

The Home Interphone System

UNTIL RECENT YEARS, almost all residential Bell System customers had only a single telephone, and their use of the instrument was limited to placing or receiving calls from distant locations. Gradually, however, extension telephones have become almost essential, until today, nearly one-third of all residential customers have one or more. Using these extensions, it is now convenient to place or receive calls from almost any point in the home. However, without additional facilities, it is impractical or inconvenient to communicate from one part of the house to another.

The Home Interphone* Residential Intercommunications System now provides Bell System customers with facilities for expanding telephone service to include in-home communications. With the Home Interphone System, each of the telephone sets in the home can be used in an interphone system, as well as to place or receive normal "outside" calls.

*Bell System service mark

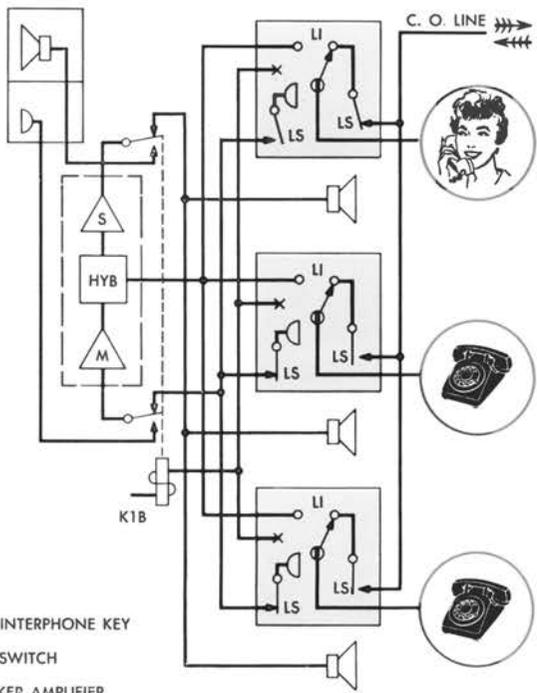
Typical installation shows versatility of the Home Interphone System. Up to five inside stations and two outdoor door-answering units may be installed.

Any one of the sets can be used for calling persons in the vicinity of any of the other sets and the called person can answer without picking up a telephone handset. Also, any one of the sets can be used to answer the door and converse with visitors there.

A number of new equipment items were developed to provide this service. For example, standard two line type telephone sets are equipped with a special transmitter assembly for remote-speech pickup. Miniature loudspeakers for use with the System are packaged in two alternate ways. One of the plastic-housed assemblies incorporates a telephone station terminal block and in this form is associated with each telephone set to project the initiating caller's voice throughout the surrounding areas.

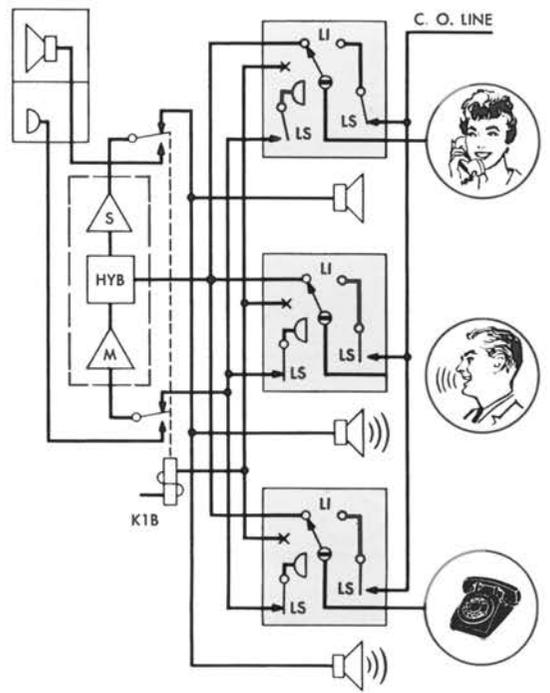
When the loudspeaker is used at an outside door location, it is associated with a transmitter so that a person there may respond to queries and carry on conversation with individuals at the telephone locations inside the house.

The control unit which completes the system is a small out-of-sight package, housing the transistor amplifiers, hybrid circuit, switch-

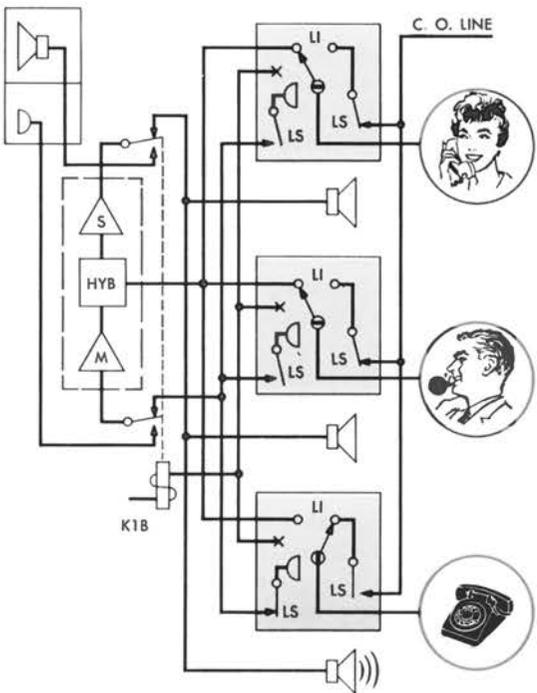


LI = LINE INTERPHONE KEY
 LS = LINE SWITCH
 S = SPEAKER AMPLIFIER
 M = MICROPHONE AMPLIFIER

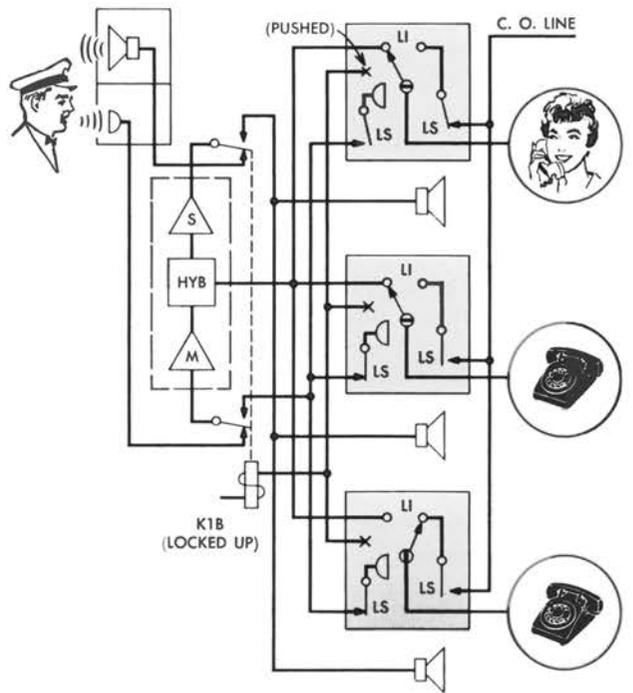
A



B



C



D

ing relays and power rectifier and filter.

Since the centralized control unit must be connected to each telephone location by a six pair inside wiring cable, there is a significant installation expense unless the home can be wired during the construction period.

This installation cost, plus the maintenance which the customer receives with all telephone facilities, accounts for a relatively high tariff rate, which somewhat limits the number of potential customers for this service. Of course, the appeal is primarily for those who have need for and can afford more than basic telephone service.

A typical Home Interphone System installation is shown in sketch form on the frontispiece. A maximum of five inside stations and two door locations may be equipped, although the basic tariff rate is predicated on three inside and one door locations.

Normal telephone calls are handled in the conventional manner, with the turnbutton in a vertical position. More than one set can be used simultaneously on the outside line, just as extension sets are now often used in parallel. When the turnbutton is in a horizontal position and the handset is lifted, the user may speak into the handset transmitter to anyone near any of the equipped telephone locations. The person called on an interphone conversation can either respond by speaking toward the transmitter in the telephone housing and listening to the loudspeaker, or pick up the handset and talk normally over it to the other party. (Schematic diagrams of the circuits in each of the basic situations are shown opposite.) Furthermore, by listening at the handset receiver, conversation or other sounds from those areas may be monitored. The convenience of the service is readily apparent—from monitoring the children at play to asking dad how he wants his eggs fried for breakfast.

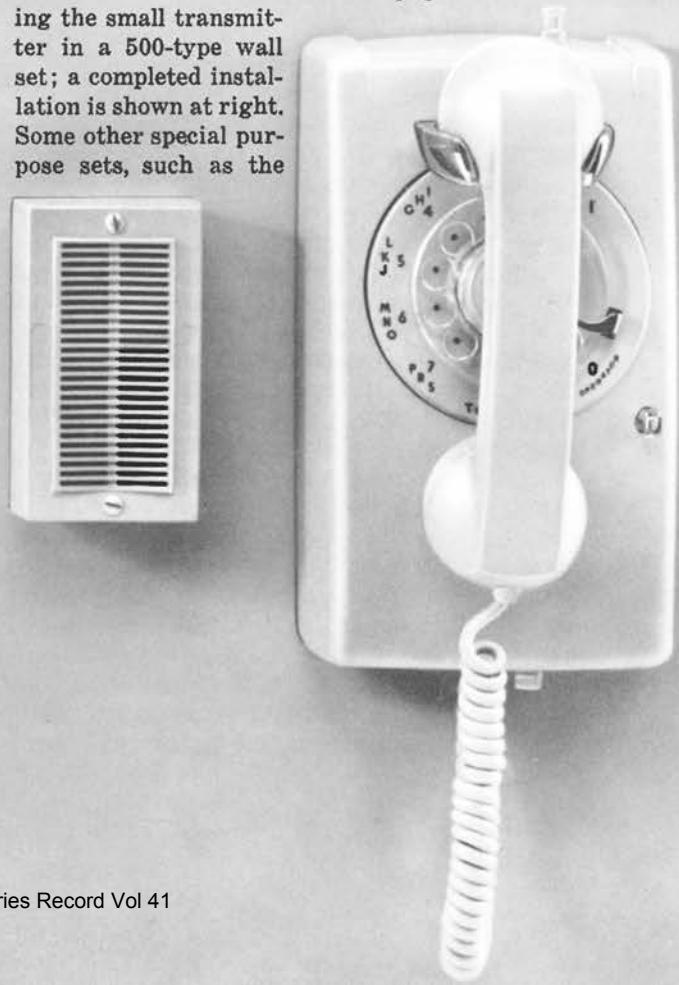
Door answering service from any telephone is available with the turnbutton in interphone position, but in this case the button must be momentarily depressed to pull up the switching relay of the control unit. This action disconnects all the speakers and transmitters associated

with telephone sets and substitutes the one or two corresponding units at entrance doors. The householder can then use the telephone handset and outdoor loudspeaker to talk to visitors outside, who respond using the microphone provided for this service. When she hangs up the handset the control unit is turned off.

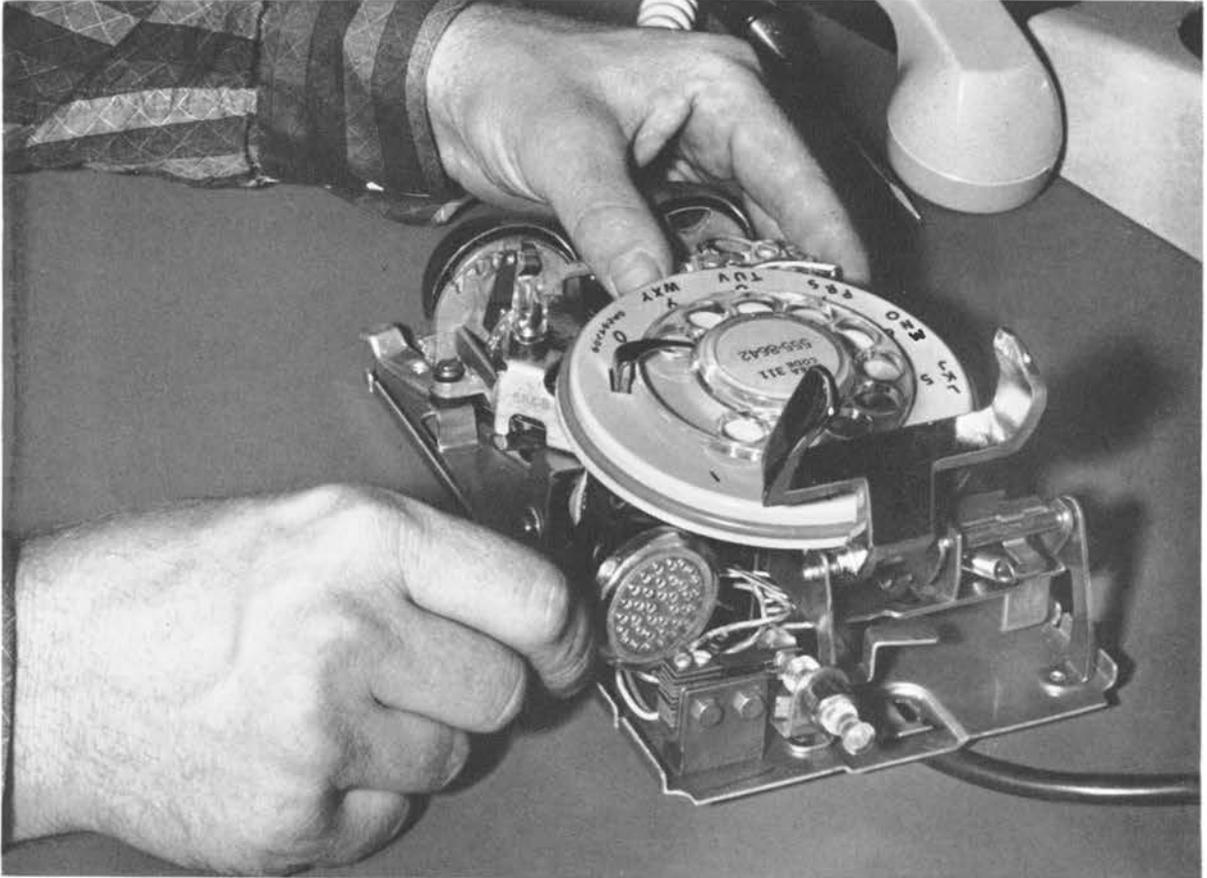
Perhaps most useful is the ability to call some other person to pick up a telephone call. In this case, after responding to an incoming ring and finding that someone else is wanted, the distant party is asked to hold the line; the hold button is actuated, and after turning the selector button to the interphone position, the wanted party is "called to the phone." The individual answering the phone initially should then restore the turnbutton to vertical, restore the hold button, and listen or talk with the distant party until the desired party answers.

In a similar manner, it is possible for the householder to hold the line while answering the door. In this case, she simply operates the "hold" key, turns the line-interphone key to the interphone position and depresses it momentarily to connect her telephone set to the outside loudspeakers and transmitters. She returns to her telephone conversation by turning the line-interphone key to vertical and the hold key to its unoperated position.

Most frequently, the 500-type desk and wall sets and the Princess phone are used to provide this service. A craftsman is shown on page 222 installing the small transmitter in a 500-type wall set; a completed installation is shown at right. Some other special purpose sets, such as the



Schematic drawings show the system in use in several different situations. (A) In use during normal telephone call through central office; (B) during interphone call when called party is responding "hands-free" and (C) when he is using the handset at his location; (D) when the householder is using the system to answer a caller at one of the outside locations.



A craftsman at a Western Electric repair shop installs a transmitter in a 500-type wall set.

Note the turnbutton near his left hand and the hold button in the foreground.

new panel phone, may be used with the Home Interphone System as well.

A wiring board in the control unit incorporates the transistorized transmitter and loudspeaker amplifiers. Separate controls in each permit adjustment by the installer for each installation. A hybrid transformer and balancing network also mounted on the wiring board permits interconnecting the two-wire telephone sets and the four-wire loudspeaker-microphone combination without excessive electric feedback which would otherwise result in a singing (oscillating) condition. Acoustic coupling is, therefore, the most commonly encountered limitation on the output levels to which the system can be adjusted. Judicious spacing is sometimes required between the loudspeakers and the associated telephone sets with their remote pickup microphones. A supervisory relay in the control unit activates the amplifiers whenever any handset is off the hook while the selector button is in the interphone position. The control unit also mounts a large terminal board

which is usually the interconnecting point for all the system wiring.

Power for this unit comes from the customers' conventional power outlet via a small dial-light transformer. When the system is being used as an interphone, it draws approximately one watt of power; this drops to the order of $\frac{1}{4}$ watt during the much longer standby periods. Of course, the system is designed so that power failure does not interfere with incoming or outgoing telephone calls.

Many Potential Uses

Like all such systems, there are many potential services and a number of limitations. The latter are exemplified by any high noise level near a remote pickup microphone; these tend to mask interphone conversations. However, the approximately 20,000 systems in service attest to its usefulness. After all, what is more natural, when a need arises for voice communication with another area, than to reach for the nearest phone?