

**Monotype**  
REG. U.S. PAT. OFF.  
**Standardized  
Switchboards**

**MONOTYPE P. B. X**

Bulletin 102-E

**THE AUTOMATIC ELECTRIC COMPANY, LIMITED**  
CHICAGO, U. S. A.

# ***The Monotype Series***

A Standardized Line of Switchboards  
Covering the Entire Field of Requirements  
in Manual Telephone Operation.

## **MONOTYPE SENIOR**

Unit position common battery multiple.

## **MONOTYPE SENIOR M**

Unit position magneto multiple.

## **MONOTYPE JUNIOR**

600 line common battery multiple.

## **MONOTYPE CONVERTIBLE**

400 line magneto convertible to C. B.

## **MONOTYPE 150-M**

150 line magneto.

## **MONOTYPE 30-M**

30 line magneto.

## **MONOTYPE 15-M**

15 line magneto.

## **MONOTYPE PBX**

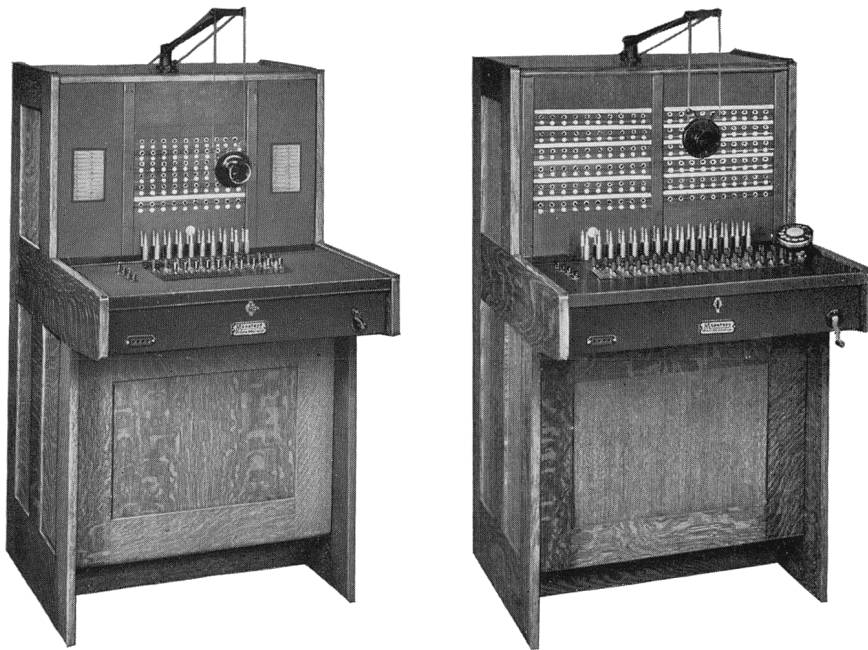
# Monotype Standardized Switchboards



## The Monotype P. B. X.

The huge expansion of industrial and commercial enterprises during the past decade has widened the field for Private Branch Exchange service proportionately. The demand for time and labor saving equipment has made the intercommunicating features and the trunking flexibility of the P.B.X. almost indispensable adjuncts to modern business houses, factories, banks, hotels, hospitals and schools. The complex requirements presented by individual cases makes

*Field of  
Application*



50-line and 100-line Monotype P.B.X.'s

it necessary for the telephone company to have equipment which will be adaptable to the varied conditions encountered. In the design of the Monotype P.B.X. has been included every feature necessary to meet successfully, even the most severe requirements. It is truly a modern switchboard attuned to modern conditions.

*Flexibility*

Being a unit in the Monotype series of standardized switchboards, the Monotype P.B.X. uses the same parts as the equipment for main exchanges. It has the same operating simplicity, the same wearing ability and the maintenance economy. A review of its design and construction, as outlined in the following pages, will reveal its obvious superiority over former designs and its many exclusive improvements.

# Monotype Standardized Switchboards

## Features

This switchboard has been designed by experienced engineers to fit all operating conditions. In its design and construction is incorporated every operating feature that could be desired by operating companies. These features, which adapt it for use with all central-battery exchanges, either manual or automatic, include:

1. Removable side panels, for ease in maintenance and installation.
2. Equipment of each cord circuit is mounted on one plate. It is merely necessary to add and connect a plate when an additional cord circuit is installed.
3. Through supervision to central-office operator from P.B.X. station permits her to release trunk, even if P.B.X. operator has not yet done so.
4. Through-dialing key enables P.B.X. subscriber to make a number of consecutive trunk calls without recalling P.B.X. operator.
5. Automatic holding to maintain connection between P.B.X. station and automatic switches when P.B.X. subscriber hangs up while operator dials for him.
6. "Group jacks" are provided for "night" or "conference" service.

## Standardization

The parts used in the Monotype P.B.X. are of standard design, and are interchangeable with parts of other Monotype boards. Stock-keeping is thus simplified, reducing stockroom expense and the investment in replacement parts. Standardization, with the resulting economies attendant on mass production of parts, enables us to build these boards at reasonable cost and keep them in stock ready for immediate shipment.

Monotype P.B.X. boards for use with manual central offices can be converted for automatic service by merely adding an operator's dial and a few relays, for which wiring is provided. Boards either with or without this equipment are kept in stock in the following standard capacities:

Code No.	Lines		Cords		Trunks		Line Relays	
	Wired	Equipped	Wired	Equipped	Wired	Equipped	Wired	Equipped
51	50	20	10	6	5	2	50	5
52	50	40	10	7	5	3	50	5
53	100	60	15	8	10	4	100	10
54	100	80	15	9	10	4	100	10

## Stock Sizes

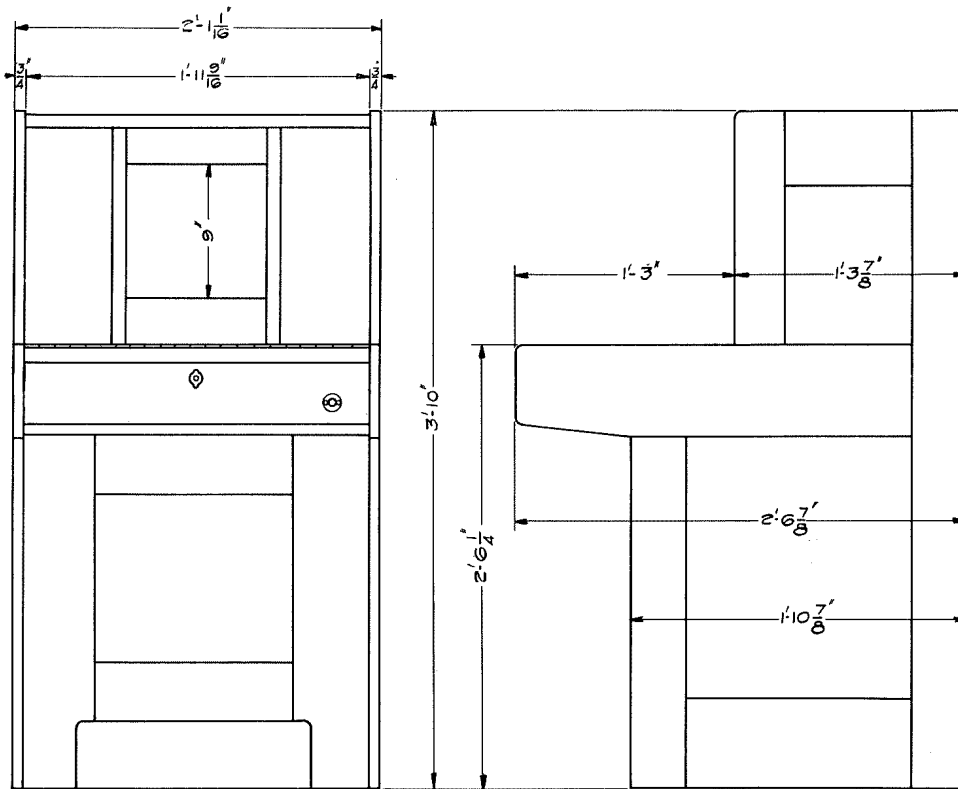
## The Cabinet

### Easily Accessible

The cabinet of the Monotype P.B.X. is built to provide ease of maintenance and remarkable durability. It is made of quarter-sawed oak, with all exposed parts given a golden-oak finish, which gives it a very pleasing appearance. All interior wood work is protected by two heavy coats of spar varnish, to exclude moisture. The cabinet is built on an iron framework from which all working parts are supported. The entire back and side panels, and the front panel below the shelf are all removable, so the parts of the board may be completely exposed, when desired for maintenance purposes.



# Monotype Standardized Switchboards



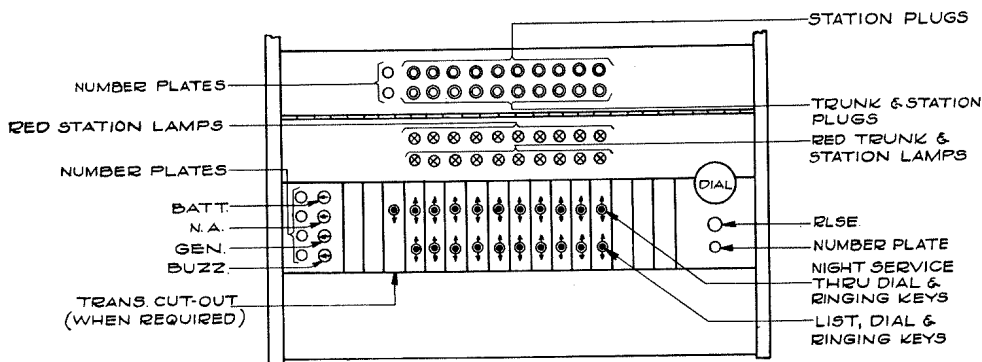
*Small Size*

*Comfortable Height*

Dimensions of the Cabinet of Monotype P.B.X.

The shelf is covered with black phenol-fiber, which is very durable and retains its color. The key shelf is attached with a full-length piano hinge, and can be easily raised for inspection of the equipment mounted beneath. On the key shelf are mounted the cord circuit keys and, at the left end of the shelf, four turn keys (night alarm, generator buzzer, pilot buzzer, and battery cut-off). The cabling to these keys is so designed as to make it possible to lift the keys of

*Key Shelf*

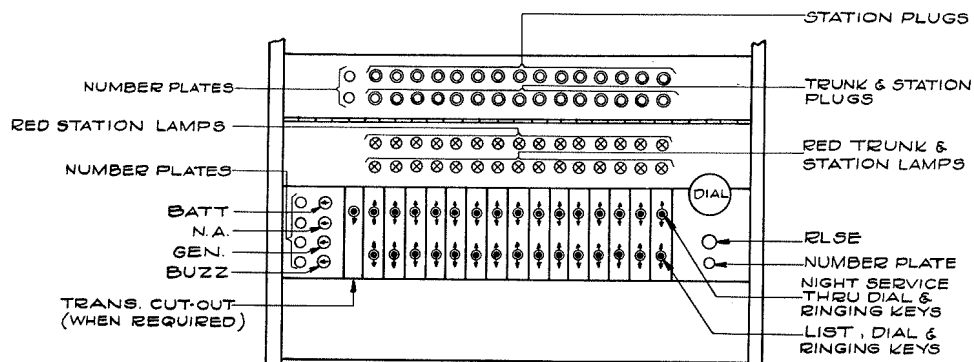


Shelf Arrangement of 50-Line Monotype P.B.X.

*Equipment*

# Monotype Standardized Switchboards

## Simple Arrangement



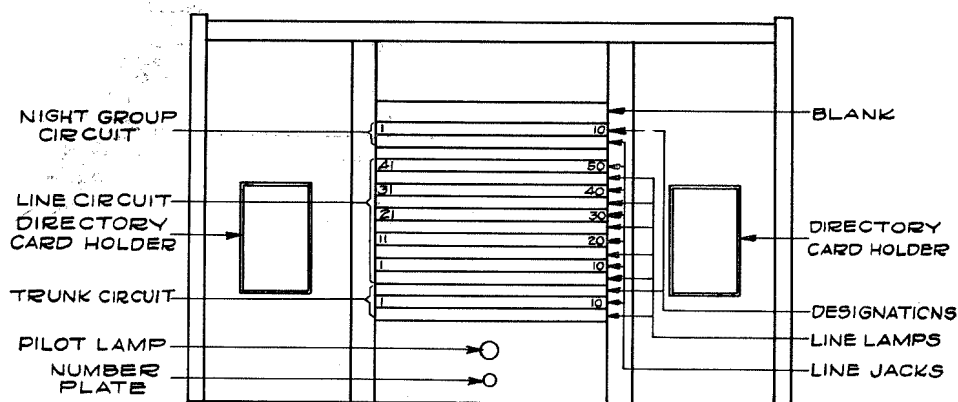
Shelf Arrangement of 100-Line Monotype P.B.X.

each cord circuit off of the shelf, so that the contacts can be inspected, and the springs adjusted, without raising the shelf and interrupting operation. The operator's comfort is insured by the shelf height, which is the same as that of an office desk, permitting the use of an ordinary chair.

## Relay Gate

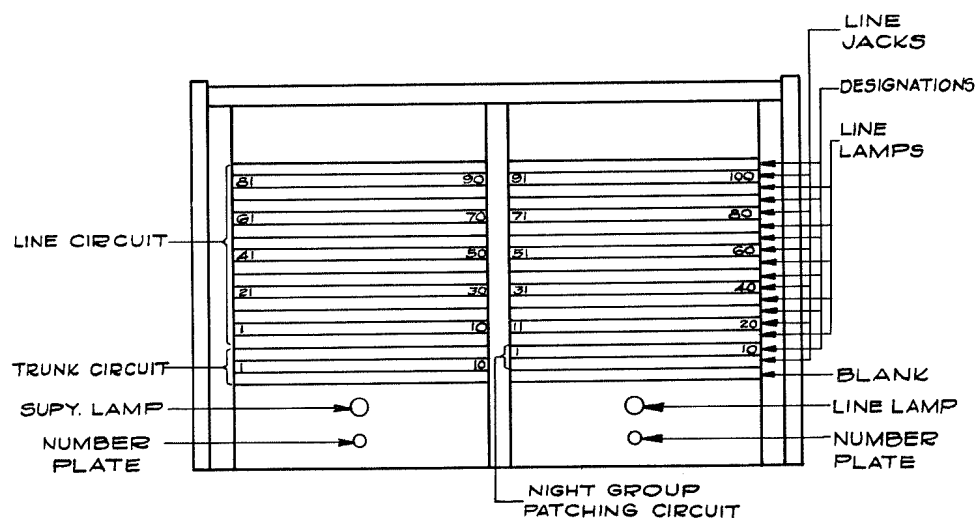
In the rear of the cabinet, and supported from its iron framework, is mounted a relay gate which can be swung open, providing easy access to the equipment on it, and to the cord terminal and connecting racks. On the upper part of the gate is a small panel which accommodates all necessary fuses, and on which are mounted the generator buzzer, the pilot buzzer, and the ringing-circuit lamp.

Below the fuse panel are mounted the line relays, which are protected by covers. Enough space is provided to accommodate line relays for all lines, if desired. The lower part of the rack mounts the miscellaneous equipment for trunk, night alarm, pilot lamp, operator's telephone, and cord circuits.



Equipment Panel of 50-Line Monotype P.B.X.

# Monotype Standardized Switchboards



Equipment Panel of 100-Line Monotype P.B.X.

## Line Equipment

The line relays of the Monotype P.B.X. are of a very compact and efficient design, and are all mounted under dustproof group-covers on substantial mounting plates. The windings are of the best grade of enameled copper wire, and have a resistance of 440 ohms. The contact springs are of nickel-silver, and are insulated with micarta.

The lamp jacks are assembled in strips of ten. Each lamp is placed in a fiber tube of such length that the light from one lamp cannot illuminate the cap of another. The lamps are securely held in the correct position by the heavy nickel-silver springs. As these springs are held in a hard-rubber strip having a slot for each spring, permanent insulation is assured.

The spring jacks are of similar construction, with long springs of such thickness as to insure uniform contact pressure on the plug. The strips are mounted in the switchboard with jack-fasteners, and the wiring is made long enough so the strips can be easily removed for inspection or adjustment.

## Cord Circuit Equipment

By automatic relay action, the cord circuits adapt themselves to either station-to-station or trunk-to-station service. Two lever-type keys are associated with each cord circuit, and are mounted on a single escutcheon. When the front key is pulled toward the operator, it applies ringing current to the front cord; and, when it is pushed from the operator, it connects the cord circuit to the operator's telephone and the dialing equipment, if any is furnished. (An operator's dial is provided only where the central office is automatic). The rear key applies ringing current to the rear cord when it is pulled toward the operator, and when pushed away from the operator, it disconnects all relays (except, of course, the series relay), thus preparing the cord for through-dialing or night service.

*Relays*

*Jacks*

*Universal  
Circuits*

# Monotype Standardized Switchboards

## Keys

The lever keys are easy-running and very durable. The lever cam is pivoted, on steel bearings, on a rod of hard-drawn phosphor-bronze, forming a bearing which requires no lubrication. The cam will not come loose, even after years of service. Hard-rubber rollers on the cam actuate the springs, which are of nickel-silver. The entire key assembly is made on a one-piece brass frame, from which the springs are separated by phenol-fiber insulators.

## Cords

Uniform efficiency of the cord circuits is maintained by the design of our cords. Each conductor consists of 21 strands of fine-quality copper tinsel, and is heavily insulated and reinforced. The insulation consists of two wrappings of Tussah silk, and an outside braiding of Sea Island cotton, with 18 inches of reinforcement at the plug end. These cords can be depended upon to stand continuous hard wear. They are ended on terminal racks with plenty of room between them and the adjacent equipment, so that they are in plain view and may be easily reached.

## Relays

The cord relays are individually mounted, each relay having a pressed-steel cover to protect it from dust and damage, and to prevent cross-talk. The armature is pivoted on the sharp undercut edge of the heelpiece, and may be easily adjusted. The contact-springs are operated through a brass yoke fastened to the armature, and approximately at right angles to it. They are of the best grade of nickel-silver, and are of such length and thickness as to assure permanent adjustment and positive contact. The armature is not restored to normal by its weight only, but the return is made positive by tension from the contact springs. A hard-rubber bushing on each armature spring insulates it from the armature.

## Correct Transmission

The cord circuits contain condensers separating the called and calling stations, and each telephone gets the proper amount of transmission current through double-wound relays which insure balanced, noiseless transmission.

## Ringling Equipment

The ringling equipment of the Monotype P.B.X. consists of a hand generator; a turn key on the key shelf, for switching the ringling circuit to the central-office generator or a local power-driven generator, as desired; and a key for cutting out the generator buzzer.

## Hand Generator

The hand generator is a powerful, carefully-wound, three-bar generator. Smooth operation and long life of this generator are assured by making the gear of brass and the pinion of steel. The generator buzzer is placed in its output lead, so that when the ringling current is applied, the buzzer operates. This buzzer indicates that the ringling circuit is functioning properly, and is also used to verify the sending of code impulses, and thus aid the operator in sending such codes.



## Trunk Equipment

The ring-up and cut-off relay in each trunk consists of two relays (similar to the cord relays in design and construction), mounted on one frame and having a mechanical interlock between their armatures. This interlock is so arranged that the ring-up relay cannot release, after being operated, until the cut-off relay operates. The operation of the cut-off relay, when the P.B.X. operator answers a call, releases the ring-up relay. The mechanical locking and release of the trunk relay insures positive action unobtainable by the use of a double-wound electrically-locked single relay.

The condensers used in the Monotype P.B.X. are made of a high grade of tinfoil and a special condenser paper. They are saturated with paraffin, and hermetically sealed into steel cans so they will retain their capacity unaffected by atmospheric conditions. Steel mounting plates, heavily plated to prevent rust, are used, and are so arranged that the condensers can be easily and quickly inspected or changed.

*Relays*

*Condensers*

## Operator's Equipment

The operator's equipment may consist of either a suspended-type transmitter with separate receiver, or a breast-type operator's set, whichever is desired. The circuit is so designed that there is no current flowing through the transmitter unless a listening key is operated. A non-locking lever key is wired in the circuit, for cutting out the transmitter whenever desired for monitoring. The suspended-type transmitter is hung from an arm which is adjustable for height and length. The receiver used with it is mounted on an easily-adjusted headband, which is very light in weight and has no surfaces to collect dust or absorb moisture. A light and flexible six-foot cord fitted with a cut-in plug is furnished. The quickly-removable headset and the handy cut-in plug make this arrangement especially convenient for the operator who has other duties to attend to, and who, therefore, must frequently leave the board.

The breast-type operator's set includes the breastplate with transmitter and adjustable neckband, the receiver and headband, and a transmitter and receiver cord with cut-in plug. It is sanitary and light in weight.

If the Monotype P.B.X. is supplied with a dial, a push key is furnished, for releasing the switches if an error is made in dialing.

*Suspended Type*

*Breast Type*

*Release Key*

## Night Alarm and Pilot Equipment

The night alarm equipment consists of a turn key and a buzzer which gives a continuous alarm as long as a station, trunk, or answering supervisory lamp remains lighted.

*Buzzer*

A pilot lamp is mounted in the piling rail, to operate when any of the lamps light.



## Wiring and Cabling

*Neatly  
Arranged*

All wires and cables are neatly formed and arranged, and are thoroughly tested before leaving the factory. The cord circuit cables are hand-made, of No. 22 B. and S. gauge wire, insulated with two wrappings of silk, and a reverse wrapping of cotton. The generator circuit wiring is separated from the cabling to prevent trouble from induction. Wiring for batteries, power-generator circuit, etc., is ended on connecting terminals at the bottom of the cabinet.

## Battery Supply

*Central-office  
Battery*

The Monotype P.B.X. operates on from eighteen to twenty-four volts. Where the distance between them is not too great, current may be supplied from the central office over a number of parallel cable conductors large enough to carry it without a great loss of voltage.

By means of the battery cut-off key which is provided, the battery is entirely disconnected from the Monotype for night service.

## Method of Operation

The Monotype P.B.X. is arranged to give extension control on trunk calls; through-dialing from P.B.X. stations, if the central office is automatic; and automatic holding on those attendant-dialed calls in which the P.B.X. subscriber hangs up to be called back after the called party has answered.

*Successive  
Calls*

The placing of successive trunk calls is independent of the P.B.X. operator, the circuit being arranged so that the exchange operator's supervisory lamp will light (or, if the exchange is automatic, the switches will release) when the hook-switch at the P.B.X. station is operated.

Calls to an automatic central office from P.B.X. stations which have no dials must be dialed by the P.B.X. operator. The calling party may either hang up, and be called back when the called party answers, or wait for the desired connection to be completed. A retardation coil is placed across the station cord, to hold the central-office connection for him if he hangs up.

*Group  
Jacks*

For night service, no "patching cords" are required. This service is provided by operating a through-dialing and night-service key, and, through the associated cord, connecting a trunk to the desired P.B.X. station. "Group jacks" are provided, so that each of two trunks can be connected to three telephones, giving a total of six telephones having night service. When the Monotype P.B.X. is used in connection with an automatic central-office, all telephones that are to be used for night service must, of course, be provided with dials, even if outgoing calls during the day are dialed by the operator.

The "group jacks" may also be used to give group connections, by connecting a number of P.B.X. stations, through a "group jack," to one trunk.

# *Monotype Standardized Switchboards*

## Installation

The labor required in installing the Monotype P.B.X. has been reduced to a minimum, all wiring and equipment being mounted and connected in the factory. It is merely necessary, after the cabling has been run in, to mount the lamps and lamp caps, the generator crank, and the operator's telephone.

*Minimum  
Labor*

## Plug- Ended Trunks

In accordance with present-day operating and engineering practice, the standard Monotype P.B.X. is equipped with jack-ended rather than plug-ended trunks. Jack-ended trunks speed up service by obviating the necessity of taking down a cord before completing a trunk connection. They permit reduction of the relay equipment in the trunk (and, since even the best relays require some attention, every relay dispensed with is one possible source of trouble removed). This is of great importance, for failure of a trunk relay will tie up a profit-making trunk. When the relay equipment is placed in the connecting cord, as it is in the jack-ended-trunk board, failure of a relay will merely tie up a cord.

*Jack-Ended  
Trunks*

For these reasons, we strongly recommend the use of jack-ended trunks, and furnish them as standard equipment on the Monotype P.B.X. However, we can make to your order, a P.B.X board embodying as far as possible, the characteristics typical of Monotype construction, but having plug-ended trunks.

Such a board is similar in size and general appearance to the standard Monotype P.B.X. The trunk plugs are to the right of, and in line with, the station plugs, and associated with each trunk plug are three supervisory lamps. Supervision provided is similar to that with jack-ended trunks.

## Monotype P. B. X. for Larger Exchanges

The Monotype P.B.X. described herein is not adapted for service in exchanges of more than one-hundred stations. For larger exchanges, longer cords and a somewhat higher jack panel are required. We are, however, prepared to furnish a board providing these, and having a maximum capacity of 320 lines, 20 trunks and 15 cords. This board is otherwise identical with the 100-line Monotype P.B.X. and has the same low shelf. It must therefore be mounted on a six-inch platform which will provide a well to accommodate the extra length of the cords.

*320-Line  
Board*



## ***A Complete Service to Telephone Companies***

American Electric Company, Inc. manufactures or distributes everything necessary for public telephone systems. This equipment includes:

### ***Central Office Apparatus***

Monotype series of standardized switchboards—toll boards—power plants—power panels—chief operator's desks—wire chief's desks—distributing frames—arrester equipment and interior cabling.

### ***Subscriber Station Equipment***

Central battery telephones, local battery telephones and auxiliary equipment.

### ***Outside Equipment***

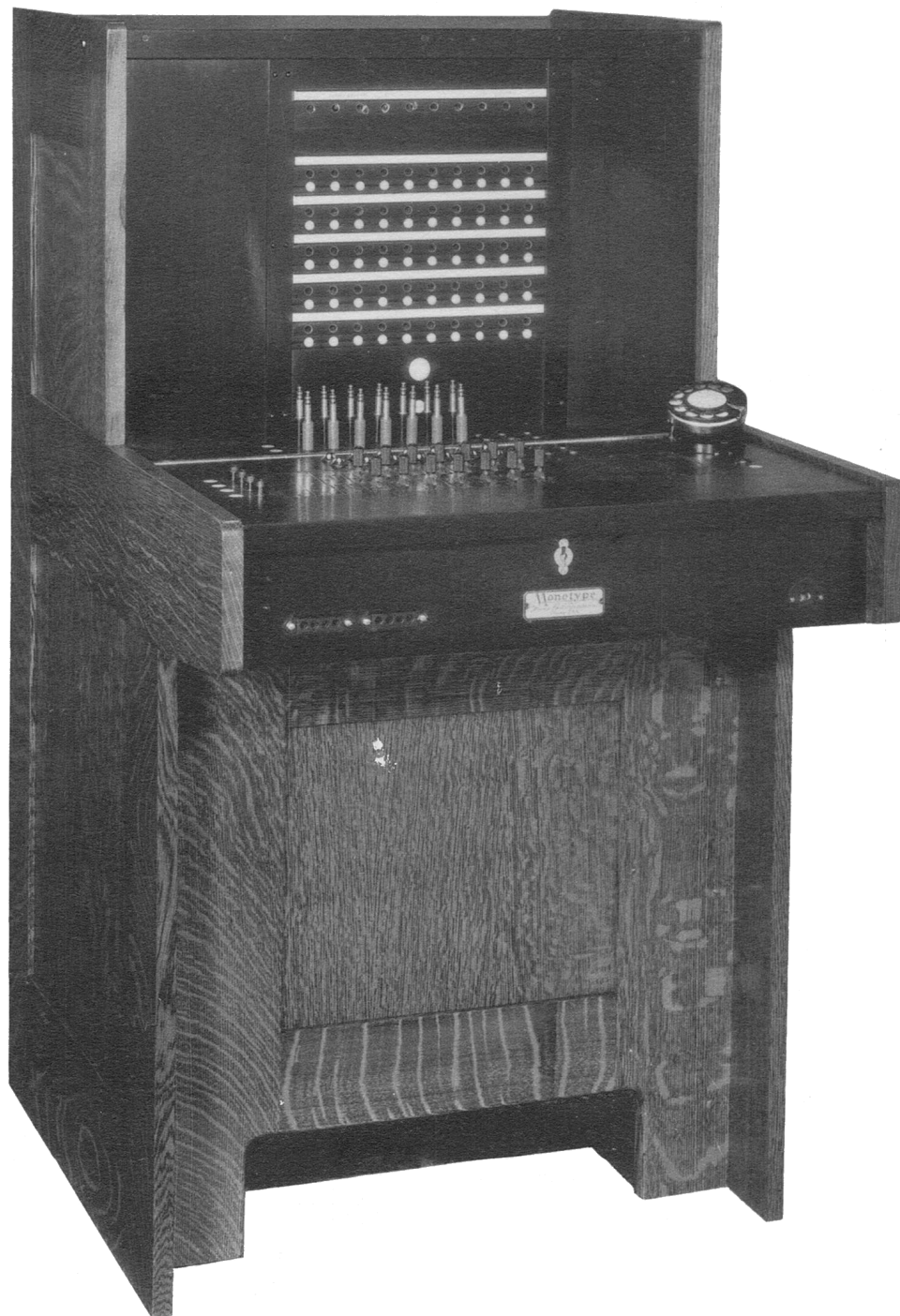
Poles—cable—cross arms—line wire—drop wire—strand—construction materials—tools—supplies—everything for either overhead or underground construction.

EXCLUSIVE EXPORT DISTRIBUTORS

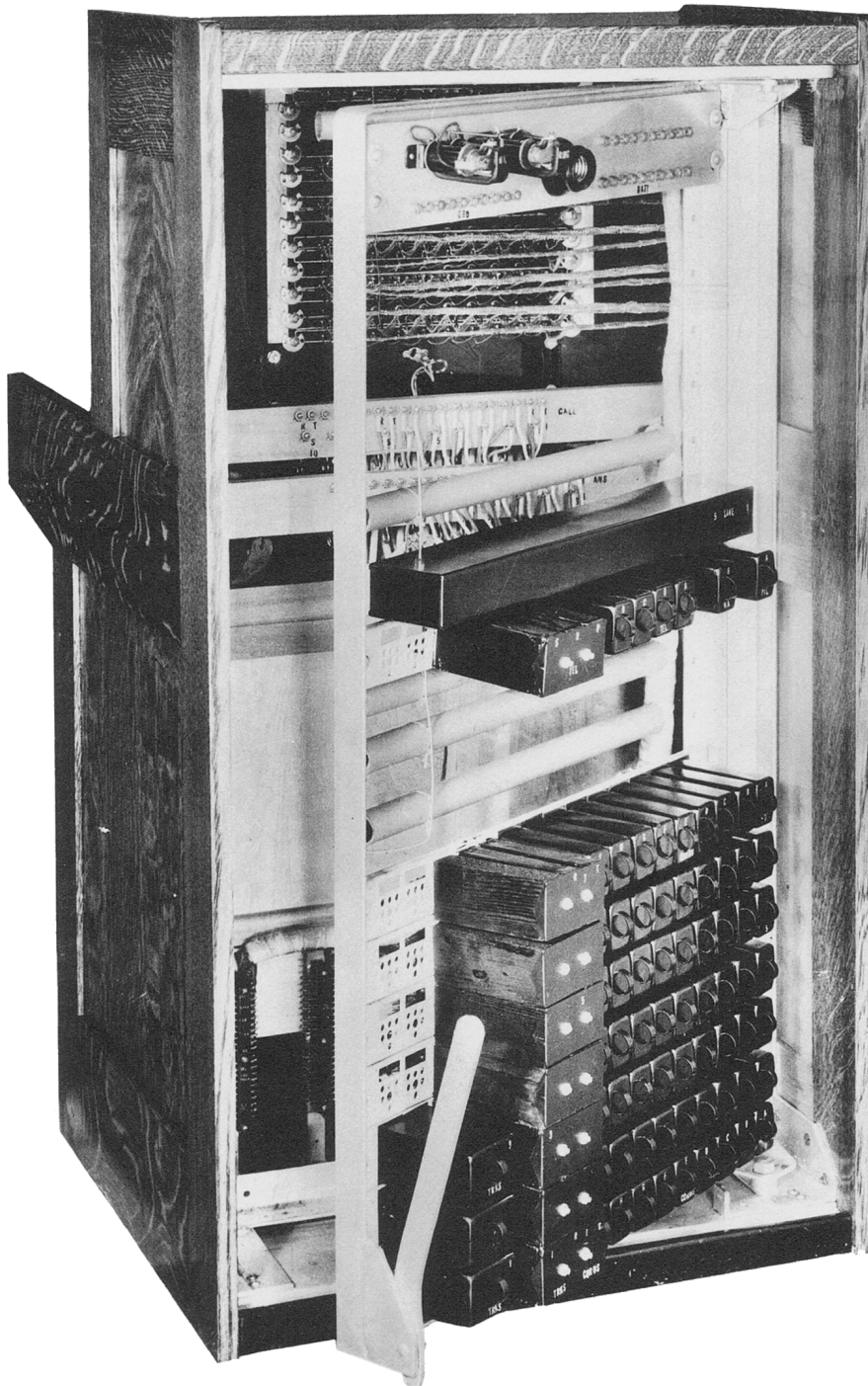
**THE AUTOMATIC ELECTRIC COMPANY, LIMITED**

1027 WEST VAN BUREN STREET, CHICAGO, U. S. A.

PRINTED IN THE U. S. A.  
S. D. CHILDS & CO.



50-LINE MONOTYPE P.B.X.  
40 LINES EQUIPPED. 10 TRUNKS EQUIPPED. 10 PATCHING JACKS. 7 FEATURE CORD CIRCUITS  
ARRANGED FOR AUTOMATIC OPERATION

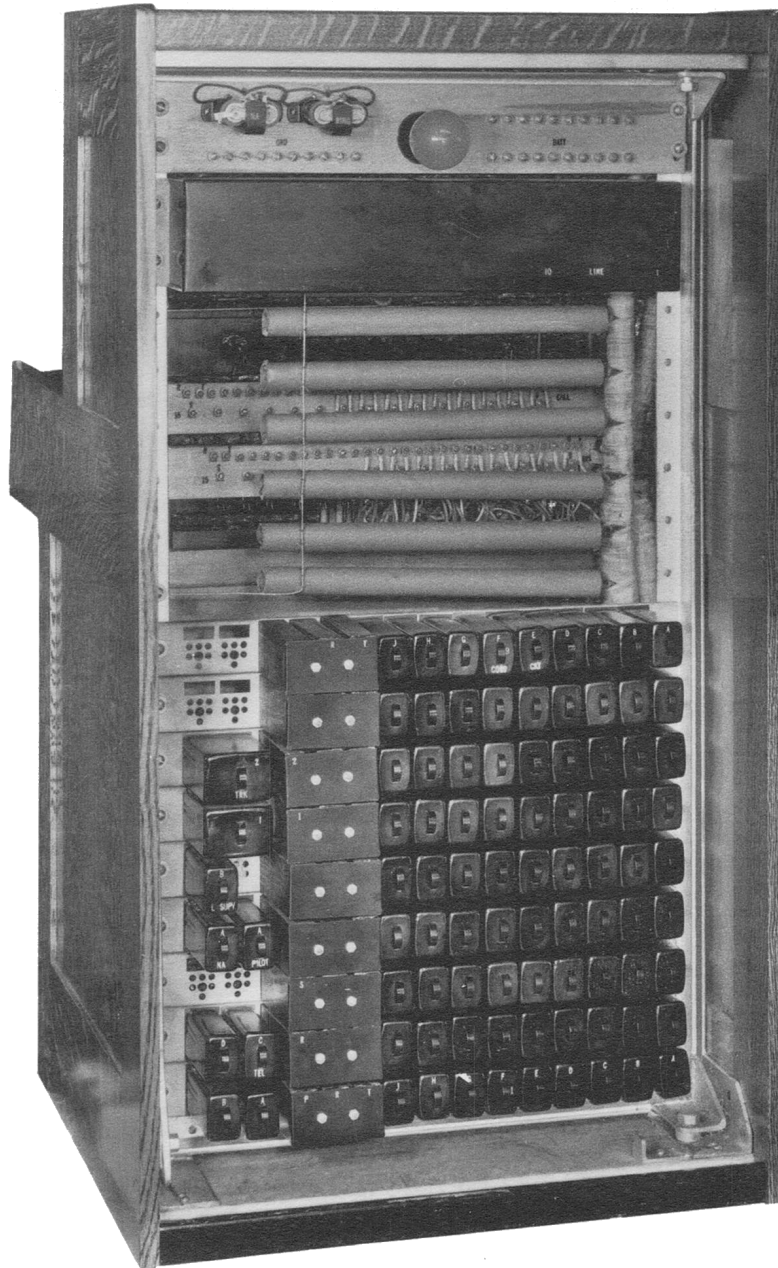


50-LINE MONOTYPE P.B.X.  
REAR VIEW

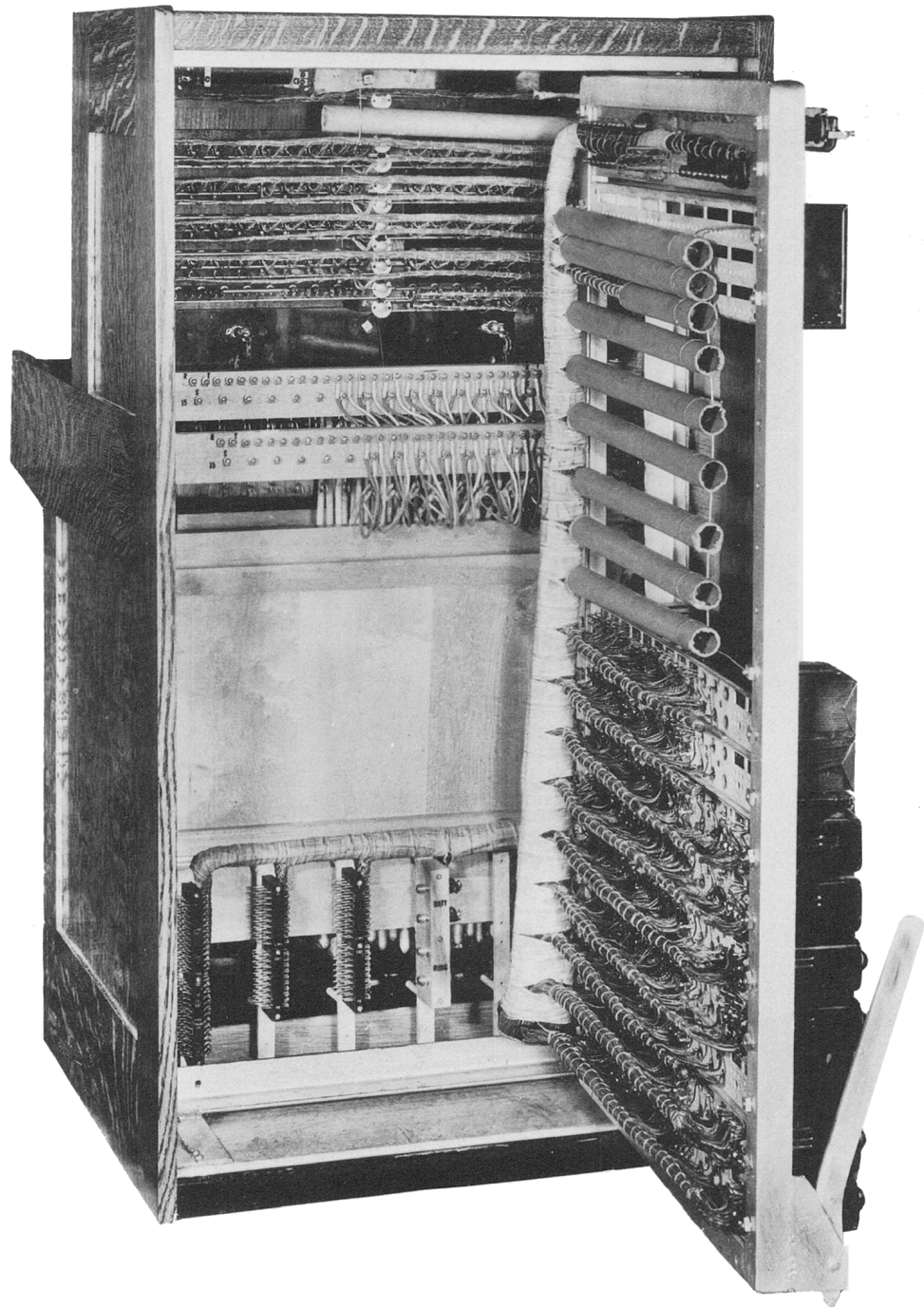




100-LINE MONOTYPE P.B.X.  
80 LINES EQUIPPED. 10 TRUNKS EQUIPPED. 10 PATCHING JACKS. 9 FEATURE CORD CIRCUITS  
ARRANGED FOR AUTOMATIC OPERATION

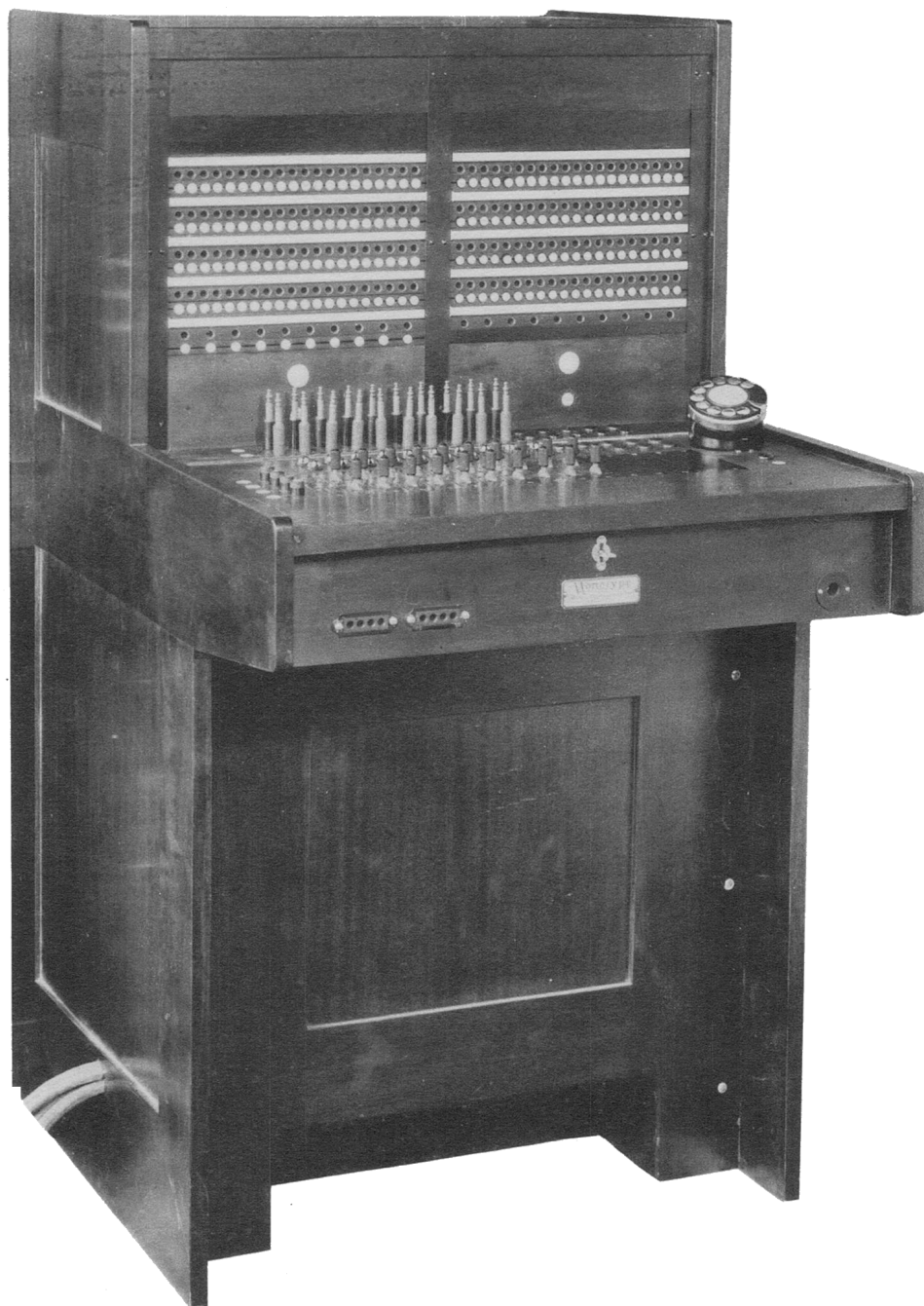


100-LINE MONOTYPE P.B.X.  
REAR VIEW



100-LINE MONOTYPE P.B.X.  
REAR VIEW. WITH GATE OPEN





200-LINE MONOTYPE P.B.X.  
180 LINES EQUIPPED. 10 TRUNKS EQUIPPED. 10 PATCHING JACKS. 10 FEATURE CORD CIRCUITS  
ARRANGED FOR AUTOMATIC OPERATION



THIS CANCELS PRICE SHEET PBX –APRIL 29, 1927  
THIS CANCELS PRICE SHEET PBX #1-A

**MONOTYPE JACK ENDED TRUNK P.B.X.**  
**ALL SWITCHBOARDS DESIGNED TO OPERATE ON BATTERY**  
**RANGING FROM 16 TO 24 VOLTS**

SEE BULLETIN #102

**SINGLE CABINET COMPLETE** WITH KEY CABLE, WIRED FOR ULTIMATE CAPACITY AND INCLUDING RINGING CIRCUIT, NIGHT ALARM CIRCUITS, LINE AND SUPERVISORY PILOT CIRCUITS, MAIN BATTERY SWITCH AND OPERATOR'S TELEPHONE CIRCUIT. THE ULTIMATE CAPACITY IS 50 LINES, 10 CORDS AND 5 TRUNKS. \$350.00

**DOUBLE CABINET COMPLETE** WITH KEY CABLE, WIRED FOR ULTIMATE CAPACITY AND INCLUDING RINGING CIRCUIT, NIGHT ALARM CIRCUITS, LINE AND SUPERVISORY PILOT CIRCUITS, MAIN BATTERY SWITCH AND OPERATOR'S TELEPHONE CIRCUIT. THE ULTIMATE CAPACITY IS 100 LINES, 15 CORDS AND 10 TRUNKS. \$375.00

**LAMP LINE CIRCUITS** WITH RELAYS IN UNITS OF 10 \$27.50  
" " WITHOUT " " \$17.50

**FEATURE CORD CIRCUITS** FOR OPERATION WITH AUTOMATIC CENTRAL OFFICE \$40.00  
**FEATURE CORD CIRCUITS** FOR OPERATION WITH MANUAL CENTRAL OFFICE \$38.00

**TRUNK CIRCUITS** JACK ENDED \$9.00

**NIGHT GROUP PATCHING CIRCUIT** – 10 JACKS PER GROUP \$7.00

**AUTOMATIC DIAL** AND DIALING EQUIPMENT \$12.00

**SPECIFY TYPE OF OPERATOR'S SET** TO BE USED –  
BREAST PLATE OR SUSPENDED TYPE.

**ALL STOCK CABINETS** ARE OAK, GOLDEN OAK FINISH  
IF MAHOGANY IS DESIRED – ADD \$10.00

ALL PRICES NET F.O.B. CHICAGO

THIS CANCELS PRICE SHEET PBX -OCTOBER 29, 1928  
THIS CANCELS PRICE SHEET PBX #2-A

**MONOTYPE PLUG ENDED TRUNK**  
**ALL SWITCHBOARDS DESIGNED TO OPERATE ON BATTERY**  
**RANGING FROM 16 TO 24 VOLTS**  
SEE BULLETIN #102

**SINGLE CABINET** COMPLETE WITH KEY CABLE, WIRED FOR ULTIMATE CAPACITY AND INCLUDING RINGING CIRCUIT, NIGHT ALARM CIRCUITS, LINE AND SUPERVISORY PILOT CIRCUITS, MAIN BATTERY SWITCH AND OPERATOR'S TELEPHONE CIRCUIT. THE ULTIMATE CAPACITY IS 50 LINES, CORDS AND TRUNKS, ANY COMBINATION UP TO 15 CIRCUITS. \$350.00

**DOUBLE CABINET** COMPLETE WITH KEY CABLE, WIRED FOR ULTIMATE CAPACITY AND INCLUDING RINGING CIRCUIT, NIGHT ALARM CIRCUITS, LINE AND SUPERVISORY PILOT CIRCUITS, MAIN BATTERY SWITCH AND OPERATOR'S TELEPHONE CIRCUIT. THE ULTIMATE CAPACITY IS 100 LINES, CORDS AND TRUNKS, ANY COMBINATION UP TO 20 CIRCUITS. \$375.00

**LAMP LINE CIRCUITS** WITH RELAYS IN UNITS OF 10 \$27.50  
“ “ WITHOUT “ “ \$17.50

**CORD CIRCUITS** \$14.50

**TRUNK CIRCUITS** FOR OPERATION WITH AUTOMATIC CENTRAL OFFICE \$34.50

**TRUNK CIRCUITS** FOR OPERATION WITH MANUAL CENTRAL OFFICE \$32.50

**AUTOMATIC DIAL** AND DIALING EQUIPMENT \$12.00

**NIGHT GROUP** PATCHING CIRCUIT - 10 JACKS PER GROUP \$7.00

**SPECIFY TYPE OF OPERATOR'S SET** TO BE USED -  
BREAST PLATE OR SUSPENDED TYPE.

**ALL STOCK CABINETS** ARE OAK, GOLDEN OAK FINISH  
IF MAHOGANY IS DESIRED - ADD \$10.00

ALL PRICES NET F.O.B. CHICAGO