

TELEPHONE BELLS AND AUXILIARY SIGNALS

GENERAL

Three types of signals are used with telephone service on the customer's premises:

1. Signals to notify people of incoming calls, known as line signals.
2. Signals to indicate when the line is in use, known as busy signals.
3. Push button and buzzers for signaling between telephones on the premises. Used mainly by one telephone user to request another to answer a certain central office, private branch exchange, or intercommunicating line.

LINE SIGNALS

TWO KINDS OF LINE SIGNALS—There are two kinds of line signals to indicate incoming calls.

1. Signals operated by the regular ringing current from the central office or private branch exchange (PBX).
2. Signals which require special control equipment and a source of electric power in addition to the ringing current. These are known as station auxiliary line signals.

SIGNALS OPERATED BY RINGING CURRENT—The regular telephone bell, the extension bell, the extension gong, and the 21-type lamp indicator are operated by ringing current. They are illustrated and described in the exhibits.

Ordinarily at least one regular bell should be permanently connected to each central office line. The exception is that when several central office lines terminate in 1-A key telephone systems, in 100 or 101 key equipment, one bell or buzzer common to all the lines may be used together with individual lamp signals.

It is not necessary to have a permanently connected bell on each PBX line.

The 21-type lamp indicator is used to supplement the regular bell. It is never used alone without an audible signal.

Sometimes more than one bell per line is required, that is, one or more extension bells, or several regular bells associated with extension telephones. However, one bell for each telephone on a line may not be required when the telephones are close together, for example, in the same room or office.

A maximum of four line signals operated by ringing

current may be permanently connected to an individual central office or a PBX line. Four such signals may be used by each party on a two-party line, and two by each party on a four-party line. For example, a regular bell, an extension bell, an extension gong, and a 21-type lamp indicator may be connected to a central office one-party line; or, one regular bell, an extension gong, and two 21-type lamp indicators.

When station auxiliary line signals, described below, are associated with a line, one signal control equipment (per line) is required. This control equipment reduces by one the maximum number of line signals per line operated by ringing current. For example, an individual line with three ordinary bells and one station auxiliary signal control equipment would have the equal of the maximum number of four signals operated by ringing current.

STATION AUXILIARY LINE SIGNALS—These signals indicate incoming calls and supplement the signals operated by ringing current. There are two kinds: Audible and visual.

The standard audible auxiliary line signals are the bells, buzzers, loud bells, xylophone bar signals, and loud horns illustrated and described in the exhibits. In general, they are used (1) when there is a need for more signals than the maximum number of ringing current line signals permitted per line, (2) when line signals softer or louder in tone than ordinary bells are required, and (3) when continuous line signals are desired instead of non-continuous signals which operate only when ringing current is applied to the line.

The standard visual auxiliary line signals are the lamp indicators illustrated and described in the exhibits. Mainly they are used as supplementary visual indication to distinguish between incoming calls or two or more lines.

OPERATION OF AUXILIARY LINE SIGNALS

SIGNAL CONTROL EQUIPMENT—One signal control equipment is required for each central office or PBX line equipped with station auxiliary audible or visual signals. The signal control equipment when actuated by the regular ringing current connects the auxiliary signals to the additional source of electric power needed to operate them, that is, central office or PBX battery, or commercial power. When commercial power is required, the customer furnishes it; also, he furnishes any electric wiring required. (See exhibits.)

SELF-CONTAINED SIGNAL CONTROL EQUIPMENT

—In some cases where the customer desires to be relieved of installing the necessary power wiring for auxiliary line signals operated from high voltage, a signal with a self-contained control equipment is available. These signals are equipped with a plug for con-

nection to a regular appliance outlet which should be located near the location of the signal. These signals, which operate on a non-continuous basis only, consist of a 10" bell, a horn, and xylophone bar signals. (See exhibits.)

CONTINUOUS OPERATION—Continuous auxiliary line signals operate on the first application of ringing current to the line, and remain in operation until the called telephone is answered, or until cut off by a switch.

Continuous signals should always be provided with a key to cut them off at night and whenever they will be unattended for some time. This arrangement conserves battery or power supply and prevents the annoyance of a continuously sounding loud bell or horn.

Signal control equipment for continuous signals requires special housing if used outdoors. The cost of the housing is borne by the customer. To avoid the additional cost, a mechanically locking type of control equipment for continuous signals may be provided at regular rates. The equipment is mounted in a cast-iron weatherproof housing. The signals connected to this equipment will operate at the first application of ringing current and will continue until a button, located in the bottom of the housing, is pressed.

NON-CONTINUOUS OPERATION — Non-continuous auxiliary line signals operate only when ringing current is applied to the line. They do not operate during intervals between rings and cease operation when the ringing stops.

SPECIAL AUXILIARY SIGNALS

CUSTOMER-OWNED SIGNALS — The customer may provide his own auxiliary line signals. These signals are not connected directly to the telephone line but to signal control equipment provided by the telephone company.

SPECIAL LINE LAMP SIGNALS—In some cases the customer may need a line lamp signal that will attract attention over a larger area than is covered by lamp indicators or he may need an outdoor lamp signal. A power lamp operating from commercial power supply can be provided for this purpose. In most cases the customer will desire to provide his own lamp as well as the necessary power wiring to connect the power supply to the signal control equipment. If the customer desires, the telephone company will provide the power lamp, based on cost. As in the case of audible signals, the customer provides the commercial power for the power lamp.

BELLS FOR USE IN EXPLOSIVE ATMOSPHERES—A non-continuous type line signal control equipment is

available for use in explosive atmospheres, indoors or outdoors. Also available are 8" and 10" indoor or outdoor bells for this purpose. They are operated by commercial power. (See exhibits.)

The control equipment and the bells have been approved by the Underwriters Laboratories for use in all explosive atmospheres of all gases except acetylene, the same as the 320-type telephone described in Part III, Section 1.

The customer provides the power wiring, the special conduit required for both the power wiring and the telephone wiring in the hazardous area, and the necessary commercial power.

As with the 320-type telephone, customer releases must be obtained providing that the telephone company will not be liable for damages arising from use of the signals.

BUSY SIGNALS

STATION AUXILIARY BUSY SIGNALS—The standard lamp indicators illustrated and described in the exhibits may be used to indicate when a line is in use or busy instead of indicating incoming calls. On an incoming call the lamp lights when the call is answered, and remains lighted until the telephone user hangs up. On an outgoing call the lamp lights when the "receiver" is lifted and remains lighted until the user hangs up.

The lamps operate on low voltage power obtained from central office, PBX or building batteries, or from a transformer-rectifier set operating on commercial power. One signal control equipment is required for each central office or PBX line equipped with busy lamp signals. Use of busy lamp signal control equipment does not reduce the number of ringing current line signals allowed per line (Signal control equipment for line signals does reduce the number, as explained above).

COMBINED LINE AND BUSY SIGNALS—With the 1-A key telephone system, (see Part IV) the lamps shown in exhibits following may be arranged to provide a combined line and busy signal.

On an incoming call, the lamp flashes at half-second intervals until call is answered. The lamp changes to a steady signal when call is answered and remains lighted as long as line is in use. An audible signal common to all lines in the group is also provided with this arrangement; it may operate continuously or non-continuously.

One signal control equipment is required for each central office or PBX line equipped with the combined line and busy signal arrangement.

TELEPHONE BELLS AND AUXILIARY SIGNALS

PUSH BUTTON AND BUZZER SIGNALS

Push button and buzzer signals are required:

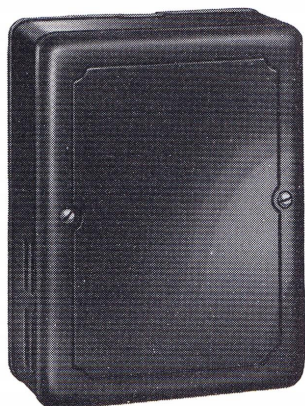
1. To enable a secretary or receptionist who answers several central office or PBX lines to request some other person to take a call on a particular line.
2. To permit a person at a telephone equipped with an intercommunicating line to ask a person at another telephone so equipped to answer on the intercommunicating line.
3. To summon employees to offices of supervisory peo-

ple (not furnished by telephone company if to be used for this purpose only).

Push buttons and buzzers, shown in the exhibits are used mainly in connection with key telephone systems and key equipments described in Parts IV and V. Push button-buzzer circuits are separate from telephone circuits, but in some cases the buttons and buzzers in key handsets are used for all or part of the signaling service to form a more compact arrangement than if mounted separately on a customer's desk.

The customer may furnish his own push button and buzzer system to be used with the telephone system.

LINE SIGNALS OPERATED BY RINGING CURRENT



TELEPHONE BELL BOX

Approx. 7" x 6" x 2"

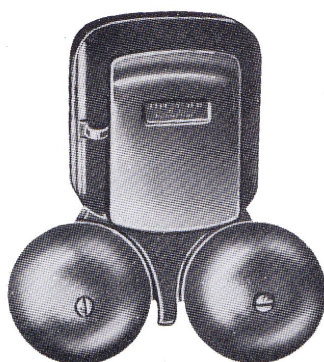
Mounted indoors on wall or desk and associated with hang-up and cradle handsets or used as extension bell.



BELL IN BASE OF COMBINATION HANDSET

Base dimensions: 5 $\frac{1}{8}$ " x 7 $\frac{1}{2}$ "

Bell is inconspicuous and does not have to be mounted on desk or wall. Also serves as portable bell with portable extension telephone.

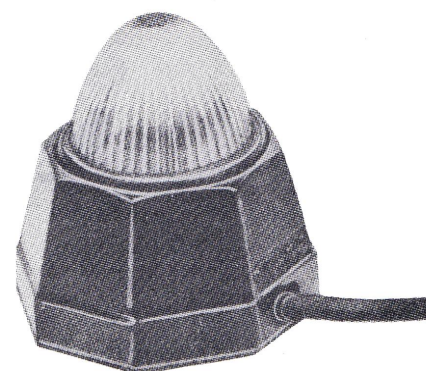


EXTENSION GONG

592 Subscriber Set

7 $\frac{1}{4}$ " high; 6 $\frac{11}{16}$ " wide; 2 $\frac{1}{8}$ " deep

The 592 set is smaller than 392 set which it supersedes. Black enamel finish. Regularly provided with two 26-B gongs. For louder signal, two 42-A gongs may be provided. For indoor or outdoor use.



21-TYPE LAMP INDICATOR

2 $\frac{1}{8}$ " high; base 2 $\frac{3}{16}$ " wide

Clear glass lens; black base. Lights in unison with audible signal to indicate incoming call. For use on common battery individual or PBX lines, but not on party lines, or in community dial or magneto lines where vibrating interrupters are used as source of ringing supply. Also not suitable for magneto lines when hand generator is used. Arranged for either fixed or loose mounting on desk or table top.

NUMBER OF SIGNALS OPERATED BY RINGING CURRENT PERMITTED PER LINE

	PBX Line	Indi- vidual Line	2-Party Line (Ea. Pty)	4-Party Line (Ea. Pty)
Maximum Number of Signals per line.....	4*	4	4	2
Count 1 signal for each bell, extension bell, extension gong, 21-type lamp indicator, and each auxiliary line signal control equipment.				

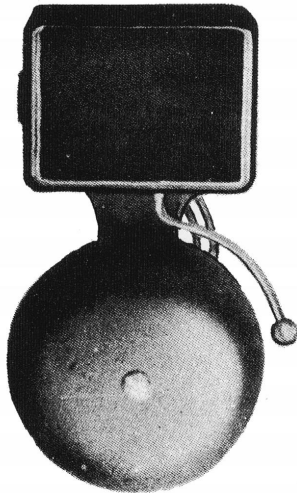
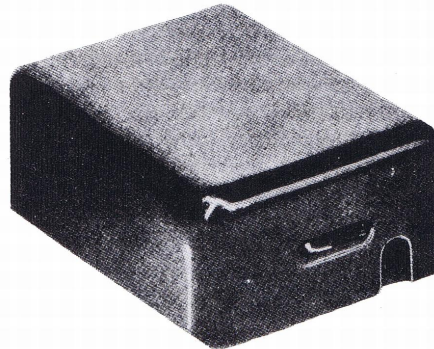
* Except on night service. See Part VI, Section 1.

AUDIBLE AUXILIARY LINE SIGNALS

Requiring Low Voltage Power Other Than Ringing Current

No. 7 TYPE BUZZER

1-31/32" wide; 2-11/16" long; 1-1/8" deep
Black snap-on cover. For use indoors as continuous auxiliary line signal of low volume.



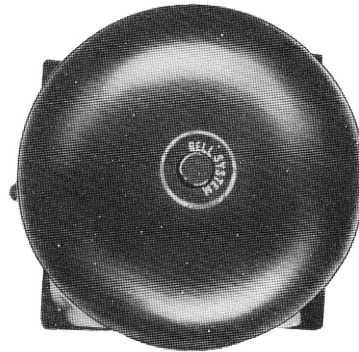
3" INDOOR BELL (No. 7 BELL)

3 1/2" wide; 5 1/2" long; 1 1/2" deep

Operates same as No. 7 buzzer except the armature is extended to form a clapper and a 3" bell is provided. For use indoors as a continuous auxiliary signal about as loud as the regular telephone bell.

4" AND 6" INDOOR BELLS

6 volt vibrating bells. The 4" bell is somewhat louder than 3" No. 7 bell. The 6" bell is about as loud as 592 extension gong. Used mainly as continuous signals. These bells supersede the 3" and 6" skeleton type bells which are no longer manufactured.



GENERAL CHARACTERISTICS OF AUDIBLE AUXILIARY LINE SIGNALS

1. Audible auxiliary line signals supplement but do not replace regular telephone bells.
2. Require a signal control equipment per line and power supply other than ringing current. Customer furnishes electric wiring, if required.
3. Continuous control equipment operates signals until call is answered; non-continuous equipment operates only when ringing current is applied to line.
4. Vibrating type bell plunger continuous to strike bell as long as current passes through solenoid coil.

AUDIBLE AUXILIARY LINE SIGNALS

Requiring Commercial Power



10" INDOOR BELL

Loud vibrating bell to cover large areas and extremely noisy locations. Operates from 110-volt AC or DC. Continuous or non-continuous. A non-continuous type is also available with self-contained signal control equipment which eliminates need for special electric wiring.



10" OUTDOOR BELL

Carries same features as 10" Indoor Bell together with the special protective housing illustrated.

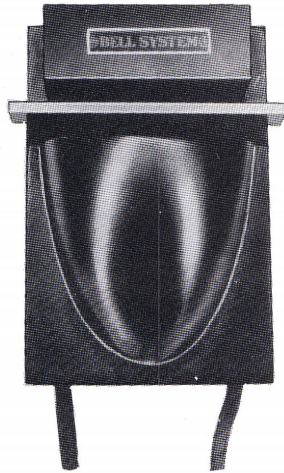
BELLS FOR EXPLOSIVE ATMOSPHERES

8" AND 10"

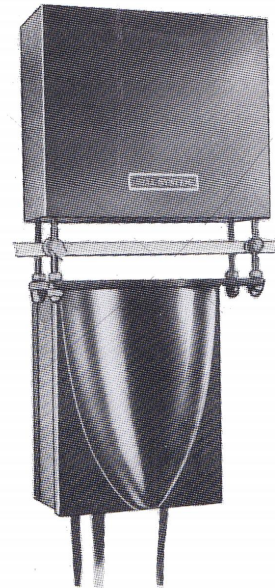
Approved by the Underwriters' Laboratories for use in explosive atmospheres of all gases except acetylene. Special signal control equipment for use indoors or outdoors in explosive atmospheres operates the bell as a non-continuous auxiliary signal. Requires 115-volt AC or DC. The AC signal may be single stroke or vibrating; the DC signal, single stroke only. Customer furnishes the electric wiring required and the conduit for both the electric wiring and the telephone wiring in the hazardous area; also the power. If the signal control equipment can be located outside of the explosive atmosphere, regular control equipment may be used. The customer signs a release providing that no liability shall attach to the telephone company for damages arising out of use of the bell and control equipment.

AUDIBLE AUXILIARY LINE SIGNALS

Requiring Commercial Power



980 - CYCLE



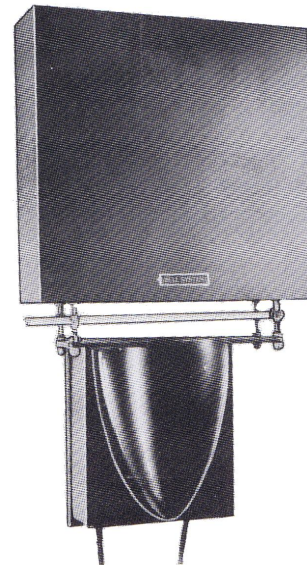
490 - CYCLE

XYLOPHONE BAR SIGNALS

Sometimes called musical toned gongs. Used indoors where low-pitched, harmonious signal is required. Also sometimes heard better by people with impaired hearing than regular bells of higher frequencies (arrange trial before installation). Operates off 110-volt AC or DC non-continuously only. Available only with self-contained signal control equipment eliminating need for special electric wiring.

OVERALL DIMENSIONS

	Height	Width	Depth
980 cycle (highest tone)	6 $\frac{1}{8}$ "	4 $\frac{3}{8}$ "	5 $\frac{1}{4}$ "
490 cycle (medium tone)	13 $\frac{1}{2}$ "	11 $\frac{1}{2}$ "	5 $\frac{1}{4}$ "
245 cycle (lowest tone)	20 $\frac{1}{8}$ "	15 $\frac{1}{4}$ "	5 $\frac{1}{4}$ "



245 - CYCLE

LOUD HORN

Used to cover large areas and extremely noisy locations. Special housing necessary for outdoor use. Operates continuously or non-continuously from 110-volt AC or DC. Non-continuous type may be provided with self-contained signal control equipment eliminating need for special electric wiring.



LENGTH: 18 $\frac{1}{4}$ "

VISUAL AUXILIARY SIGNALS

Requiring Low Voltage Power Other Than Ringing Current

USED AS LINE SIGNALS, BUSY SIGNALS, OR COMBINED LINE-AND-BUSY SIGNALS



15 TYPE LAMP INDICATOR

Height $2\frac{1}{8}$ "; base $2\frac{1}{8}$ " x $2\frac{1}{8}$ "

Black or old brass octagonal shaped base. White, ruby or green beehive lens for one line. Arranged for either fixed or loose mounting on top of desk or table.



14 TYPE LAMP INDICATOR

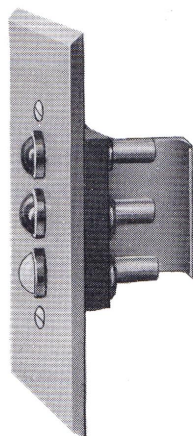
2" high; $1\frac{1}{2}$ " wide; 3" long

Black or old brass finish with red, green and white small flat lamp caps for three lines.

20 TYPE LAMP INDICATOR

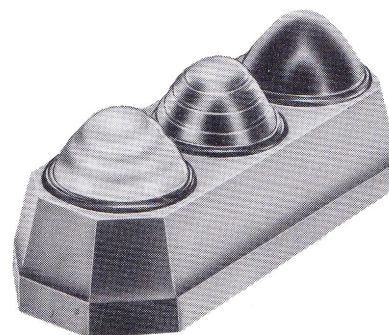
2" high; $1\frac{1}{2}$ " wide; 3" long

Black or old brass base with red, white, green and amber small flat lamp caps for four lines. Arranged for either fixed or loose mounting.



16 TYPE LAMP INDICATOR

Plate is $4\frac{1}{2}$ " x $2\frac{3}{4}$ " in ivory, brown or brush brass finish. Contains red, green and white small flat lamp caps for three lines. For flush mounting in a wall.



18 TYPE LAMP INDICATOR

$2\frac{1}{8}$ " high; $2\frac{3}{16}$ " wide; $5\frac{3}{8}$ " long

Black or old brass base with white, green and ruby beehive lens for three lines. Arranged for either fixed or flush mounting.

17 TYPE LAMP INDICATOR

$2\frac{1}{8}$ " high; $2\frac{3}{16}$ " wide; $3\frac{3}{4}$ " long

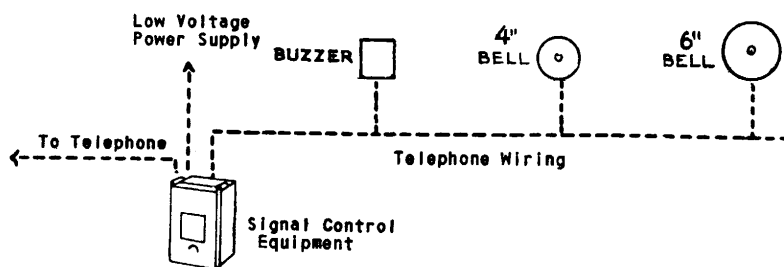
Black or old brass with green and ruby beehive lens for two lines. Arranged for either fixed or loose mounting.

GENERAL CHARACTERISTICS OF VISUAL AUXILIARY SIGNALS

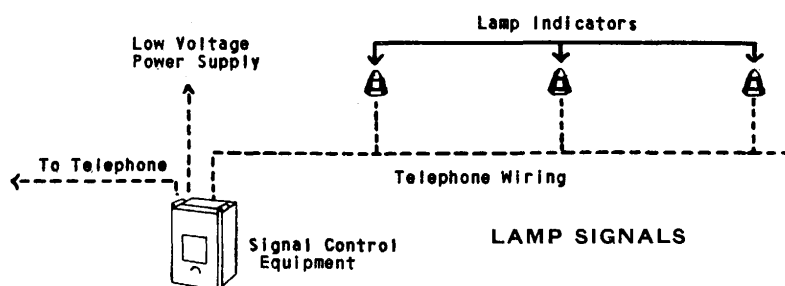
1. Visual signals supplement but do not replace audible signals.
2. Require a signal control equipment per line and low voltage power supply other than ringing current (usually central office, private branch exchange or dry-cell battery supply but not commercial power).
3. Continuous control equipment for line signals causes lamp to light and remain lighted until call is answered. With non-continuous equipment, lamp lights only when ringing current is applied to line.
4. When used as busy signal, lamp lights whenever receiver is lifted to answer or place a call and remains lighted until user hangs up.
5. When used as combined line and busy signal with the 1-A key telephone system, the lamp flashes at half-second intervals on application of ringing current, and burns steadily when call is answered and line is in use.

AUXILIARY SIGNAL ARRANGEMENTS

Low Voltage Signals

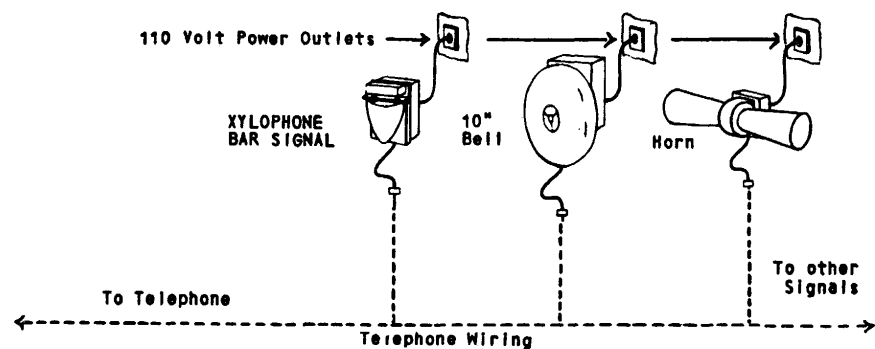
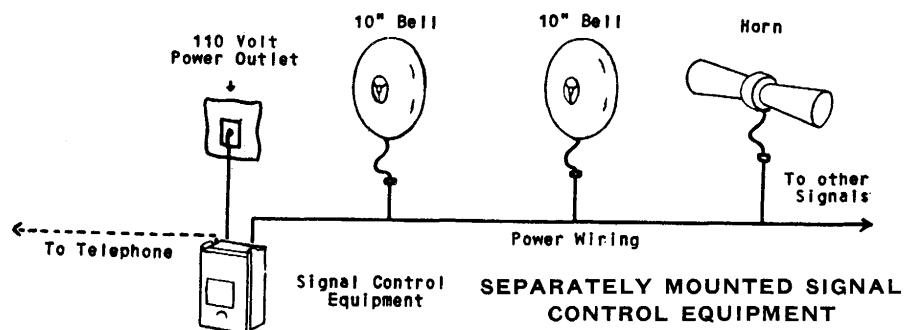


AUDIBLE SIGNALS



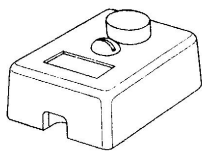
LAMP SIGNALS

Commercial Power Signals



SELF-CONTAINED SIGNAL CONTROL EQUIPMENT

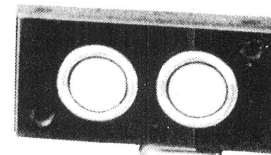
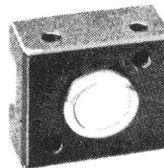
PUSH BUTTONS AND BUZZERS



551-A PUSH BUTTON

$1\frac{1}{2}'' \times 1\frac{1}{2}'' \times 1''$

Black molded phenol plastic base, shell and button. Designation strip is $\frac{3}{32}'' \times \frac{5}{8}''$.

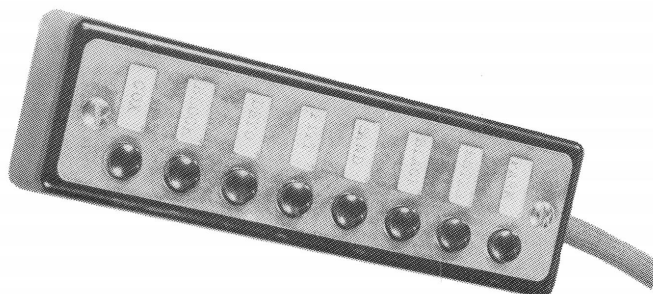
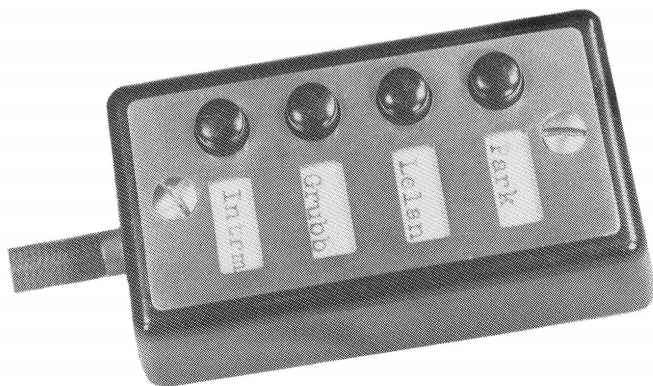


707-679 PUSH BUTTONS

$1\frac{3}{8}'' \times 1\frac{1}{2}'' \times 1''$

$1\frac{3}{8}'' \times 2\frac{3}{4}'' \times 1''$

No. 707-679 push buttons with nickel plated shoulders are mounted in a black finish wood block which is the 360 key mounting for one button and the 361 for two buttons.

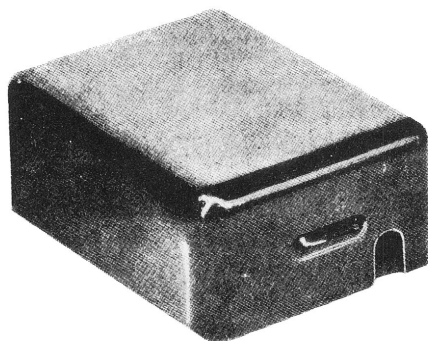


549 TYPE PUSH BUTTON KEYS

Size of 4-button key: $\frac{1}{4}'' \times 1\frac{3}{4}'' \times 3\frac{1}{4}''$

Size of 8-button key: $1'' \times 4\frac{1}{8}'' \times 4\frac{5}{8}''$

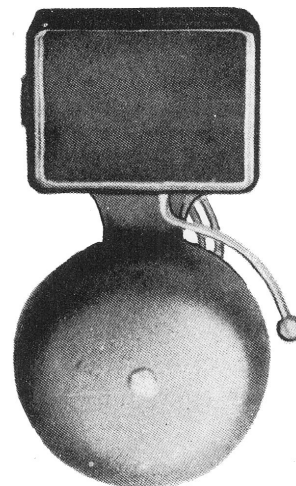
Black finished metal boxes with black keys. The 549-A and B keys have four buttons each; the 549-C and D, eight buttons. The A and C keys have suede leather bases for loose mounting; the B and D keys are for fixed mounting.



No. 7 TYPE BUZZER

2" wide; $2\frac{5}{8}''$ long; $1\frac{1}{8}''$ deep

Black finished metal cover. Buzzer has fixed volume or tone which cannot readily be adjusted. When not more than two buzzers are to be operated by one push button, dry cells may be used. With AC commercial power or central office or private branch exchange battery, twelve buzzers may be operated from one push button. Supersedes KS-6846 Buzzer.



No. 7 BELL

Dimensions: $3\frac{1}{2}'' \times 5\frac{1}{2}'' \times 1\frac{1}{2}''$

The bell is 3" in diameter. Black finish. The operating unit is the same as that of the No. 7 Buzzer except the armature is extended to form the bell clapper. The No. 7 buzzer and the No. 7 bell may be used interchangeably, the bell where distinction from an adjacent buzzer is required or in installations requiring a signal louder than the buzzer.