

CENTRAL
OFFICE

BRANCH
LOCATION

PBX

MAIN LOCATION

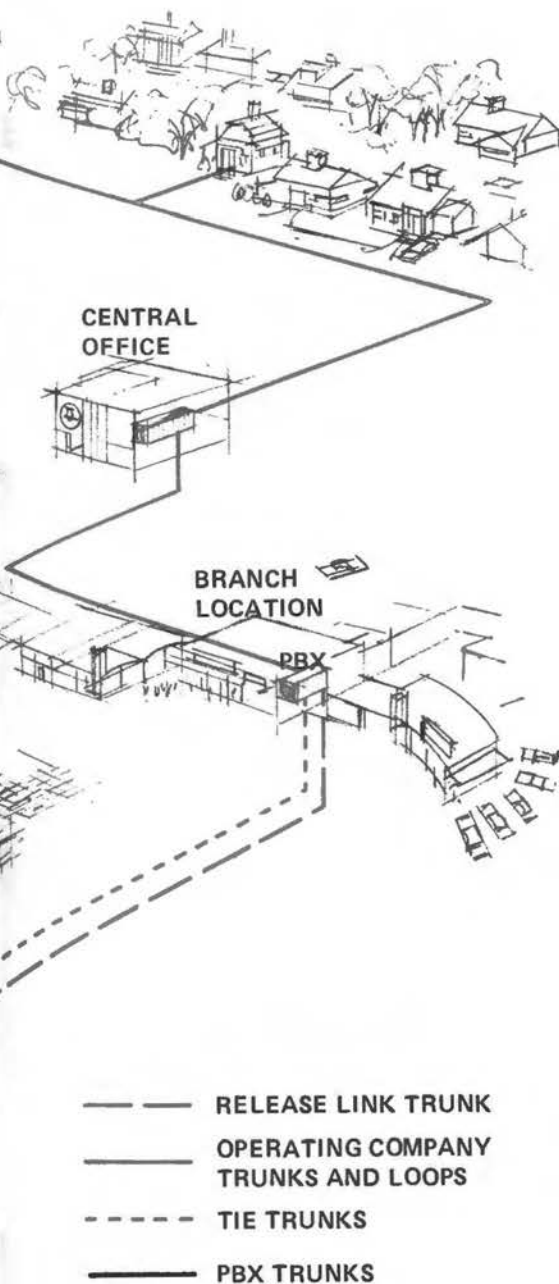
PBX

CALL
DIST.

BRANCH
LOCATION

PBX

CENTRAL
OFFICE



With Centralized Attendant Service (CAS), customers with multiple business locations can improve efficiency by centralizing consoles and attendants for branch locations. Also, phone services at each branch can be tailored to that location's needs.

Centralized Attendant Service

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THE BELL SYSTEM offers a wide variety of equipment and services to meet the telephone needs of its business customers. PBX (Private Branch Exchange) or Centrex equipment, used in conjunction with a switchboard or attendant's console, connects the telephones in one location—a hospital, office, motel, or department store, for example—to each other and to the telephone network. Several other features improve the convenience of the system or the efficiency of the attendants. Tie trunks furnish direct connections between separate locations—usually parts of the same firm or agency. Direct Inward Dialing furnishes the option of receiving most calls without attendant assistance, and Identified Outward Dialing adds the option of billing toll calls to individual extensions. Call distributors allocate incoming calls requiring assistance among a number of attendants, either queuing the calls or signaling the attendants so that calls are answered in approximate order of arrival.

How it maps out. With Centralized Attendant Service, customers' calls requiring assistance go through a central office direct to a firm's local branch. From there they are routed over release link trunks to an attendant at the central or main location. Interlocation calls are placed over tie lines to avoid tying up the attendant service.

Recently, a related need has been recognized—the need to allow business firms with offices at scattered locations to concentrate their attendants at one location. The Bell System's new offering to meet this need is Centralized Attendant Service (CAS).

Imagine a department store with a downtown sales and office building and three suburban branches (see the illustration on pages 60-61). With Centralized Attendant Service, all the attendants work at one central location referred to as the "main" location—in this case, at the downtown store. A customer who wishes to call the gift department at a particular branch dials the listed directory number for the branch. The call is switched over a short holding time connection called a Release Link Trunk (RLT) to the main location. There the call is assigned to an idle attendant or is put into a queue if all attendants are busy. The attendant processes the call back over the same connection to the gift department's extension. When the telephone there starts to ring, the attendant hangs up and becomes available—along with the release link trunk—for other calls.

CAS pays off

Although this sequence seems complex, it pays off in more efficient use of attendants. With a common pool of attendants handling a larger number of calls, the efficiencies of load-sharing become available. The new service offers a number of additional advantages over standard PBX service. With CAS,

- Incoming calls are answered faster.
- Attendants can be supervised, managed, and scheduled better.
- Total communication expenses are lower since the savings in attendant costs more than compensate for the slight increase in the cost of added equipment.

From a caller's point of view, call processing is the same as though the attendants were located at the local branch.

A number of switching arrangements for centralizing attendants have been available from Bell System Operating Companies and from Western Electric since New York Telephone developed Centra-Call in 1966. Centra-Call required 701 and 711 PBXs at the main and branch locations respectively and switchboards for the centrally located attendants. Other arrangements were designed to operate with No. 5 crossbar Centrex, No. 1 ESS (Elec-

tronic Switching System) Centrex, or No. 101 ESS (see *New Switching Concept for Multi-location Customers*, RECORD, September 1971). But these prior arrangements had certain limitations. Some of them could work with only one switching machine. Others could not automatically distribute incoming calls to the attendants, or were slow in operation or had limited features.

Centralized Attendant Service is designed to remedy these shortcomings. For one thing, call distribution is built into the system. Also, the system is both flexible and fast—a typical call takes an attendant only 5 to 9 seconds to process. This minimizes the number of consoles and release link trunks required and allows the overall number of attendants to be reduced.

Equally important, Centralized Attendant Service provides for a mix of different Bell System switching machines to be used on a standard basis at low cost. Company managers may now consider each location as an independent switching center and, choosing from a variety of switching arrangements, may custom-tailor the features to meet the needs of that location. For example, our fictional department store might provide Centrex service for the downtown store—where there are offices that customers should be able to dial directly—and PBX service for branch locations.

There are four classifications of calls that usually require attendant assistance. They are incoming calls to the listed directory number, calls dialed to attendants from extensions and tie trunks, calls transferred or intercepted, and special calls—WATS (Wide Area Telephone Service) calls, conference calls, toll calls, and the like. Although special calls may require additional provisions (see below), incoming calls, operator calls, and transferred calls can all be processed by centrally located attendants.

Centralized Attendant Service is designed for companies having from two branch locations to 15 or more. The distance of any branch from the centralized answering location may be quite far; however, mileage charges associated with release link trunks usually make it economically feasible to handle calls for branch locations up to about 25 miles from the attendant location. The number of release link trunks needed to any particular branch location is about the same as the number of consoles that would otherwise be required at the

SELECTING EQUIPMENT FOR CAS

There are a number of equipment options for furnishing Centralized Attendant Service to a customer. The choices will depend primarily on the number of telephone lines needed at each of the firm's locations and on the availability of some of the alternatives.

For example, a customer having relatively few locations and extensions might choose the first option under switching plan I (see the table below).

A larger firm might require the second option, with either a 770A or an 812A PBX at a particular branch location depending on the number of lines needed at that branch.

Switching plan II furnishes the greatest capacity with the least on-premises equipment, but this plan is available only if the customer's local central office is a No. 1 ESS office with a Centrex 5, Issue 6 program.

	EQUIPMENT			MAXIMUM CAPACITY		
	MAIN LOCATION	BRANCH LOCATION	CALL DISTRIBUTOR	LINES PER LOCATION	TOTAL ATTENDANTS	TOTAL RLTS
SWITCHING PLAN I	1 770A or 812A	770A or 812A	4A CD	400 2080	15	20
	2 770A or 812A	770A or 812A	2B ACD	400 2080	70	68
SWITCHING PLAN II	NO. 1 ESS Centrex	PBX: 770A or 812A Centrex: NO. 1 ESS or NO. 5 crossbar	NONE NEEDED	PBX: 400 2080 Centrex: 10 K	128	AS NEEDED

branch PBX. But a branch PBX with just two release link trunks (the minimum number) will furnish a better grade of service than a single console.

Equipment choices

Two switching plans are now available, plan I using 770A and 812A PBXs and plan II using a mixture of these PBXs and No. 1 ESS Centrex Service. Plans using other PBXs, such as the DIMENSION* PBX, are being developed. Each offers flexibility in choosing equipment (see "Selecting Equipment for CAS," above).

*Trademark of AT&T Co.

Plan I requires one or more PBXs at each location, release link trunks between the main and branch locations, a call distributor or automatic call distributor at the main location, and consoles for the attendants and the supervisor (see the illustration, pages 60-61). Tie trunks between branches are optional. Branch locations are also equipped with supplementary attendant facilities—either a console, key telephones, or "trunk answer any station" (an arrangement, generally used at night, that makes it possible to answer incoming calls at any telephone). Thus, incoming customer calls that require the assistance of an attendant can be answered even if the main location is

closed or some release link trunks have failed.

Under switching plan I, calls can be handled in a variety of ways. For example, many calls do not require attendant assistance at all. These calls, which are switched automatically, include incoming calls to extensions in a Direct Inward Dialing system, extension-to-extension calls, and outgoing calls dialed directly over central office trunks.

A firm having a relatively small number of locations and extensions might use several 770A PBXs and a 4A Call Distributor (see *New Features for the 770A PBX*, RECORD, May 1975; also, *A Small Call Distributor Based on the Key Telephone*, RECORD, January 1973). Each 770A furnishes PBX or Centrex-type service for up to 400 extensions and three release link trunks per location. With this arrangement up to 15 attendant positions and 20 release link trunks are possible.

Customers requiring a larger number of attendants and automatic call distribution of attendant-handled calls might use a 2B Automatic Call Distributor along with a mix of 770A and 812A PBXs. An example is the W. H. Block department stores in the Indianapolis area, which required four 770A PBXs at branch stores and an 812A at the main store (see photo, top of page 66). The 2B Automatic Call Distributor can handle up to 70 attendant positions and terminate up to 68 release link trunks; the 812A provides either PBX or Centrex-type service for up to 2080 extensions and permits the use of up to 14 release link trunks per location (see *Meeting Business Needs with the No. 2B ACD*, RECORD, April 1975; also, *812A PBX: Answering the Market's Call*, RECORD, November 1974).

Switching Plan II involves using a No. 1 Electronic Switching System at an Operating Company's central office to furnish Centrex service to the main location. Branch locations use 770A or 812A PBXs, No. 1 ESS Centrex, or No. 5 crossbar Centrex. In plan II, the No. 1 ESS equipped with the proper program serves as both the main switching machine and the call distributor. It allows both call processing and special attendant functions to be performed by the same group of attendants.

Processing calls

With Centralized Attendant Service, attendants have a number of aids to help them handle calls. A console lamp indicates which branch the call is from (see lower photos, page 66), while information tones that origi-

inate at the branch location indicate the type or condition of a call—for example, whether it is an incoming dial "0" call, a "recall on don't answer" call (see below), or a call requiring transfer.

The attendants process the incoming calls with a TOUCH-TONE® dial for dialing the desired extension or trunk, a console release key to disengage from the release link trunk, and a flash key. Operating the flash key sends a signal via the release link trunk to the branch PBX. This signal may disconnect a ringing or busy connection or give access to a Touch-Tone dialing register, as necessary. Attendants can originate calls to branch locations over regular tie trunks or through the public network but not over release link trunks.

Major features

Processing calls is therefore quick and convenient not only for callers, who need only dial the local listed numbers, but also for attendants (for the processing of an ordinary call, see "How It Works," page 65). The following are some features that add to the flexibility and ease of providing this service.

Recall on Don't Answer. Once an attendant has extended a call to an extension and released, the call is brought back to the attendant after a predetermined time—15, 30, 45, or 60 seconds—if it has been neither answered nor abandoned. Unique lamp and tone signals identify the branch location and the type of call ("recall on don't answer"). One choice for the attendant at this point is to let the extension continue to ring for a second timed interval by simply releasing from the call. The second option is to connect the calling party to another extension by pressing the flash key twice.

Camp-On and Camp-On Recall. The "camp-on" feature permits the attendant to place a call in a waiting state, to be automatically connected when the busy extension becomes free. The feature works this way: If the attendant attempts to complete a call to a busy line, a confirmation tone is returned to the attendant from the PBX and a talking connection is re-established between the attendant and the calling party. If the person wishes to wait, the attendant releases from the connection and the busy extension receives a single half-second tone, indicating that another party is waiting to talk. When the first call is over, the called party simply hangs up, and the telephone automatically rings for the camped-on

HOW IT WORKS

This diagram traces a typical call to a branch location of a company set up for Centralized Attendant Service. The equipment at the main location consists of a 770A PBX and a 2B Automatic Call Distributor.

1. A caller who wishes to speak to someone at the local branch of the company dials the listed directory number for that location. The call is automatically connected through a release link trunk to the call distributor and answered by an attendant. The caller asks for a particular person or extension.

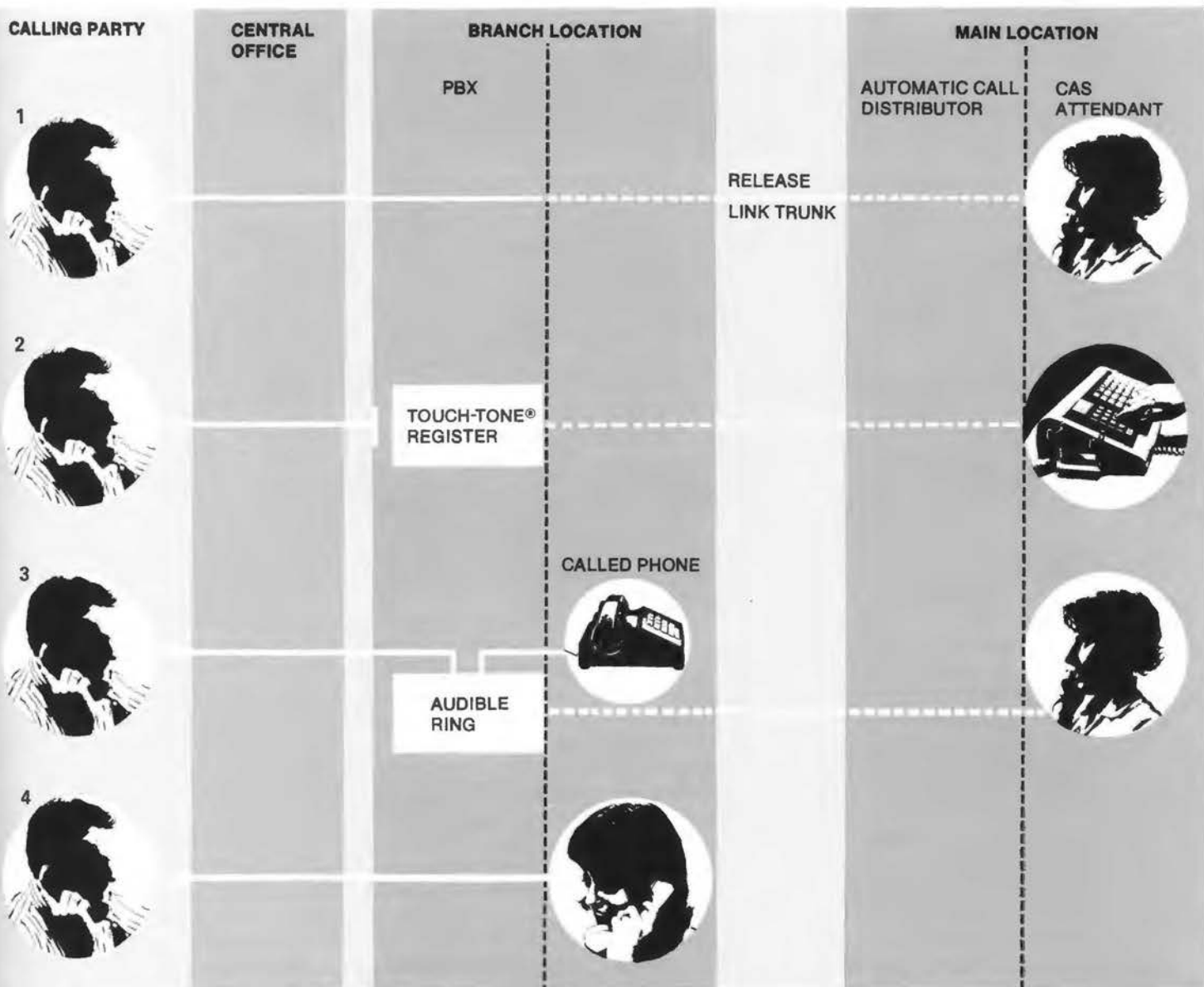
2. Operating via the release link trunk, the attendant simply presses a button, which automatically places the call on hold at the branch PBX and returns dial tone to

the attendant. The attendant then TOUCH-TONE® dials the extension number.

3. The attendant immediately hears a ringing signal and releases from the call. At this time the called extension rings, the caller hears audible ring, and the release link trunk is released and made available for another call.

4. When the called party answers, the connection is established.

A call that is destined for a location different from the one that was called can also be handled via a release link trunk and a centrally located attendant. But the final connection is made over a tie trunk to avoid tying up a release link trunk.





First installation. In July 1974, the W. H. Block department stores in Indianapolis became the first customer to use Centralized Attendant Service. Through this service, the company has been able to reduce substantially the number of attendants required. At left is Henrietta Moody at the supervisor's console, with three attendants handling calls.



Help for attendants. The 2B ACD console (far left) has been modified for Centralized Attendant Service by the addition of a row of light-emitting diodes (LEDs) on the extreme right. For each incoming call, one LED lights to tell the attendant the branch from which the call is coming. The console of the 4A call distributor (left) required only a minor modification.

call. Camp-on is not possible if another call is already waiting or if the called telephone is ringing.

Remote Hold. When an incoming call cannot be completed or camped on and the caller is unwilling to call back later, the CAS attendant may place the call on "remote hold." The call is held in silence at the branch PBX for a timed interval (15 to 60 seconds), after which a release link trunk is seized and the call is returned to a central attendant.

"Dial 0". A person at a PBX extension who wishes to reach an attendant simply dials "0". The branch PBX seizes a release link trunk, an action that results in the automatic assignment of the call to one of the attendants. The attendant receives normal lamp and tone information and can process the call in the same

manner as a call to the listed directory number. Dial "0" service is frequently used when outgoing calls must be screened. If the attendant dials an outgoing trunk and releases from the call, the person can then dial to complete the call directly.

Attendant Transfer. To transfer an incoming call to another extension, the called party simply flashes and dials "0". This action connects both the caller and the called party to an attendant over a release link trunk. The call is identified to the attendant by lamp and tone signals. Normally, the called party hangs up at this point, and the call is completed like any other incoming call.

Calls to Tie Trunks. Attendants may need to extend certain calls from one PBX location to another—for example, a call dialed to the

listed directory number of a store's branch location but intended for the credit department located in the main store. The operating procedure for such a call is similar to the procedure used for an incoming call to the same branch except that the attendant first dials a tie trunk access code, receives a second dial tone from the PBX at the main location, and then dials the number of the desired extension. In this case the attendant generally remains on the line until the call is answered, since the "recall on don't answer" feature is not provided on tie trunk connections.

Special Calls. If a business customer with CAS also requires WATS lines, conference features, or any of several other attendant-handled features, the customer will need either a 770A PBX or a No. 1 ESS as the main switching machine. The 770A PBX allows a special console to be used for these calls in addition to the three release link trunks. Potential callers dial a unique code (other than "0") to reach the attendant at this console. Calls to this special console cannot involve release link trunks. If the switching is done by a No. 1 ESS, however, then ordinary attendant calls and special calls can be handled by the same common pool of attendants. The reason is that No. 1 ESS installations use standard data-link consoles, which have the needed capabilities for both kinds of calls.

Testing. Arrangements have been included so that customers can test the release link trunks associated with their system, since these trunks are critical to the service. Testing is usually done each morning before the start of normal operations. Tests can be conducted from each branch or from the main location via a tie trunk to a branch and then back through a release link trunk to an attendant. The tests verify that each release link trunk is operating and allow the attendant to make a subjective evaluation of the transmission quality of each connection.

Uniform Numbering Plan. Though strictly speaking not a feature of Centralized Attendant Service, the use of a "uniform numbering plan" for an entire complex is recommended to minimize attendant "look-up" time. As an example, under this plan the sporting goods departments in every branch of a department store would each have the same extension number. Uniform numbering ordinarily permits an attendant to complete most calls without looking up the extension number.

Paging and Code Calling. Voice paging and



On-the-job scene. Jodi Fritz, attendant for Pomeroy's Department Store, Harrisburg, Pennsylvania, processes a call from a branch store, while Rosemarie Mc Camant, attendant supervisor, talks with the other attendants.

code calling (calling that produces audible gong signals, such as those heard in department stores) are both possible at all locations. Access to the paging amplifier or to the code call equipment is by dialed code, and either the caller or an attendant may do the actual dialing and paging.

Besides W. H. Block, a number of other firms are using Centralized Attendant Service. The Mabley and Carew department stores in Cincinnati, Ohio, use a No. 1 ESS for the downtown store and 770A PBXs for three nearby suburban stores and a distant branch store in Louisville. Smaller installations—such as Jordan Marsh in Greensboro, North Carolina, and Pomeroy's in Harrisburg, Pennsylvania (see the photograph above)—use 4A Call Distributors, with 770A PBXs at both the main and branch locations. □