DIMENSION® spectrum expands with Custom Telephone Service

DIMENSION Custom Telephone Service is a new feature package of easy-to-use custom-calling and key-system features available with the DIMENSION PBX.

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RESPONDING TO THE SPECIAL NEEDS of business telephone customers has been a tradition in the Bell System—a tradition being continued with the introduction of the DIMENSION® Custom Telephone Service, or DCTS. Being offered with the DIMENSION PBX, DCTS provides all the popular features of the DIMENSION system plus several new options.

A key element of DCTS is the multibutton electronic telephone. This new set dramatically improves the operation of custom-calling features—the business customer gains access to these services simply by touching a button instead of flashing the switchhook and dialing a special code. The electronic telephone also furnishes the latest key telephone features, as well as several new advanced options. To accommodate the new sets, DCTS includes expanded PBX software.

Also part of the DCTS package is a new electronic telephone controller. Acting as the interface between the electronic telephones and the DIMENSION PBX, the controller scans the buttons and lights the indicator lamps in the telephones. It also exchanges information with the DIMENSION PBX at regular intervals on the status of the phones and action to be taken.

Multibutton electronic telephones

DCTS is the first commercial offering of electronic key telephones in the Bell System. A variety of models is available, ranging from 5- to 30-button sets. Equipped with a new, lightweight handset (K-type) and a modular handset cord, the multibutton telephones have newly-styled, ivory-color housings, which accommodate faceplates in nine contrasting colors. All the telephones use an electronic tone ringer instead of an electromechanical bell, and a Recall button that the customer can use after completing a call to get an immediate dial tone for a second call or to activate some system features, such as threeway conference transfer. The new sets also use solid-state, red and green light-emitting diodes (LEDs) as visual indicators. A green LED gives status information that is provided on today's conventional key sets by an incandescent lamp. It lights steadily while the line is in use, winks while it is on hold, and flashes while it is ringing. A red LED performs the same function as a locking button; it indicates the extension selected by the customer.

Because they need only four wire pairs instead of the 25 or more pairs used for conventional key sets, electronic telephones reduce the investment required in building wiring. At the same time, they increase the flexibility of this wiring because the same four wire pairs can be used for any electronic telephone, regardless of the number of buttons or features in the set. In addition to supplying the standard talking path, these four pairs control the tone ringer and lamps and relay data

signals on switchhook and button status. Power for the lamps, tone ringer, and set logic also is delivered over these conductors.

The new telephones use a four-pair mounting cord with modular plugs and jacks. The jacks are compatible with the plugs used for single-line telephones. Thus, if a building is equipped with a DIMENSION PBX and is wired with four-pair jacks throughout, either single-line or multibutton electronic telephones of any size can be plugged into the jacks without changing any wiring. Adapters are available to make existing 25-pair building wiring compatible with the four-pair wiring of the multibutton electronic telephone.

Field repairs on the electronic sets are expected to be minimal because highly reliable solid-state components are used, and there are no filament-type lamps to burn out. If a fault should occur, the usual procedure is to replace a component, such as the dial or the handset.

The features activated by the buttons on each electronic telephone are controlled by programs in the DIMENSION PBX. Because of this stored program control, no mechanical wiring modifications are necessary to change line arrangements or to add new custom-calling features. Craftspeople make such modifications easily by following the same procedures used for the basic DIMENSION PBX system. They enter the appropriate information into the DIMENSION PBX processor by operating pushbuttons in a specified sequence on the Maintenance and Administration Panel (MAAP). Thus each electronic set can be programmed for those features the customer finds most useful.

Electronic telephone controller

The electronic telephone controller is the interface between the multibutton electronic telephones and the DCTS software in the DIMENSION PBX. The controller's memory contains the status of telephone buttons, switchhooks, lamps and ringers.

The controller and DCTS software exchange information at regular intervals. When a button or switchhook changes state, the controller updates its memory and prepares a message for the DCTS software. The software in turn alerts the controller when the state of a lamp or ringer must change. Then while scanning the telephones, the controller instructs the appropriate sets to update the lamps or generate a ringing tone. By controlling the volume (high-low), pitch, and interruption rate of the ringers in the sets, the controller allows the electronic telephones to produce a wide range of audible signals.

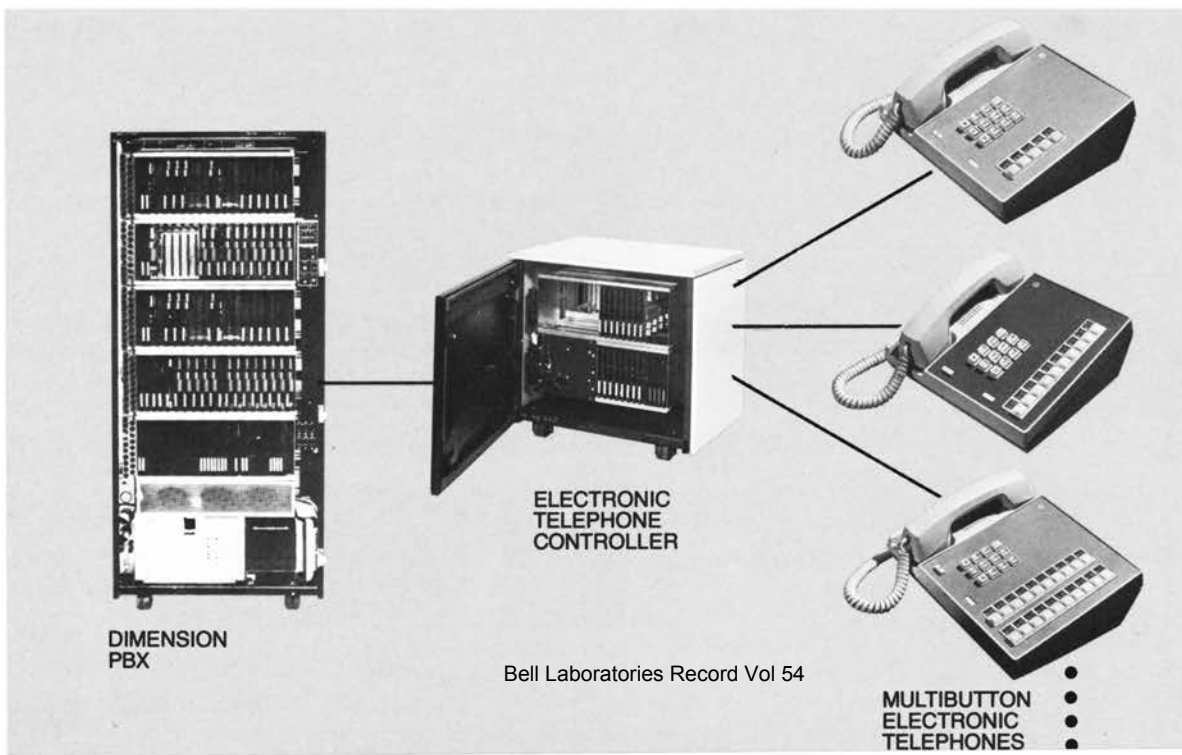
The controller uses standard DIMENSION PBX hardware. It can be located in the DIMENSION PBX or in a separate cabinet. Each controller has a self-contained power supply.

DCTS software

DCTS call processing software has been added to the DIMENSION PBX to control the structure of the electronic controller's mem-

A new dimension. Pictured here are the major components of the DCTS. The new multibutton electronic telephones are available in desk and wall models.

The electronic telephone controller can be installed in a separate apparatus closet or in the DIMENSION PBX cabinet.



ory. This memory contains data reflecting the status of the buttons, lamps, switchhooks, and ringers in the electronic telephones.

The DIMENSION processor repeatedly scans the controller to determine if any action is required. If so, the DCTS software completes the processing necessary to control features unique to DCTS and then passes control to the PBX call processing software.

The maintenance and administrative software of the DIMENSION system also has been expanded to accommodate the controller and the electronic telephones.

Maintenance programs for detecting and diagnosing trouble conditions are stored in the system. These programs include diagnostics covering troubles that may occur anywhere from the DIMENSION PBX to the electronic telephones.

Also stored in memory are administrative programs designed to reduce the effort required to add or rearrange features and services provided by DCTS. These programs allow a craftsperson at the MAAP to add, remove, and rearrange service assignments for the electronic telephones. Line pickup buttons and other key telephone features can be rearranged without changing the wiring, the usual practice with conventional key systems.

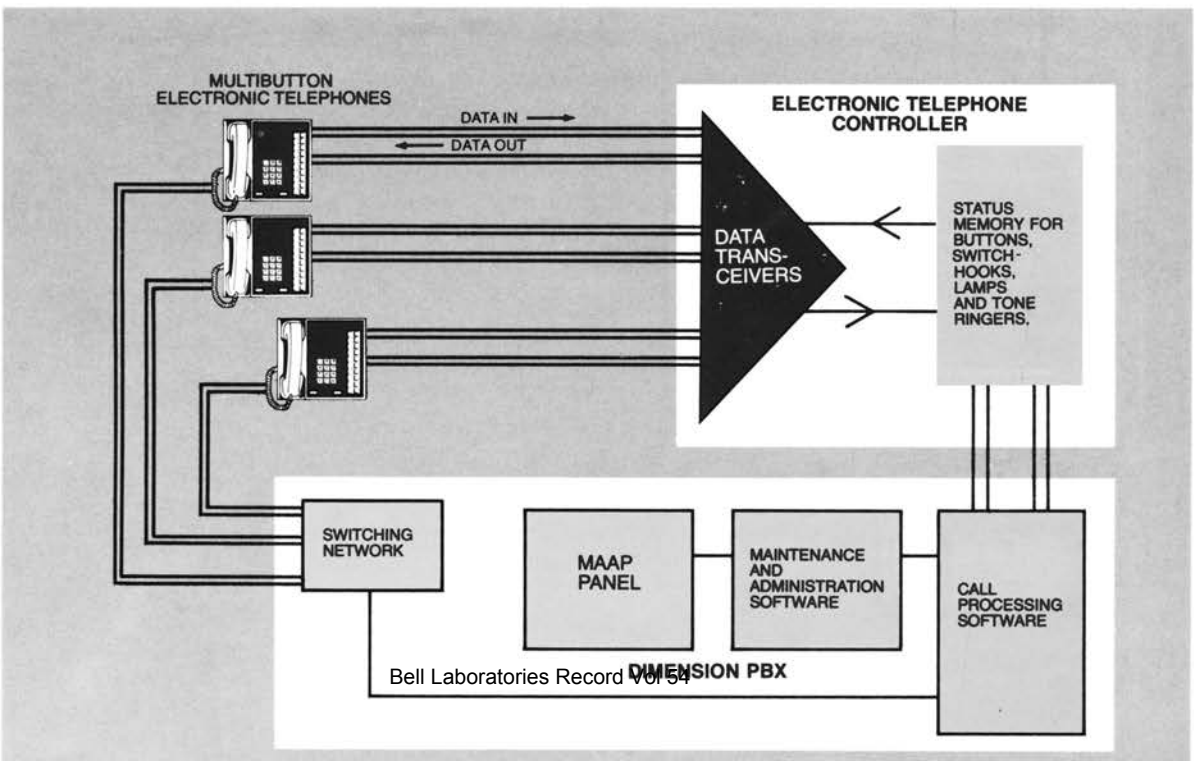
DCTS feature package

Among the key telephone features offered by DCTS is Multiline Pickup. It permits a person to use a number of different extensions from just one set. Automatic Intercom, another key telephone feature, provides a direct talking path between two DCTS telephones. It signals the called telephone with a distinctive three-burst ring.

DCTS has made it easier to use the DIMENSION custom-calling features by eliminating the need for switchhook flashing and access codes to activate features. For example, Automatic Callback, which automatically redials a busy extension, ringing both calling and called extensions when they are free, can be activated or deactivated simply by pressing a button. A flashing status lamp associated with the Automatic Callback button complements the distinctive ringing the originating telephone receives when the callback call is completed. To activate this feature from a telephone other than the electronic set, it is necessary to hang up, dial a two- or three-digit code and then redial the desired extension.

Two features unique to DCTS are Prime Line Preference and Ringing Line Preference. When a person picks up the handset to make an outgoing call from a telephone with the Prime Line Preference feature, the set automatically reverts to its own assigned extension number regardless of the extension used for the preceding call. With Ringing Line Preference, the user, simply by lifting the handset, is automatically connected to the ringing line. These features are made possible by the flexibility offered by the nonlocking buttons on the telephones and by the stored

Tying it all together. The electronic telephone controller sequentially scans the multibutton electronic telephones and reports any changes to the DIMENSION call processing software. This software updates the status memory in the controller and controls the switching network in the DIMENSION PBX. The talking path from the electronic telephones is connected directly to this same PBX network.



Several members of a new family. Multibutton electronic telephones have been added to the DIMENSION PBX. The new solid-state sets enhance custom-calling and key telephone features available with the DIMENSION system. To simplify maintenance, they are modular in design and use light-emitting diodes and nonlocking buttons. The lamps and buttons on the telephones are controlled by a serial data link, allowing the use of a standard, "skinny" wire cable.

program control of the switching and lamp status functions.

Another new feature is Exclusive Hold. By pressing a button, a person can place a line on hold and prevent someone else from picking up on the same line and accidentally disconnecting the call.

Multibutton electronic telephones can be equipped with the Direct Station Selection (DSS) field, consisting of ten buttons above the dial. These buttons furnish one-touch dialing of preassigned PBX extensions. One button also can be programmed to offer one-touch redialing of the last dialed extension number.

Making an intra-PBX call

Consider an electronic telephone with Prime Line Preference that goes off-hook. When the controller scans that set, it detects the change in the status of the switchhook and prepares a message for the DIMENSION PBX.

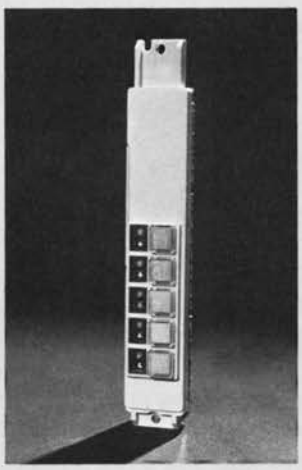
When the PBX scans the controller, as it does periodically, it reads the message in the controller. Since the system is equipped with the Prime Line Preference feature, which is unique to DCTS, the DCTS software in the DIMENSION processor must activate the prime line—the line assigned to the person using the telephone. To do this, the DCTS software sends the controller one message for each of the lamps affected by the change. After decoding these messages, the controller updates the appropriate lamp status words in its memory.

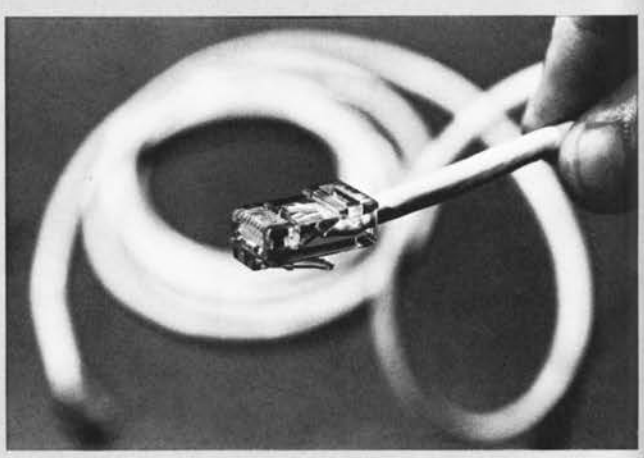
The DCTS software in the DIMENSION processor also notifies the PBX call processing software that a telephone has gone off-hook. The DIMENSION software then connects the telephone to a digit receiver, and after the number is dialed, notifies the DCTS software that a line is to be rung. After determining which telephones are affected by this change, the DCTS software prepares the appropriate messages and sends them to the controller, which in turn updates its memory to reflect the status of the lamps and/or tone ringers.

When the called telephone goes off-hook, the controller detects the changed status, updates its memory, and prepares a message for the DIMENSION PBX. As the last step in the process, the DCTS software updates the status of all the lamps affected by the change and notifies the DIMENSION software to connect the two telephones.

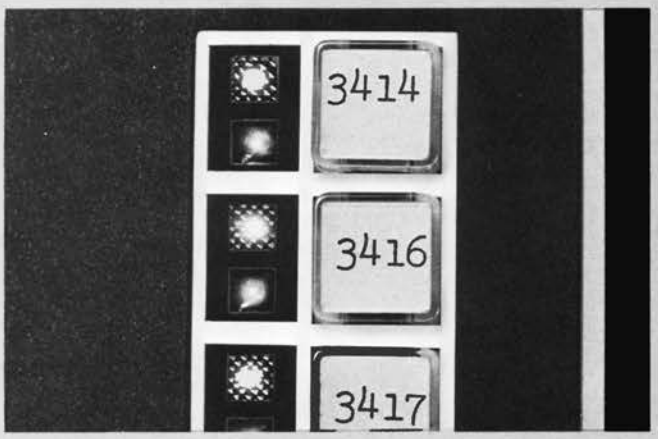
DCTS was initiated in November 1975 with the cutover of the first customer in the Northwestern Bell Telephone Company area. Successive installations have resulted in enthusiastic response from business customers and Operating Company personnel. □

DCTS close-up





The MAAP in the DIMENSION PBX is used to change telephone features and line pickup assignments and to diagnose system problems.



Light-emitting diodes give a continuous reading of each button on the telephone. RED indicates the line the customer has selected, and GREEN tells the status of each line—busy, idle, ringing, or on hold. The buttons, which do not lock when pressed, access features or serve as line pickups.

Solid-state technology, light-emitting diodes, and modular parts simplify maintenance of the multibutton electronic telephones.

The Recall button eliminates the need to flash the switchhook to access special features.

The new "skinny" four-pair mounting cord with modular plugs is standard on all sets.

The optional Direct Station Selection field provides one-touch dialing of prestored extensions.

A tone ringer located under the handset furnishes distinctive ringing.

Custom-calling feature buttons replace dial codes. For example, after receiving a busy signal, a DCTS customer has several options: press Automatic Callback and when the line is free be called back automatically; press Call Waiting-Originating to send a special tone that lets the busy extension know a call is waiting; or press Executive Override to talk to the called party immediately.