

BULLETIN SF-263

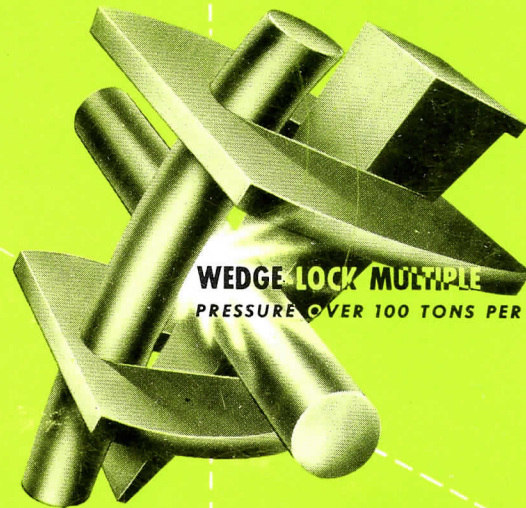
advanced design

WEDGE-LOCK MULTIPLE

"POSITION THEN LOCK" JACKS

COMMON CONTROL

LIFE-TIME CONTACTS



WEDGE LOCK MULTIPLE
PRESSURE OVER 100 TONS PER SQ. INCH!

NORTH all-relay MCXR

DIAL AUTOMATIC SWITCHBOARDS

THE NORTH ELECTRIC MANUFACTURING CO., GALION, OHIO, U.S.A.

MCXR...

For more than 40 years we have concentrated our manufacturing and research facilities on automatic switching systems.

Over the past 25 years The North Electric Manufacturing Company's "All-Relay" system has become recognized as the finest dial automatic equipment for operating economy, freedom from maintenance and reliability.

With this bulletin, we are introducing an "All-Relay" system of advanced design, the MCXR.

The MCXR was designed for telephone men—by telephone men. Their objectives were simple:

I. To continue the time proven, dependable, maintenance-free characteristics of the "All-Relay" system.

II. To build an "All-Relay" system which provides the ultimate in convenience to the telephone man—ease of making additions, low space requirements, economy of operation, economy and speed of installation.

III. To reduce costs where costs can be reduced without sacrifice of quality or without impairment of service to the subscriber.

In the following pages you will see what we have done and how we did it.

... gives you these advantages

FLEXIBILITY

A relay system in which lines and links are fully jack-mounted, lines and/or links can be added in a matter of minutes.

INTERCHANGEABILITY

Line-finders are completely interchangeable with one another. They may be moved from position to position on the same bay, to other bays or to other exchanges. The same interchangeability applies to selectors, connectors and lines.

If seasonal traffic conditions are such as to impose changing loads, line-finders, selectors, connectors and lines may be moved to follow the load.

PRE-INSTALLATION

A jack-ended system of cross-connect. This means that the major part of the installation is performed at the factory. Pre-cut cross connect cables are jack-ended at the factory. When you receive the switchboard units, you jack them together, solder the switchboard line cable to the M. D. F., make simple, routine tests and you are ready to go. Remember, your switchboard will have been pre-tested at the factory—no more tiresome, expensive terminal wiring, no "buzzing", no transpositions.

EVEN GREATER RELIABILITY OF OPERATION

The MCXR incorporates new circuits, advanced methods of contact protection, improved contact materials, all directed at furthering the outstanding quality of "All-Relay" operation. We called upon the combined experience and knowledge of our technicians and men with operating experience to determine the features which should be incorporated in a telephone switchboard. THEN we put the problems in front of our own, expanded research and engineering group for solution—FURTHER—we engaged the services of an outstanding research organization to assist with a fresh point of view and with its extensive resources and personnel.

ECONOMY

In the MCXR North engineers have introduced COMMON CONTROL, a feature designed to assure maximum permissible use of your equipment. In previous "All-Relay" equipment, approximately 30% of the equipment has been used only 5 seconds in the course of a 150 second call. Now common control makes this unused equipment available for use on other calls. TO YOU THIS MEANS THE ADVANTAGES OF "ALL-RELAY" OPERATION AT LOWER COST.

SPACE SAVING

Space saving, another economy, is made possible by COMMON CONTROL because of reduced equipment quantities and by reason of revised equipment layouts providing efficient usage of available space.

- Future Connector Controls
- Connector Control Strips
- Line Relay Strips
- Future Line Relay Strips
- Selector Multiple Strips
- Selector Control Strips
- Connector Auxiliary Strips
- Unit Common
- Fuses
- Monitor and Test Panel
- Line Finder Control Strips
- Allotters
- Connector Multiple Strips
- Line Finder Multiple Strips

Key to equipment locations on MCXR.

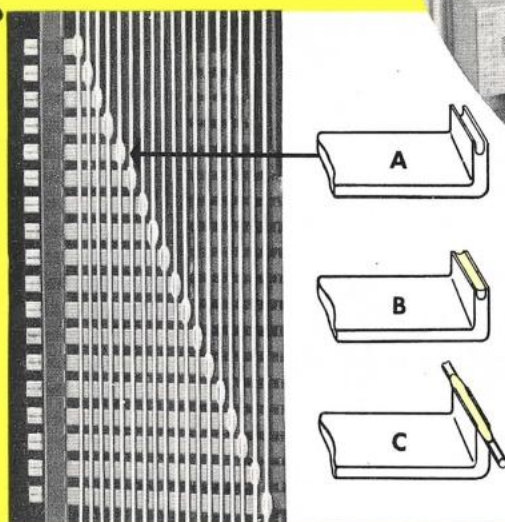
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NORTH all-relay MCXR SWITCHBOARD

PRE-SOLDERED FRONT MULTIPLE

- (A) This is the machine formed relay terminal before solder filling.
- (B) After the solder filling operation at the factory.
- (C) With the application of heat (no additional solder) this joint is produced.

Note: Even the addition of multiple relays to individual link strips is made easy with the MCXR presoldering method. The automatically aligned, double tinned multiple is slipped in place. A touch of a soldering iron to each terminal point solders the terminal permanently.



NEW!

LINE ADDITIONS

Line relay strips of ten lines each are slipped into place and connected by North's new "POSITION-THEN-LOCK" Jack.

COMMON CONTROL

The result of years of research and experimentation Common Control in the MCXR makes it possible for several line-finders, selector or connectors to use the same respective controls.

- On this MCXR switchboard:
- 2 Line-finder controls instead of 15.
 - 3 Selector controls instead of 15.
 - 3 Connector controls instead of 15.

LINK ADDITIONS

Link strips are connected by the "Position-then-Lock" Jack then the rear multiple is wedge-locked as shown on page 7.

Line or link additions may be made on the MCXR almost as quickly as plugging into a wall receptacle.

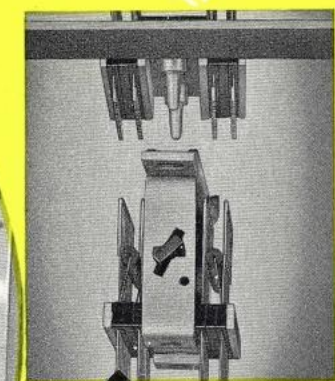
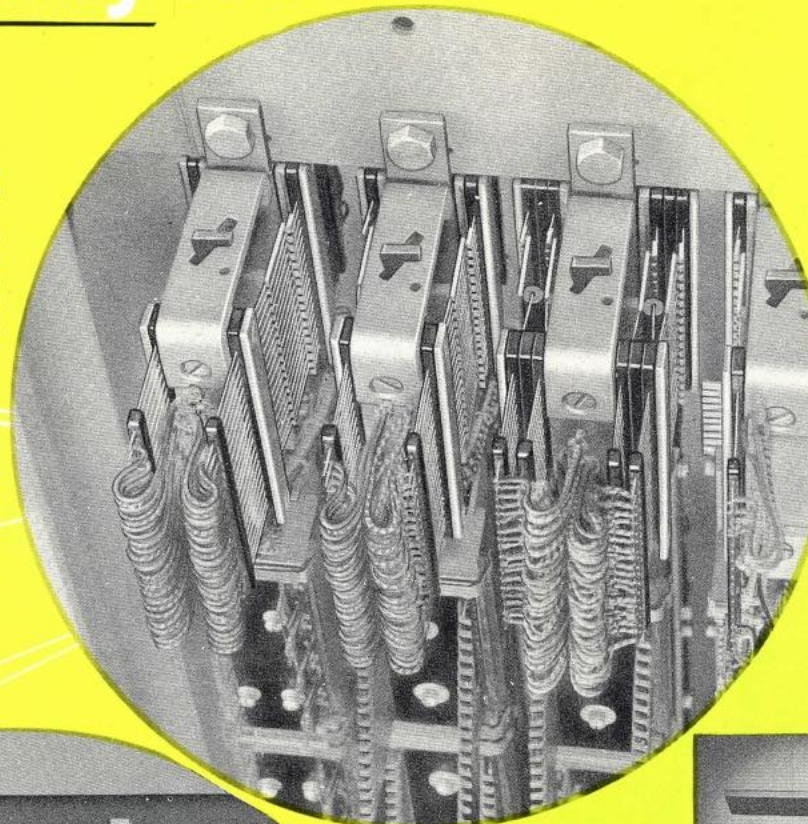
COMPLETELY JACK-MOUNTED "all-relay"...

JACK-MOUNTED STRIPS

A jack employing a well established principle of contact closure in telephony, newly applied for multiple jack purposes, provides the most positive, convenient and reliable "jack-in" feature for line, control and multiple strips yet devised.

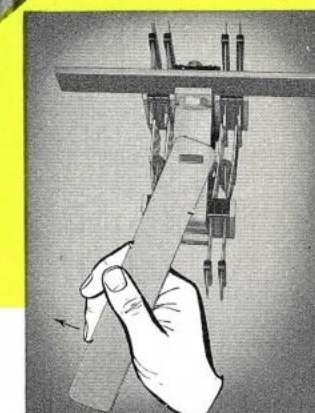
This multi-contact jack operates on a brand new "POSITION-THEN-LOCK" dual action principle. Positioning the jack is effortless and precise. Once in position the gold alloy contacting surfaces are locked together with a cam-action application of intense pressure. Each pair of contacts is self aligned and is secured in place by a pressure of 125 grams.

HERE'S HOW JACK-MOUNTING WORKS . . .



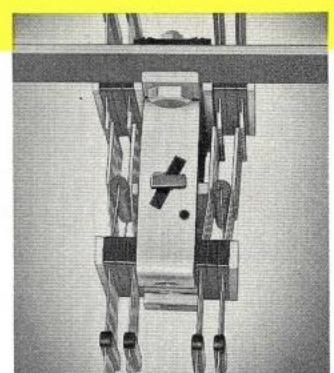
North's new "Position-then-Lock" Jack shown disengaged. This Jack closes 72 circuits simultaneously.

Jack positioned before locking.



Locking tool applied and Jack locked.

Locked Jack. Note flexure of springs providing positive contact pressure on 72 simultaneously closed circuits.



MONITOR AND TEST PANEL

Available at all times without opening cabinet doors, this convenient panel is provided for routine test or monitoring procedures.

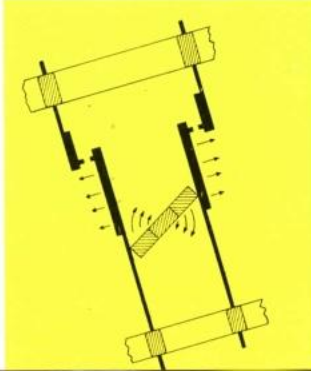


Diagram at left illustrates the "Toggle" locking action of the Jack. A 20° rotation of the actuator provides the high pressure follow and wipe characteristic of North's MCXR Jack mountings.

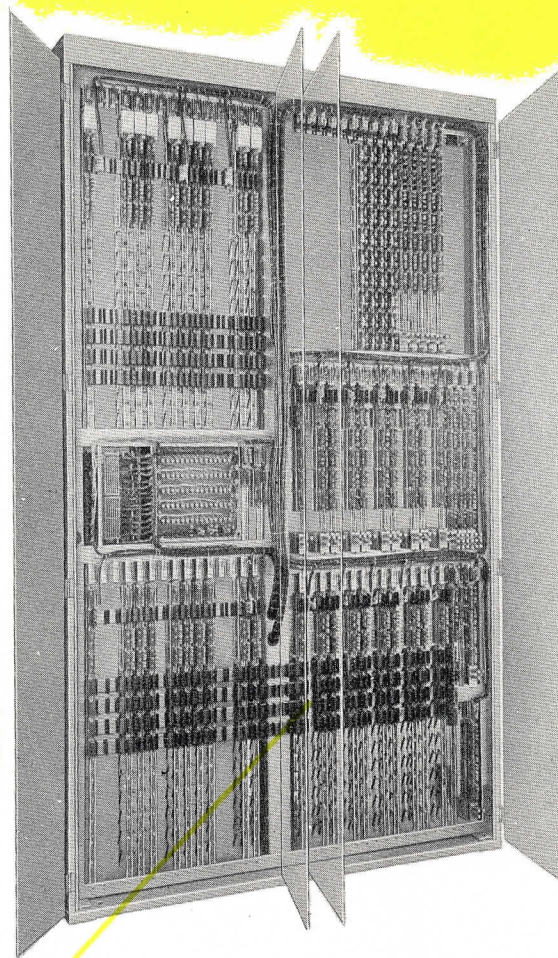
Illustrated above—A 100 line Unit equipped with 40 lines, 10 Line-Finders, 10 Connectors, 10 Selectors. As shown, the Unit has a wired capacity of 100 Lines, 15 Line-Finders, 15 Connectors, 15 Selectors. Easily expandable to 10,000 lines.

Demountable Multiple Strips!

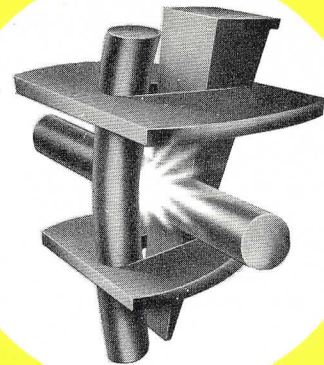
REAR MULTIPLE

The first problem in connection with demountability in a relay system is a rapid, secure method of establishing the rear or line multiple in contact with the "ten's" (multiple relays) relay terminals.

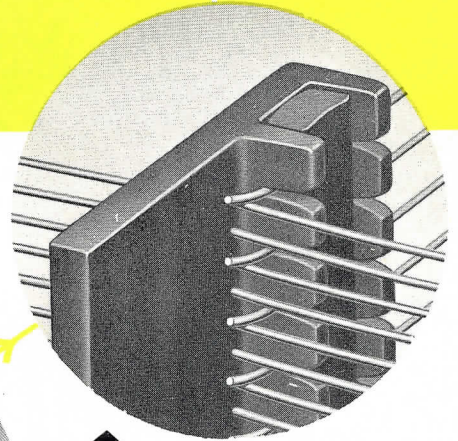
Using a simple, positive application of the "live" wedge principle, the line multiple wires are held firmly to the relay terminals under a "live" pressure of 100 tons per square inch.



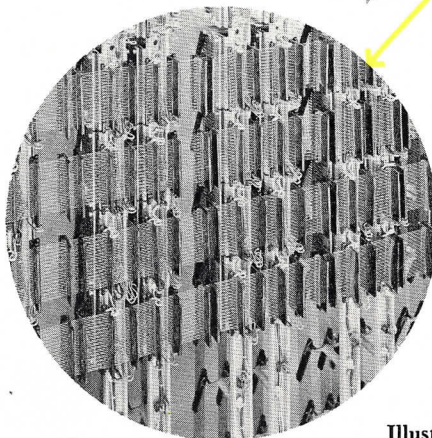
The principle of the wedge-locked multiple may be easily seen in this simplified sketch.



Rear view of MCXR switchboard.



Magnified view of locking wire guide in locked position showing details. The construction of the locking wire guide is such that a continuous "live" pressure is maintained between the multiple and the relay terminals.



Closeup of four levels of the connector multiple—completely demountable.

Illustration of locking wire guide in locked position—note flexure of multiple wires establishing "live" wedge locking action.

advanced design

**NORTH all-relay
MCXR switchboard**

COMMON CONTROL

Costly equipment which stands idle most of the time has long been a burden of expense to the operating company.

Outstanding examples are the controls for selectors and connectors in dial systems. These costly mechanisms or relay strips were formerly furnished one to each talking channel or bank appearance. Yet they are used only .5 to 2 seconds during a 3 minute call.

An identical comparison may be made with the function of an operator in a manual exchange. The operator, like the line-finder, selector or connector control is the brain, the mechanism which secures the desired connection. The operator requires 3 to 5 seconds to complete one call—then proceeds to complete another and another. On previous automatic systems, one control (brain) was removed from further service for the entire duration of each call. One operator's time taken up for the duration of a call—consider the waste involved!

Now, with Common Control, the controls proceed from one call to another, establishing connections—rapid service, no lost time, no wasteful drain of the invested dollar.

CIRCUITS...

All circuits used in the MCXR are time tested, proven circuits. But we have, by reason of new layouts and the superior speed and operating characteristics of these relays, introduced new combinations of circuits and new applications of circuits principles to relay operation.

Made possible by the speed of operation and release of the relays, a hunting type line-finder selector operation has been incorporated in the MCXR. The result, a simpler line-finder, the need for the guard circuit to prevent double connections is eliminated. With the elimination of the guard circuit there is no point in the system in which a single failure can "tie-up" a whole group of lines.

The MCXR incorporates every latest development in contact protection. We have built into this switchboard the results of over 40 years of experience and observation, and of the research of a leading industrial research organization to provide the most dependable contacts you have known.

... more information on NORTH MCXR

FRONT MULTIPLE

A convenient and positive new method of soldering is used to connect the front multiple. The multiple of double tinned music wire fits into a deep solder filled notch in the pre-soldered relay terminals. Relays may be added, removed or replaced with the mere application of heat to the terminal. No additional solder is necessary.

As in the rear multiple, bare wire is used entirely—air is the insulating medium. Gone are the wet weather problems of insulation breakdown. A minimum air separation distance of 1/16" insures perfect insulation under all atmospheric conditions.

BAKELITE MOLDINGS

are used throughout the MCXR in the construction of relays, jacks and multiple guides. Bakelite, a thermo setting material, once molded is not affected by extreme conditions of temperature and moisture.

The characteristic absence of distortion of molded Bakelite under extreme pressure makes it ideally suited for use in the wedge lock multiple assembly and relay components.

General Specifications

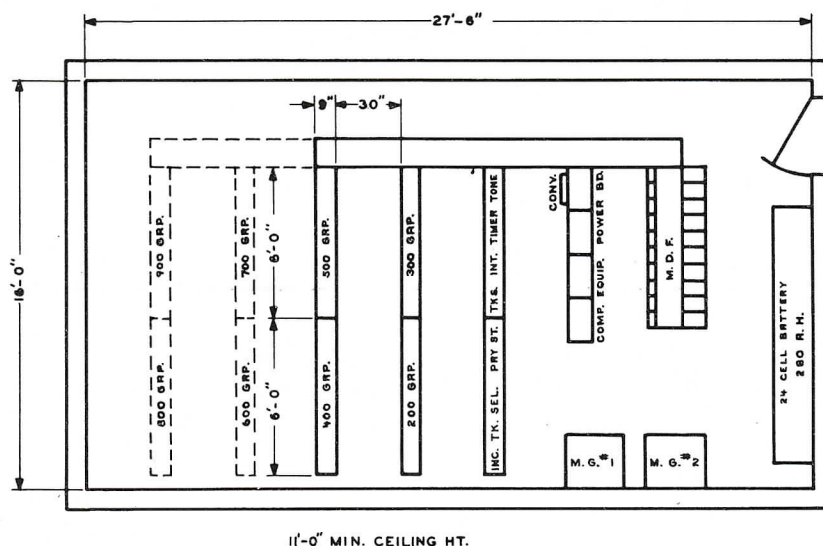
The MCXR is available in two sizes:

The MCXR 10,000 is supplied in 100 line bays each with capacity for 100 lines, 15 line-finders, 15 selectors, and 15 connectors, dimensions 6' wide, 9" deep, 10'6" high.

The MCXR 400 is supplied in 100 line bays each with capacity for 100 lines, 15 line-finders, 15 connectors, dimensions 6' wide, 9" deep, 8' high. Capacity for 15 selectors per 100 line group is provided in an additional cabinet.

In the MCXR 400 selectors can be equipped with only 7 levels, therefore, this size should ordinarily be considered only when it is not expected that estimated requirements will exceed 400 lines.

typical floor plan
for NORTH MCXR
10,000 Equipped 400
Lines, Building Space
For 400 Additional
Lines



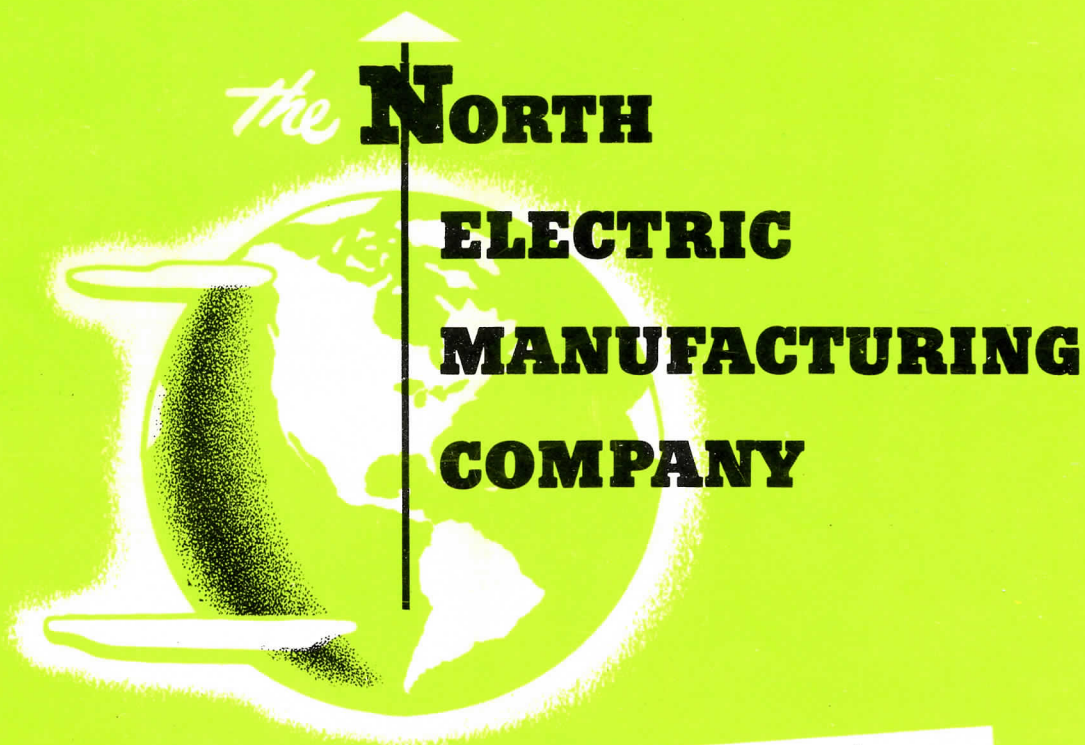
TELEPHONES • DIALS

DIAL AUTOMATIC EXCHANGES

TOLL BOARDS

PRIVATE AUTOMATIC BRANCH
EXCHANGES

ALL-RELAY EQUIPMENT



Originators of "All-Relay" Systems of Automatic Switching

GALION, OHIO, U.S.A.