

# Introduction and Definitions

Supplying a properly equipped private branch exchange to a subscriber offers the telephone company a two-fold advantage. First, it makes a satisfied customer; second, it brings in additional revenue.

North "All-Relay" P.A.B.X.'s are the ultimate in fine P.B.X. equipment from your point of view and from that of your customer. For you they mean revenue producing equipment with minimum cost, no routine maintenance—simple, flexible systems arranged for ease of addition up to their planned capacities. For your customer, North P.A.B.X. provides efficient, economical communication, tailored to fit his specific problems.

## "ALL-RELAY"

The trade name for the dial automatic system manufactured by the North Electric Manufacturing Company. The system is composed entirely of relays, essentially substituting a minimum motion electro-magnetic operation for maximum motion, mechanical switching systems, with resultant elimination of wear and maintenance.

## FULL MULTIPLE

When an attendant's cabinet is used in conjunction with an automatic switchboard and every line on the automatic equipment appears upon and is available at the attendant's cabinet, the attendant's cabinet is said to be "full multiple."

## LINK

One conversation path in dial automatic equipment consisting of a line finder and a connector and, on a larger system, of a selector. Corresponds to a cord circuit on a manual board.

## MULTIPLE — "ALL-RELAY" SWITCHBOARD

In the "All-Relay" system the term "multiple" is used to denote the relays on which the lines appear on each link, and through the operation of which relays, connection is established to the line by the link.

## MULTIPLE — ATTENDANT'S CABINET

The appearance of the line jacks on a position of manual switchboard (attendant's cabinet).

## P.A.B.X.

Private Automatic Branch Exchange.

## P.B.X.

Private Branch Exchange.

## SELENIUM, DRY DISC

Selenium is a metal possessing the property of rectification of alternating current. Used as a rectifier for battery chargers, the selenium dry disc eliminates the need for tubes or moving parts, has a long life and a favorable ratio of output to input current.

## SELF-REGULATING CHARGER

A charger which follows the load or discharge rate of the battery thus maintaining the battery in an approximately fully charged condition at all times.

## NOTE:

In addition to the foregoing definitions, complete descriptions of "Special Service Features" will be found on page 17 of this section.

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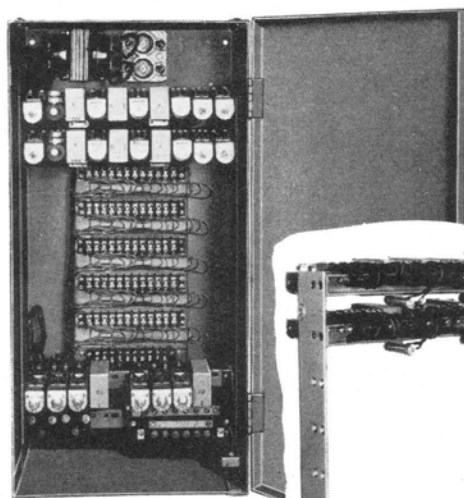


# "All-Relay" Push-Button P.B.X.

## GENERAL

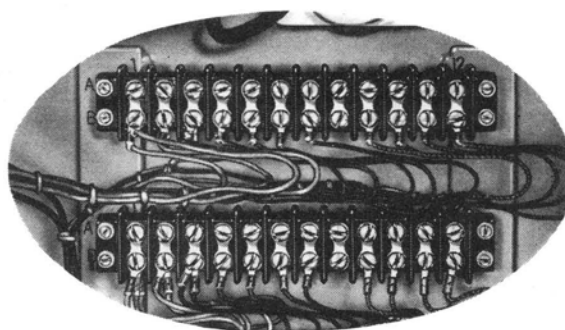
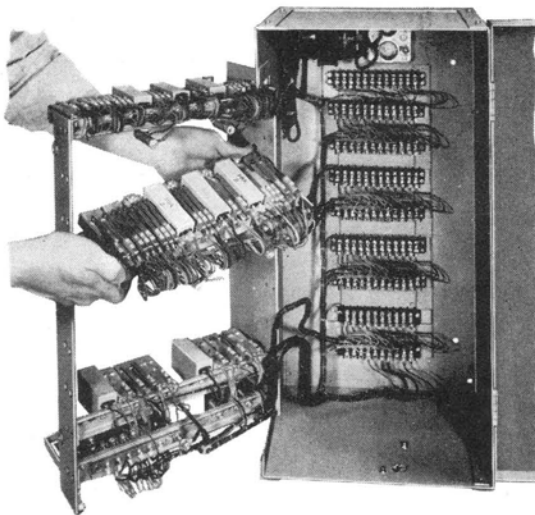
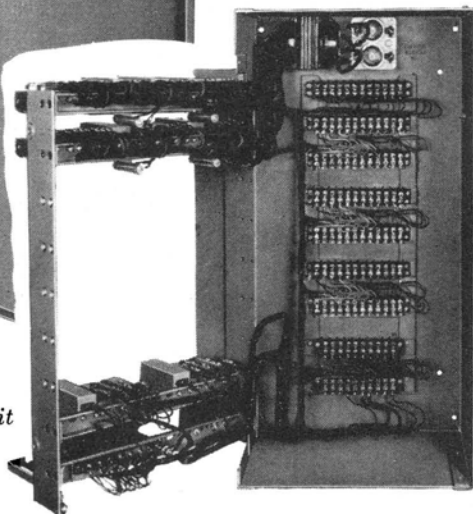
This is a key-type system designed for large residences and small or medium sized business organizations—subscribers whose maximum service requirements will not exceed the system's capacity of 6 central office trunks and 21 stations—requiring a complete and

*Trunk or Intercom Loop Units are easily added or removed.*



*Push-Button Relay Unit with gate open.*

*Push-Button Relay Unit with gate closed.*



*Additional Trunk or Intercom loops are connected on these convenient screw terminals.*

flexible telephone service arrangement at nominal cost. The system also offers excellent advantages for use within particular departments of larger organizations served with P.A.B.X. or P.B.X. installations. No attendant is required with the Push-Button P.B.X. as all stations are equipped to originate, answer, hold and transfer calls on all lines. Privacy of conversation results from lamp signals which indicate both trunk and interoffice lines in use. Signalling for interoffice calls on either of the 2 intercommunicating lines or for transfer of trunk calls is accomplished by a built-in push button and buzzer system, optionally available on either a fully selective or a code basis. Connection of the Push-Button P.B.X. can be made to either an automatic or manual common battery central office.

The key box system is used with increasing frequency

in connection with P.B.X.'s (private branch exchange, manual) and P.A.B.X.'s (private automatic branch exchange). In offices where it is desirable to switch incoming calls from one person to another, i.e., sales departments, the system offers a high degree of flexibility and economy as the call can be switched without recalling the P.B.X. operator. It is also used in locations such as departments where there is a large amount of intra-department traffic and relatively little to the outside or to other departments. The advantages to the P.B.X. subscriber are that fewer P.B.X. or P.A.B.X. lines and links are required for purely departmental traffic. Examples of this type of application are: Accounting and sales departments in manufacturing plants, sports departments and newsrooms in newspapers, general offices in department stores, reservation sections in large hotels and in railroad stations, etc.



**PLEASE USE CATALOG NUMBERS WHEN ORDERING**

*Go North for Service and Satisfaction*



# "All-Relay" Push-Button P.B.X.

## OPERATION

A standard telephone and an attractive key box as illustrated, to which all lines are multiplied, are employed at each station location. All key boxes are equipped with 8 interlocking push keys and 2 non-locking push keys. The interlocking keys allow access to the trunks and intercommunicating lines. One of the non-locking keys is for holding trunk calls; the other serves as the ringing key on systems not equipped for selective signalling and as a clearing key (for releasing the key of any trunk or interoffice line) on systems equipped with selective signalling. Lamp signals, associated with the trunk and intercommunicating circuits, are built-in directly below each push key. One or two strips of 10 push buttons each, with designation strips, are provided on all key boxes when selective signalling is specified. The operation of the system is as follows:

### INCOMING TRUNK CALLS

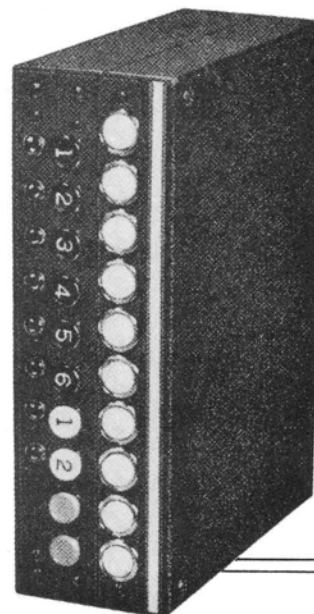
Calls from the central office are announced by a flashing trunk lamp and usually by one or more single stroke audible signals, as required. The answering party depresses the trunk key associated with the flashing trunk lamp and lifts the receiver at any station to establish the connection. The trunk lamp stops flashing but remains lighted at all stations to indicate that the trunk is in use.

### OUTGOING TRUNK CALLS

To originate a trunk call from any station, the calling party selects an idle trunk as indicated by the line lamps, depresses the associated trunk key and then proceeds to either dial the desired exchange number or give the number to the exchange operator, as appropriate.

### INTERCOMMUNICATING CALLS

Calls between stations on the system are made by the calling party signalling the desired party and then depressing the key of an idle interoffice line. When the calling party's receiver is lifted, the line lamp at the called station will light and indicate which intercommunicating circuit is to be answered. The called party simply depresses the corresponding key and the connection is established. The lamp associated with the interoffice line in use remains lighted at all stations until the connection is terminated.



*Key and Lamp Box.*



*Standard Telephone.*

### HOLDING AND TRANSFERRING TRUNK CALLS

A trunk call, whether incoming or outgoing, can be held from any station by operating the red "hold" key. The lamp associated with the held trunk remains lighted at all stations to prevent other parties from attempting to use it. After a call has been placed on hold, the telephone at the station can be used to either make or receive another trunk or interoffice call. If the held call is to be transferred to another station, the answering party calls the desired party on an interoffice line and indicates which trunk is to be picked up. The hold is automatically released when the key associated with the held trunk is again depressed, whether at the station where the call was placed on hold or at another station.

On systems equipped with selective signalling, calls may be conveniently transferred without the use of an interoffice line by simply code signalling to the desired party which trunk to pick up.

### SPECIAL SERVICE FEATURES

The optional special service features for North P.A.B.X. systems described on pages 17-20 of this section are not applicable to the Push-Button P.B.X. However, some of these features are inherently a part of the system and other features which may be required by certain users can be provided by minor wiring rearrangements at the time of installation.

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Conference service is available at all times with the Push-Button P.B.X. as the trunks and interoffice lines are common talking loops. Night answering and transferring can be accomplished from any station in the same manner as calls are answered and transferred during normal hours, the only requirement being the provision of an additional trunk signal, if necessary, for the party to handle night calls.

Another feature which can be readily provided to meet a customer's special requirement is the use of one of the intercommunicating lines as a private circuit between 2 stations only. This is simply a matter of wiring and provides a secret service circuit between 2 particular stations, reducing the common talking interoffice lines from two to one.

## EQUIPMENT

### STATION EQUIPMENT

Each station is provided with a telephone and a multiple key box. The telephone may be any standard instrument and no ringer is required. The key box has a rugged and attractive metal housing with black wrinkle finish. The top of the key box, attached by 4 screws, lifts off for easy access to the interior. The dimensions of the key box for systems without selective signalling and for systems with one strip of 10 push buttons for selective signalling (11 station initial capacity) are: height—9  $\frac{3}{16}$  inches; width—2  $\frac{13}{16}$  inches; depth—7 inches. If 2 strips of 10 push buttons are provided (21 station initial capacity) the key box width is increased to 3  $\frac{9}{16}$  inches. Trunk push keys are black with white numerals consecutive from "1" to "6" and intercommunicating keys are white with black numbers "1" and "2". The hold key is red and the code signalling key (or clearance key on selective signalling systems) is blue. The visual signals in the key box are standard 24 volt switchboard lamps with amber opals. The built-in

audible signal is a 6 volt buzzer. The key boxes are designed to be mounted either on the top or side of a desk or table or on a metal bracket, finished to match the box, which is available where wall mounting is desired.

### TRUNK SIGNALS

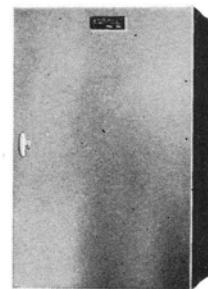
Usually, one or more audible signals are required to announce incoming trunk calls and call attention to the flashing trunk lamp on the key boxes. Single stroke, 24 volt gongs or chimes can be provided for this purpose, the soft-toned chimes being recommended for office use and the gongs for noisier locations.

### RELAY CABINET AND POWER

A small, compact cabinet, as illustrated, houses the terminal blocks and all of the relay equipment. The cabinet is finished in office grey and designed for wall mounting at any out-of-the-way location. The relay cabinet has a maximum capacity of 6 trunks and will be equipped with any number up to 6 as specified. Dimensions of the cabinet are: height—24 inches; width—15 inches; depth—12 inches.

The relay equipment for each trunk is arranged on a separate demountable bar which in turn is mounted on a swinging gate within the cabinet. Each trunk has its own flexible cable for easy connection to a small screw terminal strip, making the addition of trunks a simple operation.

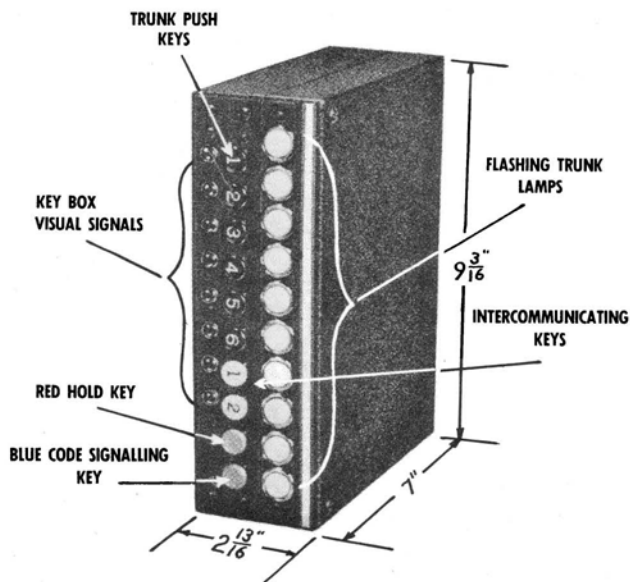
Power may be supplied from the central office battery or a small rectifier can be provided for installation near the relay cabinet. The system can be specified for either 24 or 48 volt D.C. operation. The lamps are supplied from a 110 volt, 60 cycle A.C. source through a step-down transformer to 24 volts. The buzzers are supplied with 6 volts from a small transformer.



*Relay Cabinet  
Closed.*

### WIRING

All stations are wired in multiple from the relay cabinet. Four conductors are required for each trunk and 3 for each intercommunicating line, plus one pair for battery and one common signalling wire for systems using code signalling. For systems using selective signalling, an additional pair of wires to carry battery for the buzzer circuit, plus one additional signalling conductor for each station, is required. Installations are usually made with cable, 26 pair cable being recommended for code signalling systems or selective signalling systems where the ultimate requirements will not exceed 11 stations and 51 pair cable for selective signalling installations where a greater ultimate is anticipated.



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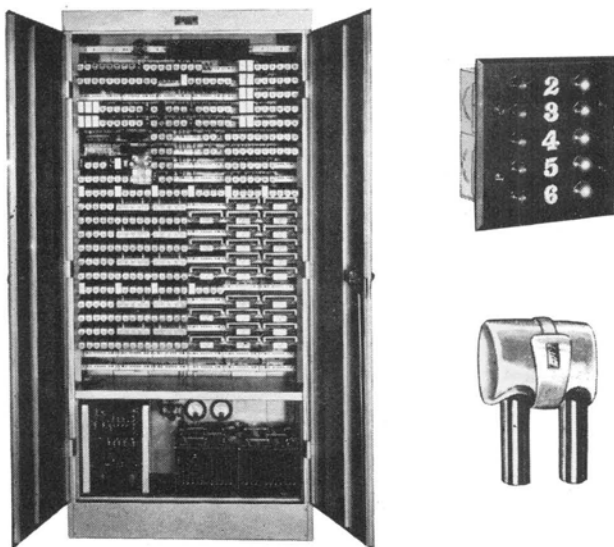
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# Type 30 "All-Relay" Attendantless P.A.B.X.

## GENERAL

A P.A.B.X. system particularly adaptable for small or medium sized business or large residence establishments desiring the efficiency, secrecy and other service features offered only by a fully automatic system, but without the expense of a regular attendant. This P.A.B.X. provides an unusual service arrangement having broad application among a large group of customers needing more complete telephone service but uninterested in any branch exchange system requiring a regular attendant. With the Type 30 Attendantless, no attendant is necessary as any station can answer, hold or transfer an incoming trunk call as well as originate



an intercommunicating or trunk call without assistance. The Type 30 Attendantless P.A.B.X. has a capacity of 25 station lines, 5 central office trunks and 6 links or conversation paths and can be arranged for operation with either automatic or manual common battery central office equipment. We believe this to be the only system offering all of these services which does not require special subscribers' station telephones.

## OPERATION

An outstanding feature of the Type 30 Attendantless unit is the simplicity of operation which results from the fact that neither auxiliary key equipment nor special telephones are required at station locations. Opera-

tion of the dial on the standard telephone sets which are used enables any station to answer, hold or transfer an incoming trunk call or originate an intercommunicating or trunk call. The system affords secret service on all calls and dial and busy tones and automatic ringing are provided. The operation of the system is as follows:

### INCOMING TRUNK CALLS

One or more single stroke chimes or bells and one or more lamp panels with lamps to indicate each of the trunks are conveniently located and serve to announce incoming trunk calls. Any station can answer an incoming trunk call by dialing a single digit code associated with the particular trunk carrying the call, as indicated by the lamp signal. Upon dialing the proper trunk code, the answering party is automatically connected to the calling party. The first station to answer the call locks out all other stations from that trunk, a busy tone being received by any other station attempting to connect to that particular trunk.

### OUTGOING TRUNK CALLS

To originate a trunk call from any station not purposely restricted, the calling party dials a single digit, usually "0". This automatically connects the station to an idle central office trunk and the calling party then proceeds to either dial the desired exchange number or give the number to the exchange operator, as appropriate. If all P.A.B.X. trunks are in use, the busy tone will indicate this condition to the calling party.

### INTERCOMMUNICATING CALLS

To originate an intercommunicating call from any station, the calling party simply dials the two digit number assigned to the station wanted. The bells at the called telephone will automatically ring at regular intervals until the call is answered or the calling party hangs up. If the called station is busy, the calling party will receive the busy tone.

### HOLDING AND TRANSFERRING TRUNK CALLS

Trunk calls, whether incoming or outgoing, can be held from any station by either dialing the digit "1" or by flashing the hookswitch button one time, without hanging up. The station may then call out over another trunk or intercommunicate with another station. The

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held call can be picked up either by the station which placed it on hold or by another station, in either case by simply dialing the code number associated with the trunk on which the call is being held. The same call can be held and transferred any number of times in the same manner. This secret service hold arrangement affords maximum flexibility both in transferring incoming trunk calls and in instances where it is desirable to be able to hold a trunk call while using the same telephone to secure information from another party.

Another method is provided for transferring incoming calls which is speedy and entirely satisfactory if Secret Service is not a factor. The party who has answered an incoming call can transfer it by simply dialing the desired station number without hanging up. When the called station answers, all three parties are connected together until the party who first answered hangs up. A call can be transferred only once by this method.

## SPECIAL SERVICE FEATURES

A complete description of optional special service features for North P.A.B.X. systems is contained on pages 17-20 of this section. The Type 30 Attendantless P.A.B.X. can be supplied with any of the following special service features: Automatic Code Call, Conference Service ("Meet-Me" type), Discriminating or Restricted Station Service, Executive Right-of-Way, Monitor Service, and Two-Party Service. If two-party service is elected, the maximum number of central office trunks which can be provided is reduced from five to four.

## EQUIPMENT

### STATION EQUIPMENT

Any standard dial equipped common battery telephones with straight line or 20 cycle ringers can be used for stations.

### TRUNK SIGNALS

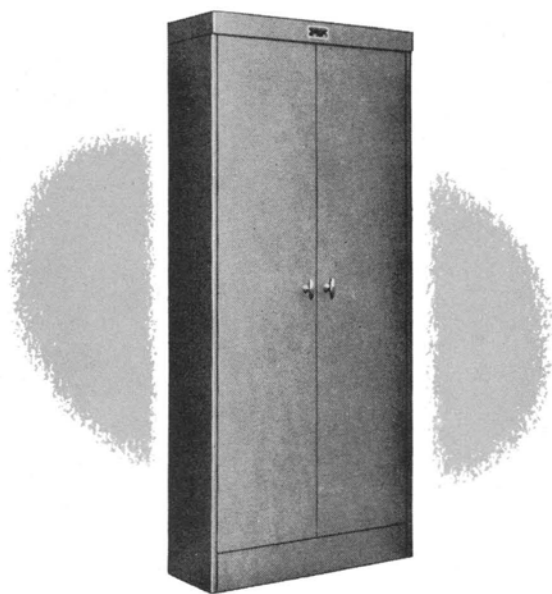
Audible trunk signals are standard 24 volt single stroke chimes or gongs. Visual trunk signals are small lamp panels, as illustrated, having a line lamp (red) and a hold lamp (green) associated with each of the numerals from "2" to "6". These numerals correspond with the code numbers of the trunks and the lamps when lighted, indicate the trunk to be answered or the trunk on which a call is being held. The



lamp panels may be surface or flush mounted. It is customary to mount the visual and audible signals together, placing the visual signal where it can be seen by one or more persons designated to answer incoming calls. Additional audible or visual trunk signals, if required, may be placed at other locations.

## SWITCHING EQUIPMENT AND POWER PLANT

The "All-Relay" switching equipment and the battery are mounted in a single metal cabinet, as illustrated. The dimensions of the cabinet, which is equipped with doors and finished in office grey are: height 6 feet 9 inches; width 3 feet; depth 12 inches. If the initial number of links specified does not exceed three, the battery charger is also mounted in the cabinet. If more than 3 links are required initially, a cabinet type battery charger designed for wall mounting is supplied.



The battery charger, a self-regulating, dry selenium disc unit, requires a standard source of A.C. 110 or 220 volts, 50 or 60 cycle, single phase. The relay equipment operates on 24 volts D.C., supplied by the battery. If the commercial power supply is reliable at all times, a battery eliminator can be used instead of the battery and charger.

### WIRING

Only two external conductors are required for each trunk and station line. However, if two-party service is specified, a third wire to ground is required at each two-party station. The line loops are operative up to 750 ohms.



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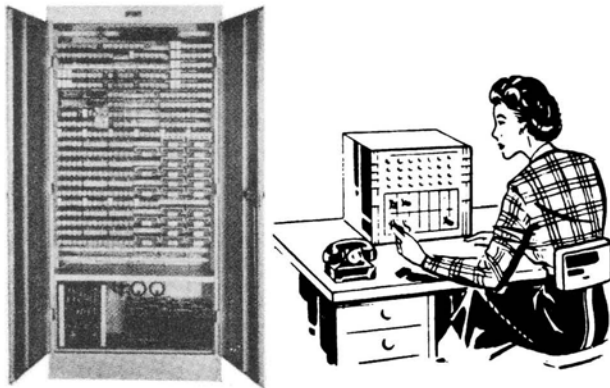
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# Type 30 "All-Relay" Attended P.A.B.X.

## GENERAL

The Type 30 Attended System has been developed to meet the demand for a small dial P.B.X. where an attendant, usually in conjunction with other duties, is to be used to intercept and extend incoming trunk calls and serve as local information operator. This P.A.B.X. has a maximum capacity of 30 lines (total of trunks, attendant's lines and station lines) and a standard capacity of 6 links or conversation paths and will provide an ideal telephone service arrangement for any of the various types of business establishments whose ultimate service requirements fall within those limitations. The switching equipment occupies a minimum of floor space and the cordless turret type attendant's cabinet (see Note below) requires less desk space than a typewriter, thus affording the attendant room for other work. The Type 30 P.A.B.X. can be arranged for operation with either automatic or manual common battery central office equipment.



### NOTE:

The Type 30 Attended P.A.B.X. is ordinarily supplied with a cordless type attendant's cabinet for desk mounting, the operation and specifications of which are described below. However, if specified, the Type 30 Attended system can be provided with a full multiple floor type attendant's cabinet. A full multiple attendant's cabinet with the Type 30 system would probably have application only in unusual instances where the incoming trunk traffic volume was abnormally disproportionate to outgoing and intercommunicating traffic and the ultimate

number of stations to be required. A full multiple attendant's cabinet supplied with a Type 30 P.A.B.X. would be identical in operation and specifications to that described for the Type 60 on page 11.

## OPERATION

The Type 30 Attended P.A.B.X. is extremely simple to operate. Secret Service is provided on trunk calls (except for monitoring which is possible only at the attendant's cabinet) and on intercommunicating calls. Dial and busy tones and automatic ringing are provided. The operation of the system is as follows:

### INCOMING TRUNK CALLS

An incoming call from the central office sounds a buzzer at the attendant's cabinet and lights a white lamp associated with the particular trunk carrying the call. The attendant, using a standard telephone instrument, answers the call by operating the associated trunk answer key. This releases the white lamp and lights a red lamp associated with the trunk. The attendant may extend the call to the desired station by operating a station dial key and dialing the station number. If the attendant does not wish to remain on the line to announce the call, she need only release the station dial and trunk answer keys. A green supervisory lamp associated with the trunk will light and remain lighted until the called station answers. If the called station fails to answer, the attendant would so notify the calling party and release the connection by operating the trunk hold and station release keys. If the called station answers, the green supervisory light goes out but the red trunk busy lamp remains lighted as long as the trunk is in use. After a through connection has been established, release of the trunk is under control of the P.A.B.X. station and the connection is automatically restored to normal when the party at the station hangs up. Before extending a trunk call to a P.A.B.X. station, the attendant may announce the call privately to the station by operating the trunk answer key to the hold position. She may also talk privately to the calling party or monitor and talk on the completed connection.

After a connection from a trunk to a P.A.B.X. station has been established, the station may recall the attendant

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by "flashing" the switch hook on the telephone. This causes the green supervisory lamp to light and the buzzer to sound. When the attendant answers, she may either reconnect the trunk to the same station, transfer the call to another station, or release the connection, as directed.

## OUTGOING TRUNK CALLS

No assistance from the attendant is necessary to originate a trunk call from any station not purposely restricted. To make a trunk call, the calling party dials a single digit, usually "0". This automatically connects the station to an idle central office trunk and lights the associated red trunk busy lamp on the attendant's cabinet. The calling party then proceeds to either dial the desired exchange number or give the number to the exchange operator, depending on whether the central office is automatic or manual.

When desired, as in keeping a record of long distance calls or providing special service to an executive, the attendant may handle outgoing trunk calls for a P.A.B.X. station. In these instances, the calling party reaches the attendant over an attendant's or "information" line, 2 of which are normally provided, by dialing a single digit, usually "9". The attendant originates the trunk call and when the connection has been established, extends the call to the P.A.B.X. station in the same manner as she would any incoming trunk call.

## INTERCOMMUNICATING CALLS

Calls between stations connected to the P.A.B.X. system are made without either the assistance or the knowledge of the attendant by simply dialing the two digit number assigned to the station wanted. The bells at the called station will automatically ring until the call is answered or the calling party hangs up. If the called station is busy, a busy tone will indicate that condition to the calling party.

## SPECIAL SERVICE FEATURES

A complete description of optional special service features for North P.A.B.X. systems is contained on pages 17-20 of this section. The Type 30 P.A.B.X. with turret type attendant's cabinet can be supplied with any of the following special service features: Automatic Code Call, Conference Service ("Meet-Me" or "Fixed Group"), Direct Line Service, Discriminating or Restricted Station Service, Executive Key Calling Service, Executive Right-of-Way, Monitor Service, Night Transfer Service, Pick-up Service, Two-Party Service, Universal Night Answering, Watchman's Recording Service and Watchman's Supervisory Service.

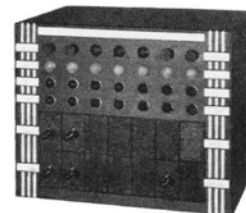
# EQUIPMENT

## STATION EQUIPMENT

Any standard telephones equipped with dials and straight line or 20 cycle ringers can be connected to the system.

## ATTENDANT'S CABINET

The small, cordless attendant's cabinet is attractively finished and of the following dimensions: height—12 $\frac{3}{8}$  inches; width—16 inches; depth—10 inches. Each trunk appearance consists of a combination trunk answer and hold key, a combination monitor and dial key, a night transfer key and call, busy and supervisory lamps with white, red, and green opals. Each appearance of an attendant's line consists of a call lamp and an answer key. One common station release key is provided.



## SWITCHING EQUIPMENT AND POWER PLANT

The "All-Relay" switching equipment and the battery are mounted in a steel cabinet finished in office grey. The cabinet has the following dimensions: height—6 feet 9 inches; width—3 feet; depth—12 inches. If the initial number of links does not exceed 3, the self-regulating

dry disc battery charger is also mounted in the cabinet. If more than 3 links are specified initially, a charger of greater capacity is supplied in a separate steel cabinet for wall mounting. A main distributing frame, with or without protectors as required, will be supplied if specified.



## WIRING

Each trunk and station line requires only 2 external conductors. If two-party service is specified, a third wire to ground is required at each two-party station. The line loops are operative to 750 ohms.



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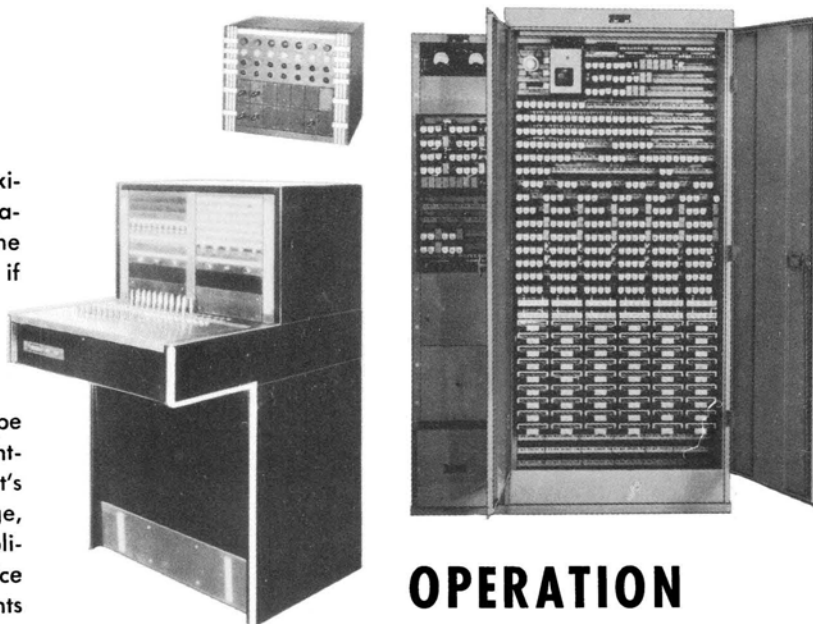
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# Type 60 "All-Relay" Attended P.A.B.X.

## GENERAL

The Type 60 Attended P.A.B.X. has a maximum capacity of 60 lines and an initial capacity of 6 links or conversation paths, the latter expandable to as many as 12 if necessary. Two attendant's or information lines are normally provided, although more than two can be provided if required. The system can be supplied with either a small turret type cordless attendant's cabinet for desk mounting or a full multiple floor type attendant's cabinet. In view of this specification range, the Type 60 Attended System has application for practically any customer service situation where the ultimate requirements fall within the 60 line ultimate limitation.

The attendant's cabinet to be specified for a particular installation should be determined by a study of the telephone traffic and an analysis of the characteristics of the business to be served. In instances where the volume of intercommunicating and outgoing traffic is considerably greater than the volume of incoming trunk calls and it is contemplated that the attendant will have some time for other duties, the desk or turret type attendant's cabinet is usually more desirable. When the turret type attendant's cabinet is used, the equipped trunks require one line terminal each and thus the capacity of the system is a combined total of 60 station lines, attendant's lines, and trunks. Also, a link is used to extend an incoming call from the turret type attendant's cabinet. If the customer's incoming traffic volume is substantial or for other reasons it is contemplated that the attendant's full time will be utilized by telephone duties, the full multiple floor type attendant's cabinet is indicated. With the full multiple attendant's cabinet, no line terminal is required for central office trunks and thus the capacity of the system is a combined total of 60 station lines and attendant's lines. Also, link requirements are less with the full multiple attendant's cabinet as incoming trunk calls are extended by plugging directly into the station line multiple and thus do not employ a link.



## OPERATION

The Type 60 Attended System, irrespective of type of attendant's cabinet used, provides Secret Service on all calls and is equipped with dial and busy tones and automatic ringing. In the case of systems with a turret type attendant's cabinet, the answering, extending and transferring of incoming calls and the making of interoffice and outgoing trunk calls is accomplished in the identical manner and with the same ease as described on pages 7 and 8 for the Type 30 P.A.B.X. with turret type attendant's cabinet.

The operation of the Type 60 P.A.B.X. equipped with a full multiple attendant's cabinet is as follows:

## INCOMING TRUNK CALLS

An incoming call from the central office sounds a buzzer and lights a white trunk call lamp, a red trunk busy lamp and a common trunk pilot lamp at the attendant's cabinet. The attendant, using either an operator's headset or a regular telephone transmitter-receiver unit, answers the call by plugging an answer or trunk cord into the trunk jack and operating the talking key associated with the cord. The white trunk call lamp (and the trunk pilot lamp if no other unanswered trunk calls are standing) goes out but the red trunk busy lamp remains lighted. If the call is to be extended to a P.A.B.X. station, the attendant plugs the calling or station

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cord of the cord pair being used into the proper station line jack and, if the line is idle, operates the ringing key associated with the cord. A supervisory lamp associated with the calling or station cord, as well as the common cord pilot lamp, will light as soon as the cord is plugged into the station line jack and will remain lighted until the called party answers. If the attendant desires to announce the call to the P.A.B.X. party without being heard by the calling party, she may do so by remaining on the line, releasing the talking key and operating the split key. When the P.A.B.X. station hangs up after an incoming trunk connection has been established, both the supervisory lamp associated with the calling or station cord and the common cord pilot lamp will light and the buzzer will sound. The attendant then removes both cords from the jacks. If desired, the buzzer may be disconnected by means of a key during periods while the attendant is in position to observe the lamp signals.

After a connection from a trunk to a P.A.B.X. station has been established, the station may recall the attendant at any time by "flashing" the switch hook on the telephone. This causes the supervisory lamp to light and the buzzer to sound.

## OUTGOING TRUNK CALLS

Except for calls from restricted stations, outgoing calls are entirely automatic and do not require the services of the attendant. To make a trunk call, the calling party dials a single digit, usually "0", and this automatically connects the station to an idle central office trunk. The calling party then proceeds to either dial the desired exchange number or give the number to the exchange operator, as appropriate. If all trunks are in use, a busy tone indicates that condition. The red trunk busy lamp associated with each trunk appearance on the attendant's cabinet lights when the associated trunk is seized and remains lighted while the trunk is busy.

The attendant may handle an outgoing trunk call for any P.A.B.X. station (even if restricted) if authorized to do so. This is accomplished by the calling party dialing the attendant over one of the attendant's (information) lines and giving the necessary instructions. The attendant would ordinarily release the P.A.B.X. station and then plug into an idle trunk jack and establish the connection. Having reached the desired party, the attendant would extend the call to the P.A.B.X. station in the same manner as extending an incoming call. It is possible to connect a P.A.B.X. station, calling over an attendant's line, directly to a central office trunk but this is not a recommended practice as the attendant's line used would be tied up for the duration of the call.

## INTERCOMMUNICATING CALLS

Intercommunicating calls are entirely automatic and are made from any station by simply dialing the assigned two digit number of the station wanted. This automatically rings the bells of the called telephone at regular intervals until the call is answered or until the calling party hangs up. If the called station is busy, a busy tone announces that condition to the calling party.

## SPECIAL SERVICE FEATURES

A complete description of optional special service features for North P.A.B.X. systems is contained on pages 17-20 of this section. The Type 60 P.A.B.X. can be supplied with any of the following special service features: Automatic Code Call, Conference Service ("Meet-Me" or "Fixed Group"), Direct Line Service, Discriminating or Restricted Station Service, Executive Key Calling Service, Executive Right-of-Way, Monitor Service, Night Transfer Service, Pick-Up Service, Two-Party Service, Universal Night Answering, Watchman's Recording Service, and Watchman's Supervisory Service. If a full multiple attendant's cabinet is specified, "Patched" Conference Service can also be supplied.

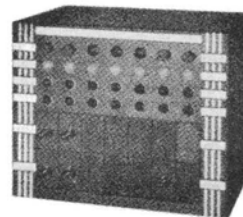
## EQUIPMENT

### STATION EQUIPMENT

Any standard telephones equipped with dials and straight line or 20 cycle ringers can be connected to this system.

### TURRET TYPE ATTENDANT'S CABINET

This attendant's cabinet is a small cordless turret, as illustrated, attractively finished and of the following dimensions: height—12 $\frac{3}{8}$  inches; width—24 inches; depth—10 inches. Each trunk appearance consists of a combination trunk answer and hold key, a combination monitor and dial key, a night transfer key and call, busy and supervisory lamps with white, red and green opals. Each appearance of an attendant's line consists of a call lamp and an answer key. One common station release key is provided.



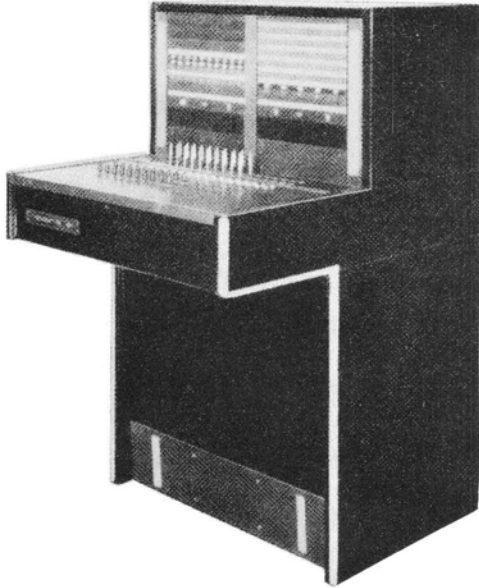
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## FULL MULTIPLE ATTENDANT'S CABINET

The full multiple floor type attendant's cabinet employs a two panel section with key shelf, as illustrated. The cabinet is sturdily constructed of steel and finished in durable black. Its dimensions are: height—50 inches; width—27 $\frac{3}{8}$  inches; depth (overall)—32 inches. Station line multiple jacks are grouped on one face panel in



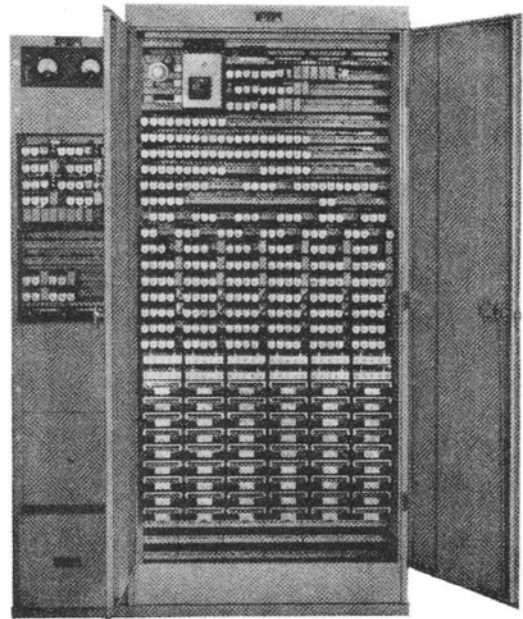
strips of 20. No station line lamps are necessary. Jacks for central office trunks and attendant's lines are grouped on the other face panel in strips of 10. A white call lamp and a red busy lamp are provided for each trunk and a white call lamp for each attendant's line. If trunks are to be patched to station lines while no attendant is on duty, a "night" jack will be provided for each trunk to be patched.

The full multiple attendant's cabinet can be provided with any number of cord pairs specified up to 15. Associated with each cord pair are trunk and supervisory lamps and 2 two-way keys. One of the two-way keys locks in one position for dialing or talking and is non-locking in the opposite position for ringing. The other two-way key locks in one position for night patching and in the opposite position when used for splitting. Three common lamps are provided on the face of the attendant's cabinet, one a trunk pilot, one a cord pilot and one a fuse alarm pilot. Easy access is provided to the wiring and equipment inside the attendant's cabinet by the hinged key shelf and by the removable back. Relays for the cord circuits are mounted on a swinging gate in the back.

## SWITCHING EQUIPMENT AND POWER PLANT

The "All-Relay" switching equipment for 60 lines and 6 links is housed in a single metal cabinet having the following dimensions: height—6 feet 9 inches; width—3 feet; depth—12 inches. The cabinet is finished in office grey and equipped with doors. If more than 6 links are required, a second cabinet of identical dimensions is provided.

A power board mounts the trunk relay equipment, the power panel and self-regulating, dry disc battery charger. The dimensions of the power board are: height—6 feet 9 inches; width—19 inches, depth—12 inches. A steel tier type battery rack, which occupies floor space approximately 48 by 12 inches, is furnished to hold the batteries. Batteries provided are of ample capacity for the equipment specified and provide 48 volts, D.C. for operation of the relay equipment. A



standard source of A.C. 110 or 220 volts, 50 or 60 cycles, single phase, is required for the battery charger. If the commercial power source is reliable at all times, a battery eliminator can be specified instead of the battery and charger.

## WIRING

Only 2 external conductors are required for each trunk and station line unless two-party service is specified. A third wire to ground is necessary at each two-party station when this special service feature is to be provided. All line loops are operative up to 750 ohms.

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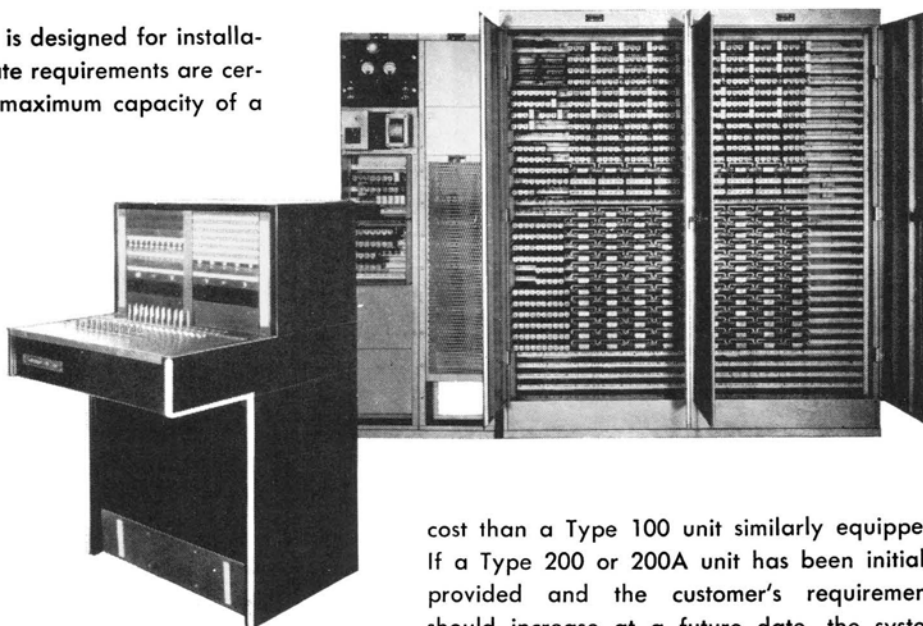


# Type 100 "All-Relay" Attended P.A.B.X.

## WITH FULL MULTIPLE ATTENDANT'S CABINET

### GENERAL

The Type 100 Attended P.A.B.X. is designed for installations where the customer's ultimate requirements are certain not to exceed the system's maximum capacity of a combined total of 100 station lines, attendant's lines and trunks. (See Note below) The Type 100 P.A.B.X. is supplied with a full multiple, floor type attendant's cabinet and has a normal capacity of 10 links or conversation paths. However, additional links as required can be provided. The attendant's cabinet supplied with this unit is identical to the one used with the Type 60 system and the information pertaining to it on page 11 is likewise applicable to the Type 100 system. This system can be arranged for operation with automatic, manual common battery or magneto central offices.



cost than a Type 100 unit similarly equipped. If a Type 200 or 200A unit has been initially provided and the customer's requirements should increase at a future date, the system can be added to as necessary to meet the additional needs. Similarly, there may be instances where the customer's ultimate requirements will exceed 200 lines, in which event the initial choice should be the Type 1000 unit described on page 16.

The Type 1000 unit can also be provided with any initial equipment specified, even though it would be less than 100 lines, and while the cost of the first unit would be substantially higher than that of a Type 100 system, it would prove to have been the economical choice in the end. In choosing a Type 1000 P.A.B.X. in such a situation, some part of the decision should rest with the customer as the Type 1000 utilizes selectors for which additional monthly charges ordinarily apply.

### NOTE:

In all instances where the Type 100 P.A.B.X. appears to be indicated for an installation by reason of present traffic volume and normal growth expectations, consideration should be given to the possibility of some change in the characteristics of the customer's business which would substantially increase his service requirements at a later date. The Type 100 system cannot be expanded economically beyond its capacity as set forth above. However, the Types 200 or 200A P.A.B.X., described on page 14 of this section, can be provided with initial equipment to meet the customer's requirements even though less than 100 lines at slightly more initial

### OPERATION

The operation of the Type 100 P.A.B.X. is identical to that of the Type 60 with full multiple attendant's cabinet, described on page 9.



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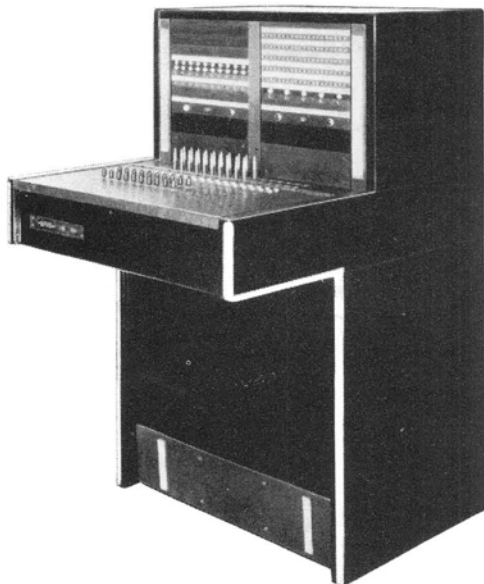
## EQUIPMENT

### STATION EQUIPMENT

Any standard telephones equipped with dials and straight line or 20 cycle ringers can be connected to this system.

### FULL MULTIPLE ATTENDANT'S CABINET

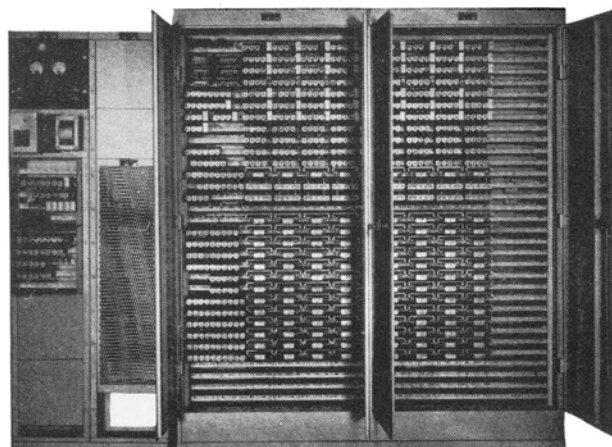
The full multiple attendant's cabinet is identical with the attendant's cabinet described for the P.A.B.X. 60 excepting that in the instances of the P.A.B.X. 100, P.A.B.X. 200A and P.A.B.X. 1000, more than one position of attendant's cabinet equipment may be required. The dimensions of the additional positions are the same as that of the first position described with the P.A.B.X. 60.



### SWITCHING EQUIPMENT AND POWER PLANT

The "All-Relay" switching equipment for 100 lines and 10 links is contained in an office grey finished steel cabinet having the following dimensions: height—6 feet 9 inches; width—6 feet; depth—12 inches. For purposes of accommodating a floor plan, this equipment can be housed in two separate cabinets, each with the fol-

lowing dimensions: height—6 feet 9 inches; width—3 feet; depth—12 inches. If more than 10 links are required, additional cabinets having a capacity of 6 links each are furnished. These cabinets have the following dimensions: height—6 feet 9 inches; width—3 feet; depth—12 inches.



A power board mounts the miscellaneous relay equipment, the power panel and the ringing equipment. The power board has the following dimensions: height—6 feet 9 inches; width—19 inches; depth—12 inches. A separate frame is furnished to mount the self-regulating selenium dry disc battery charger when necessary. The dimensions of this frame are: height—6 feet 9 inches; width—19 inches; depth—12 inches. A cabinet, height—6 feet 9 inches; width 18 $\frac{3}{4}$  inches; depth—12 inches, houses the city trunk relay equipments, information trunks, code calls, tone relays, ringing interrupter and other special service equipments. Batteries of ample capacity for the equipment are provided for 48 volt power supply. A standard source of 110 or 220 volts A. C. of 50 or 60 cycles, single phase, is required for the battery charger. It is usually advisable to furnish a battery rather than a battery eliminator for switchboards of this size. A battery rack of steel tier construction requiring approximately 60 inches by 12 inches floor space is provided for this system. A floor type main distributing frame with or without protectors as specified will ordinarily be supplied with the system.

### WIRING

Only 2 external conductors are required for each trunk and station line unless two-party service is specified. A third wire to ground is necessary at each two-party station when this special service feature is to be provided. All line loops are operative up to 750 ohms.

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# Types 200 and 200 A "All-Relay" Attended P.A.B.X.'s

## GENERAL

The Types 200 and 200A "All-Relay" Attended P.A.B.X. systems are identical in function and operations but differ to a considerable extent in the arrangement of the switching equipment in the cabinets and in floor plan layouts (see Note below). Both systems have a maximum capacity of 200 lines (combined total of station lines, attendant's lines and trunks) and an initial capacity of 19 links. On either system, links in excess of 19 can be provided if required. Both the Type 200 and Type 200A systems are supplied with full multiple attendant's cabinets and can be provided with any number of trunks and information or attendant's lines required. These systems are both of the "broad-span" type which provides up to 200 lines of access in each line finder or connector, thus making them unusually economical and efficient for use where it is anticipated that the customer's ultimate requirements will exceed 100 lines but will not exceed 200 lines. The full multiple floor type attendant's cabinet, supplied with Types 200 and 200A systems, may be a one position unit or larger if required. Whether it is one position or larger, its operation will be identical to that described for the full multiple attendant's cabinet with the Type 60 P.A.B.X. on pages 9-11. Either of the Type 200 systems can be provided for connection to automatic, manual common battery or magneto central offices.

### NOTE:

Full information concerning the difference in the arrangement of the automatic switching equipment in the Type 200 and Type 200A systems, as well as the merits of each arrangement, is contained under the "Equipment" section below. A review of this information will be helpful in deciding which of the two arrangements is more economical for a particular installation.

## OPERATION

The operation of the Type 200 and Type 200A P.A.B.X.'s is identical to that of the Type 60 and Type 100 with full multiple attendant's cabinet.

## EQUIPMENT

### STATION EQUIPMENT

Any standard telephones equipped with dials and straight line or 20 cycle ringers can be connected to this system.

### FULL MULTIPLE ATTENDANT'S CABINET

Identical with P.A.B.X. 100.

### SWITCHING EQUIPMENT AND POWER PLANT FOR P.A.B.X. 200

#### First Cabinet "All-Relay" Switching Equipment

The first unit of the P.A.B.X. 200, fully equipped, contains 100 lines and 10 links and has the following dimensions: height—6 feet 9 inches; width—6 feet, depth—12 inches.



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## **Second Cabinet "All-Relay" Switching Equipment**

The second unit has the same dimensions as the first unit. Fully equipped, it will contain an additional fifty lines, an additional 6 links and the extension multiple (or levels) for 50 lines for links 1 to 10 inclusive contained in the first unit. Thus, fully equipped the installation of the first and second units provides for 150 lines and 16 links.

## **Third Cabinet "All-Relay" Switching Equipment**

The third cabinet has the same dimensions as the first and second. Fully equipped, the unit contains an additional 50 lines, an additional 3 links and the extension multiple for the additional 50 lines, for links 1 to 10 inclusive in cabinet one and links 11 to 16 inclusive in cabinet two. The addition of the third cabinet brings the system to its full capacity of 200 lines, 19 links. In general the P.A.B.X. 200 layout is desirable when lines and links are installed in normal ratio to one another and increases in lines and links are expected to be made retaining the same normal ratio. Under these circumstances, growth can be provided for without unnecessary or premature expenditure for empty cabinet space. With the exception of the charger, the power board and the miscellaneous relay cabinet are identical with those furnished on the P.A.B.X. 100. When 13 or less links are equipped, a single self-regulating, dry disc selenium charger unit, height—6 feet 9 inches, width—14 inches, depth—12 inches, is provided. At the time 14 or more links are equipped, a second charger unit of the same dimensions and type is provided to operate in parallel with the first charger. Battery of ample capacity is furnished. A battery rack of steel tier construction requiring approximately 60 inches by 12 inches floor space is provided for this system. A floor type main distributing frame with or without protectors as specified, will ordinarily be supplied with the system.

## **SWITCHING EQUIPMENT AND POWER PLANT FOR P.A.B.X. 200A**

### **First Cabinet "All-Relay" Switching Equipment**

The first cabinet or unit of the P.A.B.X. 200A, fully equipped, contains 100 lines and 6 links with space

provided for the full multiple in completely equipped 200 line links. The dimensions are as follows: height—6 feet 9 inches, width—6 feet, depth—12 inches.

### **Second Cabinet "All-Relay" Switching Equipment**

The second cabinet has the same dimensions as the first and fully equipped, contains 100 lines and 6 links and space for the full 200 line link multiple in each of the 6 links. Thus, the first two units of the P.A.B.X. 200A have a total capacity of 200 lines, 12 links.

### **Third Cabinet "All-Relay" Switching Equipment**

The third cabinet has the same dimensions as the first and second and contains, fully equipped, 7 additional links with their complete multiple. When all three cabinets are installed, fully equipped, the system is brought to its full capacity, 200 lines, 19 links. On either the P.A.B.X. 200 or the P.A.B.X. 200A, one or more cabinets can be installed initially with partially equipped lines and links up to the capacity of the units and additions made later as required.

The advantage of the P.A.B.X. 200A over the P.A.B.X. 200 is first one of arrangement in that each link is complete within the cabinet in which it is located. When a switchboard is being ordered initially equipped with 151 to 200 lines, it is never any question but that the P.A.B.X. 200A is the proper choice. When the initial requirement is for a large number of lines and relatively few links, the P.A.B.X. 200A will again offer an advantage over the P.A.B.X. 200.

The power board and miscellaneous equipment are identical with the equipment furnished for the P.A.B.X. 200.

## **WIRING**

Only 2 external conductors are required for each trunk and station line unless two-party service is specified. A third wire to ground is necessary at each two-party station when this special service feature is to be provided. All line loops are operative up to 750 ohms.

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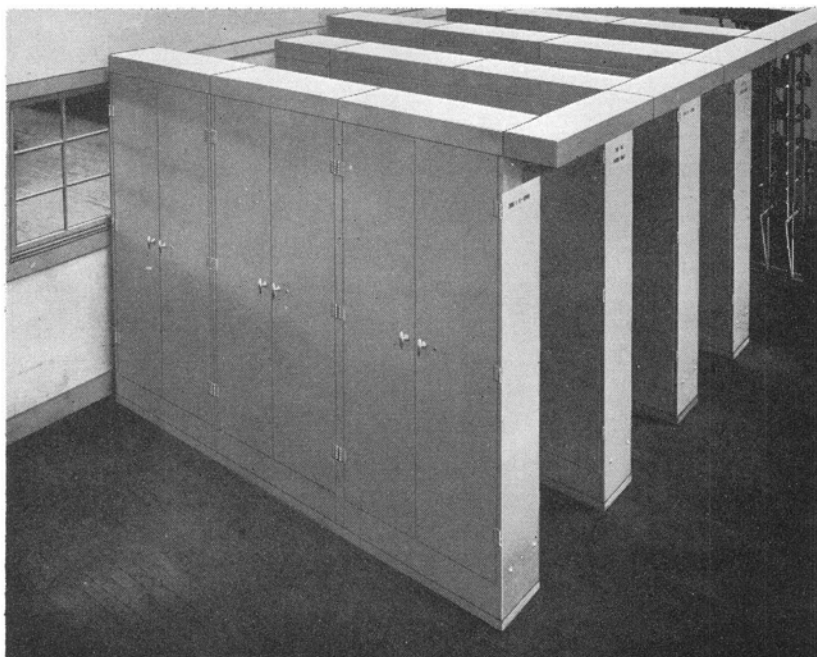


# Type 1000 "All-Relay" Attended P.A.B.X.

## WITH FULL MULTIPLE ATTENDANT'S CABINET

### GENERAL

The Type 1000 P.A.B.X. system, which can be provided with any number of lines from 10 to 1000 or more, offers maximum flexibility for installations where there is a probability of the customer's ultimate requirements exceeding 200 lines at any future time or where 200 or more lines of equipment are needed for the initial installation. The Type 1000 unit is usually arranged for a maximum capacity of 700 lines, 70 selector links and 70 connector links, although these capacities can be expanded to provide any number of lines or links required for any customer service situation. If a customer's requirements should ultimately exceed the system's planned capacity, no great difficulty or excessive expense will be involved in revising the system to meet the expansion. On the Type 1000 P.A.B.X., outgoing trunk calls are accessed over selector levels. This system can be arranged for connection to automatic, manual common battery or magneto central offices.



### OPERATION

The operation of the Type 1000 P.A.B.X. is identical to that of the P.A.B.X. 60, the P.A.B.X. 100 and the P.A.B.X. 200 and 200A.

### EQUIPMENT

#### STATION EQUIPMENT

Any standard telephones equipped with dials and straight line or 20 cycle ringers can be connected to this system.

#### FULL MULTIPLE ATTENDANT'S CABINET

Identical with P.A.B.X. 100 and P.A.B.X. 200A.

#### SWITCHING EQUIPMENT AND POWER PLANT

The "All-Relay" Switching Equipment for one group of 100 lines, 10 line finders and 10 connectors is mounted

in a cabinet. Dimensions: height—6 feet 9 inches, width—6 feet, depth—12 inches. The relay equipment for 10 selectors associated with a 100 line group is mounted in a second cabinet, dimensions: height—6 feet 9 inches, width—3 feet, depth—12 inches. If more than 10 line finders, selectors and connectors are required, additional units, height—6 feet 9 inches, width—3 feet, depth—12 inches, will accommodate 6 additional line finders and connectors for the group. A cabinet of the same size will accommodate 10 additional selectors. Ordinarily for each 100 lines equipped, only the first two units described are required. The power and miscellaneous equipment mountings are approximately the same as those furnished with the P.A.B.X. 200 and P.A.B.X. 200A switchboards. When systems are initially equipped with 200 to 250 lines, it is generally advisable to furnish a motor generator with starting and control equipment for charging the battery. A floor type main distributing frame with or without protector as specified is ordinarily furnished.

For maximum economy, consult a North sales engineer before you formulate exact specifications.

#### WIRING

Only 2 external conductors are required for each trunk and station line unless two-party service is specified. A third wire to ground is necessary at each two-party station when this special service feature is to be provided. All line loops are operative up to 750 ohms.



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# Optional Special Service Features

North "All-Relay" P.A.B.X. systems can be equipped with a variety of "built-in" special service arrangements to meet the particular requirements of the customer to be served. Below is a description of the functions and operation of the special service features most frequently specified. Other special P.A.B.X. service arrangements to meet unusual customer requirements can also be provided and inquiries concerning such are invited and will be accorded prompt attention.

## AUTOMATIC CODE CALL

Automatic Code Call is a P.A.B.X. adjunct service of inestimable value to any customer whose plant is sufficiently large to make it difficult to locate key personnel when they are away from their telephone stations. With this service arrangement, organization executives and others whose duties prevent them from being at regular locations at all times can be automatically paged through the P.A.B.X. system. Code call signals, strategically located throughout the customer's premises, are so automatically operated by either the P.A.B.X. attendant or by a party at any P.A.B.X. station.

To operate the code call system, either the attendant or the calling party using a P.A.B.X. station dials a two digit "code call" number, followed by the two digit code number assigned to the individual being called. All code signals begin to operate and continue to do so until the called party answers by dialing a two digit "code answer" number from any P.A.B.X. station or until the calling party hangs up. When the individual being paged answers, connection is automatically established with the calling party.

Automatic code call equipment is available in 6 code, 36 code and 100 code capacities. Visual or audible signals, or both, can be provided to meet the customer's requirements. Audible signals are to be employed over a large area, power relays, each capable of controlling a maximum of 12 signals, are used.

Automatic code call service requires the use of two P.A.B.X. station line terminals and reduces the ultimate capacity of the P.A.B.X. system accordingly. The service can be provided for any North P.A.B.X. System (but not for the Push-Button P.B.X.)

## CONFERENCE SERVICE

Conference Service is an indispensable arrangement for many types of P.A.B.X. customers. The service permits a number of P.A.B.X. stations to be connected together on a common talking circuit for conference purposes. There are three different P.A.B.X. conference service arrangements available, the one to be specified depending on the type of P.A.B.X. equipment to be provided and on the customer's preference. All three conference service arrangements are generally similar but differ somewhat in operation, as follows:

### "MEET-ME" CONFERENCE SERVICE

This type of conference arrangement is available for all North P.A.B.X. systems, attended or attendantless. "Meet-Me" conference enables any of a specific group of P.A.B.X. stations (usually not in excess of 5) to connect to a conference circuit at will by dialing a special conference number. With this conference arrangement, the parties to confer usually arrange an exact time when the conference is to be held and meet on the circuit at that time. Access to the conference circuit employs a link, but the link is released as soon as the calling party connects to the conference circuit. Any conference station can enter or leave the conference at any time. A modification of the "Meet-Me" Conference feature permits any P.A.B.X. station on the system to dial into the conference circuit. However, this arrangement has the disadvantage of requiring engagement of a link for the duration of the conference for each station connected to the conference circuit. A combination "Meet-Me" conference arrangement providing for link release for a specified group of P.A.B.X. stations most frequently using the service and for access by use of a link for each other P.A.B.X. stations conferring can also be provided.

### "FIXED GROUP" OR EXECUTIVE CONFERENCE SERVICE

This type of conference arrangement, available for all North attended P.A.B.X. systems, is essentially an execu-

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tive or emergency conference service. "Fixed Group" conference service permits a fixed number of conference stations to be called into conference instantly from one or more "control" stations, even though some stations are in use at the time the conference is initiated. A control station establishes a conference connection by dialing a two digit number, which acts to immediately connect all other conference stations, control or non-control, onto the conference path. A steady ring at all conference stations identifies a conference call. If any stations in the conference group are in use on regular calls when a conference call is initiated, these calls are immediately disconnected and their station lines automatically transferred to the conference circuit.

If desired, attractive lamp annunciator cabinets may be provided for one or more conference control stations. With this equipment, which is designed for desk mounting, a lamp is provided for each conference station. These lamps light as the associated stations answer and go out when the stations leave the conference.

## PATCHED CONFERENCE

This type of conference arrangement, available for all North P.A.B.X. systems with full multiple attendant's cabinets, is preferred by many customers because of its flexibility. Patched Conference Service permits the attendant to patch any group of stations, consistent with its capacity, onto a common conference circuit by means of a special set of jacks on the attendant's cabinet.

The arrangement usually consists of a strip of 5 conference jacks, allowing the connection of 5 P.A.B.X. stations or 4 stations and one trunk, although a larger group can be provided if specified.

When a party at any station or on a trunk requests that a conference be set up, the attendant inserts one plug of a regular cord pair into one of the conference jacks and the other plug of the cord pair into the line jack of the station or trunk requesting the conference. This procedure is repeated with a separate cord pair for each of the stations which are to be joined in the conference. The attendant then rings each station involved in turn and announces the call. The cord supervisory lamp will indicate to the attendant when each station enters or leaves the conference, thus enabling the cords to be taken down as they become idle.

## DIRECT LINE SERVICE

Direct Line Service is an arrangement designed for special situations where, because of the frequency of calls or for some other reason, it is desirable that two P.A.B.X. stations can be connected without dialing. With

direct line service, either of the two stations may call the other by simply lifting the receiver or handset unit. This causes the bell at the other station to ring intermittently until answered or until the calling party hangs up.

This service requires a separate circuit between the 2 stations. The direct line may terminate on separate non-dial telephone instruments at each location or, by the use of separate ringers and switching keys, on the regular P.A.B.X. station instruments. Any number of direct line arrangements can be provided on any North P.A.B.X. system, but each is restricted to 2 locations and each is distinct from the others.

## DISCRIMINATING OR RESTRICTED STATION SERVICE

Discriminating or Restricted Service is not actually a special service feature requiring special equipment but rather a wiring arrangement by which designated stations can be restricted from originating other than intercommunicating calls. The restriction is imposed on any station by a minor wiring change in the equipment and can thus be readily altered from time to time to meet changing requirements. A restricted station can make an outgoing trunk call with the assistance of the attendant.

Another variation of restricted service, possible where a P.A.B.X. is to be connected with an automatic central office, would prevent any P.A.B.X. station from dialing "Long Distance" directly, thus requiring such calls to be placed with the attendant and properly recorded. This restriction from reaching "Long Distance", if specified, would govern all stations on the P.A.B.X.

The value of these methods in controlling personal telephone calling and unauthorized long distance usage makes it an attractive feature for many P.A.B.X. customers.

## EXECUTIVE KEY CALLING SERVICE

Executive Key Calling Service is an arrangement, available for all North attended P.A.B.X. systems, which enables an executive to call individually any one of a pre-assigned group of P.A.B.X. stations, usually not more than 20, by operating keys in a small cabinet provided at the executive station. The cabinet, attractively designed and made for desk mounting, is equipped with a key for each station included in the service arrangement. The executive, by depressing the proper key, signals the wanted station and causes its bells to ring continuously until answered or until the key is released.



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## EXECUTIVE RIGHT OF WAY

Executive Right-of-Way is a special service arrangement available for all North P.A.B.X. systems which has application in any situation where it is necessary that certain executives or others be able to reach any P.A.B.X. station at any time, even though the station is in use. Stations equipped with executive right-of-way can gain access to any other stations even though they are busy by simply dialing the station number in the usual manner. If a conversation is already in progress on the called station, connection is automatically established with the right-of-way station.

Ordinarily locations to be provided with this special service also have a regular P.A.B.X. station line. When this is done, a separate circuit is required for both the regular P.A.B.X. line and the executive right-of-way line. Both lines may be terminated in the same instrument and a two-way key used for line selection. Having both lines allow normal calls to be made over the regular line and the right-of-way privilege to be used only when it is imperative that a call to a busy station be completed without delay.

## MONITOR SERVICE

Monitor Service, which can be provided for all North P.A.B.X. systems, is an arrangement permitting supervision of certain designated P.A.B.X. station lines and trunks from special monitoring positions. This feature will frequently be required by business offices as an aid in training personnel in public contact work and by schools, penal institutions and other organizations for supervisory purposes.

A small cabinet equipped with a lamp and a key for each line to be observed and using a telephone having a transmitter cutout button is provided at the monitoring station. The lamps on the cabinet indicate when stations or trunks included on the Monitor arrangement are engaged. The supervisor may then operate a key associated with the line in use and, without disturbing the conversation, listen in on the line. The Monitor may also go in on the conversation if desired.

## NIGHT TRANSFER SERVICE

Night Transfer Service, available on all North attended P.A.B.X. systems, is an arrangement which permits trunk

calls to be transferred directly to P.A.B.X. stations during periods when the operator is absent from the attendant's cabinet. This feature will be required by many P.A.B.X. customers so that departments where personnel having occasion to work during hours when the attendant is not on duty can make and receive trunk calls.

The attendant upon leaving the switchboard, by operating keys in the case of a turret type attendant's cabinet or by patching with regular cords in the case of a full multiple attendant's cabinet, connects designated central office trunks directly to P.A.B.X. stations. Each station so connected can answer incoming calls and originate calls on that particular trunk. A P.A.B.X. station patched to a trunk cannot make or receive intercommunicating calls.

## TWO-PARTY SERVICE

Two-Party Service, available for all North P.A.B.X. systems, permits the use of full selective ringing for signalling either of two stations on a single station line. This service has application in a variety of cases, as for example where an executive wants his secretary to be on his line to answer calls and screen those which he does not wish to accept. In such an arrangement, the executive station could have a different number and ring and the number be given out only to parties privileged to call directly and without interception by the secretary. The service is non-reverting—that is, one telephone on the line cannot dial the other telephone on the line. A third wire running to a ground connection, is required for each two-party station.

## PICK-UP SERVICE

Pick-up Service is a convenient arrangement which permits P.A.B.X. stations so equipped to be answered from any other P.A.B.X. station on the system. This service, which can be provided for one or more stations on any North attended P.A.B.X. system, has unusual application in instances where persons are required by their duties to be absent from their desk but are usually within hearing distance of their telephone bells. To pick-up a station at another station, the answering party dials a special two digit number and the connection is automatically established.

**THE NORTH ELECTRIC MANUFACTURING COMPANY**

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## ROTARY LINE SERVICE

Rotary Line Service is available for all North P.A.B.X. systems. One or more rotary groups, each consisting of from 2 to 10 station lines, can be provided as specified. A wide range of P.A.B.X. customers require this service arrangement which allows efficiency in calling offices and departments where the traffic volume requires that it be served with two or more station lines.

Rotary service lines are assigned consecutive numbers, the first number of the group being designated the pilot number. All calls are directed to the pilot number but if it is busy, the call is automatically transferred to the first idle line in the rotary group. If all lines in the group are busy, a busy signal indicates that condition in the usual manner.

## UNIVERSAL NIGHT ANSWERING

Universal Night Answering is a special service arrangement available for all North P.A.B.X. systems which permit any P.A.B.X. station to answer a trunk call during periods when no operator is on duty at the attendant's cabinet. This service arrangement is a valuable feature in the case of organizations wanting to be able to reach an employee such as the watchman who is on duty during periods when the switchboard is not attended but may be at any of several places on the premises. Audible trunk signals are ordinarily provided at strategic locations throughout the premises. Anyone hearing the trunk signals can answer a call by simply dialing an assigned single digit code at any P.A.B.X. station.

## WATCHMAN'S RECORDING SERVICE

Watchman's Recording Service is an unique arrangement which enables a watchman on tour to record his activities by simply dialing an assigned number from each of certain designated P.A.B.X. stations. Each report call made by the watchman is registered on a recording tape, which also shows the time the call was made. A further adaptation of this special service which includes an alarm which sounds if the watchman should fail to make his report call from any of the P.A.B.X. stations within a predetermined period of time or in correct sequence. The possibilities of this service, available for all North P.A.B.X. systems, in meeting vital customer need, are unlimited.

## WATCHMAN'S SUPERVISORY SERVICE

Watchman's Supervisory Service is a reporting arrangement similar to Watchman's Recording Service but having application in instances where a supervisor is also on duty. A lamp annunciator panel is provided for mounting in a position where it can be easily seen by the supervisor. Each time the watchman on tour makes a report call from a P.A.B.X. station, a lamp on the panel associated with that station lights. The equipment can be so arranged that an audible signal sounds in the supervisor's office each time a call is made, permitting the supervisor to talk to the watchman on a special line provided for the purpose. Watchman's Supervisory Service is available for all North Attended P.A.B.X. systems.



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