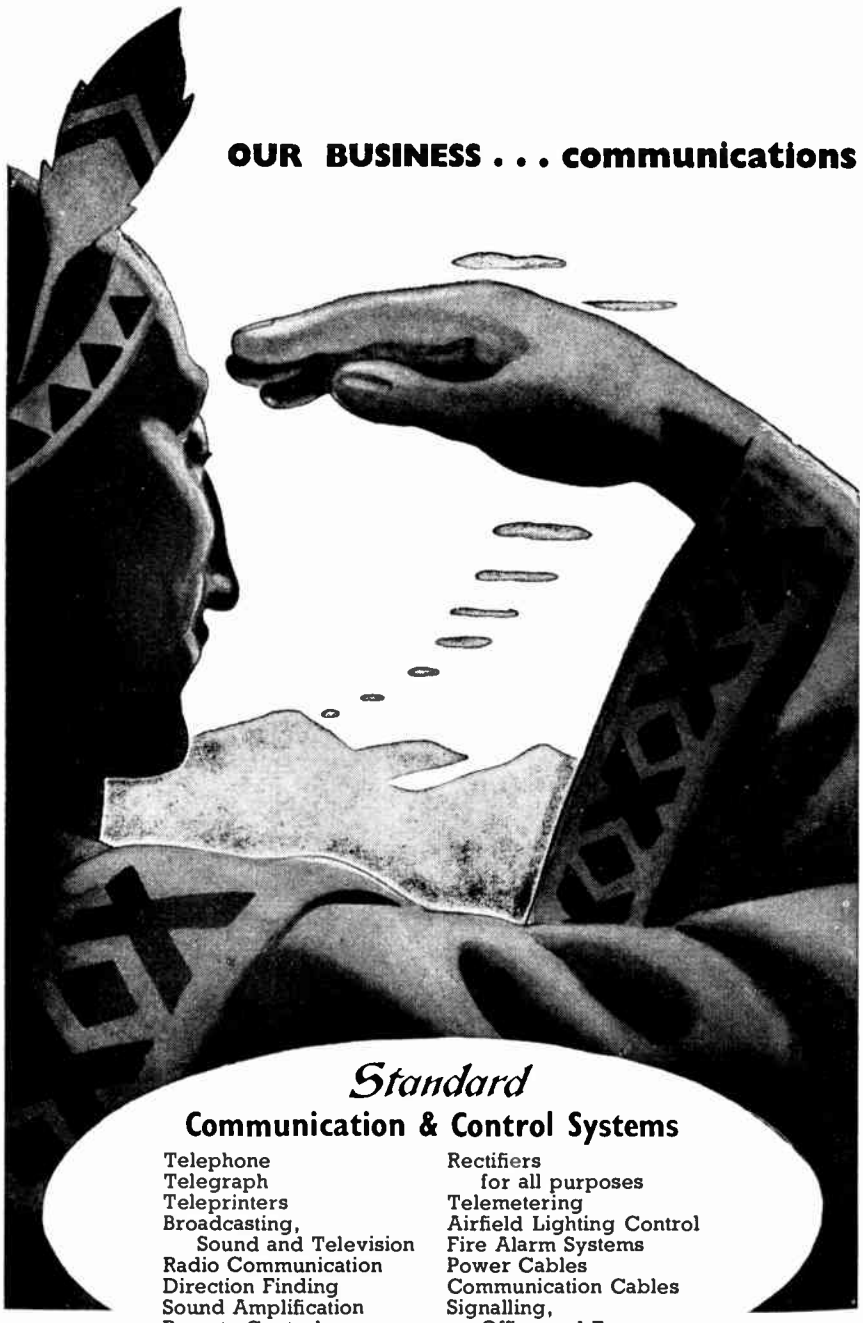
Smoke has long been recognized as a civic evil — it being the most prominent, though not always the most prolific, source of air pollution. At any rate, the public is determined to stop the smoke nuisance and alert executives are doing all possible to eliminate smoke, beating the authorities to the punch as a matter of good public relations and civic duty. Most firms find that when they stop smoke they also save fuel.

Engineers have long known that smoke is wasteful and that excess air is even more wasteful. Hence, the many instruments and controls that are used to keep the proper fuel-air ratio. Twenty years ago, when the manufacturers of smoke indicators first began to make them, they were graduated in percentage of light cut-off, or Ringelmann numbers.

Experience in plants where good combustion is maintained showed that haze varies with the other indices of combustion: fuel-air ratio, CO_2 content, oxygen content, etc. This is particularly true where fuel is instantly converted into gas, such as oil, pulverized coal, spreader stokers, etc. To magnify the readings in this critical range, the Hazegage scale, usually covering from clear to No. 2 Ringelmann, was developed. The range is adjustable to the particular plant, reading zero — center-scale — for optimum combustion, with graduations on either side. Red and green signal lights, marking the limits of good combustion, notify the operator when burners, controls, etc., need adjustment or attention.

Naturally, the red signal, marking the dark side of good combustion, is set ahead of objectionable smoke. Many who use the instruments as smoke guides find they quickly pay for themselves in the savings made in smoother operation. The relation between Haze and CO_2 is pretty direct in plants burning fuel in suspension but does not hold for furnaces having large amounts of fuel in process. Also with a large number of burners, one smoky burner may upset the relation. However, it does warn of smoke, call attention to the bad burner, and, in many cases, the green light indicates holes in the fire. Hazegage warns of irregularities.

While the Hazegage is invaluable to management, it is primarily an operator's guide, giving him quick information for managing his boiler using all his controls. When installed on this basis rather than as a threat or spy on his smoke, it pays handsome dividends. He will use it and maintain better efficiency, enough to quickly pay for its nominal cost.



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Standard Telephones & Cables
Mfg. Co. (Canada) Ltd.
9600 ST. LAWRENCE BLVD., MONTREAL

Marine Radiophone

A modern marine radiotelephone unit, designed by engineers to meet the stringent demands of marine communications, is a ten-channel transmitter-receiver operating in the 1.6-9.0 megacycle marine bands with 150 watts input power and 60/85 watts output power. A remote control unit

(Continued on page 55)

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Receiving Tubes for Radio and Television Transmitting, Special Purpose, Klystrons, Magnetrons, etc.

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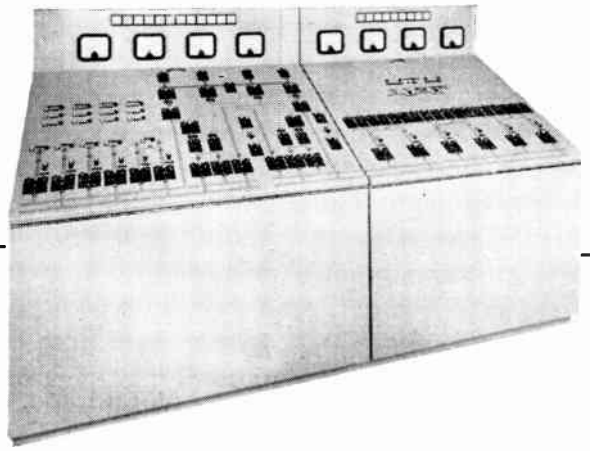
1B26	1.25	FG-17	2.95	721A	1.00	O1A	.35
1B27	10.00	TZ20	2.00	721B	5.50	1A4P	.25
1B32	.44	T21	2.00	722A	.77	1A5GT	.36
1B35	3.75	23D4	.44	723A/B	8.75	1A7GT	.39
1B38	25.00	26C6	1.00	724B	.77	1C6	.25
1B56	14.00	28D7	1.10	726C	25.00	1E1	.29
EL-1C	3.75	30 Special	.22	730A	7.50	1F5G	.39
1L21	12.00	FG-32	3.99	806	7.50	1H4G	.25
1L22	15.00	39/44	.10	807	1.33	1LD5	.55
1L24	20.00	T40	2.00	807W	2.85	1LN5	.65
1L25	10.00	QK-60	19.75	812A	3.75	2A3	.77
1L31	12.50	RK-60	1.75	813	9.75	2X2/879	.22
1L33	22.00	RK-62	1.75	826	.75	3B7	.39
1P23	.45	RK-65	7.45	830B	1.00	5T4	.77
2C22	.35	V70D	5.00	832	5.50	5V4G	.77
2C33	.65	FG-72	25.00	832A	6.75	5Y4G	.55
2C34	.50	RK-72	.44	841	.29	5Z4	.80
2C43	9.50	RK-73	.44	842	2.35	6AB7	.77
2C44	.50	101D W.E.	1.25	843	.35	6AC7	.55
2C46	5.00	101F W.E.	1.25	845	5.00	6AG5	.48
2C51	3.50	101L W.E.	1.25	850	10.00	6AG7	.77
2D21	1.00	FG-104	25.00	851	12.00	6AK5	.77
2D21W	1.75	VU-111S	.75	860	3.00	6AK6	.59
2E24	2.25	114B	.65	861	5.50	6AQ5	.44
2E25	2.75	RX-120	20.00	866A	1.25	6B4G	.77
2E30	1.75	F-127A	17.00	872A	1.25	6BC7	.65
2J21	2.75	VT-127A	1.75	876	.75	6BH6	.57
2J32	7.50	F-128A	10.00	884	.95	6BK7	.77
2J38	10.00	GL-152	10.00	891	77.00	6B8	.55
2K25	12.50	FG-154	15.00	893A	450.00	6C4	.33
2K26	40.00	205D	.65	902P1	2.25	6D6	.55
2K28	28.00	207	25.00	913	15.00	6F5	.29
2K33	55.00	212A	.45	923	1.25	6F6	.59
2K48	65.00	215A W.E.	2.00	931A	2.50	6F8G	.25
2X2/879	.22	217C	3.75	954	.15	6G6G	.55
3A5	.45	220B	100.00	955	.25	6J5	.44
3B24	1.45	222A WE	25.00	K-1001	25.00	6J6	.48
3B24W	5.45	249B	3.75	R-1038	25.00	6K6	.48
3B27	2.75	250R	5.50	CK-1089	.85	6K8G	.65
3B29	6.50	250TH	22.50	DG-1254	5.00	6L5G	.55
3C33	7.00	253A W.E.	2.45	1616	.44	6N7GT	.55
3C37	10.00	254A W.E.	4.50	1619	.25	6S7G	.45
3CP1	2.75	258B	3.75	1625	.25	6SD7	.65
3CP1S1	2.00	274B W.E.	2.00	1626	.25	6SG7	.55
3DP1S2A	8.50	282A	5.75	1629	.10	6SH7	.39
3D21A	2.75	283A	3.50	1630	.50	6SJ7	.48
3E29	8.45	285A W.E.	5.00	1631	1.75	6SK7	.48
3FP7A	3.75	FP-285	3.75	1632	.22	6SS7	.65
3GP1	2.00	312A W.E.	2.95	1641	1.75	6V6GT	.55
3JP7	3.75	316A	.50	1846	50.00	6W7G	.59
KC4	25.00	CAA322	15.00	5517	1.75	6Y6G	.59
KC4-3	25.00	350B W.E.	2.50	5518	345.00	6Z7G	.59
4B22	5.50	356B W.E.	5.00	5621	7.75	6ZY5G	.55
4B28	5.00	359A W.E.	1.50	5635	4.50	7A6	.33
4B32	6.75	368A W.E.	2.00	5636	4.50	7C4	.10
4E27	8.50	373A W.E.	1.75	5637	4.00	7C7	.59
4J25	15.00	374A W.E.	1.75	5643	4.50	7E5	.29
4J32	75.00	375A WE	10.00	5651	1.50	7F7	.59
4J33	75.00	381A W.E.	5.00	5654	1.25	7H7	.29
4X150A	22.00	387A W.E.	5.00	5670	2.00	7Y4	.50
5A6	1.77	388A W.E.	1.75	5687	2.75	12A7	.88
5AP1	2.00	393A W.E.	5.00	5706	1.45	12AH7GT	.65
5AP7	3.75	394A	2.75	5719	2.00	12AT7	.77
5B21	2.75	404A WE	12.75	5726	1.00	12C8	.22
5B24	5.00	412A W.E.	4.75	CK5744	.77	12J7GT	.35
5BP4	1.75	416B WE	45.00	5751	2.75	12K8	.45
5CP7	4.00	419A WE	100.00	5763	1.35	12SR7	.44
5C22	27.50	421A W.E.	7.45	CK5784	2.25	12SF7	.45
5D21	6.45	422A W.E.	4.45	5801	1.25	12SH7	.42
5D23	7.45	446B	2.77	5825	6.45	12SJ7	.45
5D24	15.00	GL451	5.00	5829	1.00	12SK7	.48
5FP7	1.75	464A	2.25	5853	50.00	12SL7GT	.38
5HP1	3.75	WL468	15.00	5933	2.85	12SQ7	.48
5JP2	6.50	471A	1.25	5998	7.45	12SR7	.45
5JP5	5.00	H-500	45.00	6035	10.00	14A4	.35
5MP1	2.75	GL502A	1.25	6038	3.35	14A7	.35
SN5	3.00	CK-502AX	1.00	6096	1.00	14H7	.59
5SP7	77.00	CK-505AX	1.00	6098	2.75	14R7	.59
5SP11A	77.00	CK-506AX	1.25	6099	.75	25L6GT	.44
5WP15	77.00	CK-510AX	1.35	6101	1.35	26	.44
EL-6B	3.75	CK-522AX	1.25	7193	.14	33	.25
6AC7W	.88	WL-532A	.44	8002R	25.00	37	.10
6AC7WA	1.85	559	.75	8008	3.45	38	.10
6AJ5	1.75	615	.44	8011	.44	39/44	.10
6AR6	1.00	673	12.00	8012	1.95	41	.44
6AS6	1.75	WL681/686	25.00	8019	1.50	46	.44
6J4	2.25	705A	.65	8025	2.95	50B5	.50
6SA7Y	.75	707B	3.50	8025A	3.45	50L6	.50
7BP7	2.75	713A	.35	9001	.77	71A	.40
7C29	75.00	715A	2.00	9002	.65	76	.40
10Y	.19	715B	4.50	9006	.25	77	.39
12SP11	25.00	715C	10.00	38111A	.55	89Y	.19
15E	1.25						

More Than One Million Tubes In Stock At All Times

Calvert Electronics INCORPORATED

Dept. ECJ, 536 Broadway, New York 12, N.Y.

Cable Address: "Calvertron," N.Y. — Tel. CA. 6-7400



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SUPERVISORY CONTROL

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SWITCHBOARDS

Send your Specifications to—

R.H. Nichols LIMITED

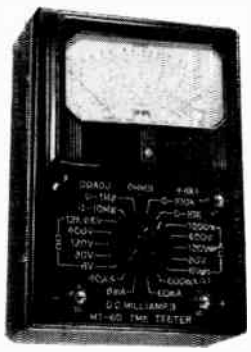
2781 DUFFERIN STREET · TORONTO

MEASUREMENT AND CONTROL ENGINEERS

For further data on advertised products use page 79.

World Radio History

20,000 OHM PER VOLT ANALYZER



Model MT-6D

The model MT-6D contains a rugged long lasting selector switch and the panel is of heavy molded bakelite.

Size 6¼" x 4¼" x 3" Wt. 10 oz.

$24.95 Complete

SPECIFICATIONS

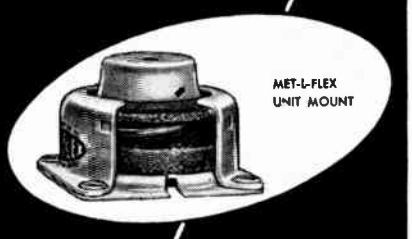
AC Volts	Dc Current	Capacity
0-6-30-120	0-60ua-6Ma	50uuf. to
0-600-1200	60Ma-600Ma	0.2Mf.
DC Volts	**Decibels**	**Resistance**
0-6-30-120	-20 to 17Db.	0-10k-100k
0-600-1200		1Meg-10
0-6000		Meg. Ohm

MJS ELECTRONIC SALES LIMITED
AJAX, ONTARIO

VIBRATION ISOLATORS...

by ROBINSON AVIATION*

. . . are designed for vibration isolation and shock protection of airbourne equipment, instruments and controls.



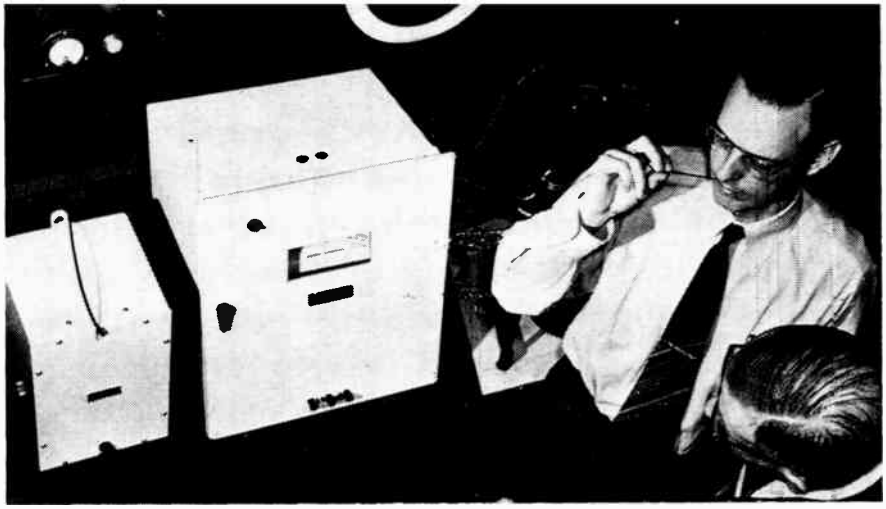
● MET-L-FLEX unit mount by Robinson is an all-metal resilient element made of stainless steel which is . . . rugged and compact . . . unaffected by oils, hydraulic fuels, temperature, altitude, vibration or moisture. High damping stability is maintained at all altitudes.

● MET-L-FLEX mounts are designed and built for the operating life of the equipment on which they are installed.

* IN CANADA

AVIATION ELECTRIC LIMITED

MONTREAL VANCOUVER



● Precision Indicator Measures Body Temperature In 4½ Seconds.

Body Temperature Readings With Precision Indicator

A body-temperature measuring device reported to be two to four times more accurate than a clinical thermometer and as much as 60 times as fast in registering temperatures is known as the "thermotron". It is known industrially as an electronic precision indicator.

In industry, electronic precision indicators are the most versatile type of instrument used for measuring or indicating a variety of conditions. These include: temperature, pressure, humidity, density, flow and liquid level. It can measure temperatures as low as minus 400 degrees and as high as 7,000 degrees F. Modified for clinical use the new electronic temperature measuring device could save hours of time for the hard pressed nursing staffs of large hospitals and could conceivably be the means of saving many lives in time of emergency.

The importance of such an instrument in times of emergency when it is necessary to handle hundreds of blood donors an hour, for instance, cannot be over-estimated. Using conventional thermometers, which are not accurate in less than two minutes, the average number of temperatures which can be taken runs at about eight in 15 minutes. With the new instrument, eight persons could be handled in less than one minute.

Use of the temperature taking device was set up during a blood donor tour for the specific purpose of demonstrating its sensitivity and speed of response. A comparison of its efficiency with the older type of clinical thermometer is little less than spectacular. A clinical thermometer must be left in a donor's mouth for a minimum of two minutes to get an accurate reading, and most nurses will leave the thermometer in longer to make doubly sure of the reading, often bringing the time up to five minutes. With the electronic instrument a reading two to four times as accurate can be registered in less than four and a half seconds.

Further advantages of the electronic instrument are that no preliminary "shake-downs" of the thermocouples is necessary and there is no breakage problem with the stainless steel thermocouples.

Material Handling Efficiency Increased By 40 Per Cent

The objective of increasing efficiency for firms engaged in the operation of materials handling trucks, messenger vehicles and transportation units has been realized by the designers of a small, low-power industrial radiotelephone capable of performing the triple duties of base station, mobile unit and public address system.

Field tests on the IMP (Industrial Mobile Phone) by impartial parties have proved that the unit is capable of increasing materials handling efficiency as much as 40 per cent.

The IMP has a range of from one to five miles and, without any modification, can operate on 6 volts DC, 12 volts DC, or 117 volts AC.

Built to withstand rough handling, the unit is shock mounted and all controls have been recessed for protection. Additional features are low cost of maintenance, simple installation, and no tune-up required after maintenance.

World Radio History

RADIOPHONE

(Continued from page 52)

provides facilities combining channel switching, volume, squelch, provision for taking over control of radiotelephone from remote or main station position, and also complete monitoring of main station at remote location.

Space economy is effected by having the transmitter and receiver sections built on a single chassis and housed in the same cabinet, which can be mounted on desk or bulkhead. The associated power supply is a separate unit and is interconnected to the transmitter-receiver unit by a heavy duty 12 conductor cable. All inter-unit connections are made by means of plugs and sockets. The unit-control channel switch selects the required channel for both receiver and transmitter operation.

The exterior of the set is protected against corrosion and tarnish from weather and water by a glossy finish, while the interior is protected by a heavy-duty cadmium plating.

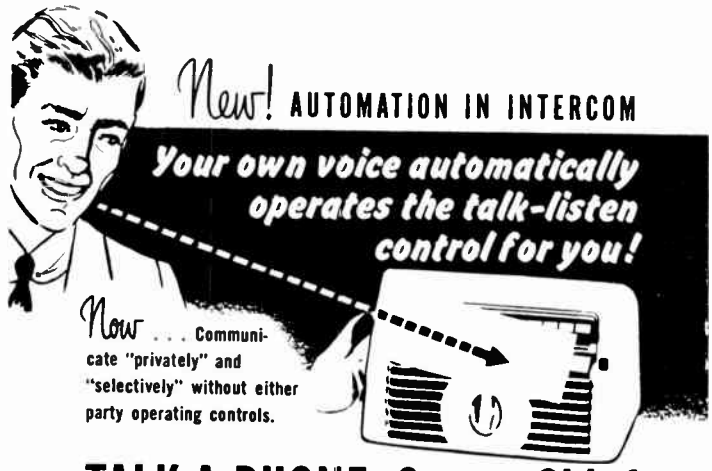
The transmitter-receiver is 23″ high, 17″ wide and 9″ deep. The weight of the transmitter-receiver is approximately 80 lbs and the power supply unit approximately 50 lbs.

Non-Destructive Materials Testing

Known as the "Inspectogage 55", a new ultrasonic measuring device gives visual indications of material thickness and requires access to only one side of the measured work, thus providing non-destructive testing of materials. Any flaw due to discontinuity or lack of bonding is indicated by a shift or disappearance of the thickness reading.

The unit consists of an oscillator, cathode ray oscilloscope and transducer which transmits ultrasonic vibrations into the tested material. When the frequency oscillator is the same as the resonance frequency of material, a vertical marker appears on the face of the tube indicating exact thickness of material by pointing to a calibrated screen.

The entire unit weighs approximately 50 lbs., is portable and has grey finish metal case. Power requirements: 115 volts, 60 cycles. Controls: Range switch, on-off switch, four output jacks, and level. On the standard unit, the search units scan four of the most commonly used ranges from .025 inches to .3 inches. Calibrated screens are provided for the four ranges. Other ranges are available if required.



TALK-A-PHONE Super Chief

The Automation Intercom System with the *"Built-in Brain"*
featuring

- BUILT-IN AUTOMATION
- MULTI-MAGIC SELECTOR
- AUTOMATIC TRAFFIC CONTROL
- CONFERENCE CONTROL
- AUTOMATIC REPLY
- AUTOMATIC MONITORING SIGNAL

TALK-A-PHONE has an intercom for your every need.

SAVES TIME! SAVES STEPS! SAVES MONEY!
Instant, direct 2-way speaking contact with any department—sales, engineering, personnel, shipping, anywhere—without anyone leaving work. Talk back and forth instead of walking back and forth. A dependable servant you can well afford.
From 2 to 100 stations, it's TALK-A-PHONE . . .

For complete literature and details write . . .
Industrial and Institutional Communications Limited
29 McNaughton Avenue Wallaceburg, Ontario.

There's much to be said for . . .

The Berco Rotary Regavolt provides a highly economical, compact and reliable means of obtaining a continuously variable output voltage without the heat losses associated with resistances.

. . . BERCO ROTARY REGAVOLT
Laboratory and Industrial Use

Model	Max. Input Volts at 50/60 cycles	Max. Output Voltage Range at no load	Rated Current
41A	250	0-250	0.8
41B	115	0-135	2.25
42A	250	0-270	2.0
42B	115	0-135	5.0

2 Frame Sizes — Protected and Skeleton Types

Other CERL Products:
Vitreous Enamelled Fixed Resistors
Power Type Rheostats
Sliding Rheostats
Rotary Stud Switches
Heavy Duty Grid Resistors
Collet Fitting Control Knobs
Hermetically Sealed Potentiometers

CERL

For full details and prices write to
Canadian Electric Resistors Limited
Curity Avenue - Toronto 16, Ontario
Manufacturers and Sole Licensees for Berco Products in Canada

World Radio History
For further data on advertised products use page 79.

Controlled Paper Cutter Exact To 1/1000 Inch

To meet the demand for paper-cutting machinery capable of working at higher speeds with greater accuracy, a U.K. firm are applying electronic control to their models.

These latest machines provide for manual operation, but are intended to work semi-automatically, or entirely automatically, once the electronic device has been set.

A photo-electric cell moves along a calibrated scale, according to the distance between the back fence and the knife. When the light beam is interrupted by bars placed over the scale, the movement of the back fence is first slowed and then halted at a position which is always exact to 1/1000 of an inch.

The electronic control dispenses with the usual mechanical stops, or "trips" which lead to decreasing accuracy as the parts wear. When the back fence stops, a powerful clamp descends to hold the paper firmly in position, and the knife of hardened steel, tapering from one inch to a razor's edge, makes a clean cut of the paper, which may be as much as five inches thick and 52 inches wide. The average working speed of the machine is 30 cuts per minute.

The table on which the paper rests is drilled with holes for valves through which compressed air may be released. In this way a heavy stock of paper can be made to ride on a film of air, and can easily be moved.

Airborne TV Equipment

A ruggedized television camera designed for airborne applications has shown, in actual usage, its capability of functioning very satisfactorily under the extreme environmental conditions found at altitudes up to 70,000 feet. Furthermore, it is able to withstand an acceleration of more than 15 G's without impairment of picture detail. The camera also performs perfectly when exposed to noise levels such as are present on jet or rocket firing stands which may be as high as 175 decibels.

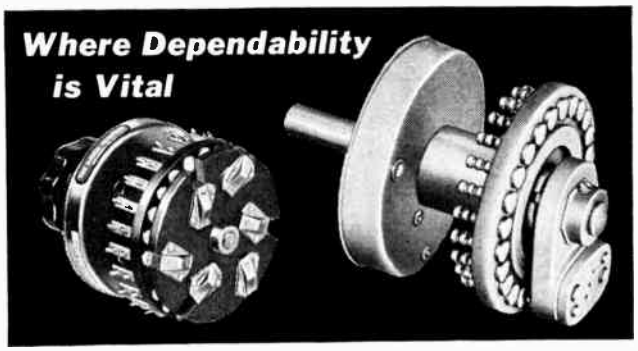
When mounted to the engine fire wall of a WV-3 type aircraft within the left wheel wall housing, it successfully monitors the operation of landing gear during take-off and landing as well as during in-flight manoeuvers. Despite rigid mounting to the aircraft structure and the absence of shock insulation, camera operation is unaffected.

One of these cameras has been employed in some 800 hours of flight tests without a failure, although it was located directly in the airstream over the vertical stabilizer with no protection. While not hermetically sealed, the camera is spray-proof and has worked for several days in an icing tunnel with humidity levels ranging up to 100 per cent with wind velocities as high as 170 miles per hour.

Radiation Monitor For Industrial Use

The first available walk-in trailer-mounted air monitor system with moving filter paper tape for measuring and recording airborne radioactivity has been introduced.

The system is designed for use by industrial plants, institutions, utilities, government units and research and laboratory groups working with radioactive materials or engaged in nuclear or defense activities. It is especially



Daven Rotary Switches Are Specified

HERE'S WHY:

- Patented knee-action rotor—ensures low, uniform contact resistance, trouble-free operation.
- One-piece combination contact and solder lug—solid-silver alloy contacts, gold plated to resist corrosion.
- Turret-type solder lugs—provide excellent mechanical and electrical connections.
- Roller-type detent—gives positive indexing action.
- Minimum space—as many as eight poles on each deck.

Write for complete data, catalog.

THE DAVEN CO.

550 West Mt. Pleasant Ave., Route 10, Livingston, N.J.
IN CANADA: Adams Engineering Ltd., Montreal & Toronto

FREED *Direct Reading*

LOW FREQUENCY "Q" *Indicator* TYPE 1030A

USES

Measures the "Q" factor of coils directly and the inductance of coils, distributed capacity, impedance and dielectric losses. The "Q" Indicator can be used to study the magnetic properties of iron, such as stability of iron cores in function of applied voltages, and, iron losses as a function of the frequency.

FEATURES

- Direct reading
- Unaffected by line voltage variations
- Self contained — A.C. operated

SPECIFICATIONS

Range of "Q" Measurements: The range of "Q" factors is from 0.1 to 1000 over the frequency range from 20 to 200,000 cycles with an accuracy of 5%.

Oscillator Frequency Range: Continuously variable from 20 to 200,000 cycles in four ranges.

Power Supply: The instrument is entirely self-contained and A.C. operated. Total power consumption 200 watts.

Dimensions: Width 19½" x Depth 14½" x Height 23".

SEND FOR COMPLETE TRANSFORMER & INSTRUMENT CATALOGS

FREED TRANSFORMER CO., INC.
1716 WEIRFIELD ST., BROOKLYN (RIDGEWOOD) 27, N. Y.

World Radio History

adapted for use at reactor sites and A. E. C. nuclear proving grounds.

The system operates automatically for periods up to seven to ten days unattended, providing a permanent continuous record of radioactivity in the area, plus complete recorded weather data if desired.

Air is drawn through a vent on top of the trailer. Radioactive particles are deposited on continuously moving filter paper in the detection chamber. The level of radioactivity is then recorded on a continuous chart.

The system consists of two NMC air monitor units, one with continuously moving filter paper and the other with fixed filter paper. Also included are an all-weather air conditioner, anemometer, locker storage and work area. An auxiliary motor generator assures uninterrupted service.

Basic detecting units of the system are a gamma-sensitive scintillation counter and a Geiger-Mueller counter, well shielded for maximum sensitivity. Optional equipment includes units for alpha scintillation counting, end-window beta and gamma counting, or simultaneous alpha and beta proportional counting.

Business Aid Pays Big Dividends

A desk-top copying machine that produces copies instantaneously utilizes an exclusive electronic principle to reproduce letters, reports, charts, meeting proceedings, production or sales data.

The "Secretary" copying machine saves time and eliminates two-thirds of the cost of copying. Four pages of solid typing can be copied in less than one minute.

Described as "the world's fastest completely dry copying machine", the "Secretary" makes error-proof copies in four seconds from printed, written or drawn originals, transparent or opaque and printed one side or both, regardless of the color of the original paper.

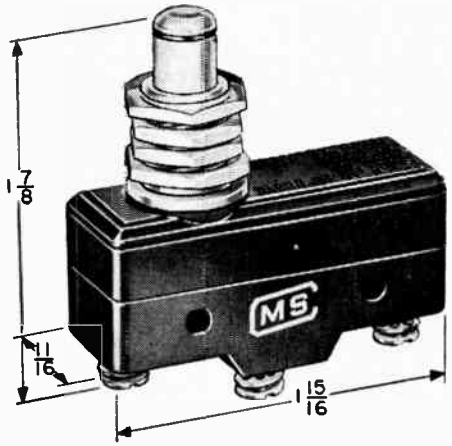
The machine employs an electronic process and a special copying paper available in buff, green, pink or yellow and copies in one step directly from the original in the open office or plant, regardless of lighting conditions. There are no liquids, negatives or master copies involved and the machine can be operated after only a few minutes' instruction.

The original and the copy paper are assembled and inserted into the top opening of the machine. Four seconds later, both are returned through the lower opening.

Singularly convenient and giving fast service, this is the type of business aid that pays big dividends.

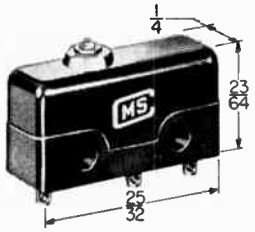
MICRO SWITCH PRECISION SWITCHES

small, rugged, high capacity "JAN"-type switches



"Q1" PLUNGER SWITCHES

Single-pole, double-throw type "Q1" plunger basic switches for mounting through panels as manual or mechanical push button switches, as door switches, or for operation by slow moving cams. Available in normally open or normally closed designs. Threaded stem with thin nuts and lock nuts for location in the panel. Screw or solder terminals. 7/32 inch over-travel. Conforms to JAN-S-63.

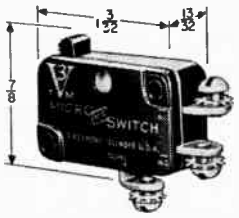


SUBMINIATURE PIN PLUNGER TYPE BASIC SWITCHES

Single-pole, double-throw pin plunger type subminiature switch for use in applications where travel of actuating mechanism is accurately controlled or with auxiliary actuators and enclosures. Available in standard, long life and high temperature versions. Conforms to MIL-S-6743.

TYPE "V3" BASIC SWITCHES

Small V3 type single-pole, double-throw switches are light in weight with highest electrical capacity to size of any switch available. Suitable for use as limit, control or safety switches in applications where space is limited. Brass-plated terminals. Conforms to MIL-S-6743.



MICRO SWITCH A PRINCIPLE OF GOOD DESIGN

MICRO SWITCH produces a complete line of extremely reliable small size, high capacity precision snap-action switches and mercury switches many of which conform to military specifications. Available in a wide variety of sizes, shapes, and weights with varying electrical characteristics and a selection of actuators. Write Honeywell, Dept. EC-EC-6 for complete information.

H HONEYWELL

MICRO SWITCH

A DIVISION OF HONEYWELL REGULATOR COMPANY, LTD.

LEASIDE, TORONTO 17

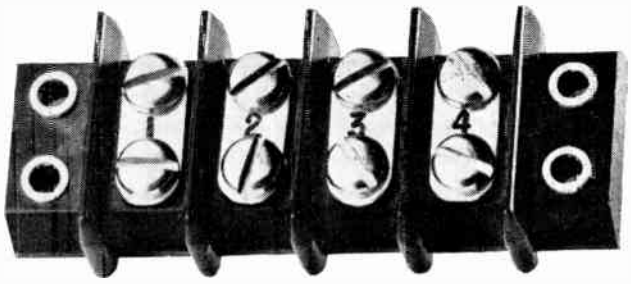
For further data on advertised products use page 79.

World Radio History

New CEECO TERMINAL BLOCKS
Many new features but still competitively priced.

MADE IN CANADA . . .

- Solid moulded back.
- Removable bus bar permits doubling the connector points.
- Completely interchangeable with standard U.S. types.
- Available MIL Spec. materials from stock.
- From 1 - 27 terminals.



CONSOLIDATED ELECTRONIC EQUIPMENT
Company Limited
1156 YONGE ST., TORONTO PHONE WA. 4-4812

Precision Equipment Cleaned Effectively By Ultrasonics

Ultrasonic equipment designed to clean clocks, parking meters and other horological mechanisms has proved to be so effective that it is being used to clean precise mechanisms for military and civilian applications requiring guaranteed continuous operation where failure cannot be tolerated.

The cleaning operation varies somewhat depending on the particular circumstances but generally is performed as follows: clock is immersed in the solvent-filled one-gallon capacity stainless steel cleaning tank. The DR-400A is then energized for from 15 seconds to one minute. The parts are removed from the cleaner while solution is being ultrasonically agitated. Aside from the case, dials and hands, the movement may be left completely assembled, where simple cleaning is indicated and repairs are not necessary.

The action of the unit is such that violently collapsing "cavitation" bubbles are generated in the cleaning solution. The forces thus released are sufficient to reduce the surface tension binding clinging soils, dusts, contaminated, rancid or oxidized oils to various parts of the clock. The scrubbing action of these bubbles flushes impurities from the clock mechanism and permits the cleaning solution to make 100 per cent contact with every pore, orifice and surface.

During the short time needed to clean even the most abused mechanisms, there will be no damage to parts. In fact, parts are actually benefited by ultrasonic action which removes rusts and oxides.

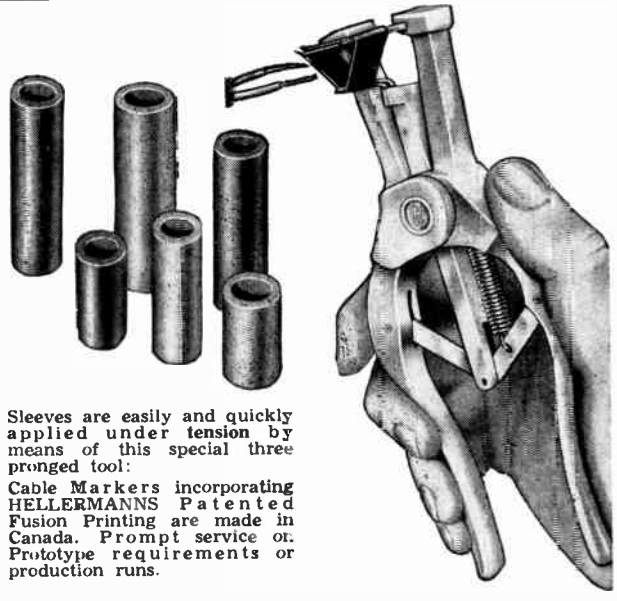
the greatest number of IN-STOCK WIRE ITEMS for the ELECTRONICS INDUSTRY

NOW!
IN-STOCK
in
CANADA
at

ALPHA ARACON RADIO
29 Adelaide St. W.
Toronto 1, Ont.
Write for FREE catalog

First in Quality Wire for over 34 years
ALPHA WIRE CORPORATION
430 BROADWAY, NEW YORK 13, N. Y.

For binding, marking or colour coding all cable ends . . .



Sleeves are easily and quickly applied under tension by means of this special three pronged tool:
Cable Markers incorporating HELLERMANNS Patented Fusion Printing are made in Canada. Prompt service on Prototype requirements or production runs.

HELLERMANN CANADA Limited
44 DANFORTH ROAD, TORONTO 13, ON. 1-1131

For further data on advertised products use page 79.

World Radio History

Heat Delay Transfer Control

In some applications where delayed heat transfer is inherent, two position control cannot give the accuracy of control desired. In order to achieve this accuracy a Proportional Electronic Controller has been designed to meet such conditions in electric furnaces and give control within fine limits and without hunting.

With this instrument, corrections to the controlled heat input are proportional to the deviation from the control set point or desired value, over a band which could be up to 5 per cent of full scale.

Sloped Console Tape Recorder

A tape recorder featuring a sloped front console with easily accessible controls has been produced by a manufacturer of magnetic recording apparatus.

Sloped at a 30-degree angle, the tape transport mechanism is within easy reach of an operator, sitting or standing. The electronic control panel, also slanted, is just in front of the tape transport.

Push-button control permits rapid shuttling between fast forward and rewind, thus facilitating rapid editing. All tape motion and record controls are push button operated, allowing full remote control of these functions.

To avoid tape stretch and breakage when small plastic reels are used, a switch has been added that automatically compensates for the increased tape tensions encountered with such reels.

For servicing, the top plate is pivoted at the balance point on the cabinet frame member. For routine checks and adjustments, the tape transport may be secured in a vertical position with its underside exposed, even while the machine is operating. Likewise, both the top and bottom of the electronic unit may be serviced while the recorder is in motion by sliding the unit partially out of the cabinet on the special runners provided. All electromechanical components, including takeup and rewind motor assemblies, drive motor assembly and the unitized control strip, are plugged into a central relay and power source. For emergency repairs, these plug-in components can be quickly removed as units and replaced.

Since all operative units are contained in the upper portion of the console, the machine may be placed on a desk or table if the user does not desire to use the base which is furnished with the equipment.

make **ETC** your prime source of **C-R** tubes . . .

SINGLE- or MULTI-GUN

One dependable source meets all your requirements for cathode ray tubes. Electronic Tube Corporation offers you MIL-type and special purpose tubes for a wide range of applications in neurophysics, geophysics, radar, high-frequency strain and stress analysis, pressure and torque analysis, materials testing and many instrumentation applications. ETC has the tube you need, or will work with you to design it.

MULTI-GUN TUBES

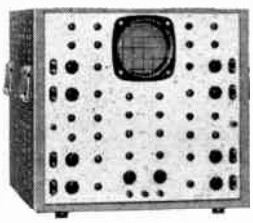
Pioneered and developed by ETC. 2 to 10 traces. Round or square faces . . . 3" to 12". All electron guns are of the electro-static focus and deflection type. Cross talk is eliminated by adequate shielding of individual guns.

SINGLE-GUN TUBES

Built and tested with the same care as more complicated ETC cathode ray tubes. Standard RETMA types available as well as "special purpose" tubes. ETC engineers can produce virtually any type tube that can be commercially manufactured.

2 OR MORE SIMULTANEOUS SIGNALS AVAILABLE IN MULTI-CHANNEL SCOPES

2 or more events can be observed *without* the use of switches . . . with full assurance of no lost signal information. Prices as low as $975.



ETC

WRITE OR WIRE FOR FULL INFORMATION ON ETC INSTRUMENTS AND CATHODE RAY TUBES

electronic tube corporation

1200 E. MERMAID LANE PHILADELPHIA 18, PENNA.

For further data on advertised products use page 79.

World Radio History

NEWS ☆ ☆ ☆

● W. J. Bennett, president of Atomic Energy Of Canada Limited, guest speaker at the 27th Annual Meeting of RETMA shown addressing the capacity audience who attended the meeting at Chantecler Lodge, Ste. Adele, on June 7th. Excerpts of Mr. Bennett's address are contained in RETMA Report page 11.

". . . . . If I were to draw one conclusion in my closing remarks, it would be this. There is no single branch of industry which has a larger or more comprehensive role in the atomic energy program than your industry. Up to this time you have satisfied every demand we have made of you, but we are at a relatively early stage in the program. Your ability to meet the future challenges will depend above all on the emphasis you are prepared to put on research and development. In atomic energy, as in other fields, this is the key to a healthy and prosperous industry."

— W. J. Bennett O.B.E.
President, Atomic Energy Of Canada Limited
To Radio-Electronic-Television Manufacturers Association Of Canada 27th Annual Meeting, Ste. Adele, June 7th, 1956.

27th Annual Meeting—

Radio-Electronic-Television Manufacturers Association Of Canada

The following is a condensation of Mr. C. A. Pollock's Address

"Canada's economic history will undoubtedly record 1956 as the year in which our country's business came of age. Private citizens as well as business men have been stirred to think of the long term future through the activities of the Royal Commission studying Canada's Economic Prospects. Your Association, along with many other industrial, trade, social and political groups, took a very serious look in the crystal ball to ascertain what seemed to be before us up to 1980. The experience which these studies induced, has raised the level of the thinking of Canadians from coast to coast. It will also freshen the pioneering spirit of our people so that we will continue to understand that, if Canada is to be a great nation, it is our job to individually and collectively do something about it. We business men will indicate that we have attained our majority by the way we utilize the findings of this Royal Commission.

"This 27th Annual General Meeting is taking place before the report of the Royal Commission has been made public but I am sure the personnel of all member companies have been having much useful mental exercise considering the future of their own operations. The R.E.T.M.A. Brief detailed great strides in the past decade and pictured a future to be filled with fantastic developments providing we worked and planned for them now. Because we all believe that the opportunities before us are wonderfully good, our efforts to achieve them must be in keeping. No industry has as much to gain for itself and the public by carefully considered joint action through its association and within the prescribed laws of our land. Happily, our association work and exchange of ideas and experiences is teaching us the value of joint objectives — that working with the good

● Carl A. Pollock, retired president of RETMA offers constructive suggestions for further development of RETMA.

World Radio History

of all in mind makes private enterprise more effective.

"The reports of the division chairmen have brought you an appreciation of the broad fields of usefulness of R.E.T.M.A. They have shown that good engineering and design alert to customer demand is at the base of all successful operations. Practical ethics in marketing, advertising and service plus a high level of interest in the wholesalers and retailers problems add up to good management and keep an industry healthy. The year from mid '55 to June '56 has shown stronger divisional activities and a greater faith on the part of the membership in the solving of the broad problems of the industry by joint study committees."

In his address to the gathered RETMA members Mr. Pollock commented on the year's work of the Board of Directors, its executive and other committees and Director of Engineering and in his closing remarks said:

"Finally, I wish to take the privilege of a retiring president to make a few suggestions which have occurred to me during my terms of office. In my opinion, they have value in two fields:

1. Organization of R.E.T.M.A.

"In the past several years, a suggestion has been made that the tube business, expanded as it has been by the production of TV picture tubes, and as it will be by the addition of many kinds of semi-conductors, is sufficiently large and broad enough in scope to separate from the components division and become a division in its own right. Ralph Hackbusch has been a supporter of this idea and, in the interests of the development of the association and the industry by decentralization and specialization, I agree with him.

"Membership in the association must keep pace with our rapidly developing industry. In order that more attention may be given to this important matter, it seems to me that it would be best handled by an over-all membership committee, responsible to the board of directors.

2. Areas in which association work can be furthered in the interests of the over-all industry.

"Our association has always been too backward about its public relations. Much good should result from a considerable expansion of this work in scope and volume. Public relations and publicity should continue to be handled by one committee, responsible to the board and not by several divisional sub-committees.

"Good industrial relations practices are vital to the health of any industry. The association's committee should be encouraged in every way possible to continue and to expand the excellent work it has been doing. A new field of study could be finding ways in which our industry can help Canada's educational institutions train more and better scientists, engineers and technicians. Through such a service, the future of electronics in Canada could be doubly bright. Member companies can be helpful if they will stimulate among their own people attendance at industrial relations meetings and close contact with the committee's work.

"Commenting on the Radio, Television and Electronics businesses, one of our members, W. E. Davidson, said, 'Never has an industry emerged from its pioneer days in such a short time'. We all know how true that statement is and we also know the reason for this unparalleled performance — research, engineering and design of a high order, done in the main by scientifically trained people outside the borders of Canada. If our industry is to grow soundly, research, engineering and design must occupy a position in our business structure as important as sales, production and finance. In the new fields of commercial, industrial and military electronics, imports will continue at a high level until we carry on more research. This association can do a most important and much needed job if it is able to stimulate more scientific activities in the offices and laboratories of its members. It can also support engineering bodies like the Institute of Radio Engineers in their Canadian activities. A real opportunity will be available to all our members to participate in the fall I.R.E. Convention in Toronto.

"Another job of great importance which R.E.T.M.A. can initiate and develop is to expand the statistical data available for its members from the industry's forecasts and operations. We might visualize this class of information as the indications of a financial radar unit. Only amateurs and some bush pilots fly by the seat of their pants — our industry supplies equipment to guide the transports of the airways — it also provides electronic computers which industry can use to advantage in its management. Statistics have been called the arithmetic of human welfare. In the competitive days to come, we will be able to use all the welfare we can create for ourselves and our businesses through good management and methods.

"Gentlemen, I close this report to you with my thanks for the opportunity you have afforded me of acting as your Association's president for the past two years. My terms of office have been busy periods, filled with interesting and pleasant experiences. It has also been my privilege to make friends and establish close acquaintanceships with many whom I had previously not known. All in all, I am happy to say I enjoyed my work in R.E.T.M.A. very much and want to continue to be useful in an association which affords so many interesting opportunities for service."

TELEVISION TUNERS
Switch Type
Licencee of Sarkes-Tarzian Inc.

LOUDSPEAKERS
Domestic and Military Types

WIRE WOUND RESISTORS
Cement and Vitreous Enamelled Coatings · MIL Approved

VARIABLE TUNING CAPACITORS
Radio Tuning Types · Special Units For Military Application

TRIMMER CAPACITORS
Conventional Air Dielectric
Glass and Ceramic

LEDEX ROTARY SOLENOIDS AND SELECTOR SWITCHES

PERMEABILITY TUNERS
PRECISION GEARS AND GEAR TRAIN ASSEMBLIES
SERVO-LOOP SYSTEMS
MICROWAVE COMPONENTS
Filters, Antennas

ALL SYSTEMS AND COMPONENTS ENGINEERED

TOOLED AND MANUFACTURED IN OUR KITCHENER PLANT

marsland ENGINEERING LIMITED
KITCHENER, ONT., CANADA

For further data on advertised products use page 79.

World Radio History

NOW... Noise Free A.C. Power!

NEW CURTISS-WRIGHT DISTORTION ELIMINATING VOLTAGE REGULATOR

- Reduces typical power line distortion to less than 0.3%
- Furnishes 1.4 KVA of distortion-free power
- Electronically regulates 115 V output to ±1%
- Recovery time less than 1/50 cycle
- Provides additional 4 KVA of ±1% electromechanically regulated power
- Electromechanical time constant only 0.6 seconds
- Electromechanical regulator, unlike usual magnetic voltage stabilizer, introduces no distortion or phase shift

Here at last is the ideal solution to the disturbing problem of harmonics and low frequency noise appearing in 115 V., 60 cps power sources. In one compact package, every laboratory can now obtain *both*

1) distortion-free, regulated power when needed, and simultaneously

2) a large supply of electromechanically regulated power for applications where normal line distortion is tolerable.

In addition to its general laboratory utility, this instrument is ideally suited for preventing instability and inaccuracy in a.c. computer system nulling operations. Many other applications. 230 V. model also available. Immediate delivery. $1,689 f.o.b. Carlstadt, N. J. Write for details.

Component & Instrument Department

ELECTRONICS DIVISION
CURTISS-WRIGHT
CORPORATION • CARLSTADT, N. J.

Canadian Representative:
CONSOLIDATED ELECTRONICS EQUIPMENT COMPANY, LIMITED
1156 Yonge St. Toronto, Ontario

● Air Commodore Keith Hodson, of the RCAF, officially opens the first Canadian privately-sponsored environmental test laboratory at the PSC Applied Research Limited plant in Toronto. Main figures in the ceremony are: Dr. O. E. Braaten, head of the laboratory; D. N. Kendall, founder and operating head of the Hunting companies in Canada; J. M. Bridgman, general manager of PSC Applied Research Limited; Air Commodore Hodson; and Bill Wilson, laboratory technician.

Remote Control Of Camera Operation Provides Wide Scope Of Uses

Remote control of camera operation greatly increases the already wide scope and flexibility of the closed-circuit television system. Since it is no longer necessary for the camera to be immediately accessible for control, it may be placed in positions too dangerous, remote, confined or dispersed to be handled by a human being — and still respond to his bidding at the flick of a switch.

Remote finger-tip operation of lens iris and focus, as well as horizontal and vertical movement of the camera, now makes it feasible for the equipment to serve with almost the same versatility as one's own eyes.

In the industrial field, one camera may scan an entire bank of dials or follow details of an automatic manufacturing operation. Dangerous processes can be watched and controlled, step by step, safe from fumes or radiation. Warehouses, aisles, exposed loading platforms and restricted areas can all be easily observed, multiplying the eyes of security guards. High traffic floor areas of department stores may also be scanned for potential shop lifters with the roving eye of the remotely controlled camera.

Outdoors, with weather-proof housing, the camera can be mounted on a high pole in a railroad switching yard to monitor the handling of freight and passenger cars. In such an application, either a wide angle view of the yard or a close-up of individual cars is possible. Operation of the camera and observation of the picture it transmits are both made from the central yard control tower. In an explosion-proof enclosure, moreover, the unit can safely transmit pictures of developments taking place in test facilities without endangering personnel.

● Shown below at the first demonstration of the Voltabloc, a new concept in battery construction, are, from *left to right:* J. De Raemy, SAFT, France; A. Hawkins, Imperial Oil Limited; P. Jacquier, president, SAFT, France; A. Murdison, Imperial Oil Limited; C. A. Wilde, D. M. Fraser Limited. The demonstration was held at the plant of D. M. Fraser Limited, Toronto.

World Radio History

PSC Applied Research Open Environmental Test Labs.

The only commercially available environment, test laboratories for testing to aeronautical standards in Canada were officially opened by PSC Applied Research Limited last May 16. The new laboratories are equipped with a wide variety of equipment including such items as a small icing wind tunnel for ice detection and similar testing as well as Chambers for altitude, heat, cold, humidity, dust and other environmental tests besides shock and vibration machines.

The new laboratories of PSC Applied Research Limited are the latest in a series of significant contributions to Canadian industry that has been made by the firm in its five year history.

PSC Applied Research is the firm responsible for the development of the R-Theta Navigational System which has won world-wide recognition as well as many other outstanding contributions to science and industry among which are included such items as the airborne magnetometer and ancillaries, airborne profile recorder, airborne radioactivity detector, stabilized airborne radar antenna and camera mount, station magnetometer, 35 mm. recording and instrumentation cameras, high speed air position navigational system, tri-film automatic photographic film processor, electromagnetic geophysical exploration system, armament intervalometer (rocket firing), ice detector (based on National Research Council patents), aircraft de-icer controller, Gamble photogrammetric mapping machine (based on Dominion Government Department of Mines and Technical Surveys patents), ground speed and interception computer, high speed transient recorder, test sets for ice detector, test sets for de-icer controller, test sets for armament intervalometer, test sets for navigational computer systems, manual range control, camera control system for radar stations.

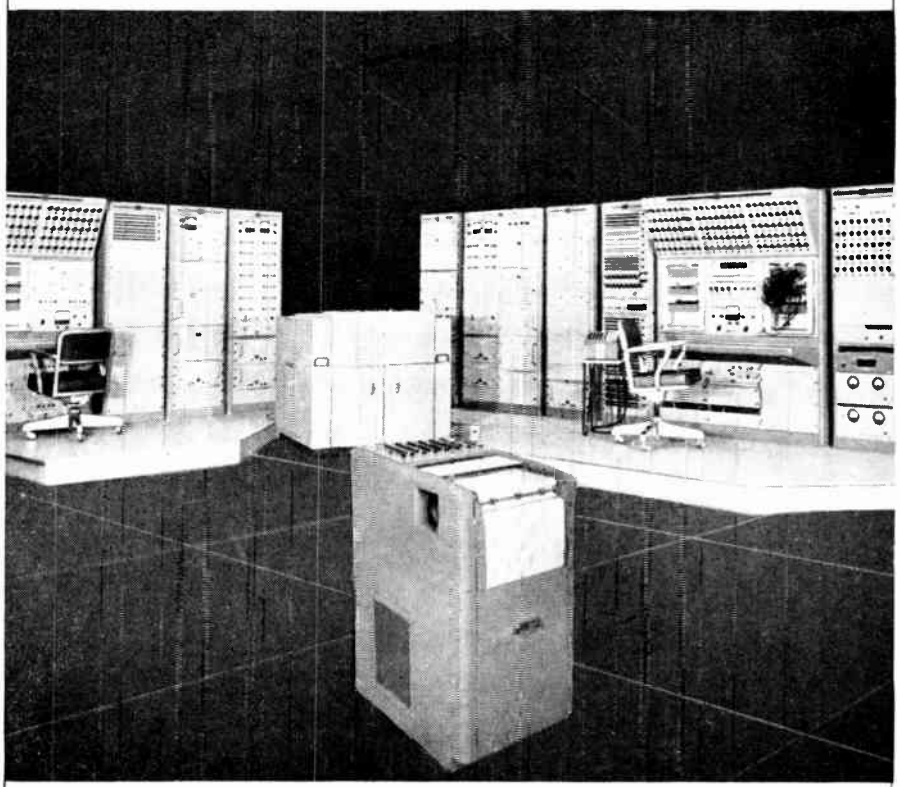
George Master Appointed Chief Engineer At Allen-Bradley

George F. Master, formerly sales engineer in the Detroit office of Allen-Bradley Company, of Milwaukee, Wisconsin has been appointed chief engineer of the Galt, Ontario plant of Allen-Bradley Canada Limited.

Master is an electrical engineering graduate of the University of Minnesota. He joined the Allen-Bradley organization in 1935, and after a year's training in the engineering department, was assigned to the Detroit sales office. He, therefore, brings to his new assignment over two decades of field experience in the application and performance of manual and automatic motor controls.

(Turn to page 64)

TRUST PACE TO HELP



IN THE ENGINEERING PROBLEM

Of infinite help in easing the engineering load is Electronic Associates' PACE Computing Equipment. Each day, more and more major industries are relying on EAI Computing Systems for help in their engineering and development work, for they know they can trust its stability, reliability and operating convenience.

An example of this operating convenience is the push-button operation of the new Six-Channel Recorder, Model 1902A (pictured in the foreground of the computing system above). Push-button controls are provided in this recorder for individual selection of the recording scale factor of each channel — as well as a push-button speed selector which provides essentially instantaneous control of paper speed over the entire recording range. This Six-Channel Recorder provides the ultimate in recording accuracy, sensitivity, chart speed, widest band width, all at the lowest cost.

For detailed information on this equipment — on complete Computing Systems — and on the rental of time and equipment at the EAT Computation Center in Princeton, N. J., write Dept. EC-6, Electronic Associates, Inc., Long Bronch, N. J.

ELECTRONIC ASSOCIATES Incorporated

EAI SETS THE PACE — PRECISION ANALOG COMPUTING EQUIPMENT

LONG BRANCH, NEW JERSEY

For further data on advertised products use page 79.

World Radio History

NEWS

(Continued from page 63)

24 Marine Radio Companies Attend World Conference

Representatives from the twenty-four main marine radio companies in the world attended a conference early in May in Berne, Switzerland. Known officially as Radio Marine Associated Companies (R.A.M.A.C.), this association was founded in 1948 to encourage and develop all commercial and technical matters related to marine communications, and electronic aids to navigation and all such devices as can be applied to the safety of life and property at sea. Another aim is to increase the efficiency of ships' operations in general. Also, to co-ordinate and foster the skill and facilities of leading marine radio companies in order to provide ship owners, marine personnel, passengers and the general public with the maximum possible benefits to be derived from marine radio communications, and various electronic aids to navigation.

Host company at the R.A.M.A.C. Conference was Canadian Marconi Company, of Montreal, which was represented by R. E. Foreman, manager, Marine Division; Arthur Wilkins, manager, Market Development; and W. Victor George, United Kingdom representative.

Every major country in the world outside the Iron Curtain that is interested in marine activity of any kind was represented at the Berne Conference.

J. D. Campbell Elected President Of RETMA

John Dundas Campbell was elected president of the Radio-Electronics-Television Manufacturers Association of Canada at the 27th Annual Meeting of the Association at Ste. Adele-en-haut, P.Q.

J. D. Campbell is general manager of the Consumer Products Group of the Canadian Westinghouse Co. Limited, in Hamilton, Ontario. He joined this company in 1934, working on time study and methods engineering. In 1937 he moved into the Consumer Product Sales Department, first in Hamilton and, in 1939, in Toronto.

J. D. CAMPBELL

J. D. Campbell takes office as president of the trade association which represents the $500,000,000 a year Canadian electronics industry at a time when this industry is expanding at over three times the expansion rate of the gross national product, and the 118 member-companies of RETMA look forward to his term of office as a time of added expansion and prosperity for Canada.

Canadian Sales Representative Named By Fielden Instrument

Keith Mercer Company, Ltd. of Montreal has been appointed sales representative in eastern Canada including Ontario, Quebec and the Maritime provinces, for Fielden Instrument Division of Robertshaw-Fulton Controls Company.

Fielden Instrument Division, a manufacturer of indicators, recorders, scanners and controllers for industrial processes, has its headquarters at 2920 N. Fourth Street, Philadelphia 33, Pa.

New Electro Sonic Appointments

James B. Christie, president of Electro Sonic Supply Co. Ltd., Toronto, has announced the following appointments:— Martin Rosenthal, vice-president; Cecil Savage, industrial sales; Ted Major, manager, mail order sales division; Cody Bowerman, dealer sales; Colin MacKenzie, manager, industrial sales division; Val Galka, manager, dealer sales division; Al Herron, industrial sales; and Herman Teicherd, dealer sales.

CW, FM and AM Signals "All the Way Up" (10-470 mc/s)

with a MARCONI TF 1066 FM/AM SIGNAL GENERATOR

Sturdy light-grey cellulose finish
Dark-grey moulded plastic control knobs
Dimensions: 14½" x 23½" x 10½"

- Outstandingly high frequency stability — *less than 0.005%* drift, after reaching thermal equilibrium
- Continuous coverage from 10 - 470 mc/s in *FM and AM*
- Incremental tuning directly calibrated in Kc/s *regardless of carrier frequency* permitting small and precise changes in carrier frequency
- Frequency modulation *accurately indicated* on easy-to-read 0 - 20 Kc/s and 0 - 100 Kc/s meter scales
- Amplitude modulation up to 80% — indicated in the same manner
- Accessories supplied include 20 db pad, 50 ohm unbalanced to 300 ohm balanced matching unit, and d-c isolating unit

The excellent frequency stability of the TF 1066, combined with its continuous coverage of the "difficult" signal bands in FM as well as AM, *and simplicity of operation, make it the ideal Signal Generator for all mobile communication measurements.*

These are only a few of the advanced electronic engineering features incorporated in this new Marconi Signal Generator. For complete specifications, write or wire today.

Marconi

CANADIAN MARCONI COMPANY — MONTREAL 16, QUEBEC

Canada's Largest Electronic Specialists

For further data on advertised products use page 79.

World Radio History

Westinghouse To Open New Plant At London, Ontario

The Canadian Westinghouse Company will build a new distribution transformer plant costing between $2 million and $3 million at London, Ontario. The new plant will be another link in the company's multi-million dollar expansion and decentralization program.

The move was announced by R. H. Williams, general manager of the firm's Industrial Products group. The plant will be used for the manufacture of distribution and instrument transformers, power capacitors, lightning arrestors and power fuses.

The new plant will mean employment for some 200 people when peak production is reached. Manufacturing space will include 100,000 square feet with an additional 12,000 square feet for offices.

Sparton Of Canada President Visits Europe

G. A. Holmes, president and general manager of Sparton of Canada, Limited, has embarked on an extended visit to England and Continental Europe. Mr. Holmes hopes to expand negotiations with various European recording companies for Canadian distribution on the Sparton label.

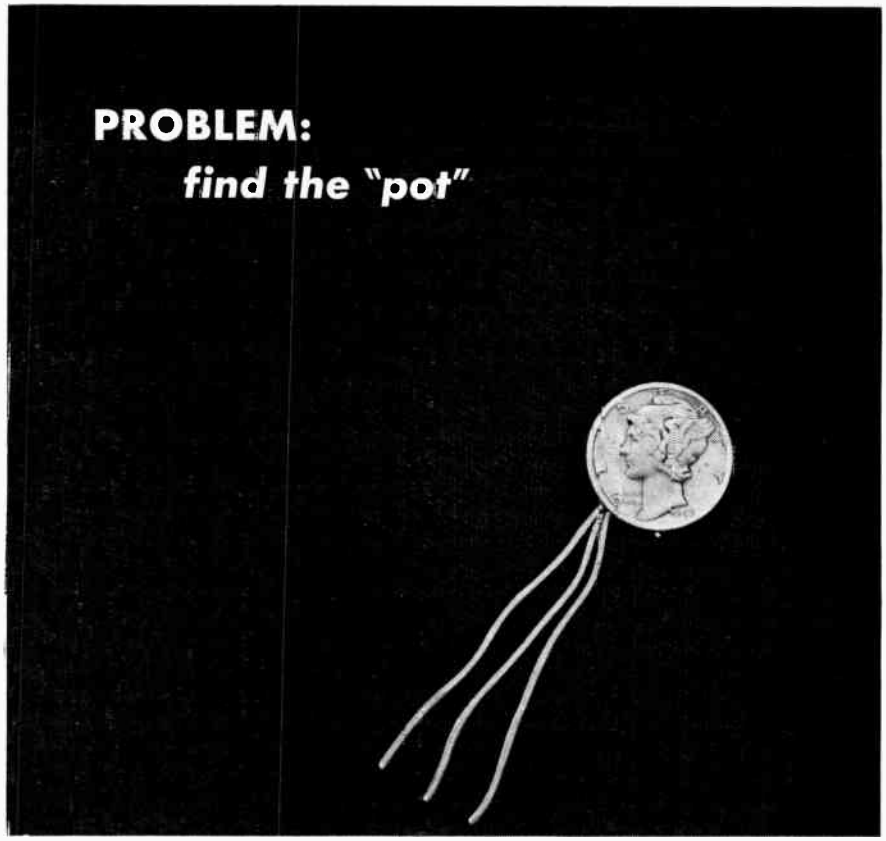
Before his departure, Mr. Holmes revealed that Sparton of Canada, which is marking its 27th year of operation in London, Ontario, is nearing the completion of the company's most successful year, having achieved an increase of better than 40 per cent above the industry average.

Canadian Marconi Equip British Liners With Ship-to-Shore Radio-Telephones

Two newcomers to the Montreal waterfront this year will be the two latest additions to the fleet of Manchester Liners Ltd., the Manchester Venture and the Manchester Vanguard. They will ply the Great Lakes — Manchester run as they were specifically built for this trading.

As each ship arrives in Montreal for the first time, they will be boarded by a team of installation engineers and technicians from Canadian Marconi Company, who will outfit the Manchester liners with a new type of ship-to-shore radio-telephone unit, the CN86 "Seaway". This was especially designed by the communications firm to meet the requirements of the Canada-U.S. Great Lakes Treaty. These radio-telephones will be used for communication with coast stations on the Great Lakes route.

(Turn to page 66)



This is the "Tail" of A DAYSTROM "POT"

The Model 300-00—smallest, most ruggedly-accurate wire-wound potentiometer on the market!

If you are having trouble finding the right "pot," a "pot" that will fit into the tiniest space, weigh less than an overstuffed feather, and still provide unexcelled accuracy and resolution characteristics, you will want to know about the Model 300-00 sub-miniature, wire-wound potentiometer produced by DAYSTROM POTENTIOMETER, and now improved even over the high-performance original.

So **SMALL** and **COMPACT** it can easily be covered by a dime (3/16 inch thick). One half as large as its nearest competitor.

So **RUGGEDLY ACCURATE** it can be used for the most exacting applications.

- **High Power Rating**
- **Extremely Fine Resolution**
- **Operable Over Extreme Temperature Ranges**
- **Designed to stack (21 per cubic inch)**

The Model 300-00 is just one of the many production or custom-made potentiometers available from DAYSTROM POTENTIOMETER. The Model 300-00 and its big brother-the 303-00 (higher resistance values)—are available out of stock.

Openings exist for highly qualified engineers.

POTENTIOMETER DIVISION

Daystrom PACIFIC CORPORATION

A Subsidiary of Daystrom Inc. 11150 La Grange Ave. West Los Angeles 25, Calif.

For further data on advertised products use page 79.

World Radio History

NEWS

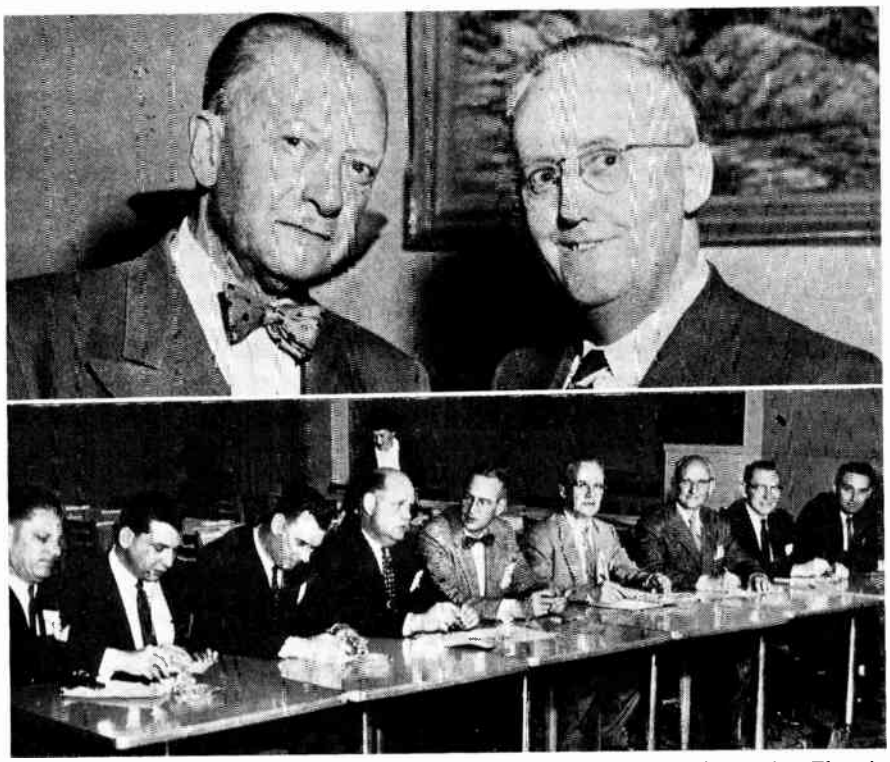
(Continued from page 65)

RETMA Transformer Engineering Committee Holds Panel Meeting

On May 16th., the Transformer Engineering Committee of the Radio-Electronics-Television Manufacturers Association of Canada held a "Group Dynamic Panel" at the Collins Hotel, Dundas, Ontario.

The panelists were all representatives of steel companies and the subject under discussion dealt with the supply of silicon steels for transformer laminations. Those taking part in the panel were W. L. Kimball, Algoma Steel Corporation Limited, J. H. Crede, Allegheny-Ludlum Steel Corporation, G. H. Cole, Armco Steel Corporation, W. R. Weir, Dominion Foundries & Steel, L. L. Anderson, Republic Steel Corporation, J. C. Snedden, Steel Company of Canada, C. W. Stoker, United States Steel Corporation.

The chairman of the RETMA Transformer Engineering Committee, W. White, presided, and R. W. Little, RETMA Transformer Engineering Committee, was the moderator. During the afternoon the panelists and guests visited the Dominion Foundries and Steel Corporation plant at Hamilton, Ontario. The visit was arranged by A. L. Stopps, president of El-Met-Parts Limited, of Dundas, Ontario. During the evening the RETMA film entitled "Electronics In Canada" was shown, and the activities concluded after an address by J. R. Montague, director of engineering of the Ontario Hydro Electric Commission, whose talk was entitled "The St. Lawrence Power Project."



● *Top*, J. R. Montague, P. Eng., Director of Engineering, Ontario Hydro Electric Power Commission *(left)*, and A. L. Stopps, president of El-Met-Parts Limited *(right)*. *Bottom*, Panel speakers at RETMA Transformer Engineering Committee meeting.

ENGINEERS . . .

SPECIFY Hoyt FOR —

✓ Accuracy ✓ Appearance ✓ Economy

You get big advantages — optimum performance at minimum cost — when you specify HOYT Instruments incorporating more than 50 years' manufacturing experience. HOYT offers you a complete Line of Panel and Portable Meters in a variety of sizes, ranges and cases . . . Milliammeters, Microammeters, Millivoltmeters, Ammeters, Voltmeters and others — Moving-Coil, Repulsion and Rectifier Types — all designed for today's needs.

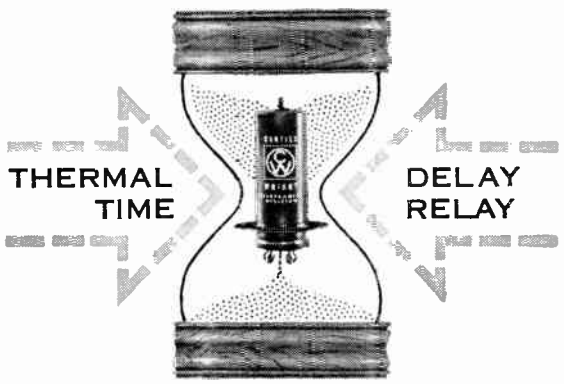
Take advantage of HOYT'S lower cost! Write today for complete information and prices on the Meters you need.

POLYSTYRENE CASES
ANTI-STATIC TREATED

BAKELITE CASES
ROUND & SQUARE

METAL CASES
FLUSH & SURFACE

Hoyt ELECTRICAL INSTRUMENTS
Sales Div.: BURTON-ROGERS CO.
42 Carleton St., Cambridge 42, Mass., U.S.A.



The Curtiss-Wright "SNAPPER"

NEW CONCEPT . . . ADVANCED DESIGN

Designed for high performance and long life, the Curtiss-Wright "SNAPPER" Thermal Time Delay Relay is proving itself in countless applications involving time delay in electrical circuits. Such applications include circuits to provide definite on-off time intervals to delay the application of high voltage until after warm-up period and for over and under voltage protection with simultaneous fault indication.

These relays have single-pole double-throw contact action, high ambient temperature range, freedom from chatter and arcing, and are small in size. The "SNAPPER" thermal time delay relays are factory pre-set from 3 to 120 seconds. They are available in metal envelope, miniature (7 and 9 pin) or octal (8 pin) and in a glass envelope in 9 pin only.

Curtiss-Wright manufactures the High-Low "SNAPPER" Differential Thermostat with high precision characteristics. Write to Thermal Devices for complete data.

Canadian Representative:
Consolidated Electronics
Equipment Company, Ltd.
1156 Yonge St., Toronto, Ont.

ELECTRONICS DIVISION
CURTISS-WRIGHT
CORPORATION • CARLSTADT, N. J.

For further data on advertised products use page 79.

World Radio History

Canadian Westinghouse Makes Appointments In Defense Apparatus Division

Two appointments in the Canadian Westinghouse Company's newly-formed Defense Apparatus Division have been announced by L. C. Sentance, manager.

R. T. D. Graham has been named manager, sales department and E. H. Dowell becomes manager, manufacturing department.

Mr. Graham, a 1949 engineering graduate of the University of Toronto, joined Canadian Westinghouse the same year and has held various sales positions. His last post was assistant sales manager for the Industrial Products Division and he has been associated with the company's naval apparatus program since its beginning.

Mr. Dowell graduated from Dalhousie University in 1941 and from the Nova Scotia Technical College, B.E. (Mech) in 1943. He joined Canadian Westinghouse in 1951 and has been engaged in steam turbine production as a manufacturing engineer, superintendent, and since 1953 as manager of manufacturing.

Muirhead Instruments Occupy New Plant At Stratford, Ontario

Muirhead Instruments Limited, precision electrical instrument makers, have occupied their new plant in Stratford, Ontario, since December 1955. It is a well-equipped and modern building of some 15,000 square feet.

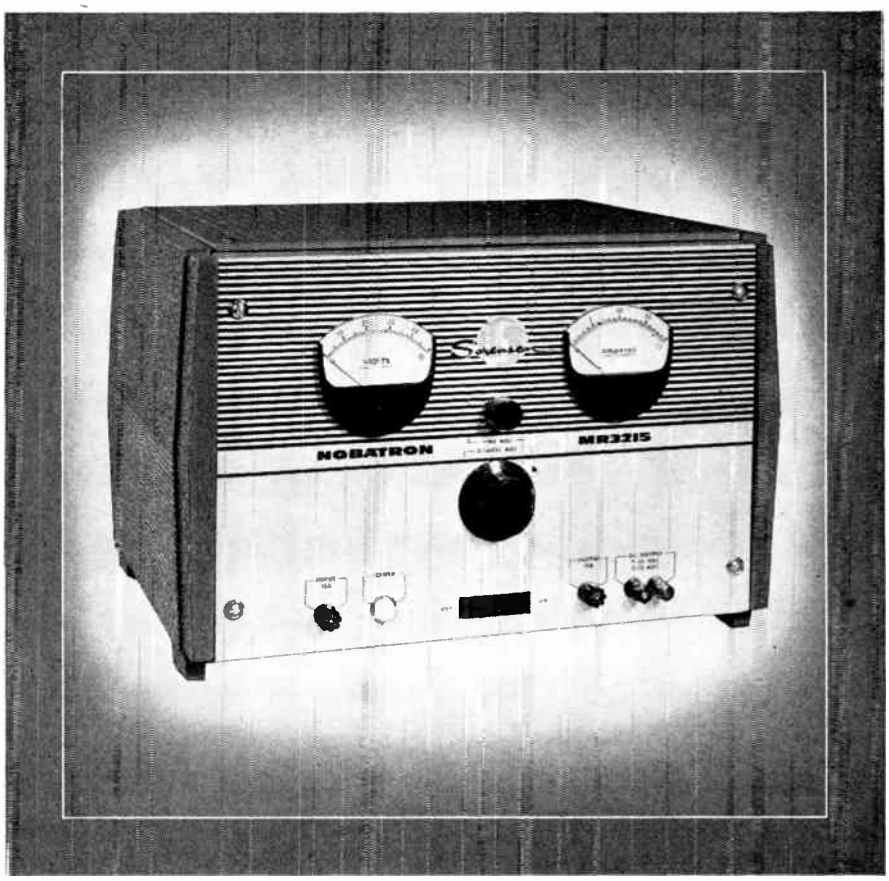
The company is a subsidiary of the English instrument-making firm — Muirhead & Co. Limited, of Beckenham, Kent — and there is an associate company in New York — Muirhead Instruments Inc., 677, Fifth Avenue, New York 22.

Rogers Majestic Electronics Ltd., Receive Air Force Order

A contract for more than 500 2-Way Radio Units for the Royal Canadian Air Force — reported to be the largest single order for standard mobile radio telephone equipment ever placed in Canada by the Services — has been awarded to Rogers Majestic Electronics Limited, Leaside, Ontario, by the Department of Defense Production. This is included in the list of Canadian firms receiving defense orders issued by the Department on May 8th.

The equipment is being manufactured in Canada under license from Motorola Inc., Chicago. For the past ten years Rogers Majestic Electronics have supplied Motorola Communications Equipment to the Canadian market.

(Turn to page 68)



NEW PRODUCTS . . . BROADER ENGINEERING HORIZONS FROM SORENSEN

MR3215 5-32VDC AT 0-15 AMPS
new, tubeless, magnetic amplifier

WIDE RANGE REGULATED DC POWER SUPPLY

for versatile, trouble-free performance in countless design & test applications

Different outside . . . and *inside!* The latest design in magnetic amplifier regulation. A silicon diode is used as reference element and a transistor amplifier provides the control current for the magnetic amplifier. Wide range, continuously adjustable voltage at high current. Regulation ±0.5% against line or load, ripple 1% RMS. Versatile, dependable, rugged, economical.

WRITE TODAY FOR DETAILED SPECIFICATIONS, PERFORMANCE DATA, AND QUOTATIONS.

Sorensen

SORENSEN & COMPANY, INC. • 375 FAIRFIELD AVENUE • STAMFORD, CONNECTICUT

World Radio History

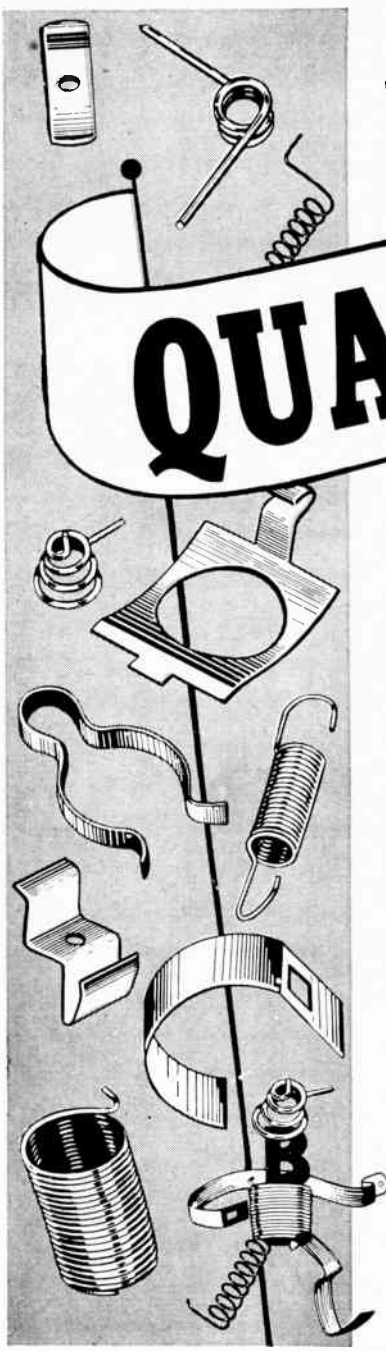
For further data on advertised products use page 79.

NEWS

(Continued from page 67)

Engineering Scholarship Offered By Electrohome

Electrohome of Kitchener, manufacturer of Radio, Television, HiFidelity, Fractional Motors and Deilcraft Furniture, has announced an Engineering Scholarship for a graduate of the Kitchener-Waterloo Collegiate and Vocational School. The award, known as the Electrohome Electronics Award, is to be available this year and it will amount to $1,600.00 in all. The Scholarship will be on the basis of $600 for the first year, $400 for the second year, and $300 in each of the third and fourth years. The company, in announcing the award, stated they wanted to encourage students to study radio physics, electrical engineering, engineering physics or physics with electronics option at a Canadian university. The scholarship winner will be selected by both the company and the Scholarship Committee from among students who have good scholastic standing and personal reputation and who are recommended by their school authorities; from students who intend to enter business or industry and who have the necessary talent and abilities for careers in the electronic field and who either need financial assistance or possess extraordinary talent or ability. In announcing the Scholarship Award to the students of the school the company stated they hoped this gesture, at this time when there is such a shortage of engineers, would lead other firms to awarding scholarships which would help alleviate the national problem of a shortage of personnel with engineering training.



WHAT'S IN A NAME?

QUALITY

IF IT'S

BOHNE

You can count on quality when you buy from Bohne because they are specialists in the field of precision spring making. Industry is constantly calling on Bohne "know-how" for economical spring production. Send your sample, blueprint or specifications for quotation.

BOHNE INDUSTRIES LIMITED

1153 QUEEN ST. W. • TORONTO 3

Dan D. Halpin Holds Dual Role For Westinghouse Electric

Assistant general manager in charge of marketing, and general sales manager of Westinghouse Electric Corporation's Television-Radio Division, Metuchen, N.J., is the dual title of Dan D. Halpin. He brings to Westinghouse an extensive background in sales management. Previously, he served as general sales manager of the DuMont Laboratories receiver division since 1952. Before that, he had been with the Radio Corporation of America, RCA-Victor Division, most recently as manager of television receiver sales, since 1939. He had his first major job as general sales manager with Dictograph Products Company, Inc., where he also served as vice-president, general sales manager, and director, having risen to that post after starting as a commission salesman in the hearing aid field.

D. D. HALPIN

Canadian Jobbers Elect Officers

At a two-day meeting held on May 18 and 19 at the King Edward Hotel, Toronto, the following officers were elected by the Canadian Electronic Wholesalers Association. John Dunn, of Hygrade Radio, Ltd., Vancouver and Victoria, B.C., was elected president under the group's new national charter; I. Morris, of the Atlas Wholesale Radio Co., Montreal, was elected vice-president. Directors elected were: M. L. Poole, Poole Electronic Supplies, Ltd., Windsor; Scott Benning, of the Canadian Electrical Supply Co., Ltd., Toronto; Ken Whitefield, of H. R. Carson, Ltd., Lethbridge, Alberta; and Leo Rosenberg, of Lee-Bern & Co., Winnipeg.

Following the meeting, the delegates left en-masse for Chicago to attend the Electronic Parts Distributors' Show.

Mr. Dunn was recently elected chairman of the Western Division of C.E.W.A. I. Morris is chairman of the Eastern Division.

For further data on advertised products use page 79.

World Radio History

Hamilton Section I.R.E. Hold Annual Dinner Meeting

Guest speaker at the annual dinner meeting of the Hamilton Section I.R.E. held in the Wentworth Arms Hotel, Hamilton, on April 9th, was Clare Norris whose subject was Canadian I.R.E. Activities In 1956.

Mr. Norris traced the early history of the I.R.E. in Canada pointing out that the first section of the organization was formed in Toronto in 1926. During the course of his talk Mr. Norris spoke of the forthcoming I.R.E. Convention to be held in Toronto in October and said that the purpose of the Convention was to promote the I.R.E. and the Canadian electronics industry.

The executive for the Hamilton Section I.R.E. was elected at the meeting for the 1956-57 season. New officers are as follows: Armand Fromanger, chairman; C. M. Chapman, vice-chairman; C. J. Smith, secretary-treasurer.

Sperry Mobile Caravan Makes Debut

First mobile exhibit of ultrasonic inspection equipment, comprising a trailer caravan fitted for plantside demonstrations of nondestructive testing, was introduced by Sperry Products, Inc., of Danbury, Conn., during the convention of the American Society For Quality Control June 6-8 in Palais du Commerce, Montreal, Canada.

The purpose of the Sperry caravan is to provide a travelling educational laboratory in which industrial engineers may learn the methods and potentialities of nondestructive testing with ultrasonic instruments. Applications are found in all industries fabricating products from any metal.

While in Canada the Sperry Ultrasonic Caravan will visit Kingston, Toronto and Hamilton, where it will function as an ultrasonic laboratory for aircraft and airframe manufacturers. After leaving Canada, the caravan will start on a 48-state tour of American industrial centers.

Canadian Electronic Sales Reps Elect Officers

At its annual breakfast meeting held at the Conrad Hilton Hotel, Chicago, during the Electronic Parts Distributors' Show in May, the Canadian Electronic Sales Representatives elected the following officers: C. G. Pointon, chairman; A. T. R. Armstrong, vice-chairman; D. Eldon McLennan, western vice-chairman; E. G. Hill, treasurer.

The retiring chairman who has presided over the group for the past two years is Fred Harris. John T. Rochford is the association's secretary.

(Turn to page 70)

NEW 8 CHANNEL

Sanborn oscillographic recording system

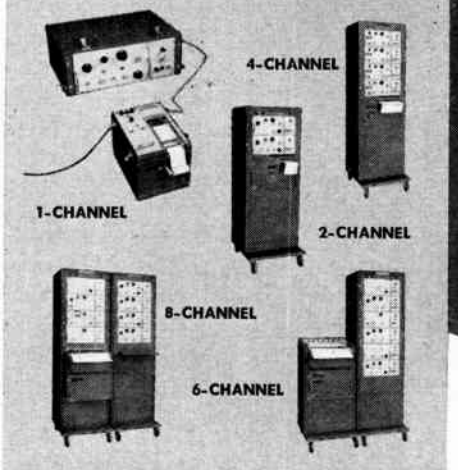
PRIMARILY FOR USE WITH ANALOG COMPUTERS

THIS new self-contained 8-channel oscillographic recording system, primarily for (but not limited to) analog computer recording, measures only 46½" x 27" x 22". In a single, space-saving mobile package, the user has a complete system for analog computer readout recording. Input cable connections are easily made at the top of the back panel. Eight groups of controls for the eight channels are conveniently located on the sloping top panel. Driver Amplifier chassis are easily withdrawn from the lower part of the console for inspection. Paper loading is quickly done from the top.

Features of the Model 158-5490 system include 0.1v/cm to 100v/cm sensitivity; over-all linearity of 0.25 mm over the entire 4 cm of the chart; drift less than 0.5 mm/hour; push-pull or single-ended input; miniaturized dual-channel DC amplifiers of improved current feedback design; 5 meg. input impedance each input lead to ground; true rectangular coordinate recording; nine chart speeds from 0.25 to 100 mm/sec. Frequency response is flat to 20 cps, down 3 db at 60 cps for all amplitudes to 4 cm peak to peak.

COMPLETE COMPACT SELF-CONTAINED

FAMOUS "150" SYSTEMS
. . . for all recording requirements



In laboratories, production testing facilities and field installations nationwide Sanborn 150 Series Oscillographic Recording Systems are proving their versatility and value. Users have a choice of basic systems ranging from 1 to 8 channels . . . "packaged" as portable units or in vertical mobile cabinets . . . and twelve interchangeable plug-in preamplifiers permitting rapid, economical changeover to new input requirements.

Sanborn will gladly furnish complete descriptive data on the new 158-5490 System and all "regular 150" systems, or engineering assistance on your recording problems, whenever you wish. Contact your Sanborn Representative, or write to

SANBORN COMPANY
INDUSTRIAL DIVISION
195 MASS. AVE., CAMBRIDGE 39, MASS.

For further data on advertised products use page 79.

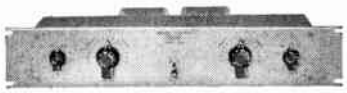
World Radio History

TUBELESS AUDIO COMPENSATION

only 14 db!

insertion loss!

The Model 4201 Program Equalizer has been developed to provide utmost versatility for the compensation of sound recording and broadcast channels. High and low frequencies may be boosted or attenuated while the program is in progress with negligible effect on volume levels. It may be switched in or out instantaneously to permit compensation at predetermined portions of the program. This feature is especially useful in tape dubbing work.



Model 4201, Program Equalizer

FEATURES:

Equalization and attenuation in accurately calibrated 2 db. steps at 40, 100, 3000, 4000 and 10,000 cycles.

Insertion Loss: Fixed at 14 db. with switch "in" or "out."

Impedance: 500/600 ohms.

Low Hum Pickup: May be used in moderately low-level channels.

send for Bulletin E for complete data

Net Price **$195.00**

F.O.B. North Hollywood

Model 4201 Program Equalizer is also available for the custom builder in kit form with complete wiring instructions. Send for Bulletin TB-4.

Representatives in Principal Cities

HYCOR

Division of
International Resistance Company
12970 Bradley Avenue,
Sylmar 9, Calif.

NEWS

(Continued from page 69)

C.C.B.A. Engineering Convention Scheduled For October

The Engineering Convention of the Central Canada Broadcasters Association will be held on October 10th and 11th at the Seaway Hotel, Toronto, officers of the association have announced.

R-O-R Associates Ltd. To Represent Eastern Air Devices, Inc.

It has been announced by Eastern Air Devices, Inc. of Dover, N.H., that R-O-R Associates Ltd. has been appointed its sales engineering representative in Canada. John S. Root is at the Toronto office, 290 Lawrence Avenue W., while Ralph Haywood is the Montreal representative at 62-01 Cote St. Luc Road.

Canada Wire & Cable To Build Simcoe Plant

A further move in the expansion and decentralization program of Canada Wire and Cable Co. Limited, Leaside, Toronto, is indicated by the decision of the company to build a manufacturing plant on a 15 acre site being acquired in Simcoe, Ont. O. W. Titus, vice-president and general manager, announced that the company will erect a modern industrial plant of approximately 100,000 square feet for the manufacture of all types of enamel and other coated magnet wires.

Plans are being prepared immediately for the erection of the plant on the former Erdelyi property on No. 3 Highway, immediately east of the Lake Erie and Northern Railway and south of the Canadian National Railways. The plant will have truck and rail shipping and receiving facilities.

On completion, the plant will employ initially about 100 persons, to be recruited locally with the exception of a small number of management and supervisory staff.

W. S. Gerrie And Associates Open New Plant And Offices

W. S. Gerrie, president of W. S. Gerrie and Associates Limited, announces the opening of their new offices, plant and warehouse at Rexdale (2 miles northwest of Weston) in metropolitan Toronto.

Commenced in November and just completed at a cost of $140,000, the new building covers 14,000 square feet on a 5 acre site.

Gerrie and Associates have pioneered the use of gas pressurizing of telephone and telegraph cables. By means of this system such organizations as Canadian National Telegraphs with their huge network of cables, can pass compressed dehydrated air through cables thus preventing cross talk and interference caused by moisture. In this connection the company is servicing the larger telephone and telegraph companies throughout Canada.

Probably the most unique product the company handles, and which will soon be produced completely at the new plant, is the Tower Ladder Safety Device. This is presently being installed on Canada's first micro wave TV relay towers and has been used for several years by such companies as Ontario Hydro to protect men climbing to any heights from falling. It is reported that several lives have been saved already by this device in Canada.

● Shown above examining one of the many displays exhibited at the official opening of the new W. S. Gerrie and Associates Limited plant at Weston are *(left to right)*, W. S. Gerrie, president of W. S. Gerrie and Associates Limited; J. M. Hambley, assistant general manager, Hydro Electric Power Commission of Ontario and I. M. Gross, president, Multi-Amp Corp., Newark, N.J.

For further data on advertised products use page 79.

World Radio History

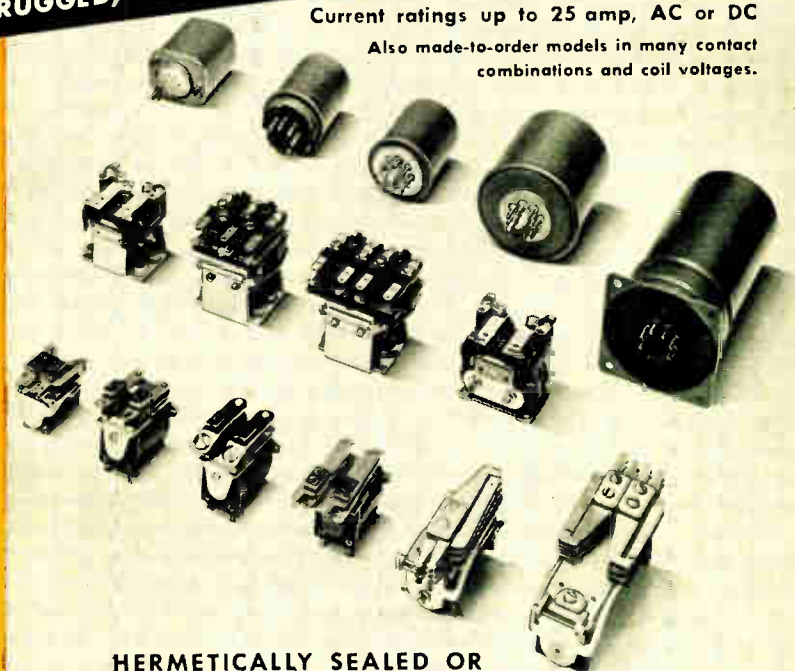
OHMITE®

AMRECON® *Relays*

HIGH QUALITY, ALL-PURPOSE RELAYS . . .
RUGGED, DEPENDABLE FOR LONG LIFE!

Current ratings up to 25 amp, AC or DC

Also made-to-order models in many contact combinations and coil voltages.



HERMETICALLY SEALED OR
DUST-PROTECTIVE ENCLOSURES

61 types in three stock models

Ohmite Amrecon relays have proven their exceptional ruggedness and long life in years of service. Now, three popular stock models—DOS, DO, and CRU, in 61 different types—are available from stock.

Models DO and DOS fill many industrial needs for a compact, lightweight relay that handles power loads usually requiring much larger, heavier units. They are particularly adaptable to aircraft and mobile equipment where severe shock and vibration are encountered. At 115 VAC or 32 VDC, noninductive load, Model DOS has a contact rating of 15 amp; Model DO, 10 amp; and Model CRU, 5 amp. Available in a wide range of coil operating voltages and contact combinations.

SEND FOR CATALOG R-10

Be Right with
OHMITE®
RHEOSTATS • RESISTORS • RELAYS • TAP SWITCHES

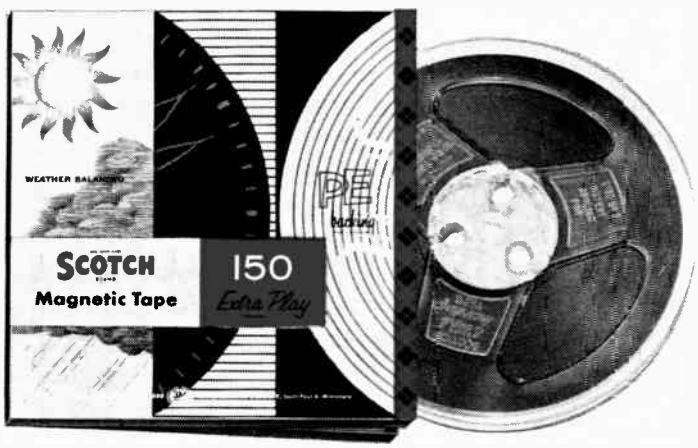
OHMITE MANUFACTURING COMPANY
3689 Howard Street, Skokie, Illinois
(Suburb of Chicago)
A. C. Simmonds & Sons — 100 Merton St., Toronto 12, Ont.
C. M. Robinson Co. — 189 Market Ave. E., Winnipeg 2, Man.

World Radio History

Now! Your choice of backings

each with "Scotch" Brand's proven potent oxide

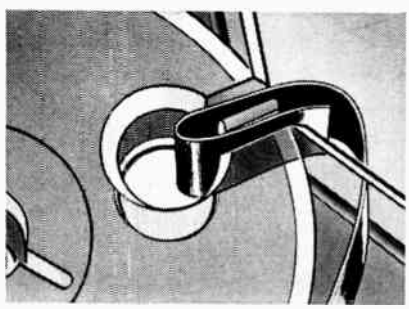
Famous acetate-backed "Extra Play" Tape 190 new economy price saves you 28%. Here's your chance to buy the magnetic tape everyone's talking about—at a special *new economy price!* It's popular "SCOTCH" Brand "Extra Play" Magnetic Tape 190, first long play tape on the market and *still* the best seller. With 50% more recording time on every reel...higher fidelity . . . strength to spare . . . high potency oxide . . . "SCOTCH" "Extra Play" Magnetic Tape 190 has been making recording history. Buy now and save 28% on every reel!



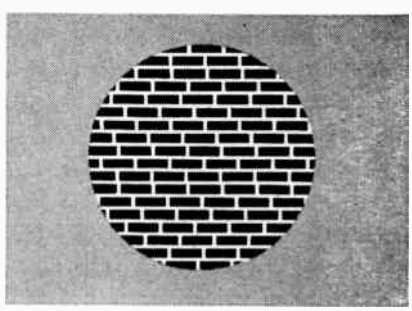
New polyester-backed (Made from DuPont's "Mylar"*)" Extra Play" Tape 150—for extra strength. Years ago "SCOTCH" Brand pioneered tough polyester-backed magnetic tape for experimental government orders. Now *you* can enjoy the *same* benefits of "SCOTCH" Brand research and development with new "Extra Play" Magnetic Tape 150. "SCOTCH" Brand's extra-strength polyester backing assures you long-lasting recordings...perfect tape performance in all weather, all climates—(It's "Weather-Balanced"!) "SCOTCH" Brand's exclusive high-potency oxide coating guarantees you superior recording quality on any machine.

*"*Mylar" is a registered Du Pont trade-mark.*

Both of these SCOTCH *Magnetic Tapes offer "Loop-Lok" Reel and famous high-potency oxide*



EASIER THREADING with new "Loop-Lok" Reel! Saves time . . . saves tape! It's "SCOTCH" Brand's exclusive "Loop-Lok" reel. Just loop tape around the new-design center pin for instant threading. Tape locks tight without troublesome wrap-around, releases fast at end of reel.



CRISP, BRILLIANT SOUND thanks to newest oxide coating! By laying fine-grain oxide particles in a neat, orderly pattern (as shown here), "SCOTCH" Brand is able to pack in thousands more particles than standard long play tapes—to produce a super-sensitive magnetic recording surface.

REG. TRADE MARK
SCOTCH BRAND *Extra Play* **Magnetic Tapes**

MINNESOTA MINING & MANUFACTURING OF CANADA LIMITED • LONDON, CANADA

PRODUCTS OF 3M RESEARCH

For further data on advertised products use page 79.

World Radio History

NEWS

(Continued from page 70)

M. T. Douglas Manages Manufacturing Dept. Of Westinghouse Electronics Division

W. J. Cheesman, manager of the Canadian Westinghouse Company's Electronics Division, has announced the appointment of M. T. Douglas as manager, Manufacturing Department.

Mr. Douglas joined the Electronics Division in February 1955 as superintendent of Manufacturing Services. Prior to that time he was engaged in manufacturing methods, production, manufacturing services and order control for the company's Apparatus Divisions.

Evans Elected President Of Controls Firm

W. H. (Hank) Evans has been elected president of Minneapolis-Honeywell Regulator Co. Ltd., Canada's foremost producer of automatic control equipment, the firm's board of directors announced today.

Evans, who has been general manager since 1941, and vice-president and general manager since 1951, takes over the presidency from Harold W. Sweatt, who has been elected board chairman.

Under Evans' direction, the company has experienced the greatest period of growth in its history, with activities and facilities being continuously expanded.

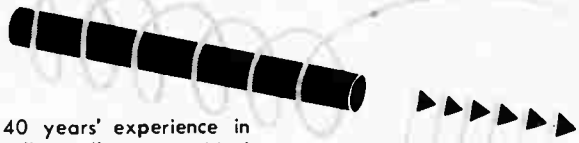
W. H. EVANS

The history of Minneapolis-Honeywell, Ltd., dates back for more than a quarter of a century to a predecessor company — The T. McDonald Company, Ltd. It has been carrying on manufacturing operations since 1932, and today its modern, 120,000-foot Toronto factory turns out a wide variety of precision equipment, ranging from temperature controls for homes and commercial buildings to instrumentation and other precision devices for Canada's industries and military services.

The company's increase in productivity has been accomplished by a similar growth in employment and a large increase in capital investment in buildings, machinery and other equipment. In addition to the Toronto factory, the company has sales offices in 15 principal Canadian cities. The company recently purchased a 35 acre site in the Township of Scarborough on which it will shortly begin construction of a new plant.

(Turn to page 74)

NORTH RELAYS
STEP-SWITCHES
for DEPENDABILITY

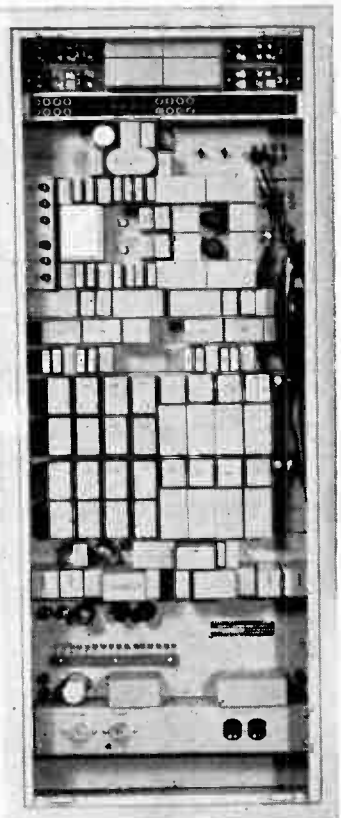


More than 40 years' experience in manufacturing "Brains" to meet critical industrial or military specifications for:

- SWITCHING
- SUPERVISING & RECORDING
- COMMUNICATIONS
- REMOTE CONTROL
- MISSILE GUIDANCE
- OTHER AIRBORNE AUTOMATIC CONTROLS
- MANY OTHER "AUTOMATIONS"

Canadian Distributors for NORTH ELECTRIC CO.

ERICSSON
TELEPHONE SALES OF CANADA LIMITED
Industrial Division
130 Bates Road, Montreal 8, P.Q. REgent 1-6428



TELEPHONE REPEATER TYPE TA-289/FCC

This is a packaged voice-frequency repeater adapted for use on almost any type of two-wire or four-wire line facility. The principal components are amplifiers, hybrid circuits and balancing networks. It also includes line protectors, monitoring telephone set, d-c telegraph composite sets, adjustable line equalizers, v-f signal converter type CV-339/FCC, and rectifier for a-c operation. It has a maximum net gain of 24 db on 2-wire circuits and of 30 db on 4-wire circuits, between nominal 600 ohm impedances.

Type TA-289/FCC Repeater, Telephone, manufactured for the U.S. Army Signal Corps. This is a recent redesign of the type OA-7/FC Repeater, Telephone, and is moisture- and fungus-proofed. It meets all applicable MIL specifications.

RADIO ENGINEERING PRODUCTS
1080 UNIVERSITY STREET, MONTREAL 3, CANADA
Telephone: UNiversity 6-6887 Cable Address: Radenpro, Montreal
MANUFACTURERS OF CARRIER-TELEGRAPH, CARRIER-TELEPHONE AND BROAD-BAND RADIO SYSTEMS

World Radio History

NEW PRODUCTS

(Continued from page 75)

● *Blower For Airborne Application*

Item 1110

A new fan-blower unit for airborne application, which compensates for low air density by increasing blower speeds, has just been announced.

The unit, BC 2914 F-1, has been designed especially to provide higher c.f.m. rates at upper altitudes. The blower will provide 8000 r.p.m., with 210 c.f.m. at 2 in. back pressure, at sea level. At 60,000 feet, blower speed is increased to 11,000 r.p.m.

This new device has a vane axial fan with a 1/6 h.p. a.c. motor, operating at 115 v., 2.5 amps, 400 cycles. The BC 2914 F-1, also available with d.c. motor, features a cast aluminum impeller and housing.

● *Constant Voltage Transformer*

Item 1111

A manufacturer of constant voltage transformers and fluorescent lighting ballasts, announces the redesign of three capacities of their Standard Type Constant Voltage Transformers. The new transformer design retains all former operating advantages, while providing lighter weight and a significant reduction of external field. Tests conducted in engineering laboratories show average external field has been reduced to only one-tenth of its former extent.

External magnetic field reduction allows sensitive electronic equipment to be installed more compactly with the unit. This may be important in equipment embodying high-gain audio amplifiers, microwave plumbing, and cathode ray tubes. Usually, magnetic shields may be eliminated.

A significant weight reduction has been achieved by the new design. The 1000 v.a. capacity unit, for example, is 53 per cent lighter than formerly.

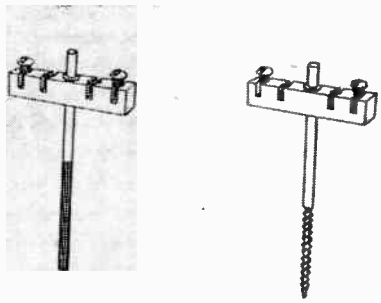
The Sola Constant Voltage Transformer, a static-magnetic stabilizer, provides automatic, instantaneous voltage regulation within ± 1 per cent with primary voltages variations as great as ± 15 per cent. It has no moving parts, and requires no manual adjustments or maintenance. Isolation is provided between input and output circuits both physically and electrically. The unit is self-protecting against short circuits on output or load circuit.

To obtain further information on New Product items in this issue, use postcards on page 79.

● *Open Line Stand-Offs*

Item 1112

A new type of Stand-off, the "Tappee", makes Open Line Transmission wire installations a snap. Designed to accommodate either 300, 450 or 600 ohm Open Line,



it can also be used to take up slack in the line. Some of the other applications suggested are to use two of these at a 21" spacing for use as matching transformers, from one impedance down to another. The plastic blocks themselves can be used to fabricate your own 300, 450 or 600 Ohm Lo-Loss line. Free catalogs on these and other Saxton products are available upon request.

● *Magnet Charger, Model 942*

Item 1113

A new, high powered magnet charger capable of charging large alnico magnets, ceramic magnets, and other materials requiring large peak magnetizing forces is now available for less than $2,000. With its accessories, the Model 942 Magnet Charger is designed to charge permanent magnets requiring up to 200,000 ampere-turns peak magnetizing force for saturation. This Charger is essentially a 3000-volt power supply with control and interlock circuitry and storage capacitors from 200 to 800 uf. The energy stored in the capacitor bank is discharged by means of an ignitron in a single unidirectional pulse into a pulse transformer and magnetizing adapter. The resulting high flux density charges the magnet. The ampere-turn rating depends upon the size and type of pulse transformer purchased to operate with the Model 942 Magnet Charger. Two standard pulse transformers, a 30 cubic inch wire-wound fixture, and many adapters and inserts are available to charge rod, bar, ring, U, multipole rotor, and special permanent magnets.

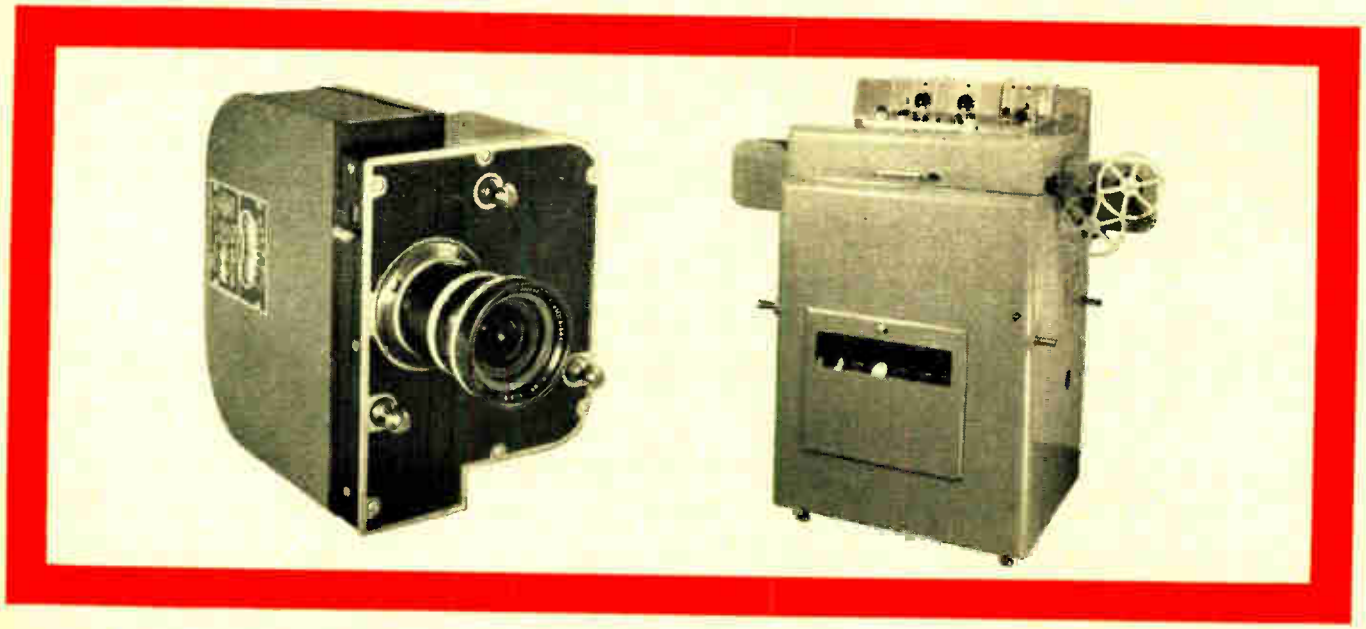
The Model 942 Magnet Charger is housed in a desk type cabinet 27¾" wide x 31" long x 29" high. The pulse transformers and fixtures plug into the control panel on top of the insulated work surface. Enclosed jacks permit safe, easy substitution of transformers or fixtures. The cabinet is provided with locking type casters for moving the equipment about in a plant. Interlock and safety circuits give complete operator protection. Unit operates from 115 volt, 60 cycle source with low power consumption.

(Turn to page 78)

World Radio History

INSTRUMENTATION CAMERA
AND AUTOMATIC
TRI-FILM PROCESSOR

PRECISION'S PERFECT PAIR



SPECIFICATIONS

INSTRUMENTATION CAMERA TYPE T232 Mk7

Size:	7½" x 5⅞" x 6½"
Weight:	13 lbs.
Power:	28 volts DC: constant demand 4 amperes; intermittent up to 1.8 amperes. The Type T232 DC power supply, which operates from 110v 60 cps, is available to power the camera
Lens:	28mm Augenieux F3.5, or to customer specification
Magazine:	100 ft. 35mm standard sprocketed film, No. 10 daylight loading spool. 400 ft. magazine available on special order
Picture Formats:	18x25, 25x25 or 25x36 mm.
Exposure:	1/100 second, or longer with intervalometer control
Interval Time:	3 cycles per second maximum

AUTOMATIC TRI-FILM PROCESSOR TYPE T246 Mk3

Size:	54" long, 22" wide, 51" high
Weight:	400 lbs.
Power Consumption:	5 KVA maximum single-phase: 110 volts, 45 amps, or according to customer requirements
Process Capacity:	1 to 4 rolls 16 mm } length 1 or 2 rolls 35 mm } to 1 roll 70 mm } 400 ft.
Rate of Processing:	1½, 3 or 6 ft. per min.

Temperature-controlled solutions and dryer
Daylight operation except loading of film into magazine
Processes perforated or plain film

Here is the perfect answer to the problems of film recording and the obtaining of quick results without loss of quality. The Mark 7 Instrumentation Camera is completely flexible through the entire field of instrumentation and aerial survey positioning photography. The shutter is a focal plane type, the basic exposure speed of which is 1/100 second. The camera may be cycled from 3 frames per second to any desired longer interval. Interchangeable apertures permit photographs of 18x25, 25x25 or 25x36 mm. A high degree of accuracy is achieved in respect to lens alignment, focusing and format positioning. Main components designed on the "module" system make conversion from one camera type to another relatively simple should customer requirements change.

A fitting companion is the transportable Mark 3 Automatic Tri-Film Processor that develops and dries 16, 35 or 70 mm film at 1½, 3 or 6 feet a minute. Four 400-ft. 16 mm films can be handled simultaneously—or two 400-ft. 35 mm films—or one 400-ft. 70 mm length. The various film sizes are accommodated by simple adjustments of film separators. Separate temperature control of the processing solutions is possible on each tank from 60 to 110 degrees F, within ± 1 degree. The latest high temperature chemical resistant plastics and Type 316 stainless steel are used in all chemical areas.

Write for literature and quotations.

PSC APPLIED RESEARCH LTD.

1500 O'CONNOR DRIVE
PLYMOUTH 5-3371
TORONTO 16, ONTARIO, CANADA

For further data on advertised products use page 79.

World Radio History

announcing

Canada's first full scale

ELECTRONICS and NUCLEAR SCIENCE CONVENTION

and exposition

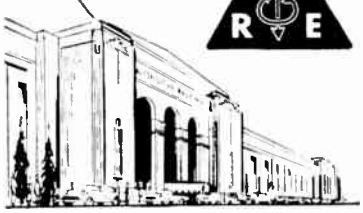
OCTOBER 1-2-3
1956

AUTOMOTIVE BUILDING
EXHIBITION PARK
TORONTO, CANADA

A milestone in the development of electronics and nuclear science!

The three day programme of exhibits and technical papers by leading experts will be a must for thousands of engineers, technicians and buyers.

Plan your company's exhibit participation now. Write today for your copy of the descriptive brochure.



CANADIAN I.R.E. CONVENTION

OFFICE: 745 MOUNT PLEASANT RD.
TORONTO 12, CANADA
TELEPHONE HUdson 8-7768

30th ANNIVERSARY in CANADA
The INSTITUTE of RADIO ENGINEERS

NEW PRODUCTS

(Continued from page 76)

● *New Toroidal Tape Winders*

Item 1114

Introduction of a brand new series of automatic tape winding machines for the toroidal coil field has just been made.

The new tape winders, gratifying end result of several years of painstaking development by engineers and designers, offer revolutionary operational and performance features including core turning table with automatic feed and variable pitch control, automatic tape cutting device, and special manual feeding attachment for hand winding when desired.

Series incorporates three models, U-9, U-14 and U-20, to wind tape from $\frac{3}{8}$ inch to one inch. Winders can be operated even by unskilled worker after only 15 minutes instruction.

● *Splicing Kit*

Item 1115

Moisture-proof low voltage "branch" or "tap" splices that can be insulated in less than 10 minutes and used under water have been made possible by a new splicing kit.

The new kit contains single-use branch splice mold and self-mixing package of "Scotchcast" electrical insulation resin No. 4.

The kit has been introduced by the makers of "Scotch" brand in-line splice kits and other electrical products.

The kit makes possible the complete encapsulation of the splice in liquid epoxy-type resin. The resin — a synthetic, thermosetting plastic — hardens into a durable jacket, sealing out moisture and eliminating electrical leakage as efficiently as the cable insulation itself under even the most critical conditions.

Designed for use in application such as street lighting systems or traffic signal systems, under or above ground or where moisture is a problem, the kit requires no special tools, equipment or skills according to the manufacturer. The splice can be used with success even where it must function when totally immersed in water.

● *Pulse Generators And Counters*

Item 1116

Here's the latest Electro-Pulse condensed catalog to bring you up-to-date on this rapidly growing range of test instruments. We bring to your attention particularly:

A completely new line of counting equipment, including preset counters, frequency indicators (events-per-unit-time), time interval meters, and combination instruments.

A new pulse amplitude meter for pulsed, sinusoid or d.c. voltages and currents, to 0.5 per cent accuracy.

A new dual trace generator for 'scope work.

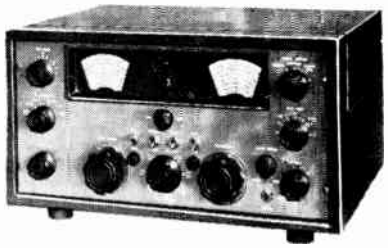
Extension of the pulse generator line, including the model 3450A, producing pulses at P.R.F.'s to 2 mc.

New pulse code generators for magnetic core tests and multi-pulse systems study.

(Turn to page 81)

Quality, Style and Beauty

GPR 90



THE *ALL NEW* COMMUNICATIONS RECEIVER

FEATURING:

- Six bands covering .54 to 31 Mc. • AM, CW, MCW, and FS with appropriate FS converter.
- Accurately calibrated main tuning dial plus auxiliary dial with full Electrical bandspread.
- A ferrite transformer provides accurate antenna matching for 75 ohm unbal. and/or 300 ohm balanced inputs.
- Sensitivity: 1 (one) microvolt or better for 10-1 signal to noise power ratio, 1.5 to 31 Mc. Less than 5 microvolts for .54 to 1.5 Mc.
- Image Ratio: Better than 60 db.
- Selectivity: Variable in 6 steps from 200 cy to 5 KC, 5 crystal and one non-crystal positions
- Input: 105-125VAC 50 60 cy., approx. 90 Watts • 6V.-6A, and 250VDC.- 0.1A
- Output: 4, 8, 16, 600 ohms. 2 Watts high quality audio-better than —60 db hum level.
- Highly effective noise limiter • Calibrated "S" Meter • Dial locks.
- Specially designed Audio Selectivity control with variable bandwidth.
- Diversity operation is available with the GPR-D. Provisions for external control for HFO, BFO, IFO.
- SSB Coaxial IF output & Audio input.
- Cabinet or rack mounting . . . 52 lbs. . . . 20"w. x 10"h. x 15"d. (Cabinet.)

Tube complement:

6AB4 Grounded grid input RF amp.	3-6BA6 IF Amplifiers
6CB6 2nd RF	6AL5 Det./Noise ltr.
6AU6 1st converter	6AG5 BFO
6AG5 Oscillator	12AX7 Avc and Audio Amp.
6BE6 2nd Converter and Oscil.	6V6 Output
6BA6 IF Buffer Amp.	OA2 Regulator
	5U4G Rectifier

Complete Receiver-Amateur net

Including Sales Tax **$495.00**

MATCHING SPEAKER $19.95

Terms may be arranged through our I.A.C. Credit Plan

Write or Phone for Bulletin 179B

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(CANADA) LTD.

In U.S.A. . . .
TECHNICAL MATERIEL CORPORATION
MAMARONECK, N.Y.

P.O. BOX 1066
BILLINGS BRIDGE
OTTAWA, ONT.

For further data on advertised products use page 79.

World Radio History

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(My old address is: ..... City .....)

☐ Check — Please add my name to your Electronics & Communications' mailing list. (No obligation)

Name ..... Position .....

Company ..... Nature of Business .....

Company Address ..... City ..... Prov. .....

Signature .....
(Not valid without signature)
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World Radio History

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INDEX — Continued

World Radio History

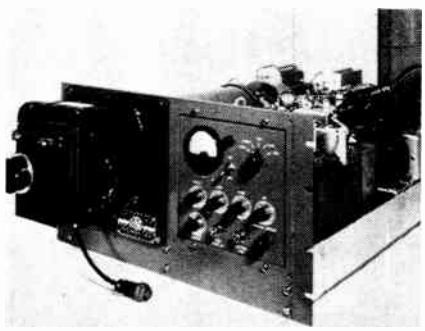
NEW PRODUCTS

(Continued from page 78)

• *Traveling Wave CRT For Millimicrosecond Measurements*

Item 1117

The development of a sealed-off, high-sensibility cathode ray tube for photographic recording of transients in the millimicrosecond region is announced. Standard models have a sensibility of 0.02 volt/trace width and a writing speed of 10^{11} trace widths/sec., permitting the recording of pulses with rise times on the order of tenths of a millimicrosecond. The new CR tube achieves high deflection sensitivity by the use of a long traveling wave deflection plate system wherein the signal velocity along the plates is made equal to the electron beam velocity, thereby eliminating transit time distortion.



For recording applications, sensibility in volts per trace width and writing speed in trace widths per second are the significant performance characteristics. The use of a much smaller spot and display than is conventional results in large gains in sensibility and writing speeds. A remarkably small spot size of 0.001 inch is obtained by optimizing the optics of the electron gun and focus structure. The combination of high deflection sensitivity and small spots size results in very high deflection sensibility.

A magnetic focus lens is used to permit optimum location of the TW deflection system helices. These are placed squarely within the lens. Up 20 to kv. post-deflection acceleration is used to obtain high writing speeds.

Among several unique constructional features in the tube are: a metal body permitting convenient attachment of high frequency coaxial connectors to the deflection system and providing greater dimensional accuracy and ruggedness of the general structure; optically flat screen coated with a special aluminized high-resolution P-11 phosphor.

• *New Thermal Ignitron*

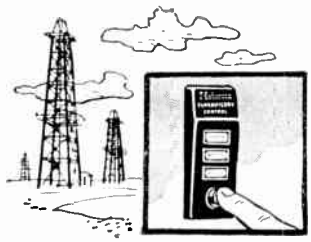
Item 1118

This ignitron, designated as the NL-1022, is exactly equivalent to the NL-5822 with the addition of the thermostat mounting plate. It embodies the same copper cooling coil construction used in other National thermal ignitrons. This construction gives increased thermal mass, more efficient cooling, and self flushing water system to prevent sediment deposits.

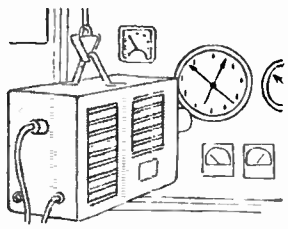
NL-1022 uses the same thermostats and mounting brackets as those used on other thermal types. One thermostat is used per tube. Thermostats are available for either protection of this ignitron or for water saving. The use of both types of thermostats in an installation permits utilization of both features.

NL-1022 is rated — 1500 amperes maximum peak current at 1200 maximum peak inverse and forward volts or 1200 maximum peak amperes at 1500 maximum peak inverse or forward volts. Maximum averaging time — 6.25 seconds.

(Turn to page 84)



SUPERVISION AND CONTROL



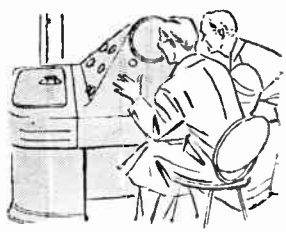
CLOSED CIRCUIT TELEVISION

CUSTOM-MADE SYSTEMS

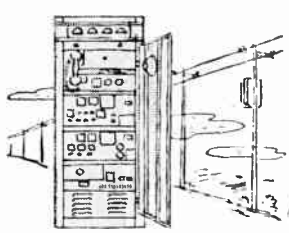
at production line prices

A 2-way radio system installed by ROGERS for Canada's largest supplier of diesel locomotives gives the dispatcher complete control over the company's fleet of fork lift trucks. A survey showed that the 2-way radio communications system would give up to 60% return on investment.

RADIO RELAY



SCIENTIFIC APPARATUS



POWER LINE CARRIER

Because Rogers Majestic Electronics provide such a wide variety of basic equipment and components our engineers can give you custom-made systems at production line prices.

With many years of pioneering experience exclusively in electronics and with access to unequalled research and development facilities throughout the world, Rogers is the Canadian organization best qualified to solve your problems in electronics. Whether you need mobile two-way radio, closed circuit television, microwave or any other electronic equipment, consult Rogers first.

Unexcelled engineering skill, quality products, and efficient service stand back of the Rogers Majestic representative in your area. Let him show you how the various time-saving, profit-making communications tools and electronic control instruments can help you.

Write, phone or wire our nearest office for a consultation — there's no obligation.

Specialists in Electronics

ROGERS MAJESTIC ELECTRONICS LIMITED

11-19 Brentcliffe Road, Leaside, Toronto 17, Ontario

HALIFAX • MONTREAL • OTTAWA • TORONTO • WINNIPEG • VANCOUVER

For further data on advertised products use page 79.

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HERE ARE 36 USES FOR PYE CLOSED CIRCUIT INDUSTRIAL TELEVISION

A new system of visual control for use in manufacturing plants, laboratories, hospitals, commercial establishments, training colleges —and wherever remote observation is desired.

INDUSTRY

- Mixing processes whether in closed or open containers
- Inaccessible moving mechanical parts
- Time study of production or assembly line
- Traffic flow at large loading platforms
- Personnel movement for peak departmental operation
- Staff training programmes
- Central point observation of control instruments
- Plant flow of materials
- Process changes in materials
- Personnel identification at plant entrances

COMMERCE

- Property and personnel security
- Staff training programmes
- Dispatch and transport control
- Pilferage control in stores and on wharves, etc.
- Cheque signature verification for banks
- Department stores sales demonstrations
- Cooking schools
- Traffic flow in exhibitions, public assemblies, etc.
- Plant watching facilities at night
- Visitor identification on restricted premises
- Transmission of documentary information

GOVERNMENT, PUBLIC AUTHORITIES AND INSTITUTIONS

- Armed forces training programmes
- Armed forces equipment
- Personnel safety in munition plants
- Forest-fire inspection
- Submarine inspection of harbours, docks, wrecks, etc.
- Scientific observation including microscopic or telescopic
- Crowd and traffic control at public events
- Hospital, clinical, medical and surgical demonstrations
- Police line-up identification
- Overflow audience at public events

EDUCATION

- Child study
- Vocational training
- Examination supervision in practical subjects
- Science demonstration — microscopic or telescopic
- Group training and demonstration of techniques

WE COULD EASILY LIST 136 AND STILL NOT HIT ON THE ONE APPLICATION THAT CAN SAVE MONEY IN YOUR OPERATION

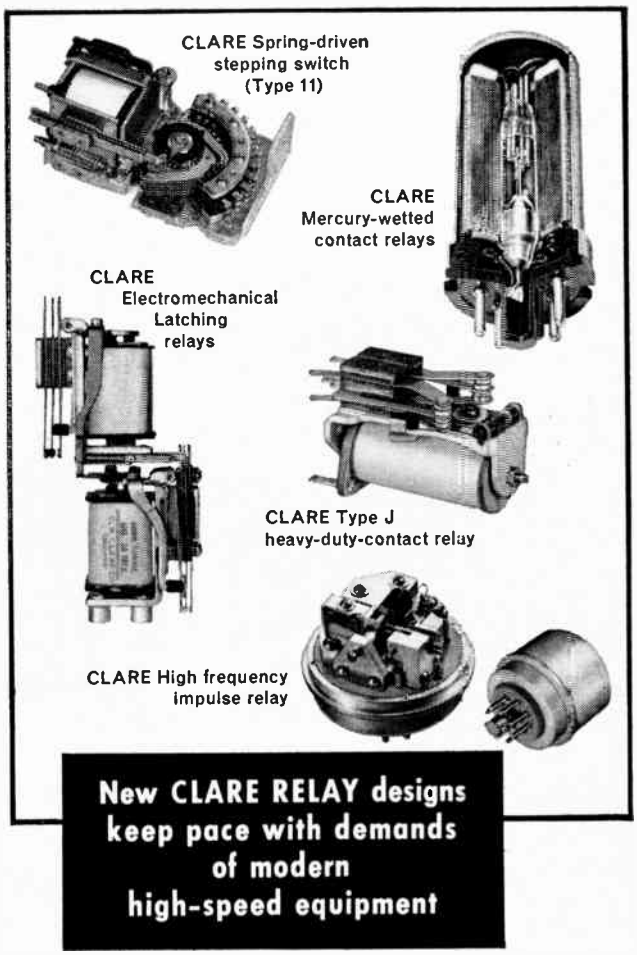
BUT YOU CAN!

We invite you to study the list of known applications. If none of them suggests a solution to your problem we will be happy to work out an adaptation with you and show how other firms have profited from Pye Industrial Television.

TELEVISION DIVISION

PYE CANADA LIMITED

Head Office and Plant: 82 Northline Rd., TORONTO 16
193 E. Hastings St., VANCOUVER
1191 University St., MONTREAL
78 Bank St., OTTAWA
3 Duke St., HALIFAX



New CLARE RELAY designs keep pace with demands of modern high-speed equipment

CLARE Spring-driven Stepping Switch (Type 11)

Latest in CLARE line of uniselectors, or rotary switches for completing, interrupting or changing connections in a succession of electric circuits in response to momentary impulses of current. Provides millions of steps without readjustment. *Send for CLARE Bulletin No. 121.*

CLARE Electromechanical Latching Relays

Assembly consists of two CLARE a-c or d-c relays with interlocking armatures. One a-c and one d-c relay may also be used. Many of these relays still operating satisfactorily after well over 15,000,000 operations. *Send for CLARE Bulletin No. 118.*

CLARE Mercury-Wetted Contact Relays

A relay of the utmost accuracy and dependability which is capable of over a billion operations at speeds to 60 operations per second. Cutaway view shows mercury-wetted contact switch sealed in glass. Available with up to 4 switches for multiple circuits. *Send for CLARE Bulletins No. 120 and 122.*

CLARE High Frequency Impulse Relay

A highly sensitive relay completely free from contact bounce and capable of billions of operations at extremely high speed (will follow up to 2,500 CPS). *Send for CLARE Bulletin No. 117.*

CLARE Type J Heavy-duty-Contact Relay

Increased current carrying capacity is provided by the use of silver heavy-duty contacts which are riveted to the springs. Rating of 10 amperes, 27½ volts d-c. Has exceeded 500,000 operations on motor load of six amperes—inrush current of 15 amperes—at 70,000 feet altitude. *Send for CLARE Bulletin No. 119.*

CLARE RELAYS

C. P. CLARE & CO., 3101 Pratt Blvd., Chicago 45, Ill.

In Canada:

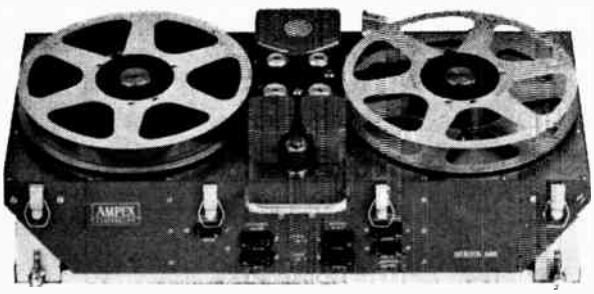
659 Boyview Ave., Toronto 17. Phone Mohawk 3829

For further data on advertised products use page 79.

World Radio History

AMPEX 800

THE MAGNETIC RECORDER YOU CAN SPECIFY WITH CONFIDENCE



A PARTIAL LIST OF AMPEX 800 USERS

Aircraft Companies:
Boeing, Seattle
Boeing, Wichita
Glenn L. Martin
Lockheed
North American
Douglas

Air Force Bases:
Patrick
Edwards
Eglin
Wright-Patterson

Navy Installations:
Navy Radiological Defense Lab
Naval Air Development Center, Johnsville
Naval Ordnance Lab

Other:
Sandia Corporation
R C A
Cambridge Research Center
Radioplane
Texas University
Bell Telephone Labs
Federal Telecommunications Labs
General Electric Co.
Airborne Instruments

This installation of an Ampex 800 Airborne Magnetic Recorder in an F-80 at Edwards Airforce Base is at the heart of a major project for developing faster data recording and reduction techniques. Over twenty aircraft companies, government test facilities and others have also purchased Ampex 800s and received delivery in quantity during its first year of production.

The Ampex 800 has had quick acceptance because it has lived up to promise. When the model was publicly announced, it was already a completed and tested design. The Ampex 800 was backed by more experience in magnetic tape instrumentation than exists anywhere else in the world. It was ready to perform with utmost reliability. It was capable of recording the entire flight test data on a single tape. And on a production basis it met specifications in all details.

For full information and specifications, Write Dept. SS2757.

Ampex International Division
Home Office: 934 Charter Street
Redwood City, California, U.S.A.

AMPEX
AMERICAN
CORPORATION

FIRST IN MAGNETIC TAPE INSTRUMENTATION

70 Grenville Street • Toronto, Ontario

For further data on advertised products use page 79.

World Radio History

molded in plastic *for complete case insulation*

AEROVOX

type MSRP

MOTOR STARTING CAPACITORS

These round, compact capacitors are *extra-protected* by a molded plastic case that eliminates the possibility of case grounding. They are protected from corrosion by the use of high-purity aluminum throughout the internal construction. And the case contains a vent which relieves excessive gas pressure.

Type MSRP Capacitors are available in four case sizes, in seven voltage ratings, with capacitance values of 25 to 650 mfd. Write today for complete technical information.

AEROVOX Capacitors

5403

Standardize with **AEROVOX**

AEROVOX CANADA LIMITED
HAMILTON, CANADA
Manufacturers of fixed capacitors for all radio, TV, and electronic equipment

western sales CHAS. L. THOMPSON LTD., VANCOUVER, B.C.

in U.S.A. AEROVOX CORPORATION, NEW BEDFORD, MASS.

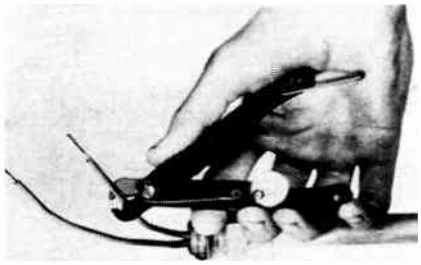
NEW PRODUCTS

(Continued from page 81)

● *New Pocket Tool Strips And Cuts Copper Wire*
Item 1119

A new pocket size wire cutter and stripper featuring a wire size adjustment for easy wire stripping is announced.

Designed for electrical work, radio, television, electronics, machine shop, garage and home use, the new tool features 5" long blades hardened and ground to cut with a smooth shearing action severing wire cleanly and neatly.



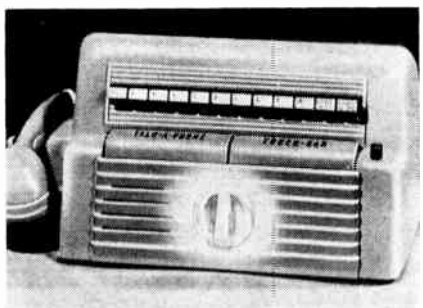
For wire stripping, the electrical worker simply sets the adjusting stop to the wire size — closes the jaws of the tool around the wire — holds firm and strips clean to the bare wire with easy "straight pull" motion.

The tool measures 5" long, weighs just 2 ozs.

● *Automated Intercom*
Item 1120

A new means of intercommunication has been produced with built-in automation which automatically operates the Talk-Listen Control, thus making it unnecessary for either party to manually operate it.

The Talk-A-Phone Super Chief provides for intermixing of 10-Station and 20-Station Masters, Staff Stations and Sub-Stations in any desired arrangement. Master Stations can call and carry on a conversation with any other Master Station, Staff or Sub-station in the system "privately" and "selectively". Staff and Sub-Stations, once called, can reply at a distance and without operating any controls; but neither the Staff nor the Sub-Station can originate calls. Staff and Sub-Stations talk only to the Masters and cannot communicate between themselves.



Between Masters 2-way "private" conversation can be held without either party operating the Talk-Listen Control, and without interruption from any other station. One's own voice automatically operates the Talk-Listen Control. Only when conversing with a Staff or Sub-Station does the Master use the Talk-Listen Control.

Automatic reply provides "privacy" to the Master so that no other station can listen-in, unless the caller so desires.

The equipment provides for "private" conferences between Master Stations without any of the persons at any of the stations in the conference operating any controls during the conference.

The Staff Station is equipped with visual signal to indicate when the Staff Station is being monitored.

● *Data Book On Varistors And Thermistors* *Item 1121*

The sixth edition of a comprehensive technical catalog describing VECO thermistors, varistors, and assemblies has been announced. This catalog is most complete and contains technical data and illustrations. A copy will be forwarded without charge upon written request.

The new sixth edition of the technical catalog will assist engineers and buyers in selecting proper thermistor or varistor units for their purposes. In addition the catalog contains complete electrical and physical characteristics covering bead, disc, rod and washer type thermistors, varistors, thermistor assemblies, varistor assemblies and special products such as thermistor hypodermic needles, combustion analyzers, gas analysis cells for vapor phase chromotography and other uses.

● *Microwave Ferrites In Custom Designs* *Item 1122*

Ferrite shapes for every known microwave application are now available in custom designs. Ferrite rods, strips, bars, and toroids are examples of shapes supplied.

The microwave ferrites find application in microwave isolators, attenuators, and phase-shifters.

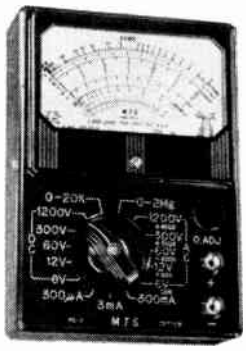
Technical data on ferrites is available.

● *Wire-Wound Controls For Printed Wiring* *Item 1123*

For fast, efficient insertion in printed-wiring assemblies, a redesigned version of the popular low-cost space-saving Series 39 "Humdinger" control is announced.

Mounting is by two tabs for positive locking to printed-wiring board. Control is rated at 2 watts. Resistance range from 4 ohms to 5000 ohms. Control measures ¾" in diameter by ⅜" deep. Adjustment is by screwdriver slot.

Accurate Well Constructed VOM complete with test leads



Model PD-3

The Model PD-3 is of sturdy construction. The panel is of heavy molded bakelite with **recessed switch** knob. The selector switch is rugged and long lasting; a feature that is seldom found in low priced VOM's.

Size 5¼" x 3¾" x 1¼"
Wt. 18 oz.

$13.95 Complete

SPECIFICATIONS

AC Volts	DC Volts	Capacity
0-6-12-60	0-6-12-60	0-0.1Mf.
0-300-1200 at 2000 _o_ per Volt	0-300-1200 at 2000 _o_ per Volt	**Inductance** 0-1000H.
DC Current 0-0.3Ma-3Ma-300Ma	**Decibels** -20 to 46Db.	**Resistance** 0-20,000 ohms 0-2 Megohms

MJS ELECTRONIC SALES LIMITED
AJAX, ONTARIO

For further data on advertised products use page 79.

World Radio History

● *Metal Thickness Measuring Gage*

Item 1124

A gage for measuring the thickness of metal plating on non-magnetic base material is a comparative instrument using standard samples with known plating thicknesses to calibrate the gage before carrying out the gaging operation. The calibration can be completed in one or two minutes, and the gaging of a thickness can then be done at a very rapid rate. The equipment is presently used to gage plating from .00025 inches to .003 inches.

This new development will enable inspection of plated parts at a very rapid rate and enable users to consistently meet the more critical limitations demanded in the industrial and military fields.

● *Linear Accelerometer*

Item 1125

Ready to furnish some of the brainpower for guided missiles is the Model A-10 Linear Accelerometer, a new entry in the electronic field. Constructed to operate exactly at altitudes reaching from sea level to 90,000 feet in a working range from 0 to 50 g's, the Accelerometer can be connected in series with gyroscopes to furnish motion details. Its matchbook height, 1¾ inches, and 2⅛ inch diameter make it suitable for missile assemblies. Weight is 0.8 pound.

According to engineers, customer specifications regarding static friction, natural undampened frequency, potentiometer resistance, power dissipation and potentiometer life can be met keeping other basic specifications uniform. Shock capabilities are ± 15 g's, 18 times in three directions, 11 milliseconds duration. Vibration: 5 to 35 cycles, 0.070 total excursion; 35 to 55 cycles, 0.030 total excursion; and 55 to 500 cycles, 5 g's. Cross talk: less than 0.001 output ratio per g of applied acceleration.

Model A-10 is air damped, spring loaded mass coupled to wiper of a linear potentiometer. The error envelope is ± 2 per cent of unit output ratio, uniform throughout the range.

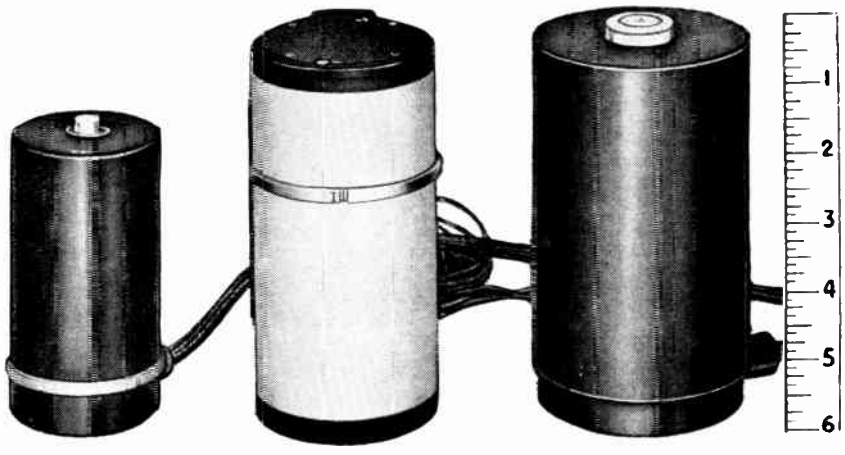
● *New Cesco Kits Catalog*

Item 1126

Publication of a new "Do-It-Yourself" Kits catalog which gives a complete listing of all types of electronic kits for servicemen, experimenter, ham and hobbyist, has been announced. Included in this catalog are kits of test instruments, radios, high-fidelity, transmitters, receivers, phonos and a listing of books for the home builder.

This Kits catalog is the first of its kind issued in Canada by a Canadian jobber and follows the popular "Do-It-Yourself" trend. Copies of this catalog are available free.

(Turn to page 86)



HIG-4 HIG-5 HIG-6

HONEYWELL HIG GYRO FAMILY

Small, Rugged
WORLD'S MOST SENSITIVE

To meet your floated gyro needs, Honeywell has developed a complete line of Hermetic Integrating Gyros—the newer HIG-4 and the HIG-6, which together with the already famous HIG-5, make up the Honeywell HIG "family"!

This is a versatile line-up, as indicated by the specifications below. It gives you a wide range of performance characteristics in a variety of weights and sizes. Honeywell HIG's can be used as rate gyros, platform gyros, directional gyros, free gyros, or precessible gyros. Other models are available as pendulous gyro accelerometers.

For full details on the HIG "family" and on our full gyro line, write Honeywell Aero Division, Dept. EC-CO-6, Leaside, Toronto 17, Ontario.

Specifications of New Honeywell HIG "family"

	HIG-4	HIG-5	HIG-6
Angular Momentum	10^4	10^5	0^6
Threshold	1° per hr	.2° per hr	.01° per hr
Trimmed Drift Rate	5° per hr	1° per hr	.05° per hr
Maximum Precession Rate	5 radians/sec	1 radian/sec	.1 radian/sec
Characteristic Time Constant	3.5 millisec	2.8 millisec	3.1 millisec
Damping Ratio — Output Axis/Input Axis	1 to 1	1 to 1	2.1 to 1
Torque Generator Scale Factor	1 or 10 dyne-cm/ma²	2.5 or 35 dyne-cm/ma²	.025 or 1 dyne-cm/ma²
Signal Generator Scale Factor	25 volts/radian at 100 ma 400 cps	34 volts/radian at 100 ma 400 cps	25 volts/radian at 50 ms 400 cps
Spin Motor Excitation	10 volts, 2 phase	10 volts, 3 phase	115 volts, 3 phase
Weight	1.5 lbs.	2.75 lbs.	4.5 lbs.

Honeywell

Aeronautical Division

AIRCRAFT • ORDNANCE CONTROLS AND INSTRUMENTATION

LEASIDE, TORONTO 17

For further data on advertised products use page 79.

World Radio History

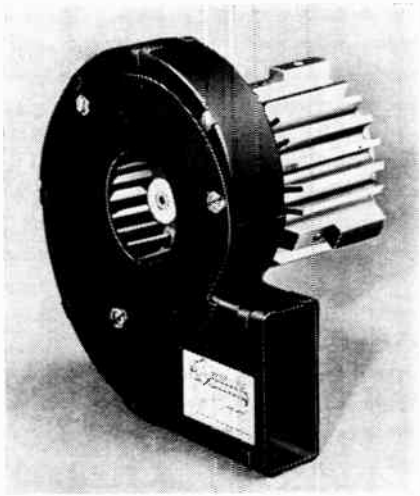
NEW PRODUCTS

(Continued from page 85)

● *Blower Fan For Electronic Components*

Item 1127

A centrifugal blower designed to meet the latest demands for cooling electronic components where higher back pressures have become a problem was announced recently.



The blower itself resembles the Standard No. 2½ blower with maximum dimensions of 3⅞" by 4⅜". It can be furnished with motors built to applicable government specifications operating from 115 volts single or three phase, 60 or 400 cycles, and 24 volts d.c. Typical air delivery is 60 c.f.m. against 4" S.P. when driven by a 4-pole cycle motor at 11,000 r.p.m.

● *The A.V.C. Amplifier*

Item 1128

An automatic volume control amplifier which maintains a constant output within ± 1 d.b. with input changes of 30 d.b. has been designed. Exceedingly rapid automatic gain reduction prevents syllable clipping and slow automatic gain increase avoids automatic control at syllabic frequencies.

The A.V.C. Amplifier basically consists of a two stage push-pull circuit. The operating conditions of the input stage have been carefully determined so as to provide optimum limiter action with minimum distortion. The input may be connected directly either to a balanced 600 ohm line (with either or neither side grounded) or it may be bridged across a 600 ohm line without upsetting line impedance.

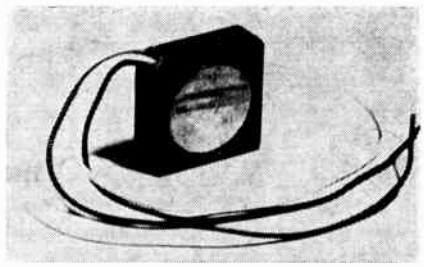
Used in conjunction with radio broadcast transmitters, telephone circuits, public-address installations, wired music systems, factory and department store paging systems. This versatile, low distortion amplifier has a great many other applications including automatic fading between two signals and for compression or expansion (or both) of any program material.

For broadcast application, the gain control feature automatically keeps modulation at peak levels without exceeding modulation limits and eliminates the element of human error. For public address and paging system applications automatic compensation is made within very wide limits, (30 d.b., or 1000 to 1 in signal voltage) to keep the output level constant (within 2 d.b.) so as to adequately compensate for drastic change in input volume caused by variable distances between announcer and microphone.

● *Sub-Miniature Trimming Potentiometer*

Item 1129

Now in full production is a dime-sized, Sub-Miniature Trimming Potentiometer, Model 300-00. It's another, and the most minute, of the maker's tiny but mighty resistors. Standard ranges — from 10 ohms to 25 k. with other ranges available on order. Units can be stacked to form a compact bank.



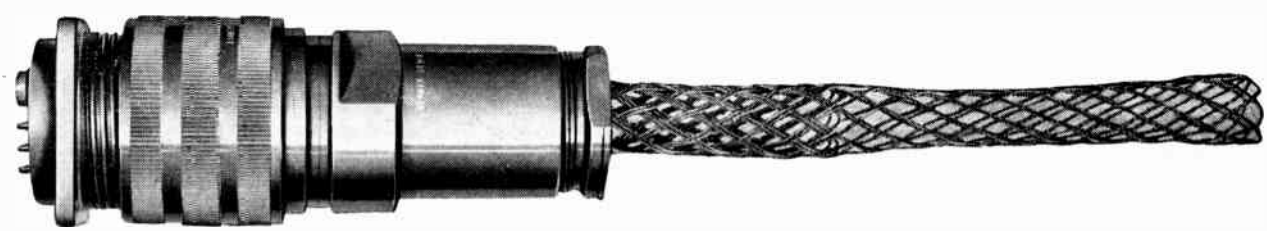
The Sub-Miniature measures 0.500 inch square by 0.187 thick. Weight is 2 grams maximum. Power rating: 1 watt derated to 0 at 120°C. ambient. Dielectric strength: 500 v. a.c. 10 seconds. Insulation strength: 50 megohm minimum, 500 v. d.c. potential. Accuracy of resistance value: ± 5 per cent. Electrical continuity: 345° ± 5°.

Stability, ruggedness, wide resistance values with a geared adjustment ratio and the unit size are virtues which give the Sub-Miniature Trimming Potentiometer unusual adaptability in electronic, electric and electro mechanical systems.

● *Data Book On Electrical Measuring Apparatus*

Item 1130

A new condensed illustrated catalog with short specifications of electrical measuring apparatus, featuring a line of Standard Resistors, Capacitors, Inductors, Decade Resistance, Capacitance, Inductance Boxes, Decade Attenuators, Voltage Dividers, Impedance, Conductance and Universal Bridges for d.c. and a.c., Impedance Comparators, Sensitive Valve Voltmeter, Diode Valve Voltmeter is available on request.



Presenting the New QWL

Bendix ELECTRICAL CONNECTOR

A HEAVY-DUTY WATERPROOF POWER AND CONTROL CONNECTOR FOR USE WITH MULTI-CONDUCTOR CABLE

This new QWL Bendix* Electrical Connector was designed for and is being used principally on ground-launching equipment for missiles and ground radar equipment.

Obviously, for this important type of service only the highest standards of design and materials are acceptable.

That's why it will pay you to specify the Bendix QWL Electrical Connector for any job that requires exceptional performance over long periods of time.

QWL outstanding features:

1. It combines the strength advantages of machined bar stock aluminum with the shock-resistant qualities of a resilient insert.
2. A modified, double stub thread provides for speed and convenience in mating and disconnecting and the special tapered cross-section thread design resists loosening under vibration. The threads can be easily hand cleaned if contaminated by a substance such as mud or sand.
3. An Alumilite 225 hard anodic finish is used which gives a case hardening to the aluminum surface. This finish offers outstanding resistance to corrosion and abrasion.
4. The cable-compressing gland used within the cable accessory accomplishes both a firm anchoring of the cable and effective waterproofing for multi-conductor cables. Neoprene sealing gaskets are used at every joint to insure a watertight connector assembly.
5. The cable accessory is designed to accommodate a Kellems stainless steel wire strain relief grip for additional cable locking.
6. A left-hand thread is used on the cable accessory to prevent inadvertent loosening.
7. High-grade copper alloy contacts are used which provide for high current capacity and low voltage drop. The famous Bendix closed-entry socket is used for contacts sizes 12 and 16.

*TRADEMARK

Bendix SCINTILLA DIVISION OF Bendix AVIATION CORPORATION
SIDNEY, NEW YORK

For engineering specifications and application details, consult Aviation Electric, Ltd., 200 Laurentien Blvd., St. Laurent, Montreal 9, Quebec, Canada.

For further data on advertised products use page 79.

World Radio History

● *Ten Ways To Cut Costs With Inside Telephones*

Item 1131

"10 Ways To Cut Costs With Inside Telephones", is the title of a new 12-page illustrated booklet which has been prepared by a manufacturer of P-A-X Business Telephone Systems.

The booklet tells how 10 different organizations, each in a different line of business, are saving money with P-A-X, the privately-owned, rent-free dial telephone system used exclusively for "inside" calls.

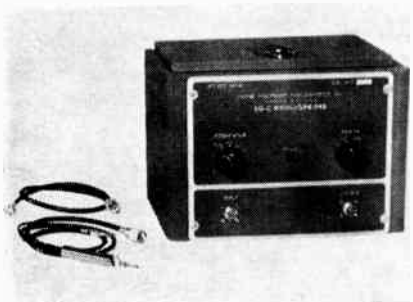
Quoting executives of these ten firms, the pamphlet explains the role of this telephone system, separate from the public telephone service, in stepping up production, saving man hours, cutting costs, improving customer relations, and effecting further company benefits.

Free copies of the booklet are available.

● *Oscilloprobes Now Commercially Available*

Item 1132

A low-capacitance oscilloprobe and video amplifier designed to extend the utility of oscilloscopes for making accurate observations of waveforms is now being commercially marketed.



This instrument consists of a shielded, low capacitance (1.5-2 m.m.f.) probe and an associated video amplifier with a gain of 40 to compensate for the probe attenuation. The overall band-width is within 3 d.b. from 5 cycles to 12 megacycles. The amplifier may be used separately to provide a gain of 40, or with the probe to provide attenuations of XI, X. 1 and X. 01.

Used with an oscilloscope, the HF-3A Oscilloprobe permits observation of signals in a circuit with negligible resultant loading or detuning, or otherwise affecting the normal performance of the circuit.

● *Rectilinear Recording Milliammeter*

Item 1133

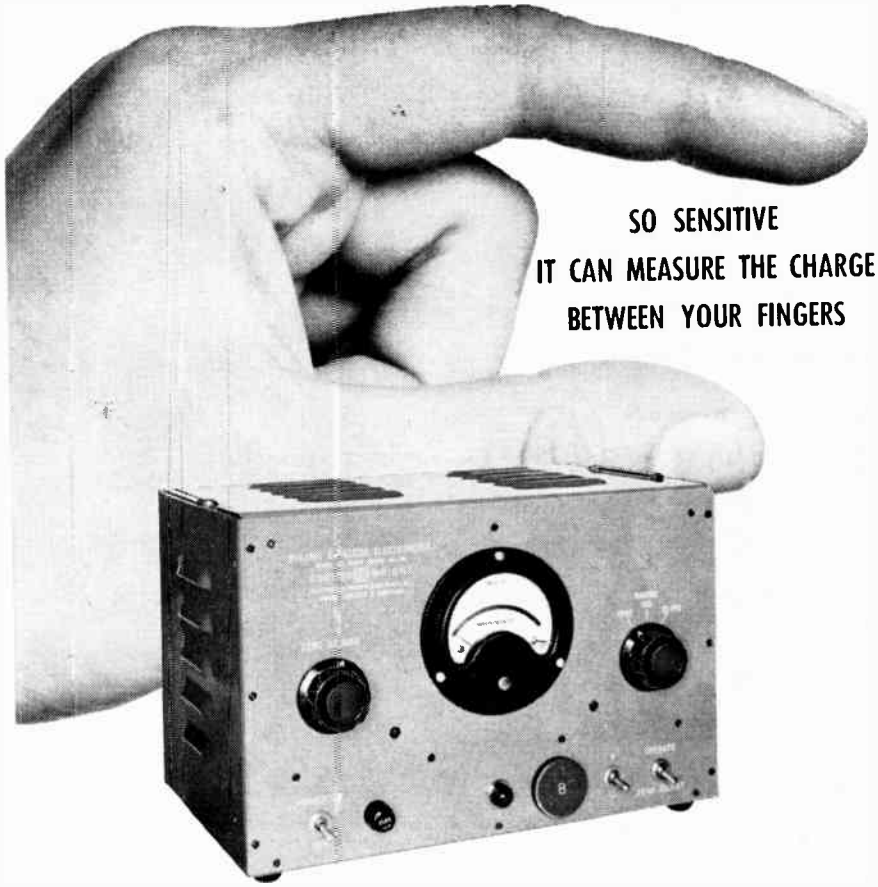
A Rectilinear Recording Milliammeter, with all its associated advantages, is now available. Signals are presented in their true rectilinear appearance, eliminating the need for complicated data reduction.

It is an ink-writing, galvanometer instrument, with front access for all routine operations. Features adding to convenience in use include: front located signal terminals (rear terminals optional); front located switches and controls; "writing desk" area on chart for notations; front filling ink system, and swinging chart-paper carriage.

Rectilinear writing is made possible by a new pantographic linkage. This includes a jewelled gymbal mounting for the pen and a freely moving A-frame with counterbalancing weights to give uniform pan pressures.

The recorder weighs less than 27 pounds, with dimensions in inches of 15 x 9 x 8¼. Electrical characteristics are: one milliampere for full scale deflection; 1500 ohms input resistance, and an undamped natural frequency of two c.p.s.. Ten speeds are available for the chart, making the 100 foot roll good for continuous recordings of from one hour and 40 minutes to 60 days.

(Turn to page 88)



CURTISS-WRIGHT

DYNAMIC CAPACITOR ELECTROMETER

FOR STABLE AMPLIFICATION OF LOW-LEVEL DC SIGNALS

Measures currents as low as 10^{-16} amp. • Extremely high input impedance . . . 10^{15} ohms. • Low drift — less than ± 1 mv per 24 hours. • Uses dependable, durable dynamic capacitor. • Accuracy of ± ½ % full scale. • Only 14" x 10" x 9"

The Curtiss-Wright Dynamic Capacitor Electrometer is ideal for measuring minute currents or voltages from high impedance sources. There is no 60 cps interference since the Dynamic Capacitor Electrometer operates at 1,000 cps. The instrument can be used to measure static charges, potentials of floating grids, insulation leakage currents, capacitor dielectric leakages; and to study transistors and diodes. Its ruggedness, reliability, and high sensitivity make it especially suited for use in the nuclear field as a component in reactor control systems and in industrial control systems employing radioisotopes as energy sources. It can be used for pH determination, and in mass spectrometry. In biophysics and medicine it may be used to measure cell potentials, skin potentials, streaming potentials, injury potentials, and nerve impulses. Besides providing an indication on its own meter, it will operate any standard recorder. For details, write Nuclear Equipment Sales Dept., Curtiss-Wright Corporation, Electronics Division, Carlstadt, N. J.

ELECTRONICS DIVISION
CURTISS-WRIGHT
CORPORATION • CARLSTADT, N. J.

Canadian Representative:
Consolidated Electronic Equipment Co. Ltd., 1156 Yonge St., Toronto, Ont.

For further data on advertised products use page 79.

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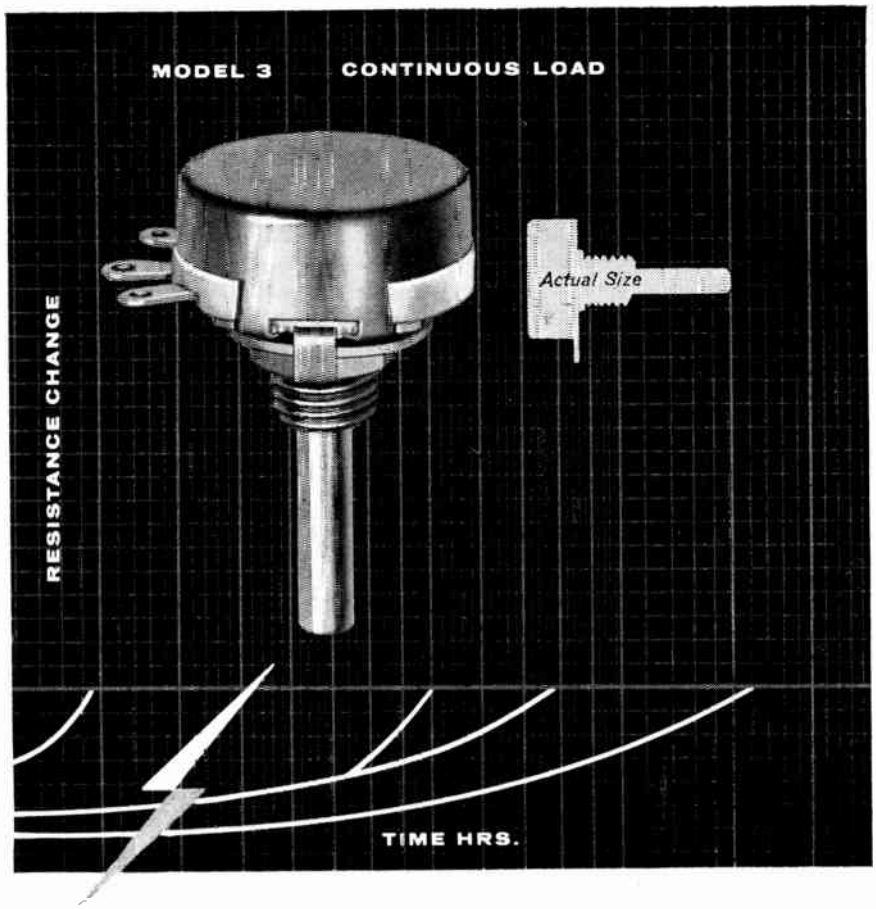


Small Size...
Big Wattage...
Ultra Quality
...at high temperatures

Typical watt-hour rating

Only 10% maximum when used at...

...1 watt for 1½ hours

...¾ watt for 35 hours

...½ watt for 80 hours

...⅓ watt for 300 hours

...¼ watt, continuous rating

Centralab Model 3 Radiohm®

An ultra-quality variable resistor — less than 11/16" in diameter—in a complete selection of values for all miniature applications, guided missiles, geophysical, telemetering, etc.

Designed for high operating temperatures (125° C.).

Closed-case construction permits sealing and potting.

Also available with sealed, locking bushing.

Technical Bulletin EP-63 gives complete engineering data. Write for it.

Centralab Canada Ltd.
804 Mt. Pleasant Rd, Toronto 12, Ontario

A DIVISION OF GLOBE-UNION INC.
964F East Keefe Avenue • Milwaukee 1, Wisconsin
In Canada: 804 Mt. Pleasant Road, Toronto, Ontario

8-1056

NEW PRODUCTS

(Continued from page 87)

● *Audio Tape Bulletin*

Item 1134

A new bulletin on "Type EP" Audiotape, Extra Precision magnetic recording tape for telemetering, electronic computers and other specialized applications, has recently been issued.

The folder lists the physical characteristics and magnetic properties of Type EP Audiotape which is made on a base material of cellulose acetate or Mylar polyester film. The publication also includes a price list of reels of various lengths, widths of tape, and thickness of base material.

Type EP Audiotape bulletin is available free.

● *Descriptive Booklet On Angular Position Encoders*

Item 1135

A comprehensive 8-page bulletin describing the new Baldwin 13-digit and 16-digit optical-type analog to digital angular position encoders is announced.

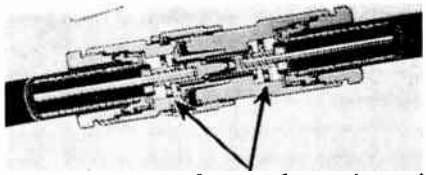
Well illustrated, the bulletin gives detailed information on the operation and construction of the two models and describes the manufacture of Baldwin binary and other type code disks. Encoder and code disk specifications are included.

Copies of the bulletin are obtainable.

● *New RF Connector Design*

Item 1136

An entirely new RF connector design has been announced. This design, for which Patent is pending, features a contact captivated within the connector shell for assured circuit continuity under great extremes of temperature fluctuation. Amphenol director of engineering, Dr. R. M. Soria, stated: "Captivated contact RF Connectors are designed to counteract the possible conditions of dimensional instability of cable dielectrics, particularly Teflon, under extremes of hot and cold. By anchoring the contact within the connector shell the contacts remain fixed in position even when the dielectric shrinks. A Plug, Panel Jack and Jack in both Series N and Series HN have been designed incorporating this captivated contact concept."



Cross-section of mated captivated contact RF connectors. Contacts remain in fixed position when extreme temperature changes may cause cable shrinkage.

● *Technical Data Booklet On Magnetic Tape* *Item 1137*

Important physical and magnetic properties of 12 "Scotch" brand magnetic tapes and films are covered in a new technical data booklet available upon request.

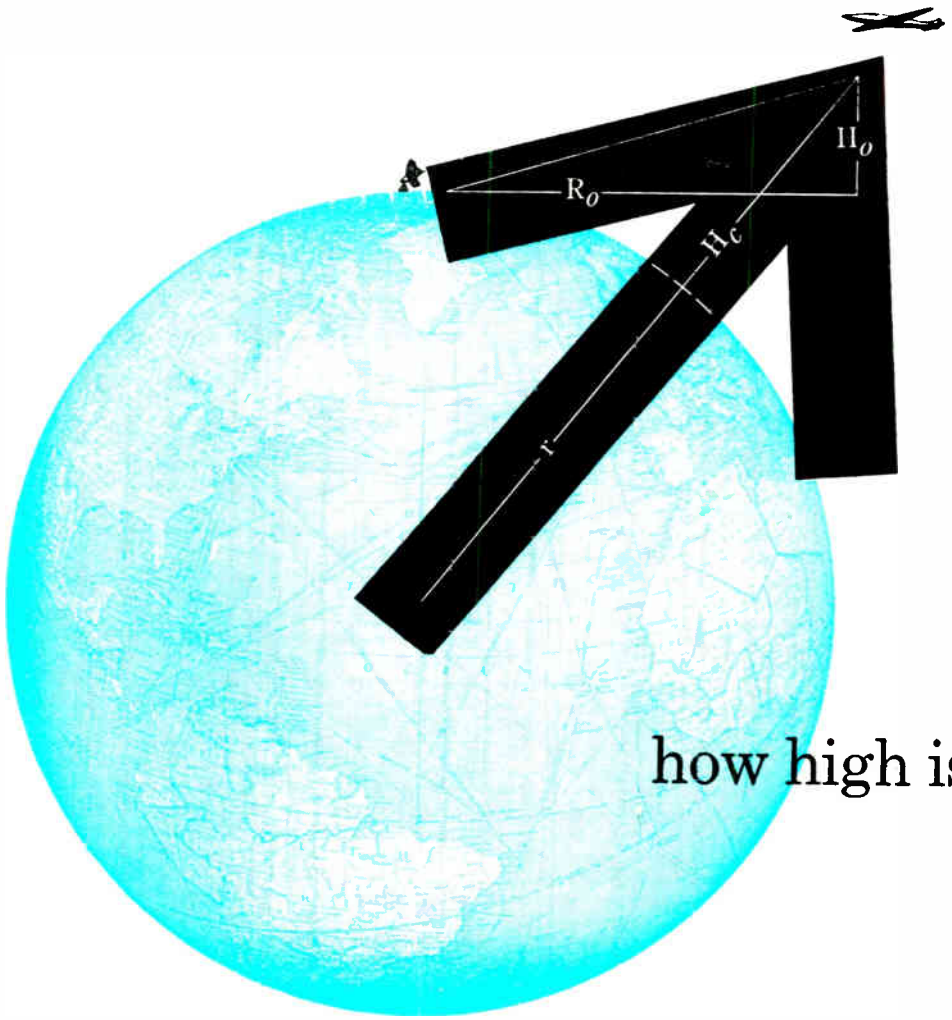
The 12-page booklet covers such physical properties as backing thickness, ultimate tensile strength, yield strength, elongation at break, residual elongation, tear and impact strength and coefficient of expansion.

Magnetic properties include coercivity, retentivity, coating thickness, erasure characteristics, bias current requirements, relative low frequency output and relative high and low frequency sensitivity.

Properties are listed for three acetate base tapes — "Scotch" brand magnetic tapes Nos. 111, 120 and 190 — and for three polyester base tapes — "Scotch" brand magnetic tapes Nos. 111 AM, 120 AM and 150. Both 1.5 mil and 1 mil backings are included.

For further data on advertised products use page 79.

World Radio History



how high is up?

A child's conundrum becomes a matter of life and death... when radar tells a lie. When our radar tracks attacking aircraft... or an incoming missile... the lives of all of us on target balance on the pinpoint of a mathematical riddle.

How high is up? It depends on the point-of-viewing.

Because of earth's curvature, radar sees an interloper... 100 miles away... 6600 feet lower than it really is. Readings must be corrected instantaneously before being fed to our interceptors... otherwise, attacker and defender play true or false at twice the speed of sound.

Electronic Engineering Company of California has designed an analog computer that makes this vital correction... converting radar observation into true altitude above sea level. The computer continuously solves the equation

$$H_c = H_o + (R_o^2 / 2r)$$

The mathematics are complex. The mechanism, with a two-gang HELIPOT• series A precision potentiometer at its heart, is beautifully simple. Both are fully described in a new application data sheet . . . write for Data File 607.

Helipot makes precision potentiometers... linear and non-linear... in the widest choice of sizes, mounting styles and resistances. Many models are stocked for immediate shipment... our engineers will gladly adapt standard models to your requirements... or design entirely new HELIPOT precision potentiometers for you.

Helipot *first in precision potentiometers*

Canadian Factory: No. 3 Six Points Rd., Toronto 18, Ont.
Sales Representative: R-O-R Associates, Ltd.
290 Lawrence Ave. West, Toronto 12, Ont.
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World Radio History

ENGINEERING PROGRESS

. . . IN *Every* DIRECTION

ASTRON CAPACITORS AND RF FILTERS . . .

are setting new *standards* in the most difficult electronic applications. Why? Because nothing is taken for granted. Astron design and production techniques are characterized by aggressive research and continuous re-examination. Carefully choosen materials are subjected to exacting quality controls.

These advanced-engineering practices have enabled Astron to consistently anticipate and meet the changing requirements of the industry.

SOME OUTSTANDING RESULTS ARE:

The first metallized paper plastic tubular — the Comet*, which for absolute environmental protection uses the patented sealing method that made the Astron Blue•Point® famous.

The Series "X" Mylar† Capacitor specially developed for reliable operation at extremes of temperatures while under the most difficult environmental conditions.

The new Astron ET electrolytic subminiatures save space and weight in printed circuits and transistorized applications.

The Astron RF Noise Suppression Filters are custom-engineered to meet your most exacting specifications.

Learn the complete story. Send for complete Engineering Data. Do it now!

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