Lucent Technologies
Bell Labs Innovations

MERLIN®
COMMUNICATIONS SYSTEM

CENTREX/PBX CONNECTION

MERLIN is a registered trademark of Lucent Technologies.

Intellectual property related to this product (including trademarks) and registered to AT&T Corporation has been transferred to Lucent Technologies Incorporated.

Any references within this text to American Telephone and Telegraph Corporation or AT&T should be interpreted as references to Lucent Technologies Incorporated. The exception is cross references to books published prior to December 31, 1996, which retain their original AT&T titles.

Lucent Technologies – formed as a result of AT&T's planned restructuring – designs, builds, and delivers a wide range of public and private networks, communication systems and software, consumer and business telephone systems, and microelectronic components. The world-renowned Bell Laboratories is the research and development arm for the company.

The intent of this document is to help you make the most effective use of the **MERLIN™** communications system in combination with either Centrex or PBX service. The document has two parts: The first part highlights aspects of the **MERLIN** system that are of particular interest to Centrex/PBX service users, and the second part explains procedures for using the **MERLIN** system that arise out of combining it with other services.

The information presented here applies to all models of the **MERLIN** system, unless otherwise stated. Use this document in conjunction with the documents that came with your system; they will provide further information about your particular model:

Installation Guide - contains procedures for the installation and expansion of your system

Administration Manual - contains administrative procedures and gives an overall view of the capabilities of the system

User's Guide - contains procedures for using and programming voice terminals.

A Quick Reference Chart, which highlights important aspects of using the **MERLIN** system in conjunction with Centrex/PBX service, appears at the end of this document. Be sure to share this information with the people who use your **MERLIN** system.

Table of Contents

Introduction

The **MERLIN** communications system-Centrex/PBX connection is the answer to improving your telephone service without disrupting your current Centrex or PBX service. By giving you greater flexibility, the **MERLIN** system's advanced technology and modular design extend the usefulness of your Centrex or PBX service. With many ways to combine components and with feature cartridges and modules offering a wide variety of useful features, you can choose those options that make the best use of your existing service and meet the particular needs of your office.

The modular design of the **MERLIN** system invites your involvement. You can install your **MERLIN** system yourself — and save money as you do it. Lines, voice terminals, and control units all simply plug into one another and attach easily to your existing Centrex/PBX wiring. Even the software is modular: both cartridges and modules easily slide into the control unit's clearly marked slots. You may decide to do some, all, or none of the installation, but the more you can do, the more you'll save.

After your system is installed, you are not locked into an inflexible arrangement, either. The entire system, including individual voice terminals, can be easily reprogrammed by using the procedures in the *Administration Manual* and *User's Guide.* If your group moves, you simply take your portable **MERLIN** system equipment with you and set it up in a new location. As more people join your department, you can increase your system's capacity by adding expansion modules or units and voice terminals, and you can buy new software when you want additional features.

Your **MERLIN** system can adapt to the arrangement you currently have, or you can use it to increase efficiency or to alleviate deficiencies in your current service. For instance, you may need a message service, or you may want control over the set-up and maintenance of your system instead of relying on building services personnel. Of particular interest to those who have Centrex or PBX service are the **MERLIN** system's options for using lines and for providing coverage.

Using Your Lines to Your Best Advantage

The **MERLIN** system gives you two basic options for using your lines: you may choose to have people share incoming lines or you may maintain the single line per person that you probably have with Centrex or PBX service. Figure 1 illustrates the difference in the two basic configurations. Between these two options, there are many possible variations, including a combination of shared and personal lines.

SHARED LINES

The standard arrangement for **MERLIN** systems is called "square" operation, meaning that each incoming line appears as a separate line button on each voice terminal. Everyone has access to all lines and can use all **MERLIN** system features. By means of its Automatic Line Selection feature, the **MERLIN** system selects a free line whenever people pick up their handsets. So even if several people share the same lines, there is little chance of people barging in on calls by mistake. And to preclude this from happening at all, you can use the Privacy feature, which prevents anyone from interrupting calls in progress.

By sharing lines you may be able to reduce the number of incoming lines you need, since many of your lines may be used only intermittently throughout the day. To determine how great a reduction you can achieve, assess the number and type of calls that people make. If most calls are intercom calls, it might be more cost-effective for you to share the outside lines that aren't used as often.

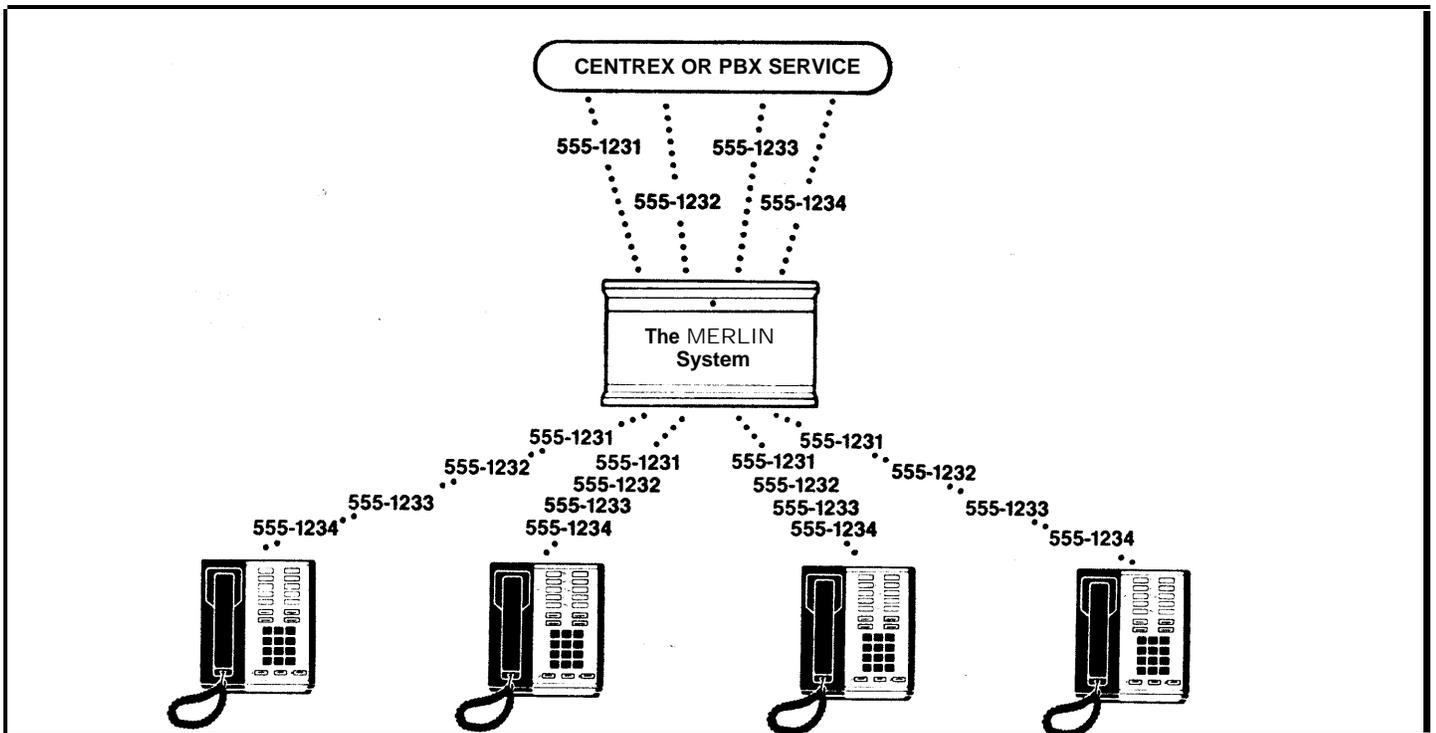4
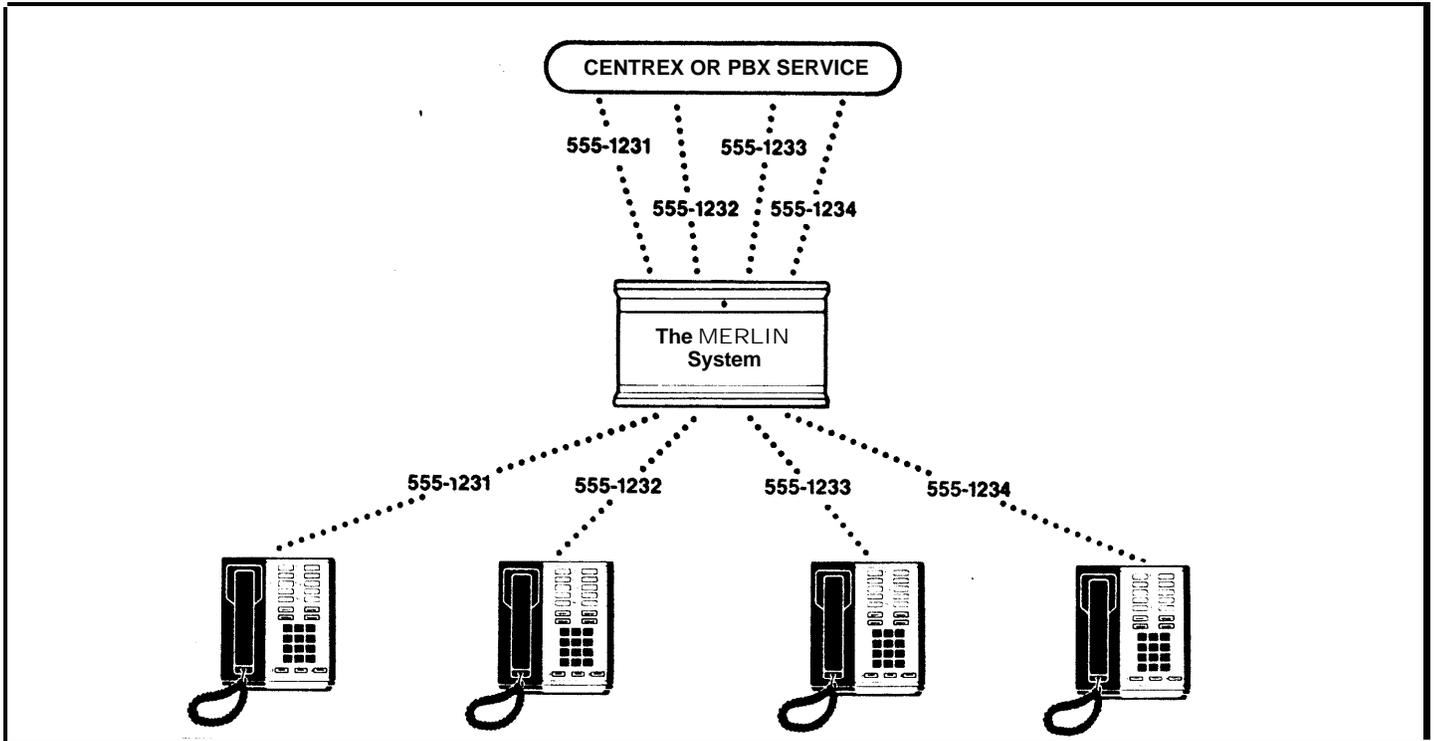
Personal Lines

Shared Lines

Figure 1

The two basic options for using your lines: personal lines versus pooled lines. To have personal lines, each incoming line is assigned to only one person. If lines are shared, everyone can use any of the incoming lines.

5

A variation of sharing lines is "pooling" them, a feature available with Models 1030 and 3070. Instead of having each incoming line appear as a separate line button on each phone, several lines may be grouped or "pooled" under one line button. Figure 2 illustrates the distinction between square and pooled operation from the perspective of someone using a voice terminal. Since the **MERLIN** system is designed to accommodate only one call per line, having two line pool buttons enables someone to use features that involve two calls at one time, such as Conference.

And to prevent the problem of barge-in, the Privacy feature is built into pooled lines.

Aside from the cost savings associated with line sharing, pooled lines have an added advantage: more buttons on the voice terminal become available for programming special features. For large systems, you can imagine the problem of showing ten or fifteen lines on a voice terminal. Either every button would be assigned a line, or everyone would need a 34-button set!
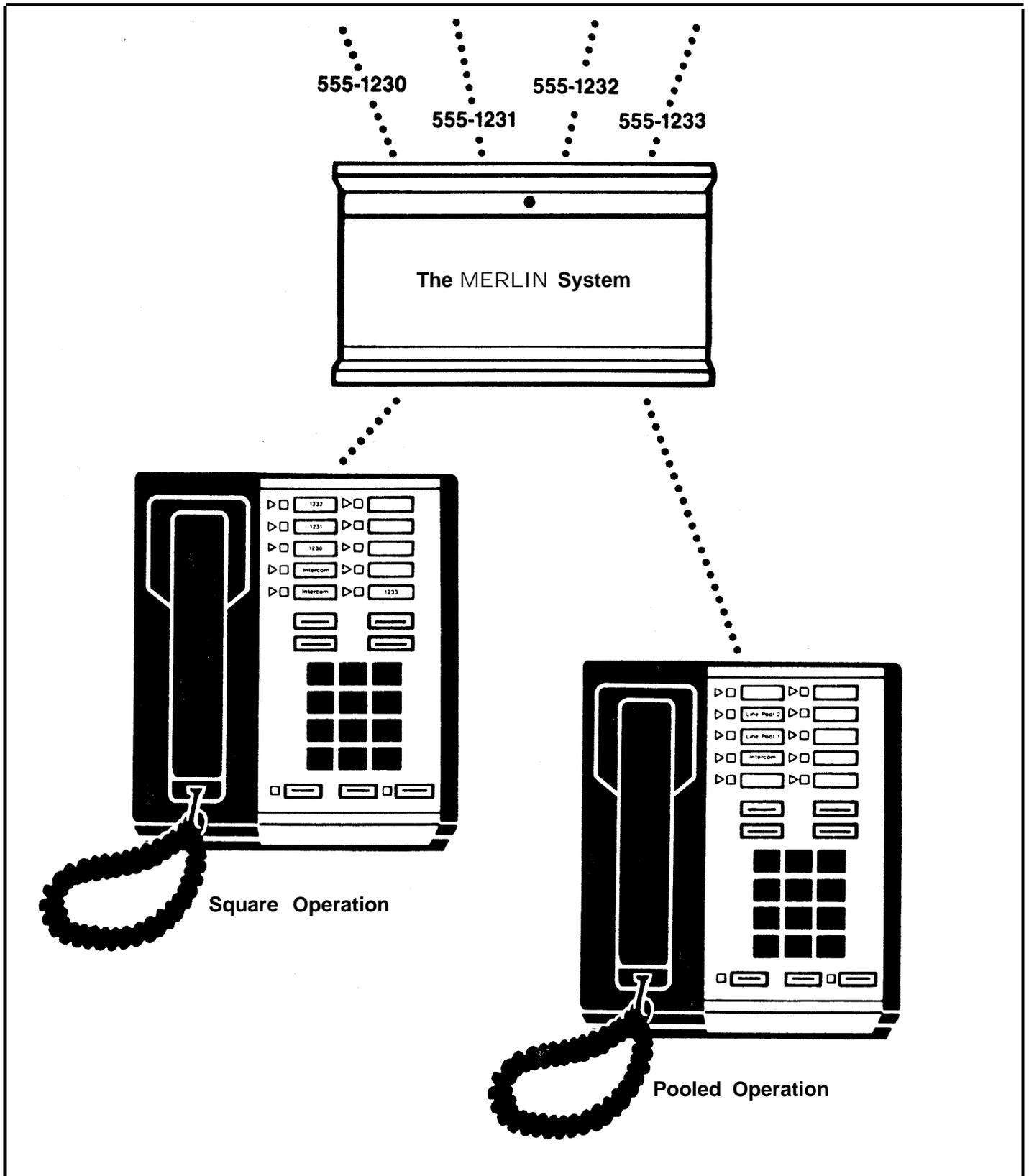
Figure 2

In this example, both voice terminals give access to the same lines. With square operation, a person has a button for each line and can choose a specific line if necessary. With pooled operation, the person does not know exactly which line is used at any time. Four lines can still be used, but only two line buttons are needed, freeing up buttons for programmable features.

PERSONAL LINES

Sharing lines may be a new idea in your office, for many people in your business may be accustomed to having personal lines. To some, a personal line may be essential; to others, a pleasant, but unnecessary privilege. You can retain personal lines for those who require them. The **MERLIN** system provides these people with efficient service without disrupting the way they are accustomed to doing business.

However, if someone has *only* a personal line, that precludes the use of those **MERLIN** system features that require two lines, such as the Conference feature. So, in addition to the personal lines you provide, consider providing one or two extra lines for everyone to share. With access to at least one other line, the people with personal lines will have the advantages of a personal line as well as access to all your **MERLIN** system's features.

Even if you can't supply extra lines, people with personal lines can still put an outside call on hold and consult with someone else over the intercom. And they can also use the Centrex or PBX Conference feature, which requires only one line.

THE RIGHT COMBINATION — USING YOUR LINES

Of course, the options of personal and shared lines are not mutually exclusive: combine them in whatever way best suits your needs.

Suppose, for example, a department previously had personal lines for each of its twenty members. Because the receptionist answered many incoming calls anyway, when the **MERLIN** system was installed, it seemed logical to have the receptionist answer and transfer all calls. After assessing their needs, members of the department decided that eight lines, in a pooled arrangement, were adequate. Two supervisors were given personal lines to use in addition to the line pool. In this way, only ten lines were needed for the whole group, reducing the number of lines by half, while still providing efficient service for everyone. Figure 3 illustrates how this department was able to use its lines effectively.
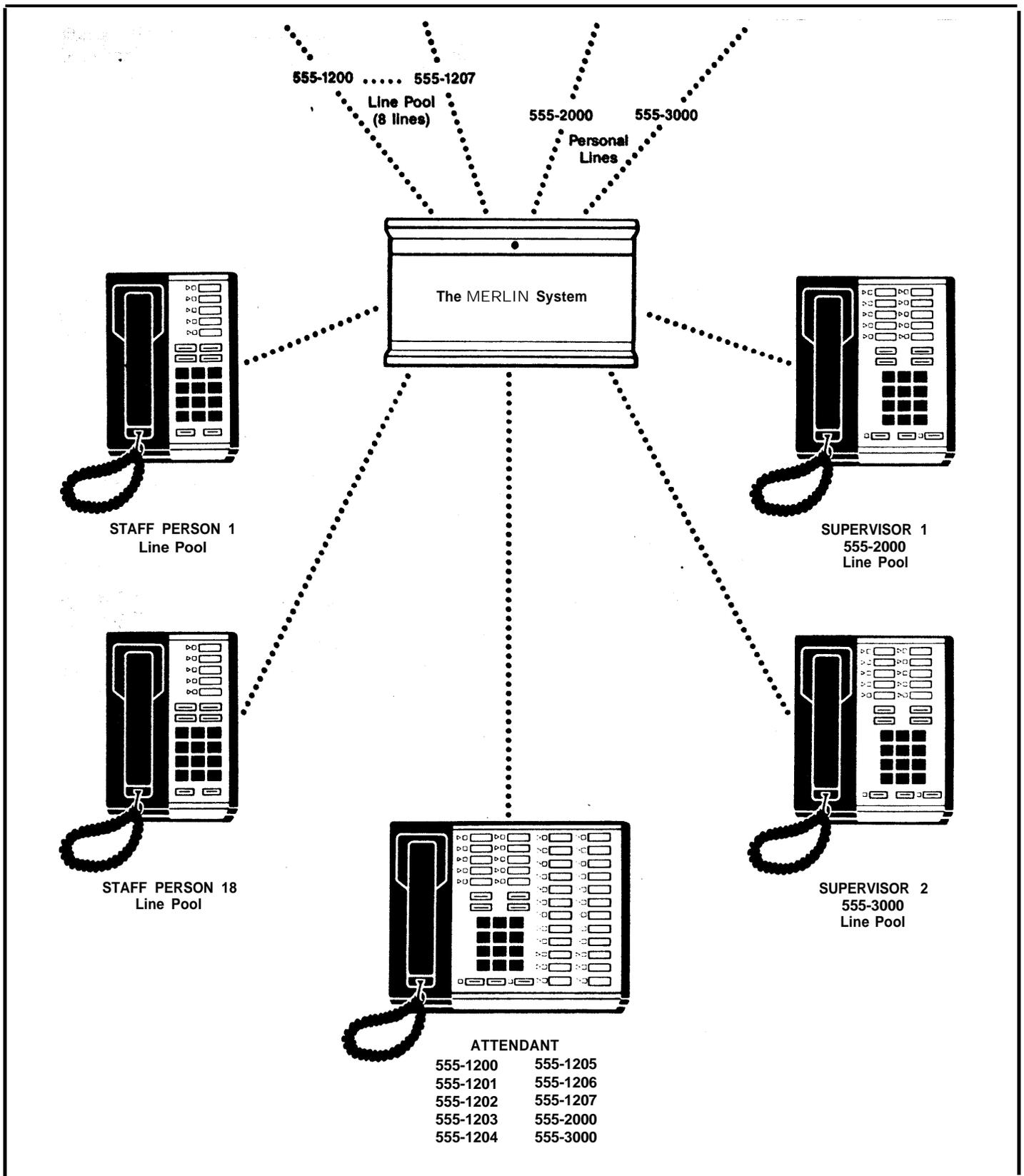
8

Figure 3

This department originally had 20 personal lines, one for each person in the department. By pooling 8 lines, everyone has access to a free line when necessary. In addition, each supervisor has a personal line to make a total of 10 incoming lines, half of what the department formerly had. All 10 lines appear on the attendant's console.

9

Covering Your Calls

In any business, answering calls is a major task. You may have an atten-
dant who answers and transfers all incoming calls, a secretary who
screens calls for one or two managers, or perhaps an informal arrange-
ment where several people cover for one another. Several **MERLIN**
system features help make call coverage easier and ensure that calls get
answered.

SPECIAL ATTENDANT FEATURES

Having an attendant is perhaps the surest way of having all calls
answered. The Transfer feature enables the attendant to pass calls on
quickly, with or without voice announcement, to voice terminals sharing
the **MERLIN** system's lines. Transferred calls never run into a dead end,
either. If it's necessary to transfer a call to someone in your company
who is not connected to your system, use the Centrex or PBX Transfer
feature. Any transferred call that isn't answered rings back at the atten-
dant's console.

An attendant may also screen calls by using the Hold and Intercom
features. A secretary who covers calls for only a few people is most
likely to use this method. With Models 206, 410, and 820 using Feature
Package 2, and with Models 1030 and 3070, an attendant may also pro-
vide a message service by turning on a light at an individual's voice ter-
minal to indicate that a message is waiting.

Some PBX systems generate a message light by sending a periodic
signal to the telephone; these message signals can sometimes cause
MERLIN system voice terminals to ring. If you have this type of PBX,
advise your PBX message center not to send message signals to
MERLIN system voice terminals.

10

THE PROGRAMMABLE LINE RINGING FEATURE

This feature allows an individual to program any line appearing on his or her voice terminal to ring immediately, to ring after a delay (after ringing elsewhere first), or not to ring at all. Although simple in concept, this feature provides extensive additional convenience.

For example, Programmable Line Ringing makes possible a simple variation on having an attendant answer all incoming calls. Since answering all calls all the time may be overwhelming — especially if the person responsible has other duties — you may choose to have lines ring at individuals' voice terminals and to have them ring at the attendant's console only if they aren't answered within two rings. That way, the attendant needs to answer calls only when people are away from their desks.

THE CALL COVERAGE FEATURE *(Models 1030 and 3070 Only)*

Another type of coverage is provided with the Call Coverage feature. Any person can cover for any other person on an as-needed basis by using a programmed **Cover** button. For instance, if a secretary wants to cover for a supervisor, a **Cover** button allows the secretary to answer any of the supervisor's calls — incoming, transferred, or intercom. Thus, instead of having a full-time answering position, several people can divide up the task of coverage.

Programmable Line Ringing can be applied to Call Coverage, too. For example, the supervisor's calls might ring immediately at his or her voice terminal and then, if not answered, ring at the secretary's voice terminal. Even when away from the office, the supervisor knows all calls are covered. If the supervisor is away for an extended period of time, the secretary may even choose to reprogram the **Cover** button so that calls ring immediately. Remember that all **MERLIN** system features — including the Call Coverage and Programmable Line Ringing features — are easily programmed and easily changed to meet individuals' particular needs, even as they change from day to day.

THE RIGHT COMBINATION — COVERAGE

Using Programmable Line Ringing and Call Coverage, people in your office can determine the right mix of coverage methods to direct calls to the right person and to support the call-handling patterns in your business.

As an example, at one company, the receptionist has primary responsibility for answering all incoming lines, except the manager's personal line. These lines are programmed to ring immediately at the receptionist's voice terminal and, in an effort to cut down on noise and interruptions, not to ring at all at individuals' voice terminals. As for the manager's personal line, it is programmed to ring at the manager's voice terminal. But since the manager's secretary has primary responsibility for answering and screening the manager's calls, including any coming in on the manager's personal line, the secretary has programmed a **Cover** button so that all the manager's calls ring first at the secretary's voice terminal. To back up the receptionist during busy periods, the secretary's voice terminal is also programmed to have incoming calls ring there if the receptionist doesn't answer in two rings. The receptionist, in turn, is able to cover for the secretary by having a **Cover** button that forwards the secretary's calls to the receptionist if the secretary doesn't answer after two rings. That way, if the secretary is out of the office, the receptionist can cover any of the secretary's calls, including any that come in on the manager's personal line. Figure 4 illustrates how various features may be combined for effective coverage.
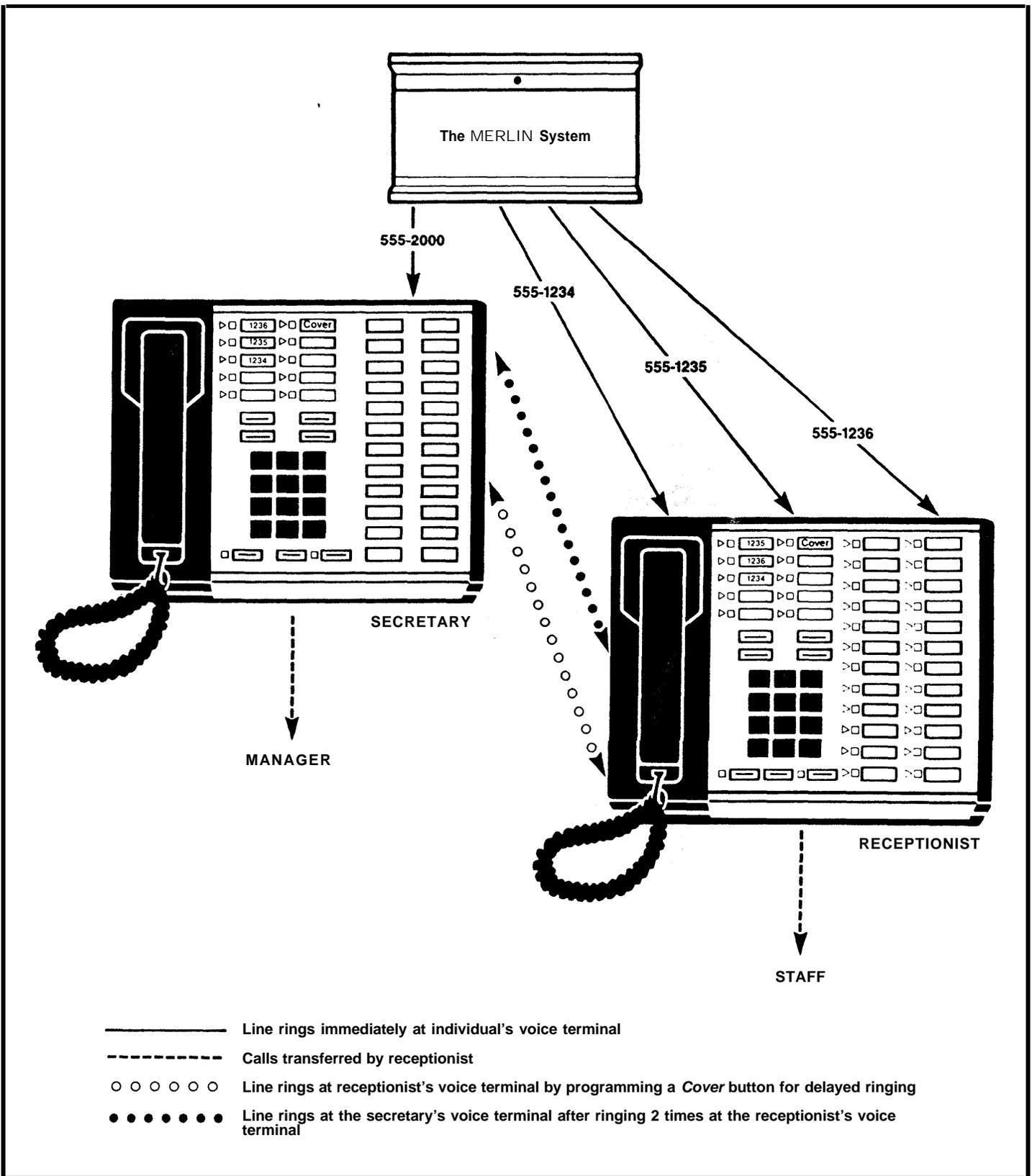
Figure 4

This office uses a variety of coverage methods to ensure efficiency. All calls are answered, screened as necessary, and then passed onto the right person. The receptionist's and secretary's primary answering responsibilities differ, but they provide backup for each other by using the Call Coverage and Programmable Line Ringing features.

Using MERLIN System Features With Centrex/PBX Service

Expect a smooth transition when you switch to using your **MERLIN** system. Office personnel can use their voice terminals as soon as they are plugged in, for the **MERLIN** system combines the best features of traditional key phone systems with advanced technology. The familiar features of multiple line appearances, lights to show line status, and a button to press to put calls on hold still exist. In fact, the **MERLIN** system's advanced design refines, rather than revolutionizes, the way you use your phones.

MERLIN system features can be used in most situations on both inter-com and incoming lines, but there may be times when you need to use a Centrex or PBX feature instead. For example, to transfer a call to a person who uses only Centrex/PBX service, an individual must use the Centrex/PBX Transfer feature instead of the **MERLIN** system Transfer feature. Even though such situations are rare, they are explained here for your information. More often, however, people will discover that the **MERLIN** system makes handling telephone calls much easier.

THE RECALL BUTTON

A significant advantage of your **MERLIN** system voice terminal is that for any Centrex or PBX feature requiring a switchhook flash, you now use the **Recall** button. Touching **Recall,** much simpler than pressing a switchhook, ensures a correctly timed signal. (NOTE: Pressing the switchhook on your voice terminal will *not* generate a "flash.") If you need to use a PBX Call Hold procedure, such as "press switchhook, dial *71," you touch **Recall** and dial *71.

THE SPEED DIALING AND OUTSIDE AUTO DIAL FEATURES
(Models 206, 410, and 820 with Feature Package 2, and Models 1030 and 3070)
If your **MERLIN** system has the Speed Dialing feature — which uses the pound sign (#) and two-digit codes for dialing outside numbers quickly — and people want to use a Centrex or PBX feature code that begins with a pound sign, they now use two pound signs (##). Using two pound signs with the Centrex or PBX feature code prevents the **MERLIN** system from misreading it.

Also, people *must* dial *90 every time they program a number or feature code for Speed Dialing or Outside Auto Dialing. So, if someone wanted to program a Centrex code such as #5 for Speed Dialing, he or she would dial *90, then a Speed Dialing code such as #01, then ##5.

THE INTERCOM FEATURE

Users of Centrex/PBX service must make a distinction between two groups of people that they call. If all the people that they can possibly call are symbolized as concentric circles, the inner circle includes people inside the building that they call with extension numbers, and the outer circle includes people outside the building that they call by dialing 9 or some other code. The **MERLIN** system Intercom feature introduces another group.

14

MERLIN system users, contacted with the Intercom feature, now form the inner circle, and anyone else, including Centrex/PBX users in the same building, is "outside." Figure 5 illustrates the various groups people may call and identifies how to reach each group using **MERLIN** system voice terminals.

This inner circle of **MERLIN** system users provides a great advantage over your current Centrex or PBX service: a close network of users tied together by the Intercom feature. Whether your office uses the **MERLIN** system for an entire department or for a manager and support staff, the Intercom feature makes communication faster and more flexible than it is with Centrex or PBX service alone. For instance, people can arrange signaling patterns to contact each other quickly, and they can announce calls to be transferred.
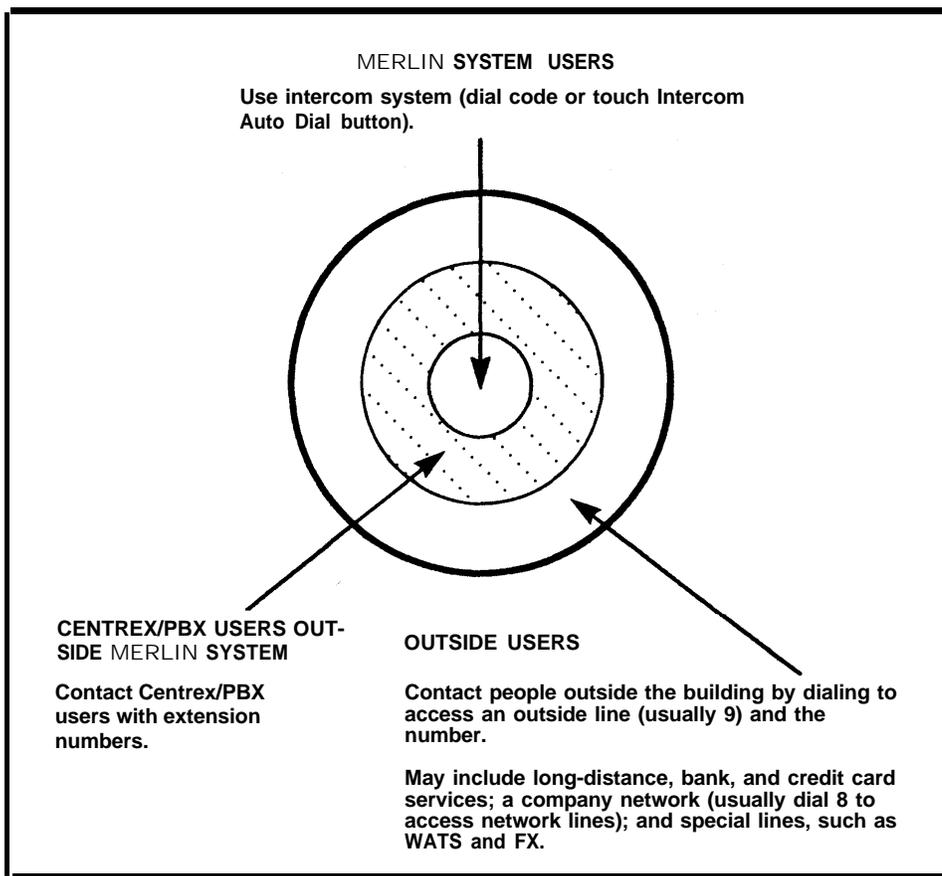

MERLIN SYSTEM USERS

Use intercom system (dial code or touch Intercom Auto Dial button).

CENTREX/PBX USERS OUT-SIDE MERLIN SYSTEM

Contact Centrex/PBX users with extension numbers.

OUTSIDE USERS

Contact people outside the building by dialing to access an outside line (usually 9) and the number.

May include long-distance, bank, and credit card services; a company network (usually dial 8 to access network lines); and special lines, such as WATS and FX.

Figure 5

A symbolic representation of the distinction between
MERLIN system users and outside users.

15

THE HOLD FEATURE

With the **MERLIN** system, the familiar Hold feature requires just a touch of a button — and has other advantages, too. When someone puts a call on hold, the green light flashes next to the call's line button. The speed of the flashing indicates whether you or someone else put the call on hold, reducing confusion about which call is on hold and who put it on hold. Furthermore, if a line is left on hold for more than a minute, a beep reminds the person of the call.

There are two instances, though, when individuals need to use the Centrex or PBX Hold feature. Because the **MERLIN** system allows only one call per line, they must use the Centrex or PBX Call Waiting procedure (if it's available) in order to hold one call and answer a second on the same line. If people in your office prefer the convenience and advantages of the **MERLIN** system Hold feature, have Call Waiting discontinued and ask the telephone company to put your lines in a hunt group. (When a call comes in on a busy line that is part of a hunt group, the call "hunts" or tries the next line in the group to see if it is free.) That way, while a person is busy on one call, he or she can see where another call is coming in and then use the **MERLIN** system Hold feature, which is simpler than the Centrex or PBX Call Waiting feature.

The other situation that requires the Centrex/PBX Hold feature is when **MERLIN** system users have only personal lines. They can put a call on hold with the **MERLIN** system Hold feature, but since they have only one line, they cannot put one call on hold and answer a call coming in on another line (for example, on an office mate's voice terminal) unless they use their Centrex or PBX Hold feature.

THE TRANSFER FEATURE

To move calls from one voice terminal to another sharing the same lines, the **MERLIN** system Transfer feature is the best choice. It is easy to use and offers the option of announcing the transferred call. Since transferred calls ring back if they are not answered, there's little chance of losing the call as can happen with Centrex or PBX service. When the call rings back, the light next to its line button flashes on and off so even the busiest attendants can tell what line the returning transferred call is on.

To transfer a call to another **MERLIN** system user sharing the same line — whether the call comes from outside the building or from a Centrex/PBX user — use the **MERLIN** system Transfer feature. However, if someone needs to transfer a call to a Centrex/PBX user, he or she must use an outside line and the Centrex/PBX Transfer feature. (Remember to use the **Recall** button—a switchhook flash will disconnect the call.)

16

THE CONFERENCE FEATURE

Any **MERLIN** system with a feature package or module provides a Conference feature that enables someone to add one or more outside lines to a call. With Models 1030 and 3070, it's possible to conference as many as two intercom lines as well, permitting conference calls with up to five participants. The Conference feature also has the benefit of showing which lines are used in the conference. The Drop feature lets the user disconnect any caller from the conversation without interfering with other connections.

Those **MERLIN** system users who have only personal lines cannot use this feature and must use the Centrex/PBX Conference feature instead.

THE CALL PICKUP FEATURE *(Models 206, 410, and 820 with Feature Package 2 and Models 1030 and 3070)*

The best way to answer someone else's call is to program line buttons with different ringing options (for example, if you don't answer it, your personal line rings at your secretary's voice terminal) or to use the **MERLIN** system's Call Coverage feature (available on Models 1030 and 3070). There may be times, however, when people need to answer calls for those they don't ordinarily cover. To pick up a call for another **MERLIN** system user, use the **MERLIN** system Call Pickup feature. To pick up a call for a Centrex/PBX user, use the Centrex/PBX Call Pickup feature.

Programming Tips For Your MERLIN System With Centrex/PBX Service

One of the most useful aspects of **MERLIN** system voice terminals is that people may program them to meet individual needs. If people have extra buttons on their voice terminals that aren't needed for lines, they can program them either with frequently called numbers or with features that increase their calling capabilities. The *User's Guide* and *Administration Manual* describe procedures for programming features; this section explains the procedural changes that are important if your **MERLIN** system is connected to Centrex or PBX service.

PROGRAMMING TELEPHONE NUMBERS

There are two kinds of Auto Dial buttons: intercom and outside. Since the code for programming **MERLIN** system intercom numbers (*6) is different from the one for outside numbers (*90), someone who wants to program telephone numbers must remember to distinguish between intercom numbers for **MERLIN** system users and "outside" numbers, as described earlier in "The Intercom Feature," page 14. Only **MERLIN** system intercom codes can be programmed onto Intercom Auto Dial buttons. If someone wants to program an Auto Dial button for an intercom number on the Centrex or PBX system, he or she must program the number on an Outside Auto Dial button.

An Outside Auto Dial button can represent the number of anyone outside the **MERLIN** system. Individuals may want to program the number of someone who also uses Centrex or PBX service. If so, they use the code for programming outside numbers, but add only the extension number, just as they would if they were dialing the number directly.

Individuals save the most dialing time by programming often-called numbers that are outside the building. However, if your Centrex/PBX service does not immediately return a dial tone after dialing to access an outside line (usually by dialing 9), they must program a pause by using **Hold** (Pause) after the initial digit to give the system time to return a dial tone. For example, to program the number 555-1234 onto an Outside Auto Dial button, a person would dial 9, touch **Hold** (Pause), and dial 5551234.

PROGRAMMING CENTREX OR PBX FEATURES

In addition to, or instead of, telephone numbers, people may want to pro-gram buttons with special features. The **MERLIN** system offers numerous custom features. (Check the *User's Guide* for more information about custom features.) Individuals may also program one or more Auto Dial buttons with codes for Centrex or PBX features they often use, For instance, if they must often have their calls forwarded, they can program a button for Call Forwarding and one for Call Forwarding Cancel. Then, instead of dialing a code every time they want calls forwarded, they can simply touch a button. If they always forward their calls to the same extension, they can include that number in the call forwarding sequence. People can program Centrex/PBX features as they would **MERLIN** system custom features, except for the following three changes.

1. If the Centrex or PBX feature uses a switchhook flash (remember that **Recall** *must* be used instead of a switchhook flash), they must include a pause after **Recall.** For instance, if the PBX procedure for Automatic Callback is "press switchhook, dial 72," they program the button by touching **Recall** and **Hold** (Pause) and then dialing 72. Note also that **Recall** must be first in the programming sequence.

2. When programming a Centrex/PBX feature with a code beginning with a star (*), people must always use the programming code for outside numbers (*90) before the feature code. Without that addi-tional programming code, the **MERLIN** system will read the Centrex/PBX code as a special **MERLIN** system programming code. (Of course, when not in programming mode, the **MERLIN** system has no trouble reading the star code.) Your system's *User's Guide* suggests the shortcut of omitting the *90 programming code when a button is already defined as an Outside Auto Dial button. However, when you use the **MERLIN** system behind a Centrex/PBX system, you *must not* use the shortcut. For example, if *65 is the centrex code for Call Forwarding, the person dials *90 plus *65.

3. If your **MERLIN** system has the Speed Dialing feature and the Centrex/PBX feature code begins with a pound sign (#), someone programming a Centrex/PBX code must use two pound signs (##) instead of one. This prevents the **MERLIN** system from reading the feature code as though the person were trying to program a Speed Dialing code. For instance, if #22 is the PBX code for Call For-warding Cancel, the person dials ##22.

Thus, not only are people able to use the many **MERLIN** system features, they can also use any Centrex or PBX feature that they find useful.

One last point to note here is that if your Centrex/PBX service does not immediately return a dial tone after dialing to access outside lines, Saved Number Redial and Last Number Redial only work with Cen-trex/PBX extension numbers.

The MERLIN Communications System
Quick Reference Chart

Your **MERLIN** system *User's Guide* provides specific details for using your voice terminal. This separate Quick Reference Chart provides additional helpful information, necessary because your company also uses either Centrex or PBX service.

IF	THEN
You want to use a Centrex/PBX feature that requires a switchhook flash	touch **Recall** instead. *Example* Before: press switchhook, dial *3 Now: touch **Recall,** dial *3
Your **MERLIN** system has a Speed Dialing feature and you want to use a Centrex/PBX feature code that begins with a pound sign (#)	use two pound signs (##). *Example* Before: #21 for Call Forwarding Cancel Now: ##21 for Call Forwarding Cancel
Your current service doesn't return a dial tone right after you dial 9 to get an outside line	the **MERLIN** system Last Number Redial and Saved Number Redial features will only work with Centrex/PBX extension numbers.
You have a personal line (and access to no other lines)	use your Centrex/PBX Conference and Call Waiting features instead of the **MERLIN** system features.
You want to transfer a call to a Centrex/PBX user who is not on your **MERLIN** system	use the Centrex/PBX Transfer procedure (usually **Recall** and extension number) instead of the **MERLIN** system procedure.

Remember: Switchhook flash = **Recall**

The MERLIN Communications System
Quick Programming Instruction Chart

You can program Outside Auto Dial buttons with Centrex or PBX features, in addition to the numbers and features described in your *User's Guide.*

IF PROGRAMMING	THEN USE	EXAMPLE
The number of a Centrex/PBX user	the extension number (assume the button is already pro-grammed for Outside Auto Dialing).	6096
A feature code beginning with a star (*)	*90 to redefine the button as Outside Auto Dial before pro-gramming the code.	* 90 * 2
A feature code beginning with a pound sign (and your **MERLIN** system has a Speed Dialing feature)	two pound signs (that is, a pound sign before the code)	##3
Outside numbers (and you don't get a dial tone right after dialing 9)	a pause after the 9.	9 + **Hold** (Pause) + number
A switchhook flash (or **Recall)**	**Recall** followed by a pause.	**Recall** + **Hold** (Pause)

Index

S

Saved Number Redial, 19, 20
Shared lines, 4 - 7
Software, 3
Speed Dialing, 14, 19, 20
Square operation, 4
Star (*), 19, 21
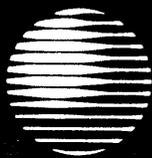Switchhook flash, 14, 16, 19, 20

T

Transfer, 10, 16

U

User's Guide, 1, 18, 19

V

Voice announcement, 15, 16
Voice terminals, 14, 18

AT&T
Information Systems