

# *Northern Electric*

**who we are - what we do**



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## Front Cover

Technician inspecting a photographic pattern, used in the diffusion of semiconductor devices, before reduction to final mask size.



## who we are - what we do

Northern Electric Company Limited is Canada's largest manufacturer of telecommunications equipment and wires and cables. It employs some 18,000 people in six major manufacturing plants, research and development laboratories and 31 sales locations across Canada. Competent representatives travel six continents.

Northern Electric is a wholly-owned subsidiary of The Bell Telephone Company of Canada. Starting in 1882 as the manufacturing department of Bell of Canada, Northern passed through a number of intermediate stages before reaching its present corporate form in 1914.

Northern is a Canadian-owned company because 97% of the 195,000 shareholders of Bell of Canada live in Canada and own 93% of Bell's stock.

Total sales in 1963 were \$302,000,000. This compares with \$236,000,000 in 1959, an increase of 27 per cent in five years. In the last 18 years, manufacturing space has been quadrupled to meet the increase in product demand.

Today, after more than 50 years' leadership, Northern's name is identified with the highest quality in telecommunications equipment.

## the creative atmosphere

Continuous expansion has marked Northern's Research and Development Laboratories ever since they were founded on a 75-acre site just west of Ottawa. Initially composed of one administration and one laboratory building, the laboratories will eventually include four buildings, the third of which is scheduled for completion in 1965 and will more than double the existing laboratory space.

In the creative atmosphere of the laboratories, top ranking scientists, engineers and technicians design and develop new products to meet specific Canadian or overseas conditions not adequately catered to by present designs. Research is carried out in electronic circuitry, microminiaturization, solid state physics, ferrites and other equally advanced fields.

There is a continuous two-way flow of information maintained between the laboratories and the manufacturing divisions in order to ensure that new products and systems will be manufactured to the highest quality standards and at a cost acceptable to customers.



### RESEARCH AND DEVELOPMENT LABORATORIES

Floor space 100,000 square feet  
Total employees 625  
Engineers and technicians 365





Test equipment used for research is the most advanced available.



Through this electron microscope, the structure of elements can be studied at 25,000 times their actual size.



Model of a precision satellite tracking antenna designed for the Defense Research Telecommunications Board of the Federal Government.



## craftsmanship and quality

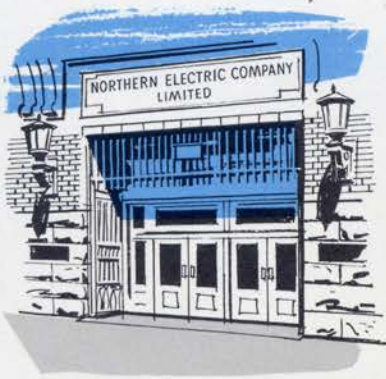
The establishment of Montreal Works in 1915 was an important event in the history of Northern Electric. In its early days a tradition of craftsmanship and high quality was established. The telecommunications equipment manufactured in Montreal Works proved its continuing worth and reliability, and played an important role in the development and growth of Canada.

Montreal Works has been the birthplace of ideas and plans leading to the building of new Northern Electric factories in other communities. It has provided and still continues to provide a nucleus of skilled craftsmen, technicians, engineers and management people necessary to the successful operation of new plants.

Montreal Works is also the birthplace of products and systems which were originated only recently; these include time division multiplexing, pulse code modulation, electronic switching, high speed data transmission and solid state microwave techniques.

These new systems incorporate modern "hardware" or components such as semiconductors, ferrites, printed circuitry and miniature components, many of which are manufactured here.

The tradition of high quality and technical competence at Montreal Works, established so long ago, is still very much alive as this plant continues to play a vital part in producing Canada's telecommunications requirements.



### MONTREAL WORKS

Floor space 1,000,000 square feet

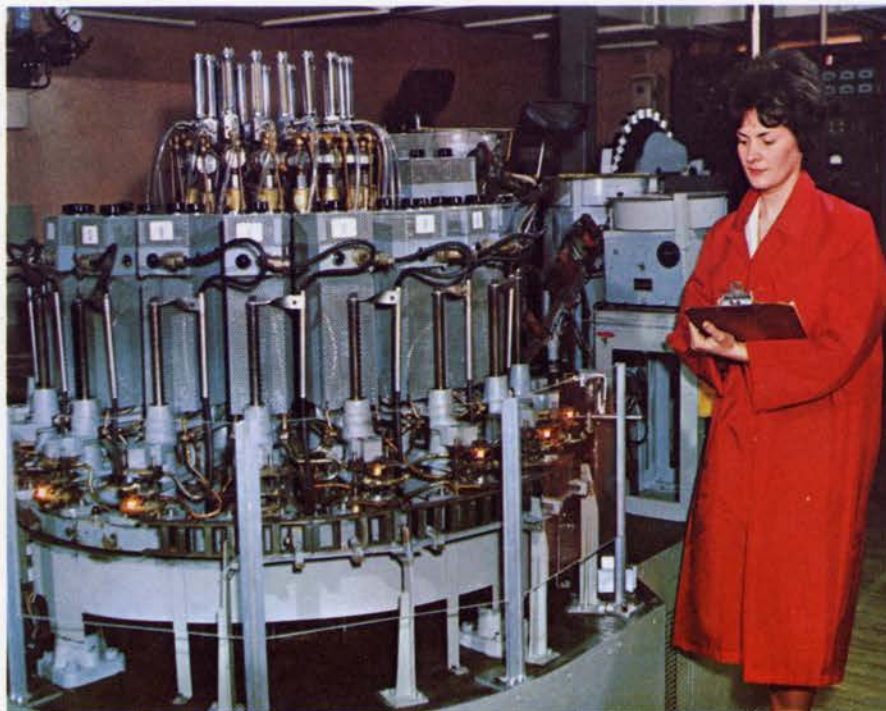
Total employees 6,135

Engineers and technicians 733

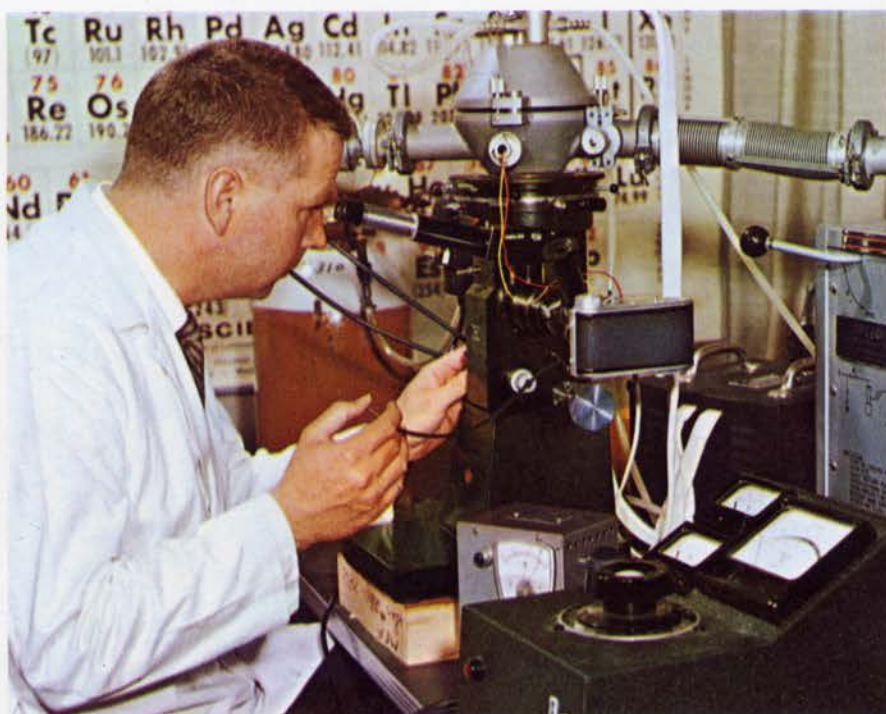




Technician supervises production of dry reed switches.



Transistor components are examined under a vacutherm microscope.





## quality assurance

At Lachine Works, Northern produces wires and cables to serve the telecommunications and power needs of Canada and the export market.

In a year 80 million pounds of raw materials including copper, aluminum, lead, paper, rubber and plastics are processed into 5000 different types of wires and cables.

As "steel men" are developed through years of experience with red hot metal so "cable men" are developed by years of experience with the massive machinery which produces wires and cables. Many of the people in the Cable Division have spent all their working lives in this demanding and challenging work. The combination of skilled men, modern machines and the very latest in testing procedures is assurance that the blue reels with the N.E. trademark carry wires and cables that are the best that can be made.



### LACHINE WORKS

Floor space 977,977 square feet

Total employees 1,833

Engineers and technicians 158





The ends of a plastic-insulated cable are bound before removal from the strander.



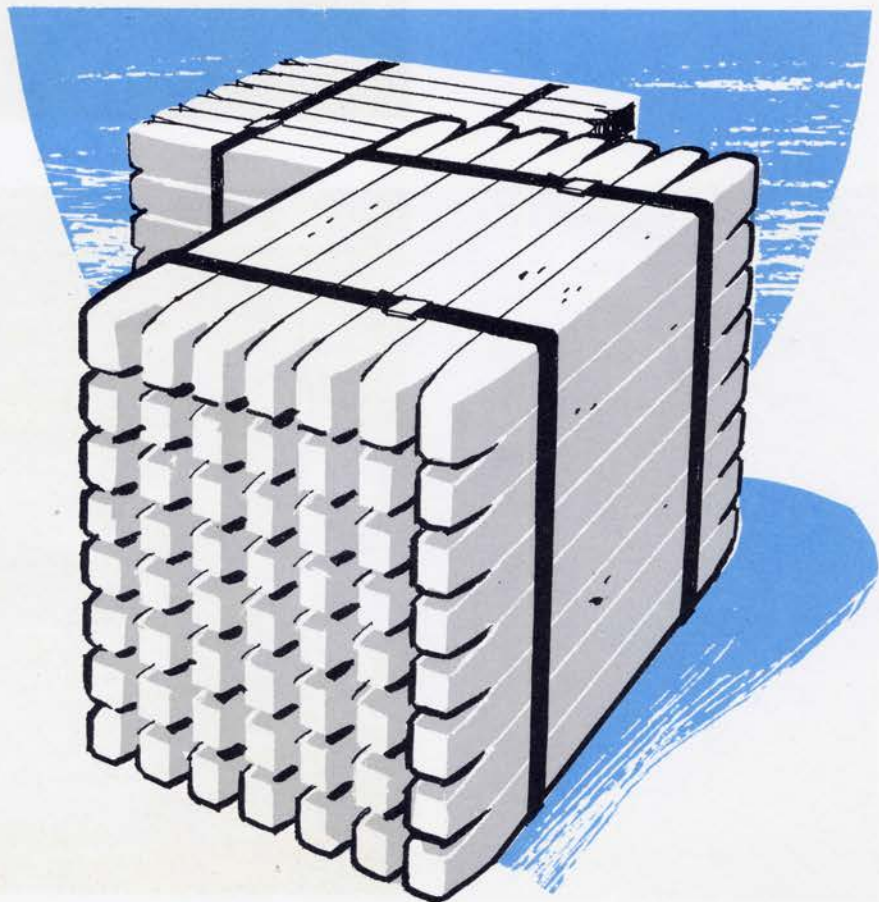
Partial view of the most completely equipped laboratory in the Canadian wire and cable industry.



## from bar to coil

The new Copper Rod Rolling Mill, adjacent to the Lachine Works, is a good example of the up-to-date production methods used by Northern Electric to keep prices at a competitive level. It is one of the few copper rod rolling mills in the world with induction heating, automatic continuous rolling and automatic spray pickling in one continuous line.

Copper wire bars 54 inches long and weighing 265 pounds are heated in low-frequency induction furnaces and then rolled into 900-foot coils of 5/16 inch copper rod in just over 90 seconds. The entire mill is controlled from a central position and the only operations performed by hand are the loading of the bars on the input conveyor and the pre-welding of the coils at the finish. The mill produces 15 miles of rod per hour, or at a rate of 1,200 miles of rod per week.

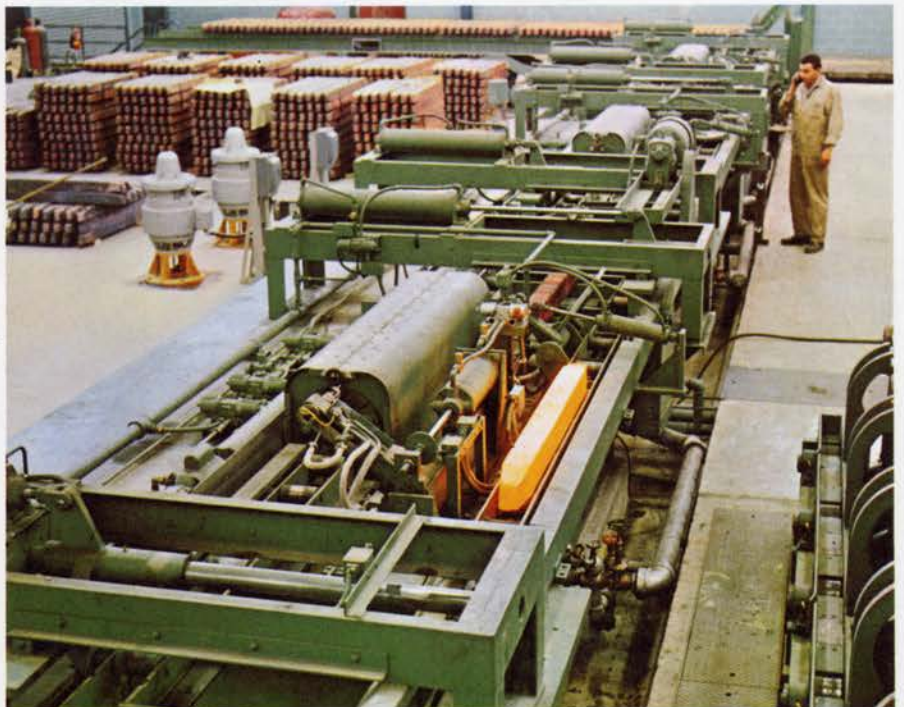




All operations in the Rod Mill are controlled by one man located in the control room projecting from the balcony at the upper right.



Two minutes in the low-frequency heating furnace brings a copper bar to 1750 degrees Fahrenheit.





## complex electronic products

At the Belleville Works, Northern Electric builds TV studio routing equipment, airborne navigational gear both for the Canadian armed forces and for export, tropospheric scatter radio equipment and many other highly complex electronic systems.

The manufacture of these products requires skilled engineers and versatile production workers, as well as a high degree of employee involvement in the work process. The individual worker is frequently responsible for a complete production unit. He takes pride in this responsibility. Inspection procedures are so thorough that one in every five employees is responsible for some phase of testing.



### BELLEVILLE WORKS

Floor space 225,750 square feet

Total staff 875

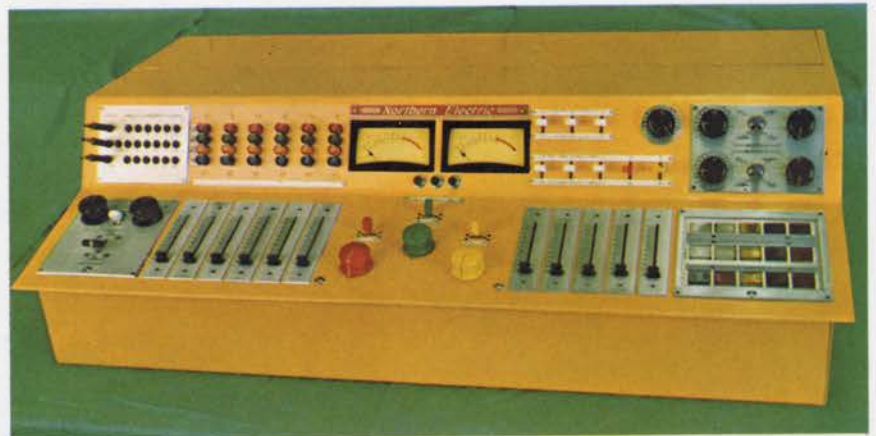
Engineers and technicians 124







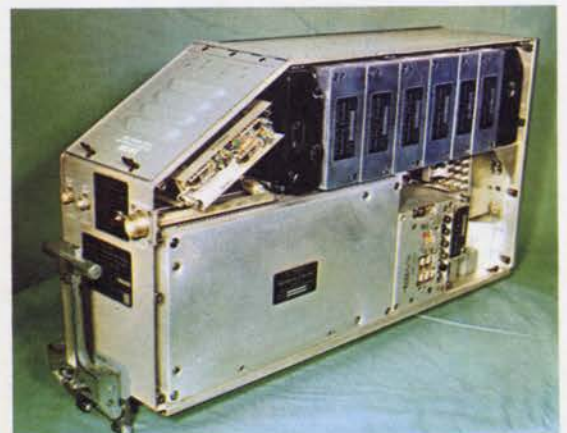
Wave Guide Assemblies used in the Parametric Amplifier.



Speech Input Equipment for Television Studios.



Semi-actuated Traffic Controller.



TACAN Transmitter-Receiver unit used in the CF-104 Reconnaissance Bomber.

## telephone instruments

The output of London Works exceeds \$30,000,000 a year. Half of this is composed of telephone instruments, of which London produces 700,000 a year of five hundred different types. The balance includes telephone booths, cable terminating and protection equipment.

Some six hundred suppliers provide the raw materials or components from which London's products are made. London Works buys coal in tons and crushes it to make the carbon used in telephone transmitters; gold in ounces to coat the electrical contacts which are a part of every telephone; plastics in many types and colours to mould into components and housings for telephone sets.



### LONDON WORKS

Floor space 375,000 square feet

Total employees 1,759

Engineers and technicians 118



More than 2½ million telephone cords are made each year.



Telephone set dials receive final adjustment.



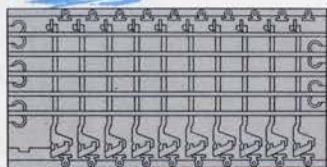


## crossbar switching

In the early days of the telephone industry all switching was done manually by means of plugs and jacks in a telephone exchange. As telephones in hundreds, thousands and tens of thousands were added to the telephone network, "switching" became a very complicated process.

Today Northern Electric's modern method of providing automatic telephone switching makes use of equipment called "crossbar". Crossbar switching makes direct distance dialing possible by storing and analysing the number dialed, using it and re-using it until the connection is made.

In 1963 Toronto Works manufactured crossbar switching equipment for 200,000 new telephone lines. This switching equipment used 3,000 tons of material made up of 14,500 different items, including 250 million feet of insulated wire, one million miles of enamelled copper wire for the manufacture of coils (this is sufficient to extend from earth to moon and return twice) and 24 million screws of various sizes. 130,000 contacts of precious metal were welded and 60 million wired connections were made.



### TORONTO WORKS

Floor space 490,000 square feet  
 Total employees 1,785  
 Engineers and technicians 191





In the middle background operators wind coils which are assembled into dry reed relays by the operators in the foreground.

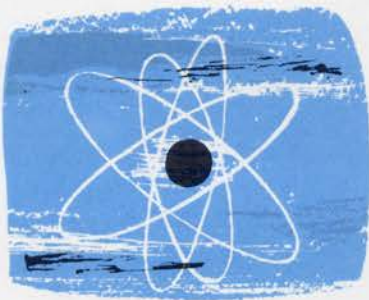


Crossbar components including switches, wired units and multi-contact relays, all made at Toronto Works, are mounted on frameworks.



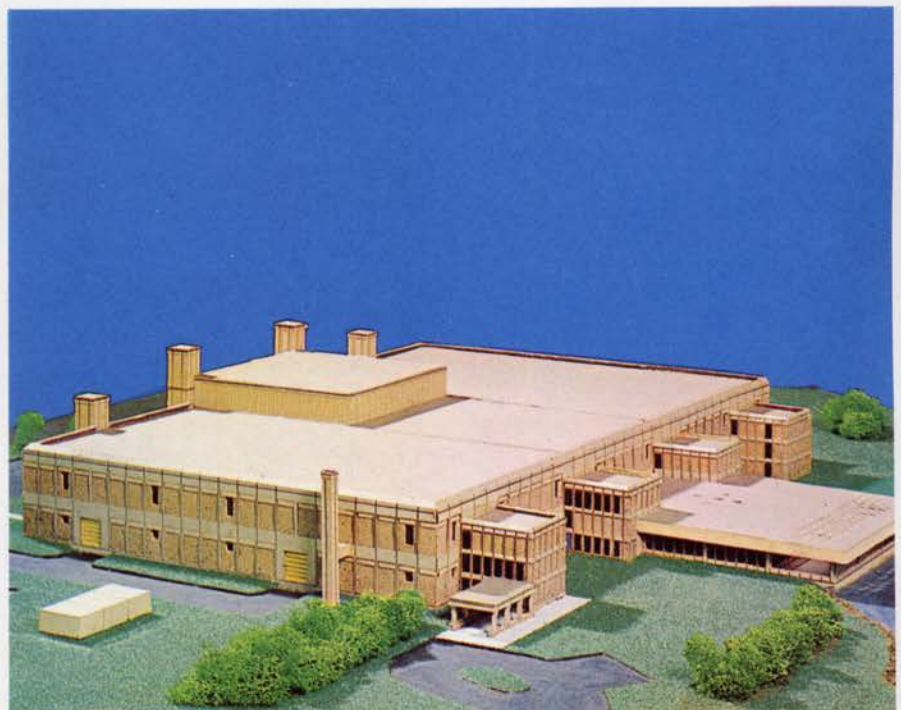
## building for the future

Northern Electric's Advanced Devices Centre is scheduled to open in the summer of 1965. Many kinds of modern devices now produced by the Company in several locations will be manufactured under one roof. Here, such solid state devices as transistors, thin film and other micro-electronic components will be made in an environment rigorously controlled with respect to temperature, humidity and cleanliness. Modern test facilities and quality control methods will ensure that products meet the most exacting parameters. Reliability controls will make predictions of life performance possible. Designed for rapid expansion, the Advanced Devices Centre is located less than a mile from Northern Electric's Research and Development Laboratories, thus facilitating close co-ordination between research and production engineering groups. From initial design concept to final product development on new devices, no time will be lost.



### ADVANCED DEVICES CENTRE

Floor space 175,000 square feet  
Planned for a staff of 400



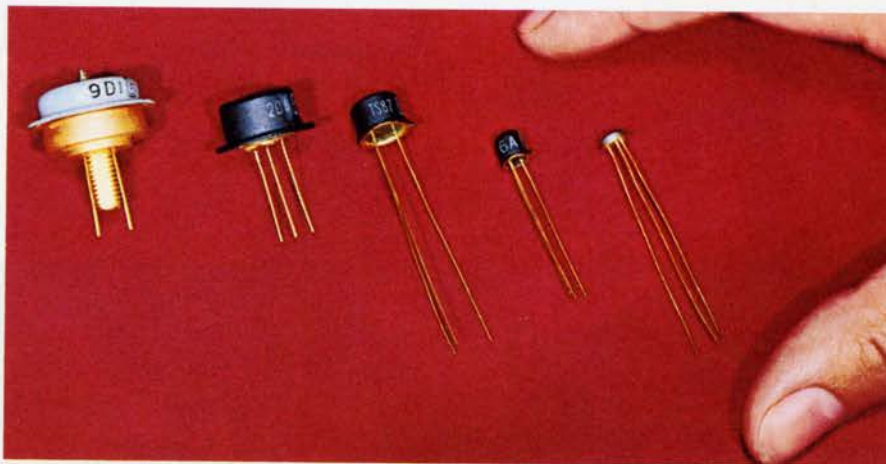


Typical examples of the device families  
which will be produced at the Advanced  
Devices Centre.

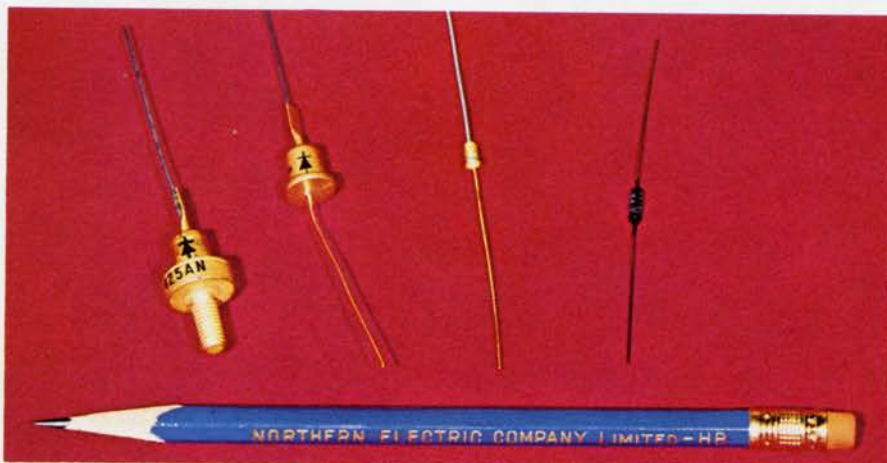
#### Varistors



#### Transistors



#### Diodes



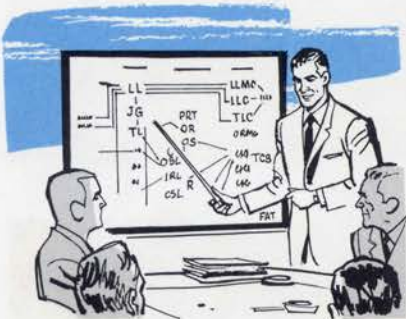
# systems engineering

The Systems Engineering Department is responsible for engineering telecommunications systems to meet the specific needs of customers with widely varying requirements. Systems Engineering originates the complex drawings and specifications required by the manufacturing and installation groups as well as customers.

The evolution of a system starts with the Systems Engineer. He is the overall architect and designer.

It is the responsibility of the Systems Engineer to examine the customer's facilities, to determine what existing features there are and what new features have to be added. It is his responsibility to devise a plan for a complete working system which will meet the customer's specifications and which can be produced at a competitive price.

Systems Engineers work closely with customers in interpreting requirements and recommending the most suitable and economical system to meet particular needs. Systems Engineers also collaborate with Research and Development Engineers to anticipate the customer's needs to ensure that the latest technological advances are incorporated in dependable telecommunications systems at minimum cost.



Engineers work on a prototype SA-1 Crossbar office.





## the training centre

The rapid rate of technological advancement in the telecommunications industry makes it imperative for Northern Electric to keep employees abreast of the latest scientific developments.

As telecommunications products increase in complexity new demands are placed on the engineers responsible for design and manufacture. The Training Centre in Montreal helps the engineer master new skills so that he can increase his individual contribution in areas marked by constant change.

A total of forty-six courses is now available at the Training Centre. These range from an introductory course on drafting to courses in mechanical design, second-generation semiconductors and advanced switching theory. Some of the courses given here are also available at other Company locations. The Training Centre has been attended by engineers from many Canadian telecommunications companies, as well as from overseas.



Engineers taking a course on telephone transmission theory.



Northern Electric's customers include power utilities, industrials, government departments, electrical contractors and, of course, telecommunications utilities. There are some 2,500 separate telephone systems in Canada. The Bell Telephone Company of Canada, the largest of these and owner of Northern Electric, serves close to four million of the country's 6½ million telephones. The smallest operates a single telephone. In between, the systems range in size from rural cooperatives serving a handful of customers to large provincially and privately-owned systems.

Many of these companies have been customers of Northern Electric for half a century. Northern Electric is in constant touch with its customers offering engineering advice as well as the equipment and supplies required for the construction and maintenance of their systems. The Company is always ready to provide technical service to assist customers in the selection of the most suitable and economical type of electrical and power equipment.

Northern Electric also acts as distributor for several hundred other Canadian manufacturers, thus providing customers with a complete service. Products distributed include: power apparatus; illumination equipment; wiring materials; equipment for the overhead and underground transmission of communications and electrical power and also acoustic materials. There are distribution centres in 31 key locations from the Atlantic to the Pacific.



YUKON

NORTHWEST  
TERRITORIES

BRITISH COLUMBIA



ALBERTA



SASKATCHEWAN



MANITOBA



ONTARIO



QUEBEC



NEW BRUNSWICK

PRINCE EDWARD  
ISLAND

NOVA SCOTIA



NEWFOUNDLAND



Northern Electric has employees fluent in these languages.

Afrikaans  
 Arabic  
 Bengali  
 Bulgarian  
 Cantonese  
 Chinese  
 Croatian  
 Czechoslovakian  
 Damil  
 Danish  
 Dutch  
 English  
 Estonian  
 Finnish  
 Flemish  
 French  
 Gaelic  
 German  
 Greek  
 Gujariti  
 Hebrew  
 Hindi  
 Hungarian  
 Indonesian  
 Italian  
 Japanese  
 Javanese  
 Kannada  
 Kanarese  
 Latvian  
 Lithuanian  
 Malayan  
 Mandarin  
 Marathi  
 Moroccan  
 Norwegian  
 Polish  
 Portuguese  
 Punjabi  
 Roumanian  
 Russian  
 Sindhi  
 Slovak  
 Spanish  
 Tamil  
 Turkish  
 Ukranian  
 Urdu  
 Yiddish  
 Yugoslav

Northern Electric scientists and engineers have learned to solve a wide range of communication and power problems as a result of Canada's peculiar geography. The ingenuity and innovative quality of Canadian scientists can well be used to solve similar problems in other lands.

Few countries have such extreme temperature conditions, ranging from a tropical 90° Fahrenheit in some parts of Canada in the summer, to lows of 30° to 40° below zero Fahrenheit in winter. Although nearly half of Canada's population lives in large urban centres, there are numerous small rural communities separated from one another by hundreds and sometimes thousands of miles. Whether large or small, highly advanced or less developed, in the tropical heat of summer or the arctic cold of winter, these communities must be serviced by systems that are both dependable and completely compatible. Company representatives are showing customers in many parts of the world how Northern Electric equipment can best meet their communications and power needs. Because of its long leadership in the field and of the international experience of its highly-trained engineers Northern Electric can be of service to any telecommunications or power customer, whatever his size, whatever his location.



## warehouse facilities

Modern warehouse facilities help provide fast and efficient service.



Distributing Warehouse in Vancouver, British Columbia.





## installation

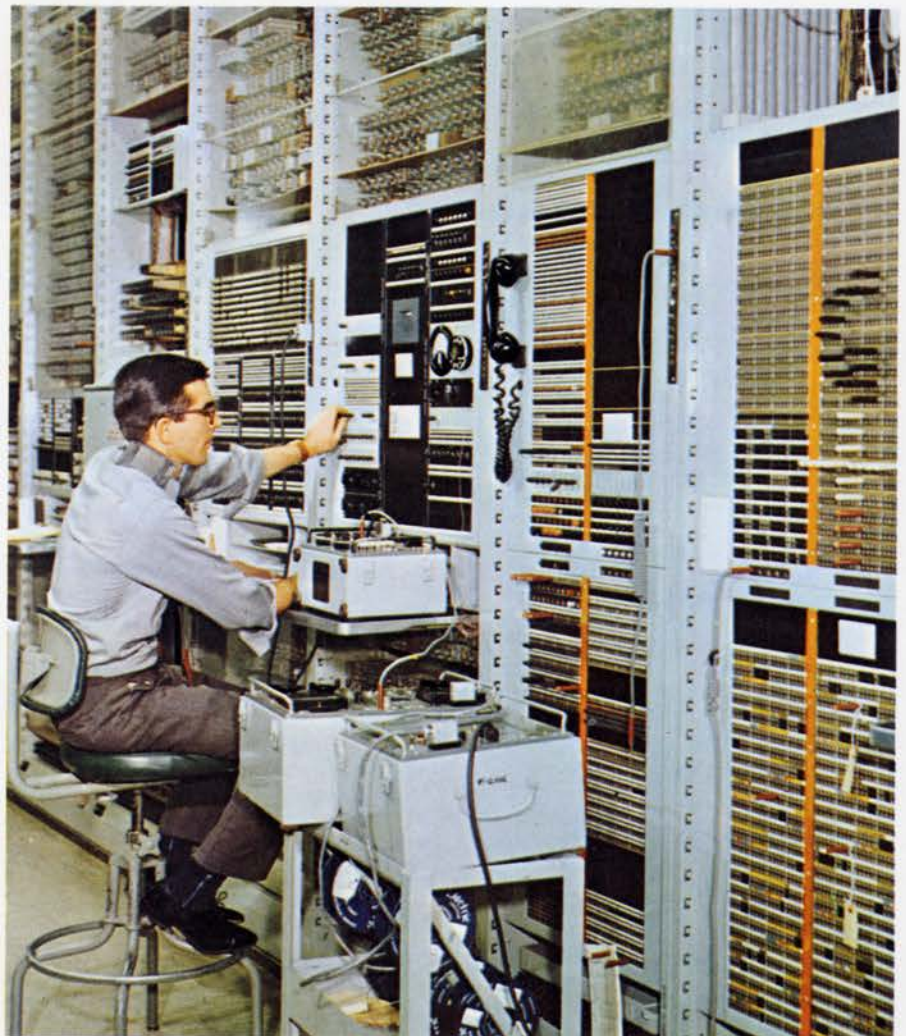
Northern's Installation Department offers customers a wide range of services associated with the installation of telecommunications equipment and wire and cable.

Ground preparation, choice and erection of buildings, pole lines and antennae, installation of buried cables, with all the attendant work and responsibility for engineering, procurement, marshalling, logistics, security, inspection, prove-in, line-up, shakedown tests, followed by maintenance and instruction of customers' personnel are among the services offered.

The Installation Department, with 1500 employees meets high quality standards. It is competent to plan and direct operations and has a strong field organization with a large number of seasoned men of proven reliability.



Installer testing Centrex equipment from the Master Test Frame.



# wires and cables

## ARMoured CABLES

### Interlocking:

Galvanized steel, Aluminum or Copper

### Double tape:

Galvanized or ungalvanized steel or Aluminum

### Single wire:

Galvanized steel or Aluminum Alloy

### Double wire:

Galvanized steel or Aluminum Alloy

### Basket Weave:

Galvanized steel, Bronze or Aluminum

## BARE WIRES & CABLES

Aluminum

Alumoweld

Bronze

Cadmium Copper

Copper

Copper Covered Steel

Galvanized Steel Strand

## BUILDING WIRES AND CABLES

Flame-seal types TW, TWU, TWH, TW Minus 40°F, TWU Minus 40°F, TW Nylon, TWU Nylon

Non-Metallic Sheathed Cable

NMD-3 (Norel-x)

NMW-10 (Norel-XPW)

Flexible Armoured Cable

(Norel) AC, ACH

Flexible Armoured Lead Sheathed Cable

(Norel) AC, ACHL

R75 (Norheat)

R60 (Nordamp)

RW60 and R75 (Norall)

RW75, R90, RW75 and R90

RWU60, RWU75

## CABLE LEADS-FOR:

Batteries

Dynamos

Electric signs

Furnaces

Motors and coils

Transformers

## CONTROL CABLES

Thermoplastic insulated

Rubber insulated

## CORROSION PROTECTION

Norprene Tape Protection (NTP)

Norprene Protection (NP)

Polyvinyl Protection (PVCP)

Polyethylene Protection (PEP)

Jute Protection (JP)

## CUSTOM BUILT CABLES

To customers' requirements or specifications

## MAGNET WIRE

## MINE CABLES

Bore-Hole Cables with Head Servings

Mine Lamp

Mine Shaft

Mine Signal

"Pyrotenax" M.I. Cables

Teck Cables

Trailing Cables

## MISCELLANEOUS COMMUNICATION WIRES AND CABLES

Annunciator

Antenna

Audio Frequency

Dictaphone

Hotel Radio

Microphone

Outdoor theatre

Radio

Television Cables

Coaxial

Composite Video Pair

## MISCELLANEOUS DISTRIBUTION CABLES

Aerial Spacer Systems

Airport Lighting

Network

Neutral Supported Wire

Pre-assembled Aerial

Service (Triplex)

Service Entrance

Street Lighting

## PORTABLE AND TRAILING CORDS AND CABLES

Cradle Center Mining Cable

Dredge Cable

Flexible Cords

Portable, Types W, G, SH-A, -B, -C, -D

Cab Tire, Types S, SJ, SO, SJO,

Power Supply

SW, SWO, SG, SGO

Welding—Electrode Holder or Extension Lead



**POWER CABLES**

Gas Filled  
 Gas Filled Pipe  
 Hollow Core Oil Filled  
 Oil Filled Pipe  
 Paper Insulated  
 Rubber Insulated  
 Submarine  
 Thermoplastic Insulated  
 Varnished Cambric Insulated

**TRANSMISSION LINE****CABLES**

ACSR  
 Aluminum  
 Alumoweld  
 Copper  
 Copper Covered Steel  
 I-Beam Core

**SIGNAL CABLES**

Fire Alarm  
 Nurses' Call Systems  
 Police  
 Railway  
 Traffic

**SUNDRY WIRES AND CABLES**

Asbestos Covered  
 Equipment Wire  
 Fixture  
 Locomotive Headlight  
 Railway Car Wiring  
 Seismograph  
 Shot Firing  
 Stove  
 Thermocouple Extension Cable  
 Thermostat Control  
 Water Heater Cable

**TELEPHONE CABLES**

Armour and Protection  
 Aerial Tape  
 Buried Tape  
 Gopher Tape  
 Light Wire  
 Single Wire  
 Double Wire  
 Jute  
 Exchange-Paired Cable  
 Polyethylene Insulated  
 Paper Insulated  
 Inside Wiring  
 PVC Insulated  
 Interphone  
 PVC Insulated  
 Sheaths  
 Alpeth  
 Lead  
 Lepeth

PAP  
 PASP  
 Polyethylene Jacket  
 Stalpeth  
 Stalplast  
 Stub  
 Paper Insulated  
 PVC Insulated  
 Textile Insulated  
 Submarine  
 Paper Insulated  
 Polyethylene Insulated  
 Switchboard  
 PVC Insulated  
 Textile Insulated  
 Terminating  
 Textile Insulated  
 Dual PE-PVC Insulated  
 Toll-Paired Cables  
 Polyethylene Insulated  
 Toll-Quadded Cables  
 Paper Insulated  
 Toll Entrance  
 Paper Insulated  
 Polyethylene Insulated  
 Multiple Coaxial

**TELEPHONE CORDS AND CORDAGE**

Desk Stand  
 Handset  
 Switchboard

**TELEPHONE WIRES**

Bridle Wire  
 Buried Service Wire  
 Cross-connecting Wire  
 Distributing Frame Wire  
 Drop Wire  
 Ground Wire  
 Inside Wire  
 Line Wire  
 Multiple Drop Wire  
 Office Wire  
 Rural Wire  
 Station Wire  
 Storm Wire  
 Switchboard  
 Tree Wire  
 Underground Wire  
 Urban Wire

**WEATHER RESISTING WIRES AND CABLES**

Aluminum  
 Copper  
 Copper Covered Steel  
 Norprene Covered  
 Polyethylene Covered  
 Polyvinyl Chloride Covered

**ALARM SYSTEMS****AMPLIFIERS**

Baseband  
Bridging  
Carrier Frequency  
Clamper  
Microwave  
Parametric  
Voice

**ATTENUATORS****BELLS & BUZZERS****BLOCKS**

Connecting  
Fuse  
Protector  
Terminal

**BOXES**

Battery  
Cable Terminal

**BRIDGES**

Capacitance  
4-Way 4-Wire

**CABLE RACKS****CAPACITORS**

Mica  
Mylar  
Paper

**CARRIER EQUIPMENT**

Cable  
Open Wire  
Radio Frequency  
Trunk  
Voice Frequency Telegraph

**CASES**

Apparatus  
Loading

**COILS**

Heat  
Induction  
Loading  
Repeating  
Retardation  
Toroidal

**COIN COLLECTORS  
(PAYSTATIONS)**

Prepay  
Postpay  
Semi-Postpay

**CONNECTORS**

Coaxial Cable  
Waveguide

**CONNECTOR CABLES****CORDS**

Dial  
Handset  
Miscellaneous  
Operators  
Patching  
Receiver  
Switchboard  
Telephone  
Transmitter

**CRYSTALS**

Quartz

**DIALS**

Push Button  
Rotary

**DIODES**

Germanium  
Silicon  
Zener

**DISTRIBUTING FRAMES**

Combined (C.D.F.)  
Intermediate (I.D.F.)  
Main (M.D.F.)

**DISTRIBUTING RINGS****EQUALIZERS****FERRITES****FILTERS**

Blocking (Carrier)  
Bridging  
Line  
Low Pass, High Pass and Band Pass  
Radio Interference  
Separation (Microwave)  
Telephone Set  
Waveguide

**FUSES**

Indicator Alarm Type  
Non-Alarm Type  
Tubular

**GAUGES**

Limit  
Non-Magnetic Type  
Spiral Spring Tension  
Spring Checking  
Thickness Gauge Nest  
(Check Armature Air Cap)

**GENERATORS**

Hand (Magneto Telephone)  
Microwave

**HAND SET****HEAD TELEPHONE SETS****INDUCTORS****INTERPHONE SYSTEMS**

Apartment  
Business  
Farm  
Home  
Nurse (Hospital)

**JACKS**

Both individual and shop mounted to  
meet all requirements

**JACK MOUNTINGS****JACKS AND SIGNALS  
COMBINED****KEYS**

Locking and Non-Locking Type  
Push Button  
Subscribers' Station  
Universal Type

**KEY TELEPHONE SYSTEMS****LAMPS**

Key Telephones  
Switchboard



**LAMP CAPS****LAMP SOCKETS AND LAMP  
SOCKET MOUNTINGS****NETWORKS****PLUGS**

Dummy  
Miscellaneous  
Operator's  
Portable Telephone Plug  
Signal  
Switchboard

**POWER PLANTS**

Various Ranges for Telephone, Carrier,  
Microwave, Scatter and Key Telephone  
Systems

**PRIVATE AUTOMATIC BRANCH  
EXCHANGES (P.A.B.X.)****PRIVATE AUTOMATIC  
EXCHANGES (P.A.X.)****PRIVATE BRANCH EXCHANGES  
(P.B.X.)****PROTECTORS**

Line  
Station

**PROTECTOR MOUNTINGS****RECEIVERS****RELAYS**

General Purposes (All Types)  
Mercury Contact  
Miniature  
Polarized  
Signal  
Thermal  
Wire Spring

**RELAY RACKS****REPEATERS**

Plug-In (Miniature)  
Single Line  
Telegraph  
Telephone  
Voice Frequency

**RESISTANCES**

Carbon Deposit  
Wire Wound

**RINGERS**

Bell Chime  
Telephone

**SEMI-CONDUCTORS**

Diodes  
Transistors

**SIGNALLING SYSTEMS****SWITCHES**

Crossbar  
Rotary  
Step-by-Step  
Telephone

**TELEPHONE BOOTHS****TELECOMMUNICATIONS  
SYSTEMS**

Carrier for Long and Short Haul  
Crossbar Telephone Exchanges  
Data Transmission  
Dial Telephone Exchanges  
Emergency Reporting  
Microwave Radio Relay for Long and  
Short Haul  
Radio Telephone  
Scatter  
Teletype

**TELEPHONE EXCHANGES  
(AUTOMATIC)**

Branch Automatic (Attended)  
Private Automatic (Non-Attended)  
Small and Large Crossbar Central  
Offices  
Small and Large Dial Central Offices

**TELEPHONE EXCHANGES  
(SWITCHBOARDS)**

Common Battery  
Console (Cordless)  
Cord, Multiple  
Cord, Non-Multiple (Magneto,  
Common Battery)  
Cord, Universal

**TELEPHONE LOUDSPEAKERS****TELEPHONE SETS**

\*Call Director  
\*Dial  
For Noisy Locations  
Hard of Hearing  
\*Local Battery Talking  
\*Magneto  
\*Manual Common Battery  
Mine  
Police  
Portable  
\*Princess  
Taxi

\*Obtainable in Various Colours

**TELEPHONE TABLES AND  
SHELVES****TELEPHONE TRANSMITTERS  
(CARBON)****TELETYPE EQUIPMENT****TERMINALS**

Building Cable  
Cable  
Combined Telephone and Power  
Pedestal  
Telephone Pedestal  
Wire

**TEST SETS****THERMISTORS****TOOLS**

Miscellaneous for Telephone  
Maintenance

**TRANSFORMERS**

Auto  
Input  
Output

**TRANSISTORS**

Double Diffused Silicon Planar

**TUBES, ELECTRON****VARISTORS**

## FIRE ALARM SYSTEMS

Northern Electric Company specializes in municipal fire box systems. Many years of experience gained in this field enables the municipalities to rely on Northern Electric sales personnel for service. We also provide training courses in Fire Alarm Systems for customers' maintenance groups.

### Control Units

- Municipal Fire Alarm Central Office Control Units
- Municipal Police Signal Control Units
- Industrial and Institutional Fire Alarm Control Units
- Industrial and Institutional Fire and Security Control Units

### Fire Alarm Boxes

- Municipal Fire Alarm Boxes
- Industrial and Institutional Fire Alarm Boxes
- Municipal Police Boxes
- Industrial and Institutional Fire and Security Boxes

### Recording and Alarm Apparatus

- Punch and Print Recording Units for Fire Alarm and Police Signal Systems
- Single Stroke Gongs
- Vibrating Gongs
- Compressed Air Diaphone Plants

## SOUND SYSTEMS EQUIPMENT

We supply a complete range of speech input equipment. Acoustic layouts for auditoriums, broadcasting studios and recording studios form a major part of the services offered.

- Microphones
- Amplifiers
- Intercommunication Telephones
- Loud Speaking Intercoms
- Speech Input Consoles
- Equipment Racks
- Impedance Transformers
- Volume Indicators
- Monitoring Equipment
- Program Transmission Panels
- Pre-Amplifiers
- Program Sound Bays

## TELEVISION AND BROADCAST EQUIPMENT

Northern Electric offers many years of experience in the broadcast industry, and through a detailed program of research and development continues to offer equipment of a quality demanded by this industry—package radio and television stations to meet the requirements of any community and any budget.

- Speech Input Consoles
- Microphones
- Electron Tubes
- Rectifiers
- Broadcast Monitoring Equipment
- Turntable Assemblies
- Sound Systems
- Remote Mobile Equipment
- Package Control Rooms
- Master Control Centres
- Video Monitors

## TRAFFIC SIGNAL SYSTEMS

Traffic equipment, ranging from isolated intersections on a highway to programmed traffic movements throughout a metropolitan grid system, is available from Northern Electric. Our field staff is composed of factory trained personnel. We also provide training courses in Traffic Control systems for customers' maintenance groups.

### Controllers

- Non-actuated Controllers
- Semi-actuated Controllers
- Full-actuated Controllers
- Computer type Master Controllers
- Pedestrian Controllers

### Detectors

- Magnetic Type Vehicle Detectors
- Radar Type Vehicle Detectors
- Pressure Type Vehicle Detectors
- Pedestrian Push Buttons

### Signals

- 8" and 12" Signal Heads
- Signal Fittings for pole and pedestal mounting



If any further information is required about this Company or about any of the products referred to in this booklet, please address your enquiry to a branch office or to the Public Relations Department, Northern Electric Company, Limited, P. O. Box 6123, Montreal, Que.

