

761A PBX

E NORMOUS EXPANSION has taken place in the motel industry in the last few years and all signs indicate that this growth will continue to accelerate with the recent introduction of prefabricated units. One of the many objectives of the Bell System is to keep pace with such growth by providing adequate communications facilities designed to meet the particular needs of this type of customer. For example, the recent introduction of Guest Dial service for larger hotels and motels has received enthusiastic acceptance and more and more of these larger establishments are converting to this new service.

Guest Dial service permits a guest to dial his own local calls and to place calls directly to a long distance operator. For charging purposes, the local calls are automatically scored on an individual-per-room register located near the hotel desk. Long distance time and charges are reported by the toll operator to the hotel attendant at the conclusion of each call. This new service also includes a Message Waiting feature to advise the occupant of a room that a call was received for him during his absence and that the caller had left a message with the hotel attendant.

Until recently, however, it has not been economically feasible to provide this service for small hotels and motels. Since forty thousand of the more than sixty thousand motels in the United are in the 11 to 40 room range, and since less than 40 per cent of these have room telephones. Bell Laboratories and the A.T.&T. Company were presented with an interesting challenge in devising a new system which could supply the new service features at a cost that would be economically attractive to these small establishments.

The first step was to determine the requirements peculiar to this segment of the hotel-motel industry as well as those common to both the small and large concerns. A review of the existing general purpose PBX's and switching arrangements revealed that they did not lend themselves to economical adaptation within the cost objectives. It therefore became necessary to look for new concepts geared to the exact needs of the small owners. Such a plan, which appeared to meet the service requirements and cost objectives, was devised. The result is a new switching system known as the 761A PBX.

The 761A PBX is a small self-contained cross-bar system in which all internal and outgoing calls are originated merely by pushing a button. It features message registers for the lines and trunks, Message Waiting, Direct Station Selection, and Remote Answering when the "desk" is unattended. It is available in 20-, 30-, and 40-line equipment sizes.

In this new system, each room is provided with a conventional four-button key telephone set which has an exclusion key. (See the top left photograph on the next page.) Three of the buttons are arranged for nonlocking operation and one is blocked inoperative. Calls are originated at room telephones by lifting the handset and momentarily depressing a nonlocking button corresponding to the type of call being made. For instance, to make a central office call within the local calling area, the momentary operation of the LOCAL button will automatically connect the caller to central office dial tone after which he may dial the desired number. Calls also can be made to the hotel or motel desk or to a toll operator by depressing the DESK or LONG DISTANCE keys, respectively. On these calls, the caller will hear an interrupted ringing tone during the

ringing period. Local and long distance calls are made solely by the guest without any assistance from the desk attendant.

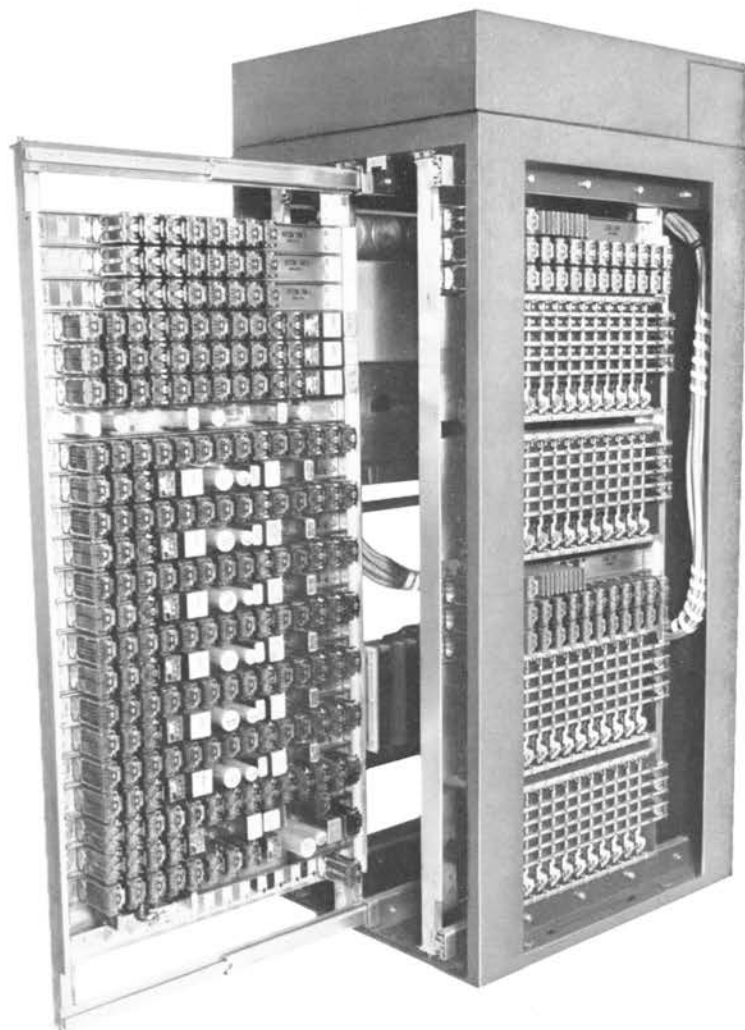
At the desk, a small console, as shown in the lower left photograph on the next page, is provided for the person on duty. Incoming calls to the desk are indicated by an audible signal and by a flashing lamp under the answering button (ANS). Two flashing rates are provided to indicate whether the incoming call is from a central office (60 IPM) or from a room telephone, (120 IPM). A momentary operation of the answering button will automatically connect the attendant to the calling party. The call may be extended to any of the room telephones by momentarily depressing the nonlocking button associated with the desired room telephone. The key buttons which provide this Direct Station Selection also provide a visual indication as to which lines are in use and which are idle. An illuminated DSS key indicates a busy condition and another call can not be connected to that line while it is in use. Extending a call to an idle room phone will cause the telephone bell in the room to be rung and audible ringing tone will be heard by the attendant and the caller. The attendant may leave the connection at this point or wait for the called room to answer. In this case, a three-way conversation is possible. The attendant can disconnect herself at any time without disturbing the established connection. To insure secrecy, however, the attendant can not re-enter a connection after she has left it except in response to a recall resulting from the momentary operation of the switchhook at the room telephone.

Message Waiting Service

When an incoming call is received at the desk for a guest who is absent from his room, the caller may leave a message and be confident that it will be delivered as soon as the guest returns to his room. The guest is made aware that a message has been received for him by a flashing light on the first of the four buttons—the one labeled MESSAGE WAITING. To get his message, the guest merely lifts the handset and depresses the DESK key. When the message has been delivered, the desk attendant restores the message waiting key (there is one for each room) which he had originally operated to light the Message Waiting signal in the guest's room.

A new feature known as "Remote Answer" has been included in this new PBX. This feature permits the attendant to answer any incoming calls from any room telephone when the desk console





A four-button key telephone set with exclusion key is shown in the top left photograph. Below it is the small desk console and at right, the cabinet which houses switching equipment for this new PBX.

is unattended. A dial completion feature is provided whereby the attendant can extend a remotely answered call to any other room telephone.

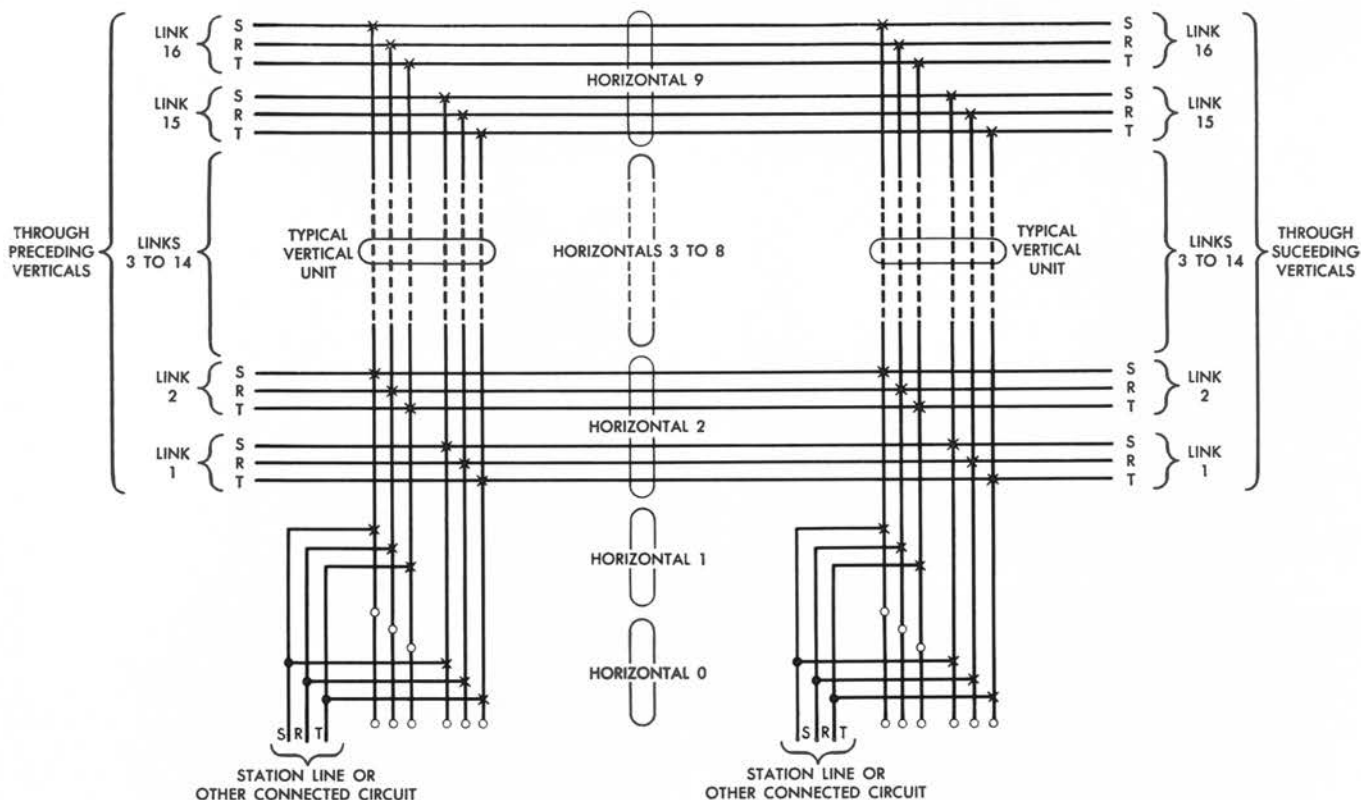
In addition to call handling, direct station selection, and message waiting keys, the attractively packaged desk console is arranged to house a resettable message register for each room telephone. These optional registers respond to signals from the central office to automatically tally all local calls as they are made and keep an accurate account of the number of calls from each room.

Floor Cabinet For Equipment

Switching equipment for this new PBX consists primarily of wire spring relays and crossbar switches. Together with the batteryless power

facilities, this equipment is contained in a single floor supported apparatus cabinet. The cabinet has an attractive dark grey frame and beige side and front lift-off panels. Its approximate size is 28 inches wide, 31 inches deep, and 64 inches high. It is similar to the type used for the recently developed 756A and 757A PBX's. All cross connections to the attendant console, the room telephones, and the exchange facilities, are made in the top of the cabinet on quick-connect terminal blocks. The equipment is mounted on three vertical slides which pull out for maintenance, as shown in the right photograph above.

The basic cabinet is arranged for 20 station lines and growth in groups of 10 lines is provided by plug-in units to increase the station capacity



This diagram illustrates the crossbar switch arrangement for the 761A PBX. Ten verticals gain access to any one of 16 links.

to 40 lines. The local central office trunks and trunks to the long distance or toll operator may be provided in any combination of from one to eight plug-in units. From one to three intercommunicating trunks may be provided as required for room-to-room communication. Two "hold" circuits are provided to permit the attendant to handle several calls simultaneously.

Switching is accomplished by the operation of the crossbar switches under the control of a common group of circuits and by the line and trunk circuits. The diagram on page 251 shows the switching plan for this new system. The central office, toll, intercommunicating, and remote answer trunks are connected to the horizontals of the crossbar switches. The station line circuits appear on the verticals of the switches. The 10 x 10 six-wire crossbar switches are arranged so that a total of 16 three-wire horizontal links are available for trunk terminations. The 16 links are obtained by using eight of the six-wire horizontals (two to nine) and choosing either the left half or the right half of a crosspoint by operating either the 0 or 1 three-wire crosspoints in combination with one of the others, as shown in the diagram at the top of this page. This principle is similar to that used for the recently developed

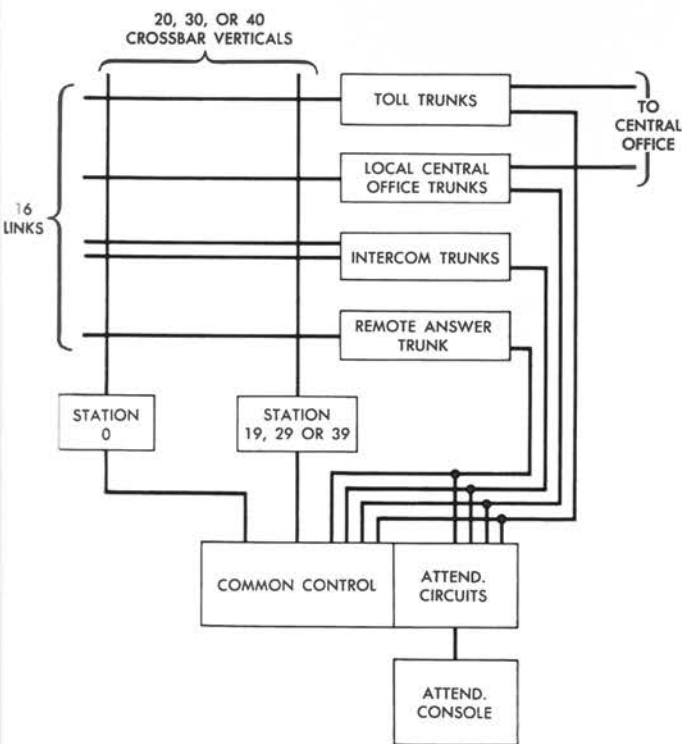
756A and 757A PBX switching systems.

The station line circuits indicate to the common control when station is off-hook and identify the particular station when the user depresses one of the buttons on his key telephone. The line circuit also controls the lighting of the associated line lamp in the attendant console.

All calls to and from the local dialing area are handled by a group of two-way central office trunks. On incoming calls, these trunks respond to seizure in the central office to signal the attendant and to prepare a path through the common connecting circuit to the attendant console when the answer key is depressed.

Another group of trunks is provided for completing long distance calls. These trunks are wired directly to the toll operator positions and are arranged to return an audible ringing tone to the caller when they are selected from either a station or from the console. They also are arranged to allow the toll operator to re-ring the PBX attendant immediately after the call has been completed to pass the time and charge information and the caller's identity to the motel attendant.

In addition to having an up-to-the-minute toll record for each guest, the system is arranged to score a message register associated with each



The over-all switching plan for the 761A is shown here.

room line every time a local central office charge call is made. Each of these registers, which appear in the attendant console, is equipped with its own reset button. Operating this button after a guest departs wipes off the previous score and returns the register to zero.

Intercom trunks are used to complete calls between the stations and the desk or to other stations. This trunk responds to the operation of the DESK key at a room telephone and signals the attendant who can either terminate the call or extend it to another room telephone by operating the proper DSS key. This trunk then provides the ringing current to the called line, trips ringing upon answer, furnishes the necessary talking battery, and supervises the connection between the two stations.

Transferral of Calls

The answering trunk of this new PBX is arranged to permit transferral of the principal attendant functions to any of the room telephones when the attendant console is unattended and the Remote Answer key has been operated. At such times, any call directed to the desk will cause a centrally located auxiliary signal to sound. Such calls may be answered from any room telephone

by operating the exclusion key in the hand set cradle and by depressing the Desk Button. These operations cause the answer trunk to connect to the calling line or trunk and establish a transmission path between the caller and the answering room telephone.

This trunk is designed to provide means for extending a remotely answered call to any room telephone by dialing. With this feature, the momentary operation of the room telephone switchhook will hold the incoming trunk and connect the room telephone to a dial pulse receiving circuit. After this circuit has received the dialed digits of the desired line, the common control acts to establish a link between the calling trunk and the desired telephone. When the link is set up, ringing current is sent to the called telephone and the "hold" is removed from the calling trunk. The caller will hear the audible ringing tone until the called station answers. When the transferring telephone goes on-hook, the answering trunk is again available to handle any subsequent incoming calls.

Several trial models of this new PBX have been installed in motels in Arizona, Florida, and Tennessee and all have been more than favorably received by the touring public as well as by the small motel owners.

