

HORIZON* Communication System: custom service for small businesses

A new business telephone system combines the advantages of key telephones with the flexibility of stored program control.

RAYMOND R. DESJARDINS, JOHN A. MILLER, AND C. DENNIS WEISS

FOR YEARS, key telephone systems have been serving the communications needs of small-business customers, and have provided added convenience to customers with PBX and centrex systems. The *HORIZON* Communication System goes even further, using stored program control to provide modern key-tele-

phone service plus the custom calling features of larger systems, in a single integrated package. The new system has already been introduced under an experimental tariff.

Designed to serve customers who have between 20 and 80 telephones, the *HORIZON* System has a capacity for over 30 outside

*Trademark of AT&T Co.

Preview. Tom Clark unveils the *HORIZON* Communication System for South Central Bell at Louisville, Kentucky.





Models. On these Multibutton Electronic Telephones—the five- and ten-button station sets and a 30-button attendant set—each button to the right of the *TOUCH-TONE*® pad has two LEDs to indicate line selection and status.

lines to a central office. These lines can be arranged individually, as direct personal lines, or in attendant-supervised groups called pooled lines. The *HORIZON* System can operate with regular *TOUCH-TONE*® telephones, but its full capability is achieved with Multibutton Electronic Telephones. These were first introduced with *DIMENSION*® Custom Telephone Service (see *DIMENSION spectrum expands with Custom Telephone Service*, RECORD, November 1976).

The *HORIZON* System includes the electronic telephones, a small equipment cabinet for system circuitry and cross connections, and a portable Service Access Unit for repair and administration procedures.

The Multibutton Electronic Telephone is available in five- or ten-button models for individual stations, and thirty- or forty-button models for attendants. All of the sets have *TOUCH-TONE* dialing, an electronic tone ringer instead of a bell, and a Recall button that eliminates the need for switch-hook flash (signaling by depressing the switch-hook) when used in conjunction with PBX and centrex systems. These sets also have two light-emitting diodes (LEDs) as visual indicators for each button. A green LED substitutes for the

incandescent lamps on conventional key sets and indicates, for example, when a line is in use. A red LED indicates line selection—the equivalent of a depressed button on a conventional key set. The buttons on the electronic telephone do not lock in the down position when depressed.

Basic station features

The first four buttons on each Multibutton Electronic Telephone set (see photo at left) are the same for all stations. These buttons, which are color-coded, are two system-access buttons, a Hold button, and a Plus/Minus button.

The system-access buttons are labeled with the user's two-digit extension number and provide two lines, either of which can be used for placing both inside and outside calls. Calls from other stations in the system, and outside calls handled by an attendant, come in to either one of the two system-access lines. If a user has a call on one line, a second call on the other line will be signaled by only one ring and the user will not be disturbed by ongoing ringing for the second call. Attendant-directed calls have a distinctive tone signal to differentiate them from station-to-station calls.

The system-access buttons also are used in combination with the other standard buttons to enable the user to:

- Hold a call in order to place or answer a second call,
- Add a third party to an existing call,
- Drop any party from an ongoing conference call, and
- Transfer any call to another station.

None of these operations requires a switch-hook flash, nor does the user have to "dial" a special activation code. Straightforward sequences of button depressions, with appropriate LED indications, help avoid confusion. For example, to add a line to an existing call, the user depresses the Plus/Minus (add/delete) button and then depresses the system-access button or other line button to be added. To drop someone from a conference call, the user depresses the Plus/Minus button and then depresses the line button to be dropped. The Plus/Minus button gives the user flexibility in establishing and rearranging conferences.

Standardizing these basic features on every Multibutton Electronic Telephone greatly simplifies marketing and training activities for the Operating Company. Trainers can focus

on the operation of the four basic buttons and then go on to the various optional features that the customer can select for assignment to the remaining buttons.

Station-oriented call coverage

One of the most useful options available to *HORIZON* System customers is the Call Coverage feature. With a single coverage button, a user can answer calls directed to any other station within a preassigned call-coverage group. The flashing green LED on the button labeled COVR indicates an incoming call to a station in the coverage group. An additional option provides ringing as well when the called line is busy or is not answered.

The Call Coverage feature differs from PBX Call Pickup and Call Forwarding features in that the call remains accessible to the called station until termination—a benefit of key systems. Also, a given station can cover several different groups by having a separate button for each group. For example, a secretary answering phones for two executives could have a separate coverage button for each of them. After answering a call, the secretary can signal the called party to pick up the call; since the call never left the called party's phone, there is no need for a transfer. When personalized answering is not necessary—as in a large sales office—a single button can serve for the entire group.

The electronic-telephone user can obtain access to outside lines by depressing a system-access button and dialing "9." In addition,

outside lines can be reached directly—and quickly—on a personal line. This option allows the user to place outside calls without dialing 9, and to receive incoming calls without involving the attendant. Personal lines can be shared with others and can be provided with an exclusion feature where privacy is a concern.

Another option is a button for a pool of outside lines. These can be local lines that also are accessible by dialing 9, or special lines such as WATS or tie lines. Access buttons for pooled lines are used only to originate calls; however, they also serve to indicate the availability of idle lines in the associated pool. For example, if a station is equipped with a WATS button for access to a pool of WATS lines, the green status LED lights when all lines in the pool are busy.

Additional line buttons give users flexibility in setting up and receiving calls. In particular, stations with one or more additional lines can set up conference calls involving up to five participants—of whom no more than two may be outside parties. The *HORIZON* System design allows such conferences with no perceptible degradation in transmission level.

Other station features

The *HORIZON* System also includes a variety of two-party signaling features. These include:

- A manual signaling feature that allows a station to give a short burst of the tone ringer to another station;

Customer aid. Instructions in a "self-paced learner" booklet, supplied to customers with the *HORIZON* Sys-

tem, are checked out by Jim Dooling of Bell Labs. On Jim's desk is the ten-button electronic telephone.





Easy access. Taking advantage of stored program control, Bell Labs engineer Harold Woodland uses a portable Service Access Unit to change a *HORIZON* System's line arrangements.

- A message-waiting indication that allows one station to light a particular LED on another station; and
- An Automatic Intercom that allows either user to place a call to the other party by depressing a single button. The Automatic Intercom also has the advantage of identifying the caller to the called party.

Another very useful feature of Multibutton Electronic Telephones is automatic selection of lines. The line most frequently used for placing calls can be predesignated as the user's prime line. The user is connected to the prime line automatically when the handset is lifted; no button depression is required. Stations also can be assigned ringing-line preference; whichever line is ringing for an incoming call is selected automatically, and the user does not need to depress the line button. Both of these features can be assigned to any electronic telephone and each can be overridden by manual selection of another line.

Central Answering Position

The Central Answering Position for the *HORIZON* Communication System is a specially configured 30- or 40-button electronic telephone set designed for the attendant. Special buttons are provided to simplify completion of incoming calls to the listed directory number or to other lines handled by the atten-

dant. The process may be simplified even further with an optional Station Selector Console that has individual buttons for each station. This console eliminates the need to dial the desired station and gives a visual indication of each station's status. With this arrangement, calls can be forwarded with as few as two button depressions per call.

Calls forwarded by an attendant and not answered after a few rings are returned to the attendant automatically. A Return button on the console flashes, and the attendant then can reenter the call. This eliminates the need for the attendant to monitor calls until they are answered. If the return facility is busy, calls are queued for service and continue to ring at the called station. When a call is reentered, the attendant can either forward it to another station or take a message. With the Station Selector Console, the attendant can light an LED at the called station to indicate a waiting message.

Customers who do not require an attendant need no Central Answering Position. However, those who do can designate up to three stations as alternate answering positions. In this type of system, the answering function is transferred from one position to another by special button controls. All positions, whether active or inactive in the answering role, retain all of the basic capabilities of any Multibutton Electronic Telephone.

Maintenance

The repair and administration procedures for the *HORIZON* System are simple and easy to use. Built-in maintenance programs and hardware monitors continuously check the operation of the system. When a hardware trouble occurs, an alarm LED on the Central Answering Position and one or more LEDs on individual circuit boards in the *HORIZON* equipment cabinet indicate the fault (see *HORIZON Communication System—innovation in system design and development*, in this issue of the RECORD). In the majority of hardware-failure cases, the system automatically identifies the faulty circuit board and, if necessary to ensure smooth service before repairs can be made, takes the faulty circuit out of service. For some fault conditions, the system also has automatic recovery features similar to those used in central offices. Depending on the severity of the problem, this recovery may be as simple as automatic correction of data inconsistencies in the memory, or as radical

as connection of certain extensions directly to the central office.

The *HORIZON* System retains in its solid-state memory records of current faults and also transient faults—those which occurred and then disappeared. The transient records are especially useful in solving the intermittent problems that otherwise could result in “no trouble found” reports. Craftspeople obtain access to these records via a display on a Service Access Unit (see page 274).

As further aids in troubleshooting, built-in test-call features allow dial access to any speech path, to any *TOUCH-TONE* signal receiver, and to any line, from any station. For complex problems, craftspeople have a maintenance test-point board that provides access to the system’s backplane without direct probing. This board is inserted in a normal circuit-board position in the equipment cabinet.

To help craftspeople use these maintenance aids, a complete Task Oriented Practice is supplied with each *HORIZON* System, and a maintenance-support Bell System Practice is available for complex troubleshooting.

A Service Access Unit provides a powerful, easy-to-use system interface for administration activities such as assigning lines, changing features to the customer’s specifications, or adding new station features. Built-in cues displayed on the Service Access Unit and repetitive operations make these jobs easy. The Service Access Unit is portable and one unit can be used in conjunction with several *HORIZON* Systems.

Only three types of data are required to add or change any detail of the system’s “translation”—the customer’s unique system arrangements. The first type is an identification number for the facility (e.g., station set or line); the second is an item number to identify which information is to be altered; and the third is the actual translation data.

The system responds almost instantaneously to these commands and checks the validity of the input data. Installations and changes can be made without disrupting ongoing operation. The system will automatically hold up a change if the station or feature to be altered is in use when a change is entered.

To organize the work, a craftsperson lists specific data, on a per-station or per-feature basis, on simple worksheets. Then this information is keyed directly into the system at the Service Access Unit.

An integral part of the Service Access Unit

is a small digital-type cassette transport used to enter the system translation from a factory-prepared cassette and to write new cassettes whenever in-service changes are made. Two cassettes are left with the equipment on the customer’s premises to provide backup in case of failure in system memory. Such failure would require a visit by a craftsperson and, at that time, the Service Access Unit cassette transport would be used to read in a current tape.

Meeting the customer’s needs is the primary objective of the *HORIZON* Communication System. It simplifies and expands call-handling features while improving ease and effectiveness of Operating Company administration and maintenance, and, with thorough documentation, offers a truly complete custom system for small-business customers. □

MULTIBUTTON ELECTRONIC TELEPHONE BUTTON FUNCTIONS

Standard

Hold—Allows a called party to hold a call.

Plus/Minus—Allows lines to be added to or dropped from a conference call.

System Access (2)—Allows the user to originate and receive station-to-station calls and receive attendant-completed calls. These two buttons are also used for access to special-services and central-office lines.

Recall (separate dedicated button)—Replaces switch-hook flash for *HORIZON* Systems served by external PBX or centrex.

Optional

Call Coverage—Allows the user to answer calls directed to another station.

Send All Calls—Allows the user to have all incoming calls ring immediately at the covering station.

Pooled Facilities Access—Provides access to special lines such as WATS or Foreign Exchange.

Manual Exclusion—Used to exclude other parties from an outside call.

Manual Signaling—Allows user to signal another predetermined station.

Automatic Intercom—Allows the user to call another internal station with a single button depression.

Station Message Waiting—Provides a visual indication of a message waiting by lighting the status LED on the MSG WAIT button.

Personal Line Access—Provides direct access to an outside line.