



MERLINTM

COMMUNICATIONS SYSTEM

INSTALLATION GUIDE:
MODELS 1030 AND 3070

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Introduction

This installation guide tells you how to install and test your MERLIN™ communications system, Model 1030 or Model 3070. It leads you step by step through system installation, from a pre-installation checklist to system tests. You should perform the steps in the order in which they are presented because many of the earlier steps prepare the system for later steps.

When you complete the steps in this guide, refer to the *Administration Manual: Models 1030 and 3070* (packed with your Feature Module) for programming and administration instructions. *Your system may not be fully operable until you have programmed and administered it.*

This guide consists of the following sections:

- **Getting Started** reviews preparation for system installation and includes a diagram of a simple MERLIN system configuration, identifying components and showing them in relation to one another.
- **Preparing the Network Interface** tells you how to prepare the connection to your outside telephone lines.
- **Installing the Control Unit** tells you how to set up and connect the control unit.
- **Connecting Voice Terminals** explains how to connect the voice terminals (telephones) to the system.
- **Installing Accessories** suggests some accessories you may want to consider adding to your system and when you should consider installing them.
- **System Tests** provides tests to help you determine if your system is properly installed.
- **What's Next?** refers you to documents that contain instructions for customizing your system to meet your particular business needs.
- **System Changes** describes how to rearrange or alter your system once it is in place.
- **Troubleshooting** isolates and identifies specific system problems that could arise during system installation, and suggests solutions to basic problems.

TIP: The steps in this guide are numbered in order of performance. To visualize a step as it is described, refer to the pictures accompanying the text. The numbers in the pictures correspond to the step numbers in the text.

Getting Started

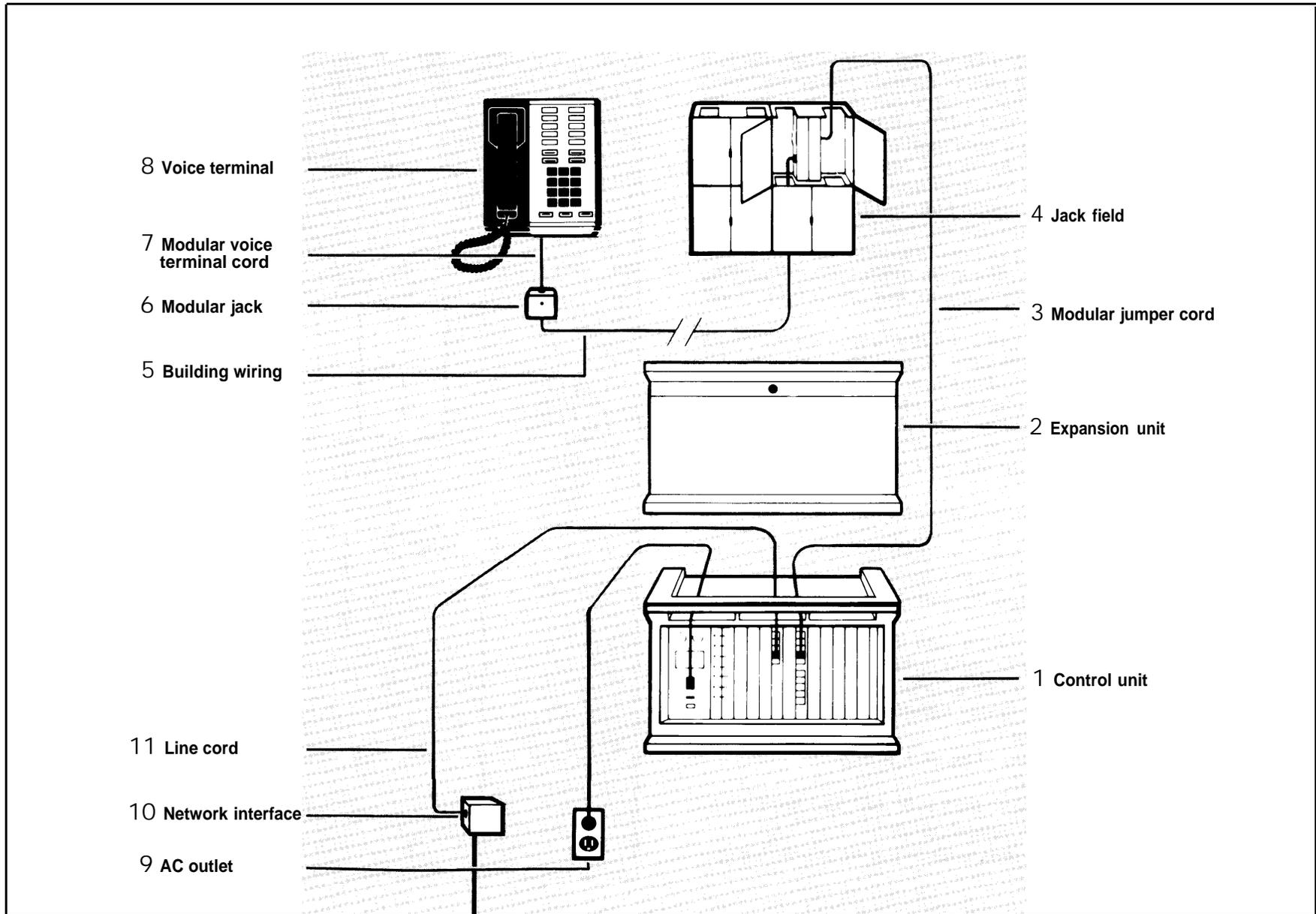
This guide assumes the tasks on the following list have been completed. *Review the list carefully before proceeding with system installation.* If you have not completed the tasks on this list, do so now.

- Check the items in your shipment against your copy of the order form. Make sure the items and quantities agree. Be sure to keep the instructions that come with each component, and also keep the packing boxes so you can easily return equipment under warranty if necessary.
- Get acquainted with the system environment. Review the planning sheets you drew up when you ordered the system. Confirm the voice terminal locations, and make sure the control unit location meets the following environmental standards:
 - *Operating temperatures:* 40 to 104°F (4 to 40°C).
 - *Humidity:* not to exceed 80%.
 - *Ventilation:* Leave 6 inches of space above and to the sides of the control unit to prevent overheating. Keep the control unit away from sources of extreme heat (furnaces, heaters, attics, or direct sunlight). Do not stack multiple control units in rooms that are not air-conditioned; install them side by side at least 6 inches apart.
 - *Airborne contamination:* Do not expose the control unit to moisture, corrosive gases, dust, chemicals, or similar substances.

If the control unit location does not meet these standards, your warranty may become void.

- Become familiar with the MERLIN system. Review the drawing of a simple MERLIN system configuration, *opposite page*, and note how components are related to one another.
 - 1 The **control unit** and the **modules** it contains provide the power and the intelligence for all voice terminals and accessories.
 - 2 An **expansion unit** increases your system's capacity from 10 outside lines and 30 voice terminals to 30 outside lines and 70 voice terminals.
 - 3 **Modular jumper cords** connect the jacks on the Voice Terminal Modules in the control unit to jacks in the jack field.
 - 4 The jacks in the **jack field** serve as an interface between the control unit and the building wiring. In some configurations, additional jacks in the jack field connect the system to its outside telephone lines.
 - 5 **Building wiring** ties the whole system together, connecting the voice terminal locations to the jack field at the control unit location.
 - 6 **Modular jacks** terminate the building wiring at the voice terminal locations.
 - 7 **Modular voice terminal cords** connect the voice terminals to the modular jacks.
 - 8 **Voice terminals** provide telephone functions and access to the advanced features in the control unit.
 - 9 The **ac outlet** is the electrical power source for the control unit.
 - 10 The **network interface jacks** provide connections to the local telephone company lines.
 - 11 **Line cords** connect the control unit to jacks at the network interface (or, if necessary, to jacks in the jack field).

NOTE: Modular jumper cords are identical to modular voice terminal cords. They have different names in this guide to reflect their different functions and locations in the system.



- Make sure your system wiring is in place.

The drawing, *right*, illustrates the wiring that must be in place before you begin installing your system. You must have building wiring that runs from the control unit location to the voice terminal locations. Wiring runs should end in modular jacks at the telephone locations and in a group of jacks mounted in apparatus boxes (the “jack field”) at the control unit location. Each apparatus box should have a white label with blue numbers indicating the numbers of the jacks in the box (1-6, 7-12, etc.). Inside the right door (the door with the handle) of each apparatus box you should find a white label lettered in blue to indicate the endpoint location (for example, “workshop” or “Room 23”) of each jack in the jack field.

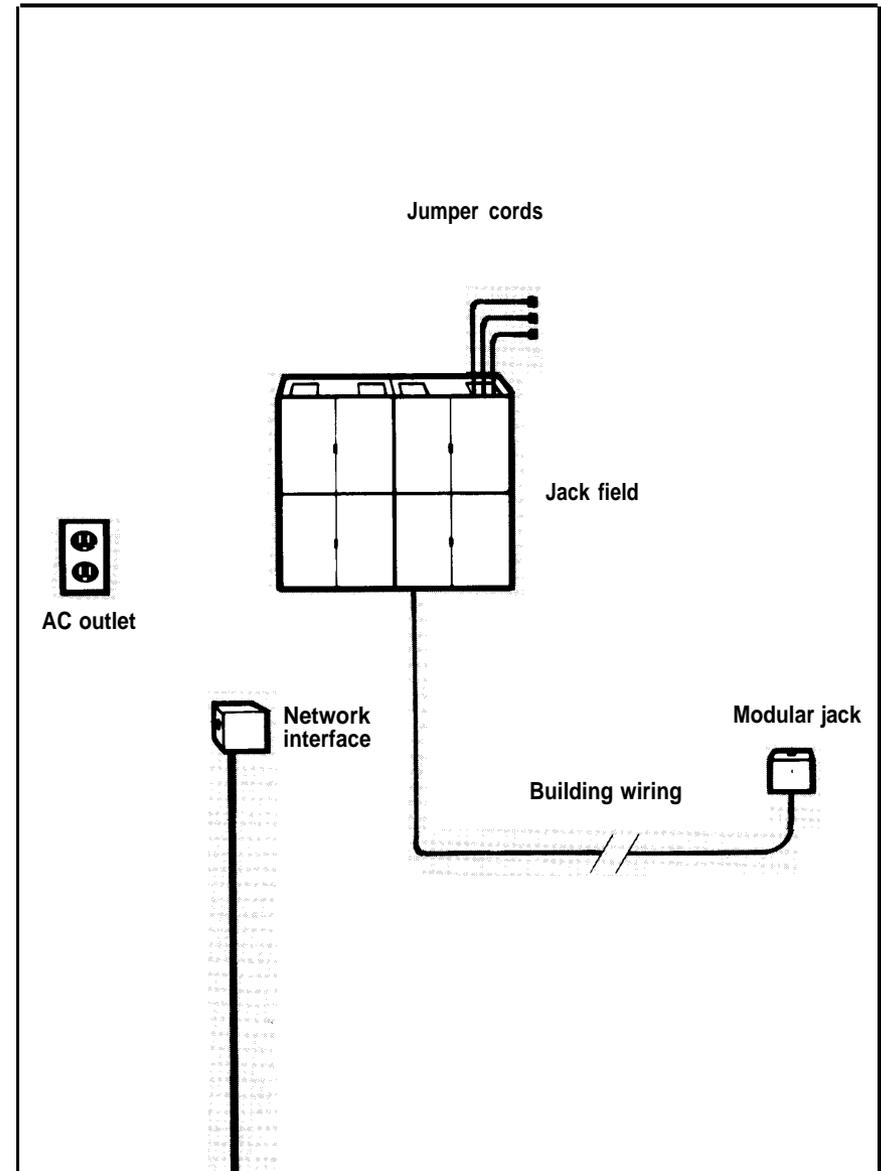
You may have your building wiring and jack field professionally installed or you may install them yourself. If you choose to install your own building wiring and jack field, follow the *Wiring Installation Instructions* included with the Wiring Installation Kit.

You must also have a network interface that links your system with the local telephone lines. A telephone company representative should have installed the necessary outside telephone lines and labeled the network interface to indicate the telephone number for each outside line. Depending on the type of interface provided by the telephone company, you may have to run additional wiring from the network interface to the jack field during installation in order to connect your system to your outside telephone lines.

If you have your building wiring and jack field professionally installed, you may want to have the wiring from the network interface to the jack field installed at the same time (if it's necessary). But if you prefer to install the wiring from the network interface to the jack field yourself, this guide tells you how to do so in the next section, “Preparing the Network Interface,” page 5.

NOTE: The manufacturers, distributors, and their agents will not be responsible for damage due to improperly installed wiring.

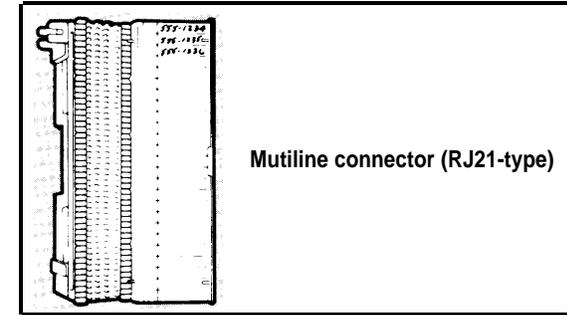
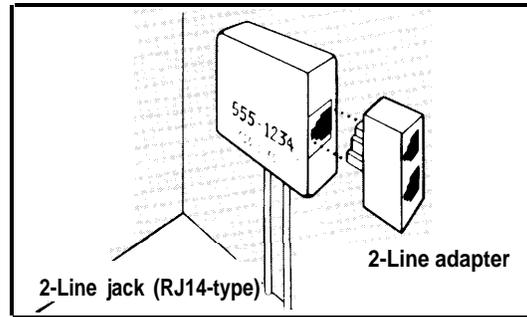
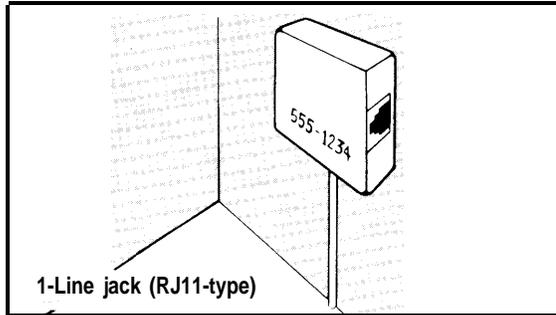
- The FCC requires you to notify your local telephone company of the following before permanently connecting your system to their lines:
 - System registration number
 - For systems with Feature Module 1, 2, or 4:
AS 593M-64884-MF-E
 - For systems with Feature Module 3: AS 593M-13529-KF-E
 - System ringer equivalence number: 0.8A
 - Telephone numbers of the lines to which you are connecting your system



Preparing the Network Interface

The telephone company should have installed a network interface with 1-line jacks (RJ11-type), 2-line jacks (RJ14-type), or multiline connectors (RJ21-type) for connecting your MERLIN system to your outside telephone lines. The drawings, *below*, show the three types of interfaces. The table, *below*, tells you what to do next depending on the type of network interface you have.

The drawings, *below*, show the three types of interfaces. The table, *below*, tells you what to do next depending on the type of network interface you have.



| If the Network Interface | and | Do This |
|--|---|--|
| has a 1-line jack (RJ11-type) for each outside line | each jack is labeled with its telephone number | Go on to the next section, "Installing the Control Unit," page 10. |
| | each jack is not labeled with its telephone number | <ol style="list-style-type: none"> 1. Label each jack with its telephone number from the list provided by the local telephone company. 2. Go on to the next section, "Installing the Control Unit," page 10. |
| has 2-line jacks (RJ14-type) for the outside lines | each jack is labeled with the telephone numbers for its two outside lines | <ol style="list-style-type: none"> 1. Plug a 2-line adapter (267C) into each jack. 2. Go on to the next section, "Installing the Control Unit," page 10. |
| | each jack is not labeled with the telephone numbers for its two outside lines | <ol style="list-style-type: none"> 1. Label each jack with the two telephone numbers for its two outside lines from the list provided by the local telephone company. 2. Plug a 2-line adapter (267C) into each jack. 3. Go on to the next section, "Installing the Control Unit," page 10. |
| has one or more 50-pin connectors (RJ21-type) carrying the outside lines | the interface is labeled with the telephone numbers for the outside lines | Go to the instructions for extending the network interface to the jack field, following this table. |
| | the interface is not labeled with telephone numbers for the outside lines | <ol style="list-style-type: none"> 1. Label the interface with the telephone numbers for the outside lines from the list provided by the local telephone company. 2. Go to the instructions for extending the network interface to the jack field, following this table. |

EXTEND THE NETWORK INTERFACE TO THE JACK FIELD

You need the following to extend the network interface to the jack field:

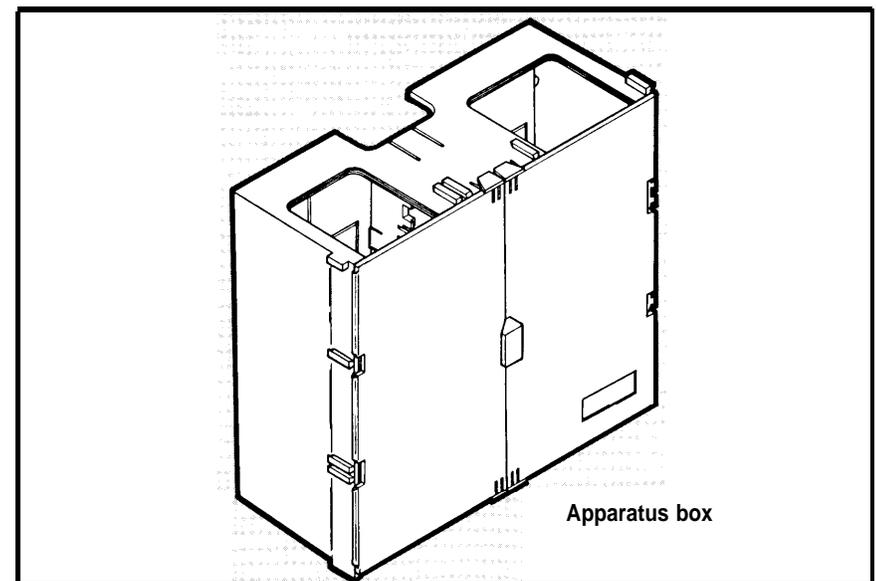
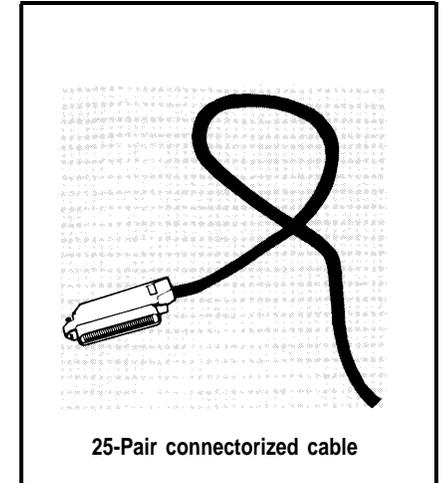
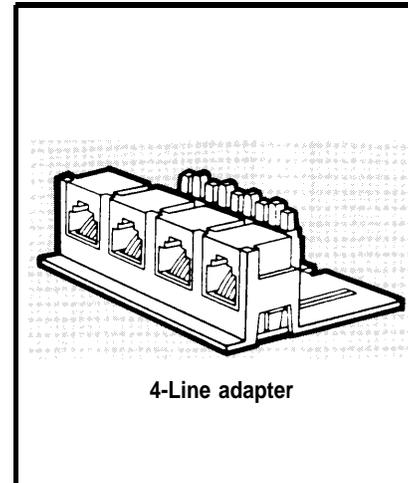
- 4-Line adapters
- Apparatus boxes
- Green-on-white line labels and directories
- Single-ended 25-pair connectorized cables

The drawings, *right*, show a 4-line adapter, an apparatus box, and a 25-pair connectorized cable. You also need a jacket-stripping tool to slit the jacket on the 25-pair cable and a cable termination tool to punch down the wires onto the blocks on the 4-line adapters. Your equipment supplier or technical consultant can help you obtain these items.

The table, *below*, tells you how many adapters, apparatus boxes, and cables you need based on the number of outside lines you have.

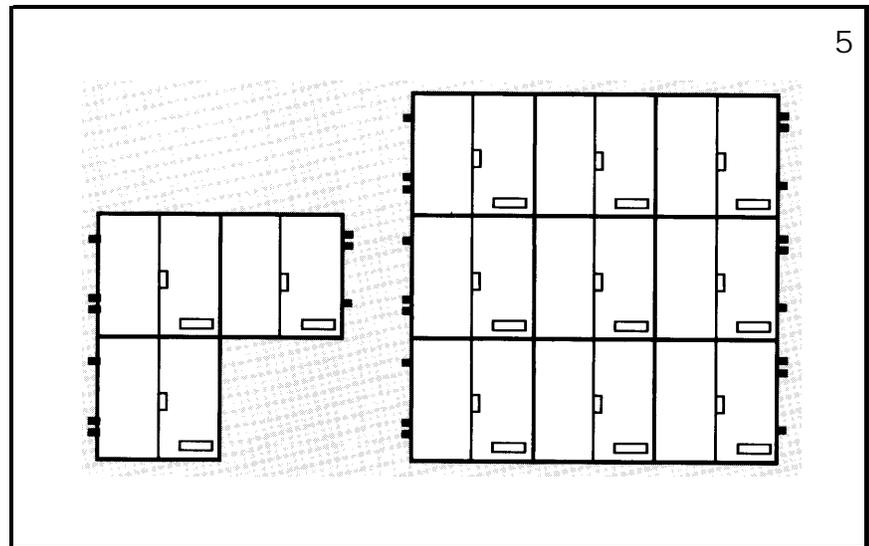
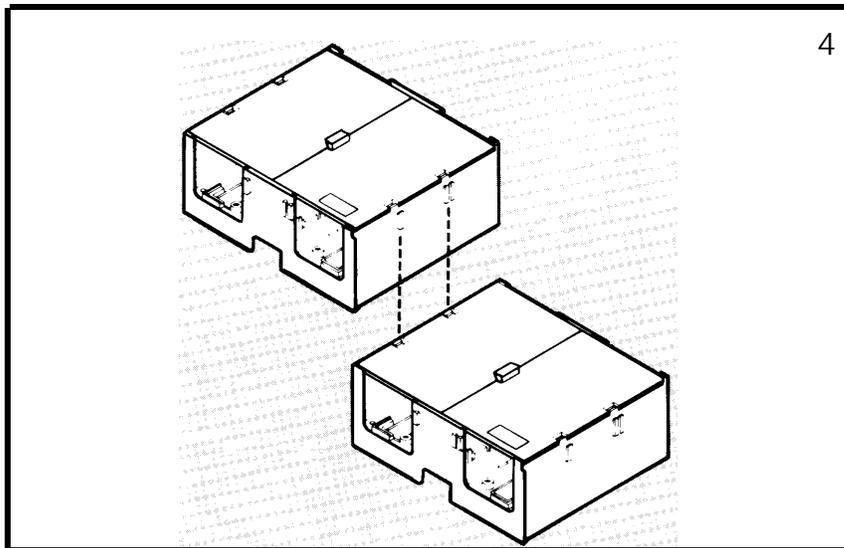
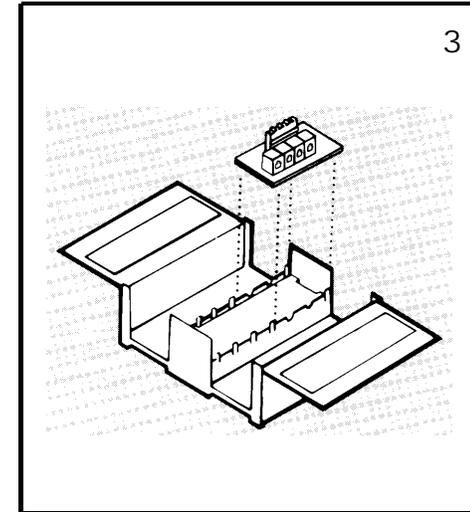
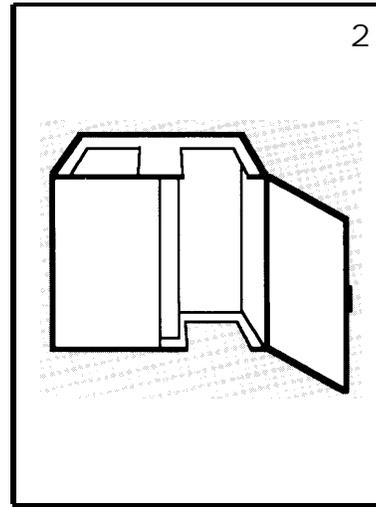
| Outside Lines | Adapters | Boxes | Cables |
|---------------|----------|-------|--------|
| 1-4 | 1 | 1 | 1 |
| 5-8 | 2 | 1 | 1 |
| 9-12 | 3 | 2 | 1 |
| 13-16 | 4 | 2 | 1 |
| 17-20 | 5 | 3 | 1 |
| 21-24 | 6 | 3 | 1 |
| 25-28 | 7 | 4 | 2 * |
| 29-30 | 8 | 4 | 2 |

* Telephone company installers do not normally connect more than 24 outside lines to one 50-pin connector. But if you have exactly 25 outside lines, the phone company may connect all 25 lines to a single 50-pin connector. If you have exactly 25 outside lines and you find a single 50-pin connector at the network interface, you need only one 25-pair connectorized cable to extend the network interface to the jack field.



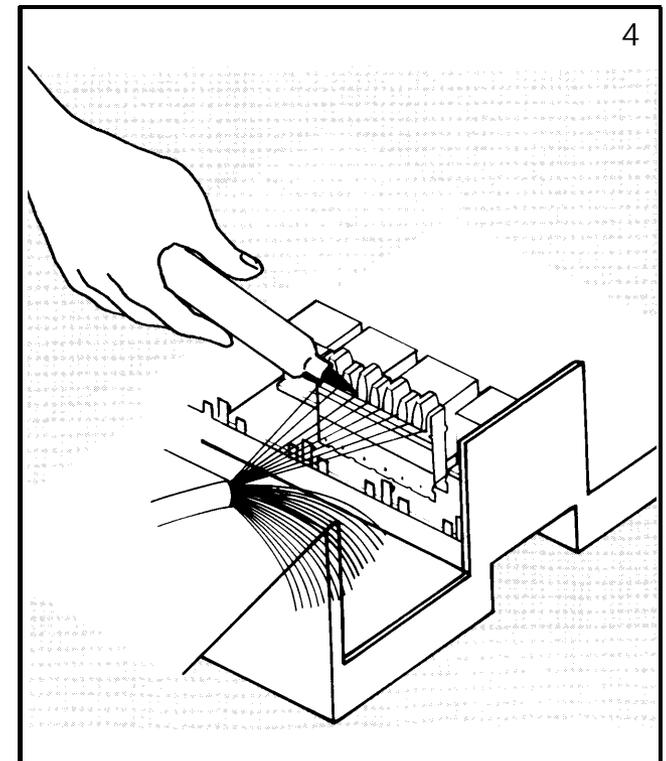
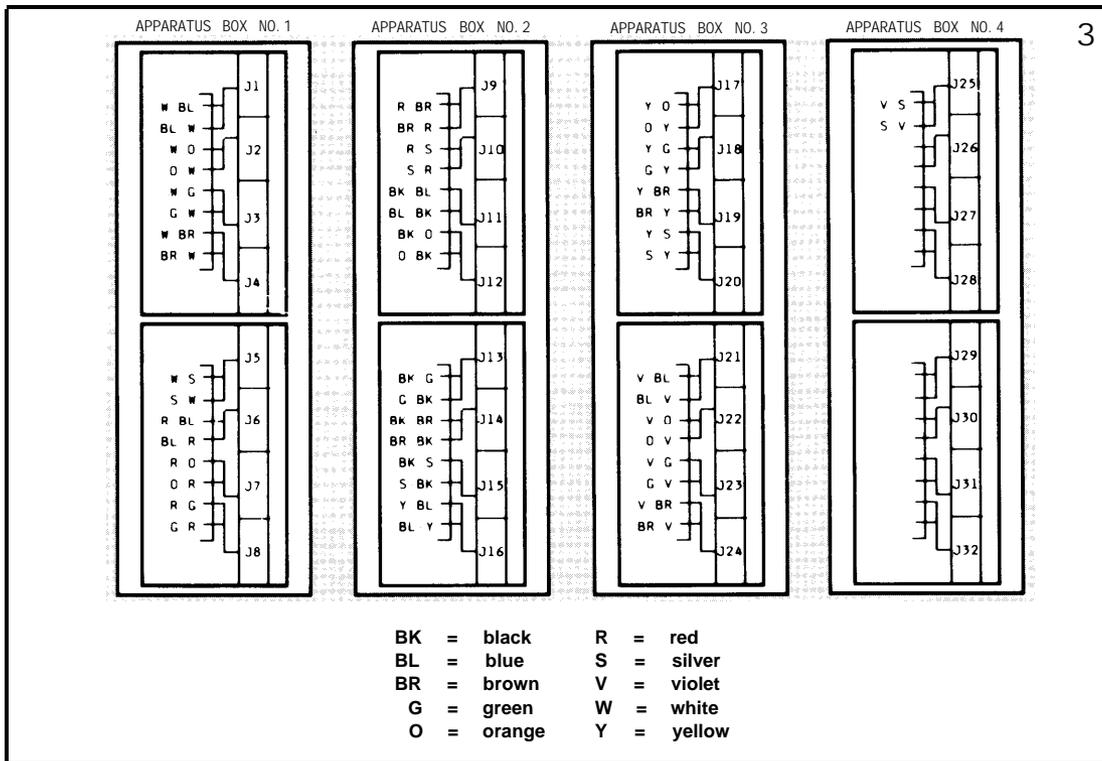
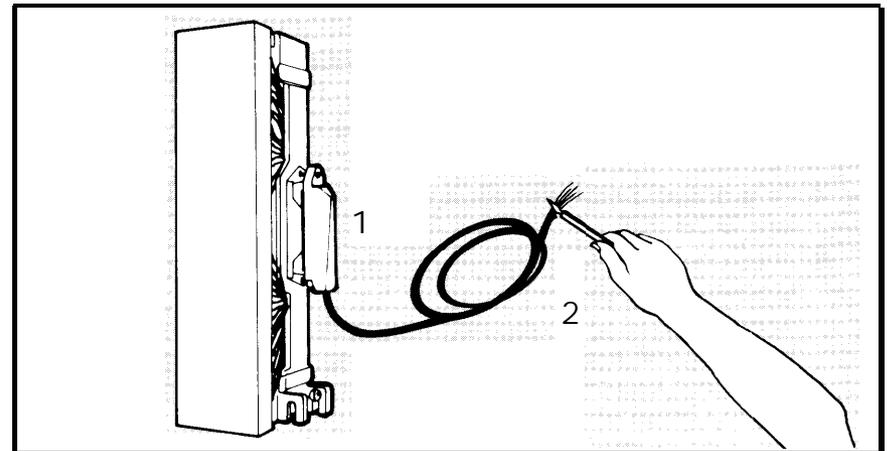
Add Jacks to the Jack Field

- 1 Use the table, *page 6*, to determine the number of adapters and apparatus boxes you need.
- 2 Position each apparatus box so that the door with the handle is on the right.
- 3 Snap adapters into boxes, as needed, so that the jacks on the adapters face to the right.
- 4 Attach the apparatus boxes to each other by meshing the tongues and grooves as shown.
NOTE: If you need two apparatus boxes, attach the second to the bottom of the first. If you need a third box, attach it to the right of the first. If you need a fourth box, attach it to fill in the square, making two columns of boxes with two boxes in each column.
- 5 Attach this configuration of apparatus boxes to the leftmost box or boxes already mounted in the jack field.



Connect the Outside Lines to the Jack Field

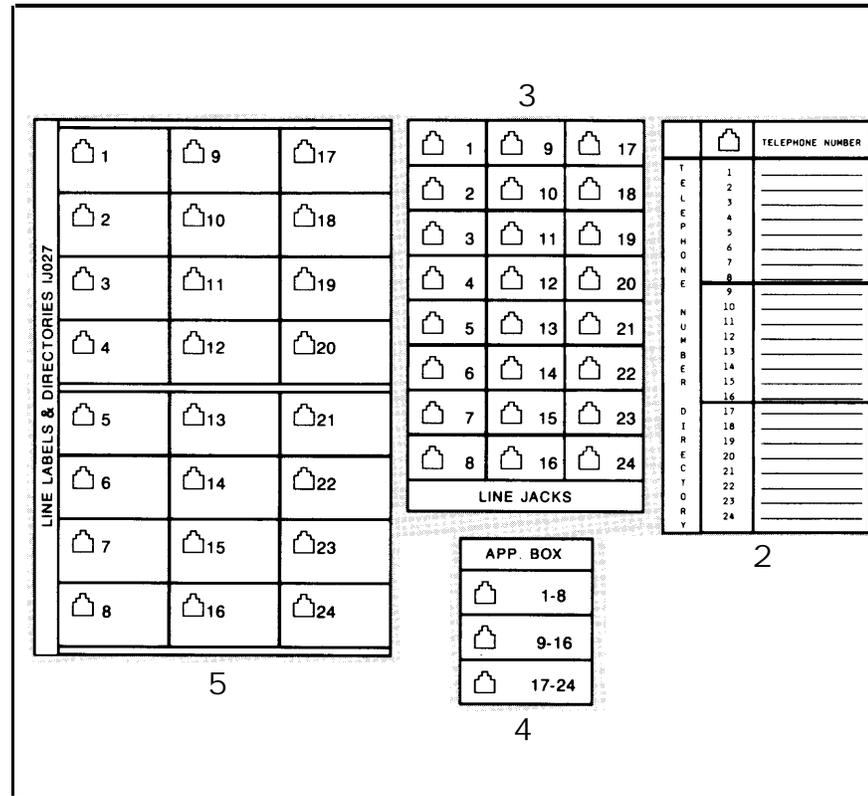
- 1 Plug the connector on the 25-pair cable into the 50-pin connector at the network interface.
- 2 With a jacket-stripping tool, slit the jacket at the other end of the 25-pair cable, and cut away as much of the jacket as necessary to allow each of the individual twisted pairs of color-coded wires to reach the jacks in the jack field.
- 3 Following the order and color code in the drawing, *below*, place the wires in the terminal block grooves on the adapters.
- 4 Punch the wires down with a cable termination tool.
- 5 If your cable termination tool does not trim the wires as it punches them down, trim the ends of the wires protruding from the grooves with a pair of scissors.



Label the Jacks and Boxes

- 1 Find the green-on-white label sheet, which includes a telephone number directory, line jack labels, apparatus box labels, and jack-identifier label strips. If you have more than 24 outside lines, you need two sheets.
- 2 Fill in the telephone numbers for your outside lines on the telephone number directory in the order in which they appear at the network interface or on the list provided by the local telephone company.
- 3 Using the telephone number directory as a guide, label the jacks with the appropriate line jack labels.
- 4 Using the telephone number directory and the line jack labels as guides, label the outside of the right door of each apparatus box with the appropriate apparatus box label.
- 5 Using the apparatus box labels as guides, label the inside of the right door of each apparatus box with the appropriate remaining long, narrow label (jack numbers 1 through 8, 9 through 16, etc.).
- 6 Attach the telephone number directory to the outside of the right door of the apparatus box labeled 1-8.

NOTE: Each green-on-white label sheet has enough labels for 24 outside lines. If you have more than 24 outside lines, get a second sheet and change the numbers on the labels to reflect the numbers of your lines above 24. For example, if you have 30 outside lines and you are labeling your fourth apparatus box, take the apparatus box label for 1-8 from the second label sheet, cross out 1-8, and write in 25-30. Then label your fourth box with that label. The second telephone number directory goes on the apparatus box labeled 25-30.



Installing the Control Unit

You need the following components to install the control unit:

- Control Unit Installation Kit
It comes with the control unit and includes line cord labels, jumper cord labels, telephone location labels, five 7-foot line cords, and a system directory.
- Control unit
It contains a Power Module (with a power cord), a Processor Module, a Line Module, and a Voice Terminal Module.
- Feature Module
It provides the system's advanced features.

You may also need the following components, depending on the size and specific makeup of your system:

- Additional modules
They provide for additional outside telephone lines, voice terminals, standard telephones, off-premises telephones, and features such as Paging, Music-on-Hold, and Power Failure Transfer.
- Model 1030 Expansion Unit
This addition to the control unit expands your system's capacity to 30 outside lines and 70 voice terminals.

NOTE: Feature Module 3 and, under certain conditions, Feature Module 4 change the system's capacity. If you have Feature Module 3 or 4, see the administration manual that comes with the module.

POSITION THE CONTROL UNIT

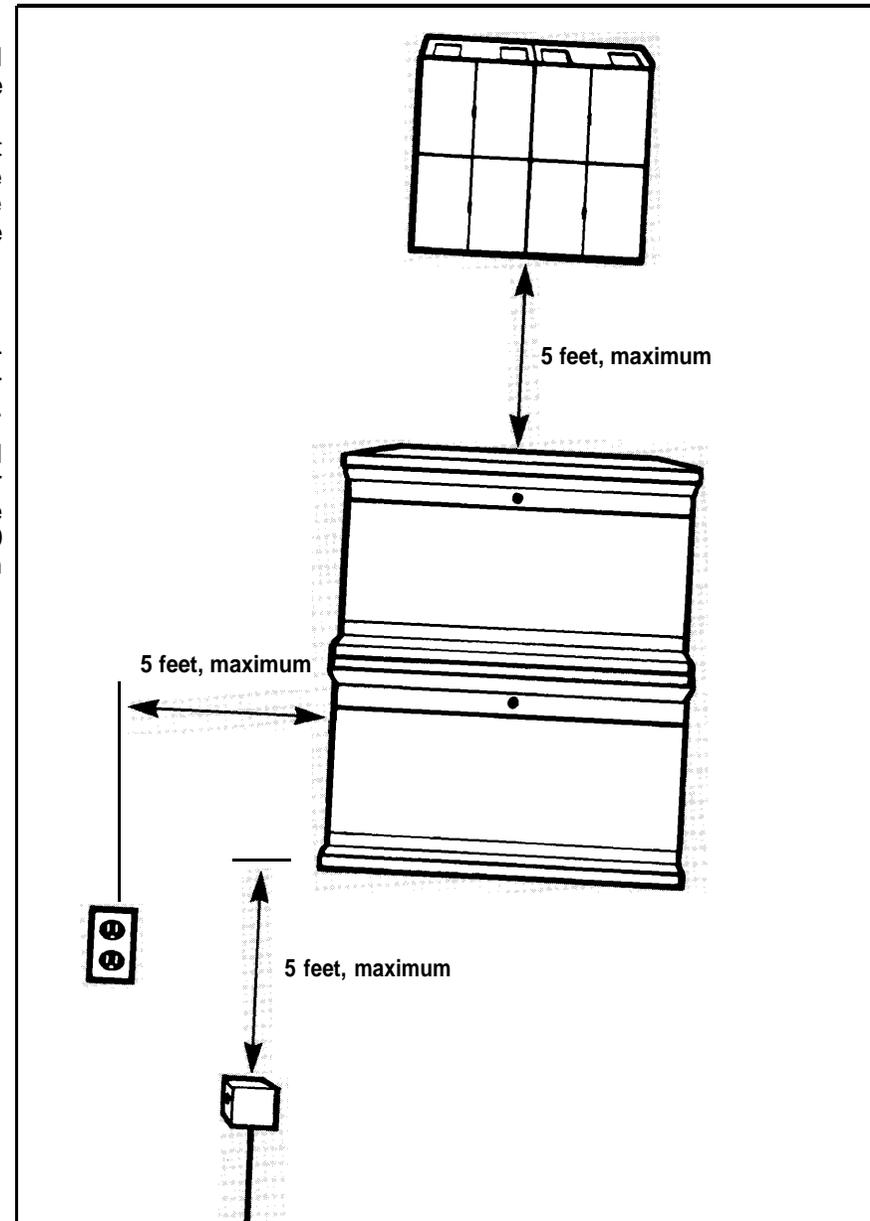
Your control unit should be:

- High enough off the floor to work with comfortably
- Close enough to an ac outlet (**not switch-controlled**) so that a power cord can reach easily (with some slack) from each Power Module (you may have as many as three Power Modules) to the outlet
- Within 5 feet of the jack field so that (1) a modular line cord can connect any Line Module jack in the control unit to any jack with a green-on-white label in the jack field, and (2) a modular jumper cord can connect any Voice Terminal Module jack in the control unit to any jack with a blue-on-white label in the jack field

The drawing, *right*, provides a diagram for positioning the control unit.

You may place the control unit on a table, a microwave oven stand, or a television stand. Or you can order a Wall Mount Kit especially designed for wall-mounting a Model 1030 or 3070 and follow the instructions that come with it.

NOTE: The ac outlet should be a 117-volt, 60-Hz, 3-prong, third-wire grounded outlet. Proper grounding protects the system from damage caused by power surges. You may want to have an electrician check the outlet's third wire to make sure the outlet is properly grounded. Power consumption for the Model 1030 control unit is 150 watts maximum. For the Model 3070, power consumption is 400 watts.



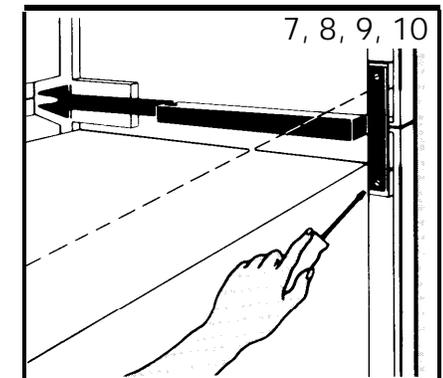
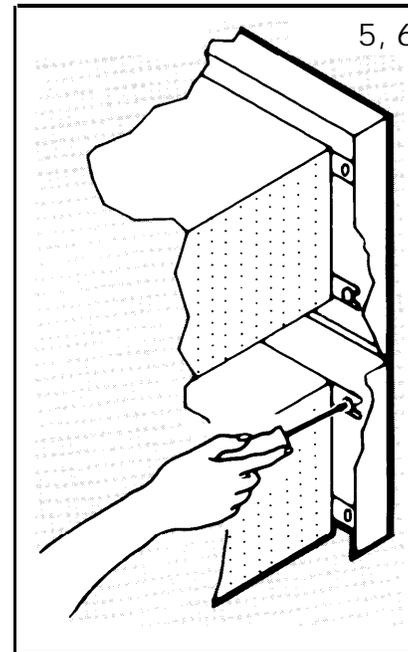
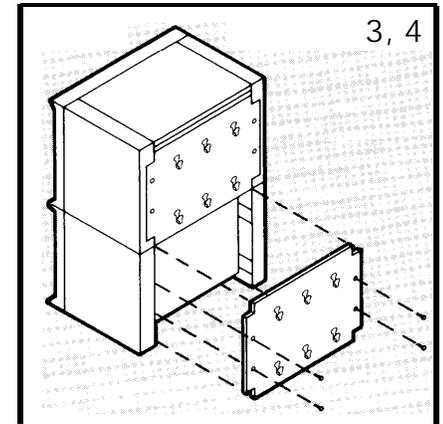
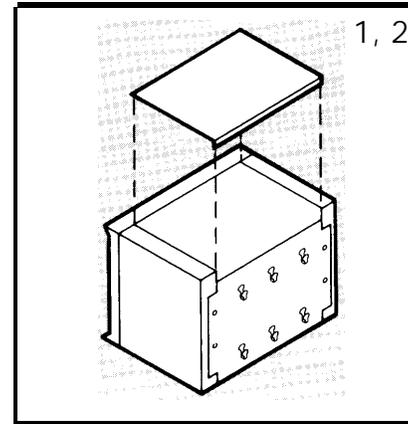
ATTACH THE MODEL 1030 EXPANSION UNIT TO THE CONTROL UNIT

If you don't have an expansion unit, go on to the next section, "Insert the Modules," on page 14.

CAUTION: Make sure the power cord is unplugged and the power switch on the Power Module in the control unit is set to *Off*. If your system has a Ring Generator Unit and/or an Auxiliary Power Unit, unplug their power cords as well.

Connect the Frames

- 1 Lift the top cover off the control unit.
- 2 Turn the control unit so you have working access to the back.
- 3 Place the expansion unit on top of the control unit and align the front, back, and sides.
- 4 Loosen the screws on the protective back panels of both the control unit and the expansion unit, and remove both panels.
- 5 Remove the screws from the bracket inside the upper rear corner of the right side of the control unit and from the bracket inside the lower rear corner of the right side of the expansion unit.
- 6 Remove the corresponding screws on the left side of each unit.
- 7 Find the two braces shipped with the expansion unit.
- 8 Slide one of the braces against the inside wall of the two units so that the forked end fits into the slots at the front of the units.
- 9 Line up the holes in the brace with the the holes in the brackets where you took the screws out, reinsert the screws, and tighten them.
- 10 Repeat steps 8 and 9 to insert the second brace on the other side of the unit.



Connect the Ribbon Cables and Ground Wires

You should find three gray ribbon cables and two ground wires hanging from the backplane of the expansion unit. Connect them to the backplane of the control unit as follows:

- 1 Find the ribbon cable labeled Network hanging from pins on the left side of the expansion unit's backplane.
- 2 Connect the free end of this cable to the set of pins labeled Network on the backplane of the control unit.

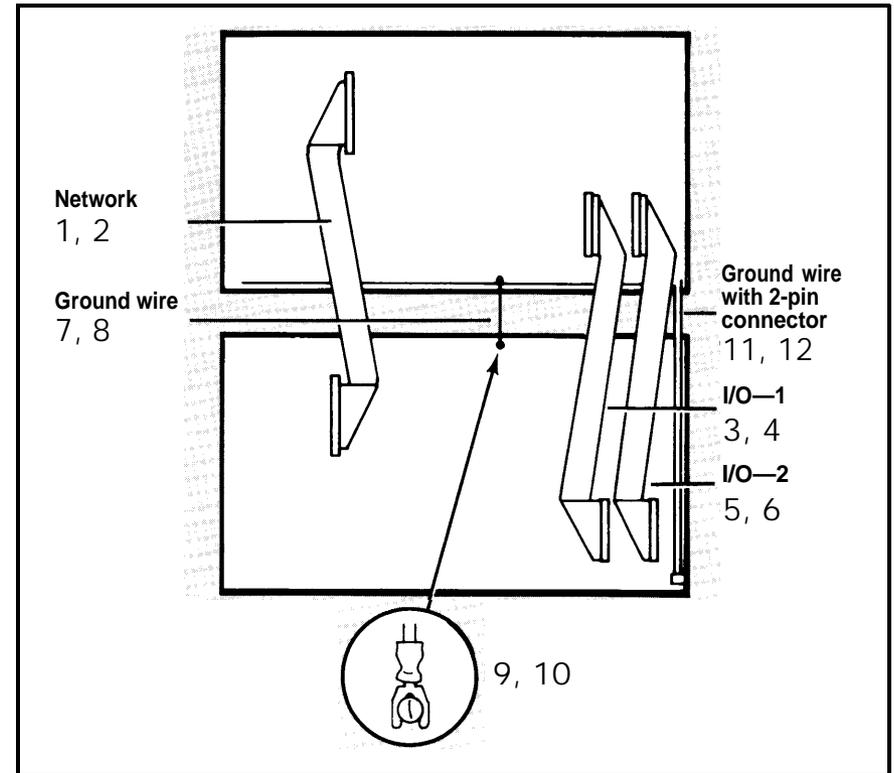
CAUTION: Be very careful not to bend the pins.

- 3 Find the ribbon cable connected to the pins labeled I/O-1 on the right side of the expansion unit's backplane.
- 4 Connect the free end of this ribbon cable to the pins labeled I/O-1 on the backplane of the control unit.
- 5 Find the ribbon cable connected to the pins labeled I/O-2 just to the right of the I/O-1 pins on the backplane of the expansion unit.
- 6 Connect the free end of this ribbon cable to the pins labeled I/O-2 on the backplane of the control unit.

- 7 Locate the ground wire with the metal fork at each end hanging from the ground screw (GS-1) on the lower middle of the expansion unit's backplane.
- 8 Locate the ground screw labeled GS-1 at the upper middle of the control unit's backplane, and loosen (but do not remove) it.
- 9 Insert the metal fork on the free end of the ground wire beneath the head of the ground screw on the control unit so that the prongs on the fork fit around the post of the ground screw.

- 10 Tighten the ground screw over the forked end of the ground wire.
- 11 Locate the ground wire with the 2-pin connector hanging from the far right side of the expansion unit's backplane.
- 12 Attach the connector on the free end of this ground wire to the pins labeled 100 and 000 at slot 1 on the backplane of the control unit.

Now that the units are connected, fold the slack in the ribbon cables into the opening between the units, and reattach the protective back panels.



INSERT THE MODULES

CAUTION: Before inserting or removing modules, make sure the power switches on the Power Modules in both the control unit and the expansion unit are set to **Off**.

Begin by unlocking and removing the front panel of the control unit (and the expansion unit if you have one). Take a minute or two to get a general overview of the slot numbering and color coding. Refer to the table, *below*, for information specific to each type of module, and then follow the procedure for “Inserting Modules in Control Unit Slots,” which follows this section on page 15.

IMPORTANT: Feature Module 3 and, under certain conditions, Feature Module 4 invalidate much of the information in the “Details” column of the table, *below*. If you have Feature Module 3 or 4, you may have to relabel the control unit slots before inserting the modules. See the guides that come with those Feature Modules for detailed information on slot assignments before inserting modules into your control unit.

| Module | Color Code | Details |
|----------------------------------|------------|--|
| Line Module | green | You should find a Line Module already occupying slot number 7. Insert your remaining Line Modules in the green-coded slots in the following order as needed: 8, 17, 18, 19, 20. |
| Voice Terminal Module | blue | You should find a Voice Terminal Module already occupying slot number 9. Insert your remaining Voice Terminal Modules in the blue-coded slots in the following order as needed: 10, 11, 21, 22, 23, 24. |
| Feature Module | orange | Your system <i>must</i> have a Feature Module. Insert it in slot number 3. |
| Services Module | yellow | If you have a Services Module, it goes in slot number 6. If you don't have a Services Module, leave the plastic cover on slot number 6. |
| Basic Telephone Module | blue | You can insert a Basic Telephone Module in any blue-coded slot in the control unit except slot number 9. Slot number 9 <i>must</i> contain a Voice Terminal Module for the system to work. |
| Off-Premises Telephone Interface | gray | If you have Off-Premises Telephone Interface Modules, you can insert them in the gray-coded slots in the following order as needed: 12, 13, 14, 25, 26. |
| SMDR Module | gold | If you have an SMDR (Station Message Detail Recording) Module, it goes in slot number 5. |
| Diagnostics Module | orange | If you have a Diagnostics Module, it goes in slot number 4. |
| Processor Module | purple | You should find a Processor Module already occupying slot number 2. |
| Power Module | red | You should find a Power Module already occupying slot number 1. If you have an expansion unit, you should also find a Power Module in slot number 16. If you have to insert an additional Power Module, it goes in slot number 27. |

IMPORTANT: A connected, loaded, but unpowered expansion unit can cause electrical interference (crosstalk) during normal system operation. If you have a Model 3070 control unit but do not need the control unit's added capacity right away, you should either (1) leave the expansion unit empty (do not insert any modules) and leave the power to the expansion unit off or (2) put the modules into the expansion unit, turn the power to the expansion unit on when instructed to do so, and leave it on during normal system operation.

Inserting Modules in Control Unit Slots

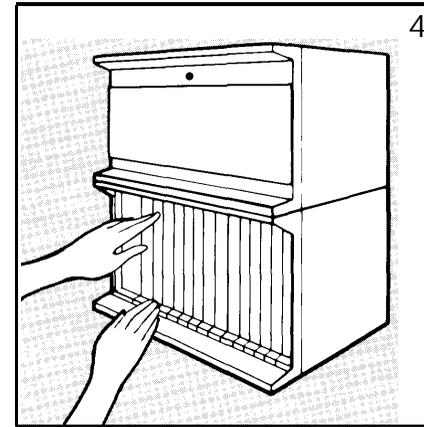
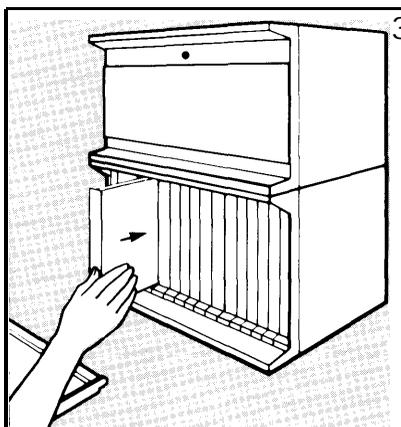
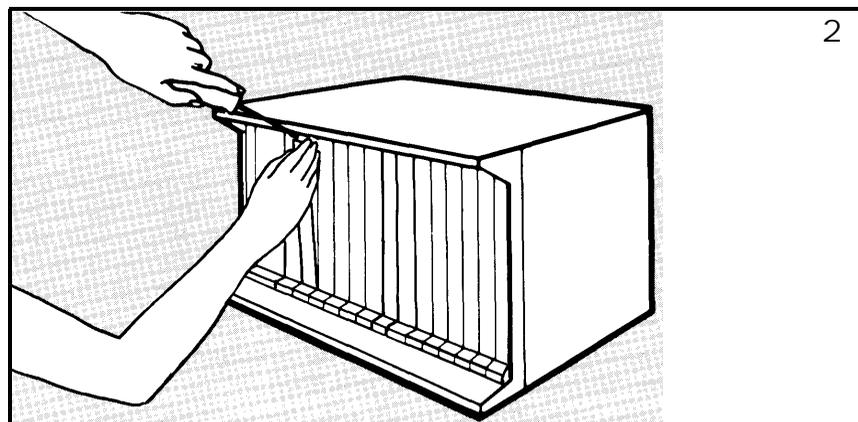
- 1 Locate the leftmost unoccupied slot in the control unit or expansion unit with the same color code as the module you are inserting.

NOTE: Fill the slots in the control unit first, before going on to the expansion unit.

- 2 Remove the protective cover from the slot by pressing down on its top with the tip of a screwdriver and pulling out at the top of the cover.
- 3 Align the module in the slot, making sure that the edges of the module are in the grooves at the top and bottom of the slot, and slide the module into the slot.

CAUTION: Do not force the module into the slot. If you have any difficulties, remove the module from the slot. Check the back of the module and the back of the slot for bent pins. If you find any damaged pins, contact your equipment supplier.

- 4 When the latch at the bottom of the module catches at the base of the slot, press firmly at the front of the module with one hand while fitting the latch into place with the other hand.

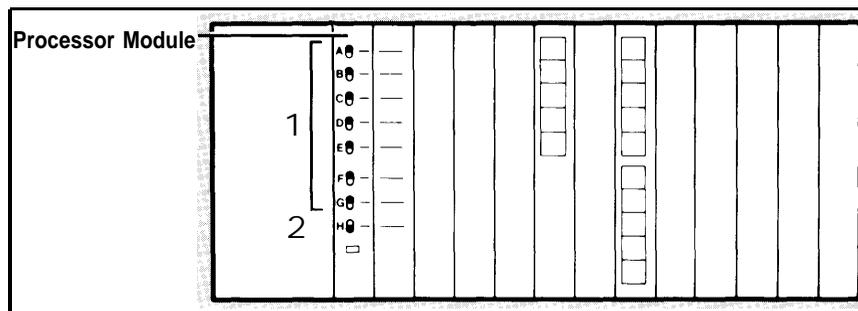


SET THE CONTROL UNIT SWITCHES

On the Processor Module:

- 1 Set switches A through G *up*.
- 2 Set switch H *down*.

NOTE: These are the proper settings for installing and testing the system. Later, when you administer your system, you may have to reset them.



CONNECT THE CONTROL UNIT TO THE AC OUTLET

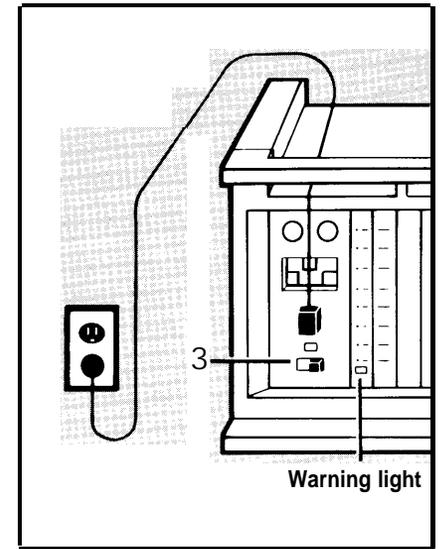
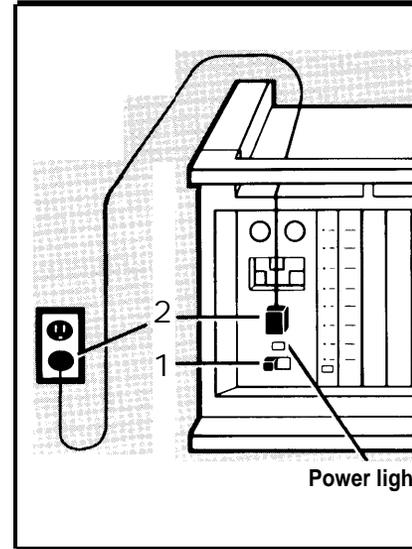
- 1 Check the power switch on the Power Module in the control unit. Make sure it is set to *Off*. If you have an expansion unit, it may have as many as two additional Power Modules. Make sure the expansion unit's power switches are set to *Off*, too.
- 2 Plug one end of the power cord into the outlet above the control unit power switch on the Power Module. Run the cord over the top of the control unit, or between the control unit and the expansion unit, and plug the other end of the cord into the ac wall outlet. Do the same for the expansion unit, if you have one. The control unit should be close enough to the outlet to allow some slack in the cord.
- 3 If you have an expansion unit, set its power switch(es) to *On* first. Now set the power switch on the control unit to *On*.

The green light on the Power Module comes on and stays on.

The red warning light on the Processor Module comes on and then goes off after a few seconds.

NOTE: These are the normal system responses. If your system responds differently, see the table, *below*.

- 4 Unless otherwise instructed, leave the power switch(es) set to *On* throughout the remaining installation procedures.



| If | Then | Do This |
|--|--|---|
| the green light on the Power Module does not come on | your electrical outlet may be faulty. | Turn off the control unit. Unplug the power cord(s) from the ac outlet. Test the outlet by plugging in an appliance such as a lamp or a radio. |
| the outlet is in working order | your control unit may be faulty. | Call your equipment supplier before proceeding with installation. |
| the red warning light on the Processor Module remains on | one or more of the modules may be loose. | Turn off the control unit. Pull out each module and reinsert it. Make sure each module is firmly seated in its slot. Set the power switch back to <i>On</i> . |
| the red light remains on | your control unit may be faulty. | Turn off the control unit, and call your equipment supplier before proceeding with the installation. |

TEST THE OUTSIDE LINES

This step is optional, but if you have a basic Touch-Tone telephone with a modular plug, you should verify your outside line connections at this time. It can save time and frustration later.

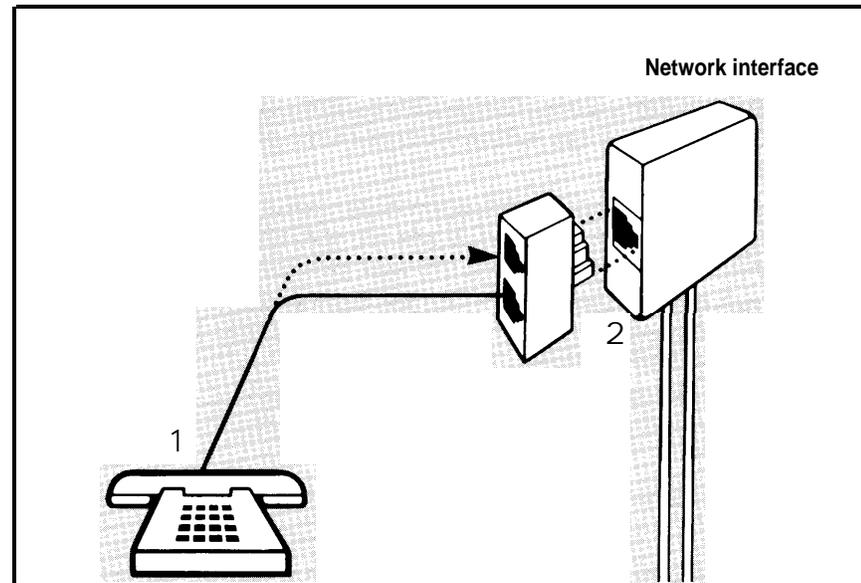
NOTE: A MERLIN system voice terminal will not work for this test.

- 1 Bring a basic Touch-Tone telephone with a modular plug to the jacks for your outside telephone lines (either at the network interface or at the jack field).
- 2 Plug the telephone's modular line cord into each outside line jack, and listen for a dial tone.

You receive a dial tone from each outside line jack.

If one or more jacks fail to provide a dial tone, see the table, *below*.

| If | Then | Do This |
|-------------------------------------|---|--|
| one or more lines have no dial tone | the line adapter may be faulty. | Replace the adapter with another one and listen again for a dial tone. |
| you still don't get a dial tone | your telephone lines may be faulty or disconnected. | Have your local telephone company representative check your outside lines. Meanwhile, you may continue with system installation. |



ATTACH CORD CLIPS TO THE CONTROL UNIT

If you have an expansion unit, you can have as many as 100 cords running from your control unit to the jack field. You'll want to arrange these cords as neatly as possible without diminishing the system's flexibility. Bundling the cords with cord clips and cable ties can reduce the cord-clutter problem at your control unit location.

- 1 Find the gray plastic cord clips with adhesive backs, and count out one cord clip for each Line Module and two cord clips for each Voice Terminal Module in your control unit (and expansion unit).
- 2 Attach cord clips along the front edge of the top of the control unit (and expansion unit), one above every two Line Modules and one above each Voice Terminal Module.
- 3 Attach the same number of cord clips along the rear edge of the control unit (and expansion unit), aligning them with the clips at the front of the unit.

The next two sections include instructions for threading cords through the cord clips.

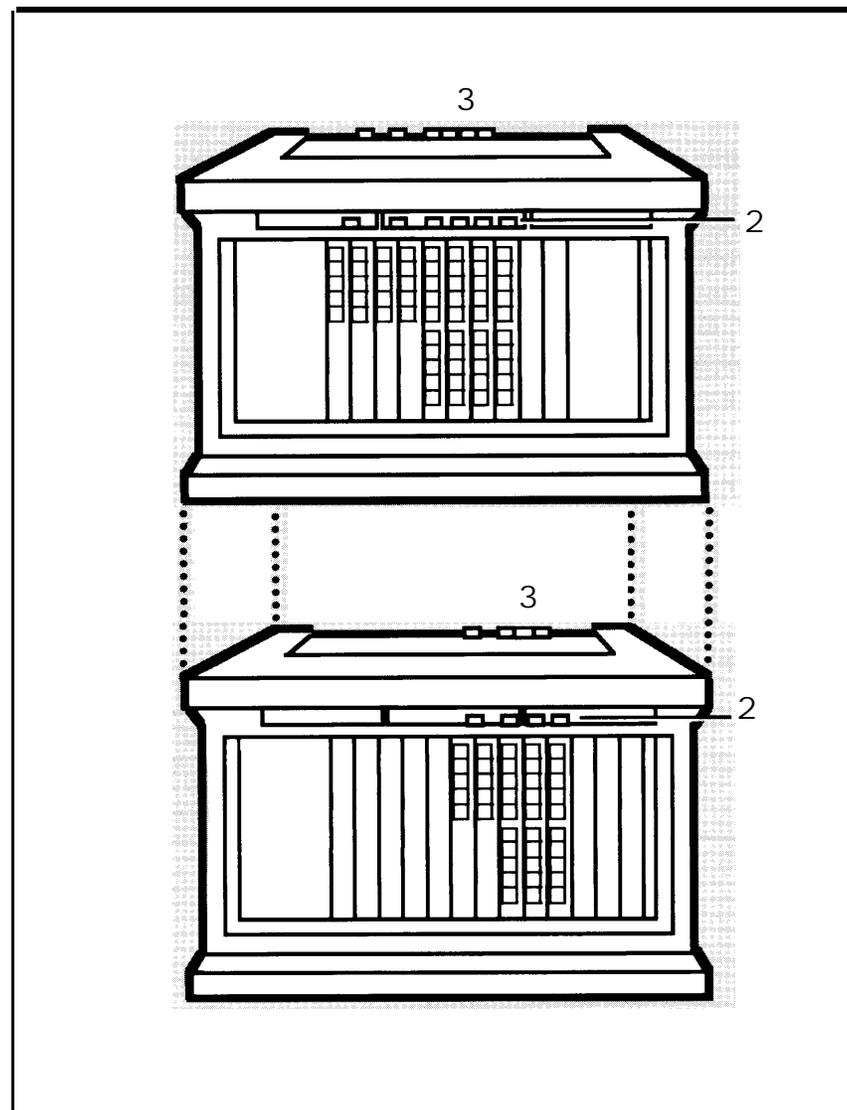
TIP: If you have cord clips that open, you can open and close the clips when the instructions tell you to thread cords through the cord clips.

CONNECT THE CONTROL UNIT TO THE OUTSIDE LINES

You may want to take time at this point to determine which outside line numbers to assign to each Line Module jack in the control unit. The Line Module jack can determine where a number appears on certain voice terminals.

You should plan to connect your general-purpose numbers to the first few Line Module jacks (for example, A0, A1, ... B0, B1), reserving A0 for your published telephone number. Fill the remaining jacks from top to bottom—lowest telephone number first, highest one last. When you fill up one Line Module, start at the top of the one immediately to its right. Fill the Line Modules in the control unit before filling the ones in the expansion unit. Connect specialized lines (for example, a WATS line) last.

NOTE: If you have basic telephones in a square system with Feature Module 1 or 2, you may not want to assign your published telephone number to jack A0 or A1 because a basic telephone connected to a Basic Telephone Module cannot receive calls on lines assigned to these jacks. See your administration manual for more information on basic telephones and square systems.



Make sure you have the following:

- System directory
 - One comes in the Control Unit Installation Kit.
- Line cords
 - One 7-foot line cord for each outside line. Five come in the Control Unit Installation Kit, and others are packed with each Line Module.
- Green-on-white cord labels
 - Labeled A0, A1, A2, etc. (two for each line cord), they come in the Control Unit Installation Kit.

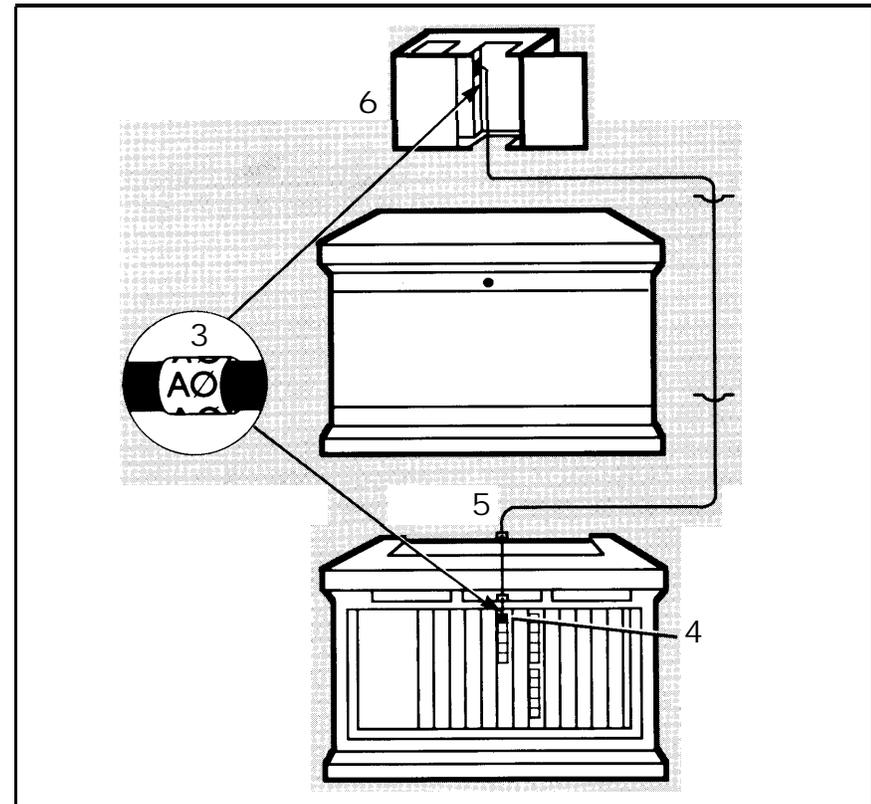
Now do as follows:

- 1 Decide which outside line number to assign to each Line Module jack in the control unit.
- IMPORTANT:** Feature Module 3 creates a one-to-one correspondence between the jacks in the Line Modules and the jacks in the Voice Terminal Modules. If you have Feature Module 3, be aware that you are assigning outside lines to specific voice terminals as you decide which outside line number to assign each Line Module jack.
- 2 Write the telephone number assigned to each Line Module jack on the appropriate line in the system directory.
- 3 Label each line cord at both ends with the green-on-white labels. Be sure the labels at both ends of each cord match.
- 4 Starting with the line cord labeled A0, plug one end of the line cord into the top jack on the Line Module in the slot labeled Lines A0-A4.
- 5 Thread the cord through the cord clip above the module on the top front edge of the control unit and then through the corresponding cord clip to the rear of the control unit.
- 6 Referring to your system directory, plug the other end of the line cord into the jack (in the jack field or at the network interface) for the outside line you've assigned to the Line Module jack.
- 7 Follow the same procedure with the remaining line cords until you've connected all the outside lines to the control unit (and the expansion unit if you have one).

TIP: You can thread cords from two Line Modules (up to 10 cords) through each cord clip. You may want to use cable ties to tie the cords at various points between the rear cord clips and the jack field.

2

| SYSTEM DIRECTORY | | | | | | |
|-----------------------|--------------------|-----------------------|-------------------------|-----------------------------|--------------------|-----------------------|
| OUTSIDE LINE NUMBERS: | INTERCOM NUMBER | PERSON OR LOCATION | WIRING RUN NUMBER | CALL RESTRICTION TYPE | INTERCOM NUMBER | PERSON OR LOCATION |
| Line A0 555-1234 | 10 | | | | 20 | |
| Line A1 555-1235 | 11 | | | | 21 | |
| Line A2 555-1236 | 12 | | | | 22 | |
| Line A3 555-1237 | 13 | | | | 23 | |
| Line A4 555-1238 | 14 | | | | 24 | |
| Line B0 | 15 | | | | 25 | |
| Line B1 | 16 | | | | 26 | |
| Line B2 | 17 | | | | 27 | |
| Line B3 | 18 | | | | 28 | |
| Line B4 | 19 | | | | 29 | |



CONNECT THE MODULAR JUMPER CORDS TO THE CONTROL UNIT

Take some time now to plan your intercom assignments and the corresponding connections from the jack field to the control unit.

Notice that only two of the ten jacks in each Voice Terminal Module are numbered: the top jack is labeled 0, and the sixth one down is labeled 5. To find the intercom numbers assigned to the jacks in any particular Voice Terminal Module, look at the label at the foot of the slot. The lowest number on the label belongs to the top jack, and the highest number on the label belongs to the bottom jack. (The drawing, *right*, shows how the jacks are numbered in the Voice Terminal Module for intercoms 10 through 19. Notice also that the intercom numbers do not appear on the module.)

Assign jack 10 (intercom 10) to the attendant's voice terminal. You can assign jacks 11, 12, 13, and 14 to backup attendants if needed (although your ability to assign jacks to backup attendants varies according to which Feature Module you have).

Before connecting the modular jumper cords to the control unit, check the following:

- Jack field

Inside the right door (the door with the handle) of each apparatus box with a blue-on-white label, you should find labels indicating the end location of the wiring run for each jack in the box.

- Modular jumper cords

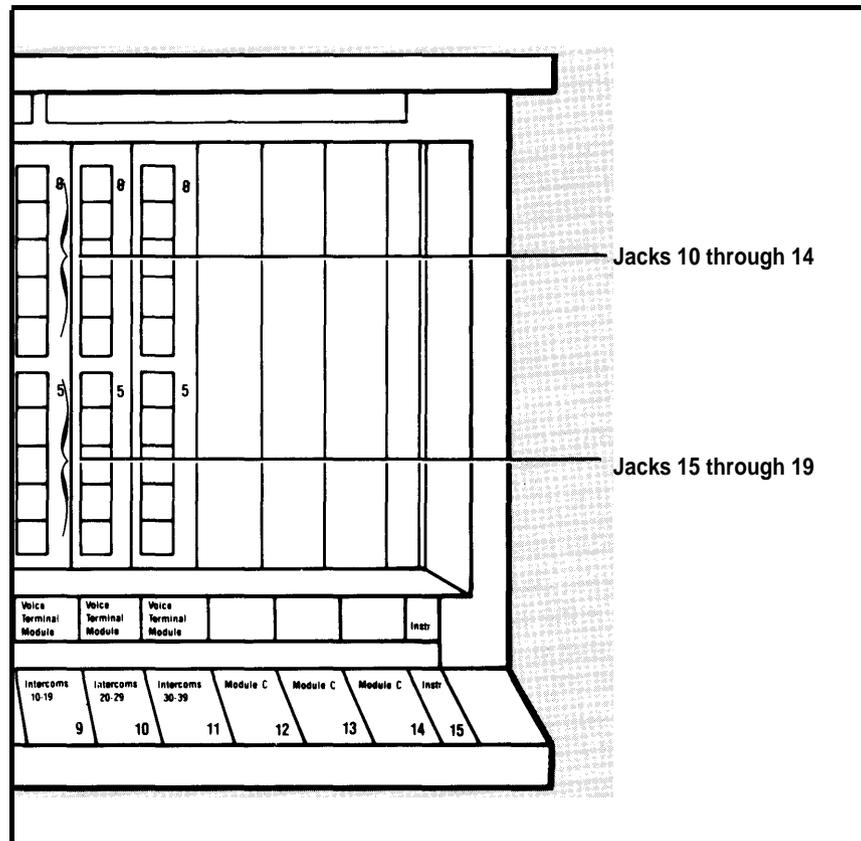
You should find jumper cords (one for each intercom) hanging from the jacks in the boxes with the blue-on-white labels in the jack field. If the jumper cords are not hanging from the jack field, find them now and plug them into the jacks with the blue-on-white labels in the jack field.

- Blue-on-white cord labels

These labels come with the Control Unit Installation Kit and with the individual Voice Terminal Modules. You should have two labels with matching intercom numbers for each modular jumper cord.

- System directory

You have already entered the telephone numbers for your outside lines on it.



Now do the following:

- 1 Fill in the intercom assignments on the system directory.

When the system directory is complete, peel off its backing and stick it to the inside of the control unit's front panel.

- 2 Take the blue-on-white cord labels to the jack field and label each modular jumper cord at both ends with the cord's intercom number.

TIP: The system directory and the labels inside the apparatus boxes can help you assign the correct intercom numbers to the modular jumper cords.

- 3 Thread each modular jumper cord through the pair of cord clips on the control unit (or expansion unit) aligned with the Voice Terminal Module to which that jumper cord is assigned.

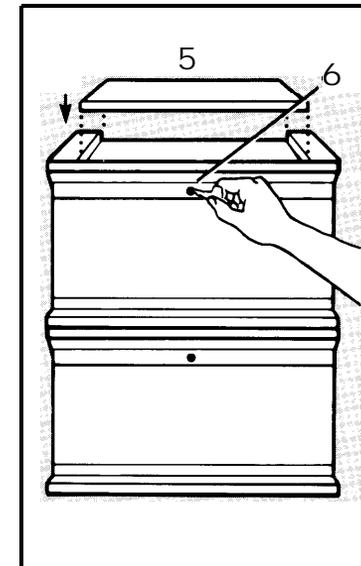
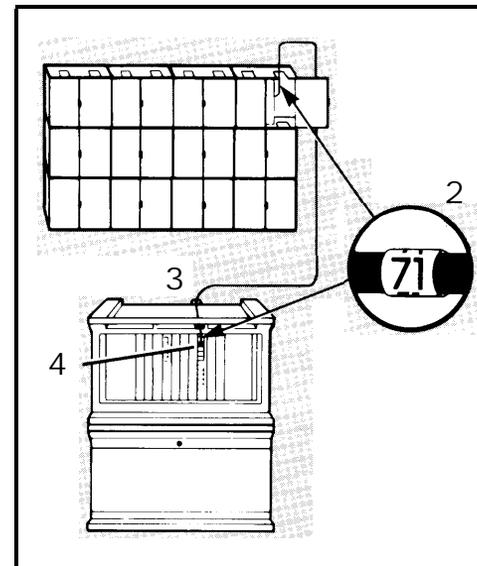
- 4 Plug each modular jumper cord into the jack for its intercom number in the control unit (or expansion unit).

TIP: You can thread all 10 cords going to one Voice Terminal Module through the same pair of cord clips. You may want to use cable ties to bundle the jumper cords from each module between the cord clips. But you shouldn't use cable ties between the rear cord clip and the jack field because you'll want to leave the jumper cords free for easy rearrangement in the future.

- 5 Fit the lid onto the top of the control unit or expansion unit.

- 6 Fit the front covers onto the control unit and expansion unit, and lock them.

| SYSTEM DIRECTORY | | | | | | | |
|----------------------|-----------------|--------------------|-------------------|-----------------------|-----------------|--------------------|--|
| OUTSIDE LINE NUMBERS | INTERCOM NUMBER | PERSON OR LOCATION | WIRING RUN NUMBER | CALL RESTRICTION TYPE | INTERCOM NUMBER | PERSON OR LOCATION | |
| Line A0 555-1234 | 10 | RECEPTION AREA | | | 20 | | |
| Line A1 555-1235 | 11 | OFFICE | | | 21 | | |
| Line A2 555-1236 | 12 | WORKSHOP | | | 22 | | |
| Line A3 555-1237 | 13 | LAB A | | | 23 | | |
| Line A4 555-1238 | 14 | STOREROOM | | | 24 | | |
| Line B0 | 15 | LOADING DOCK | | | 25 | | |
| Line B1 | 16 | | | | 26 | | |
| Line B2 | 17 | | | | 27 | | |
| Line B3 | 18 | | | | 28 | | |
| Line B4 | 19 | | | | 29 | | |



Connecting Voice Terminals

ASSEMBLE THE VOICE TERMINALS

There are several types of voice terminals available. Some are more practical for employees with limited need for custom features and access to multiple outside lines. Others are designed for employees who need access to many custom features or outside lines. A 34-button deluxe voice terminal, with lights by every flat button, or a large attendant console (a 34-button deluxe voice terminal with an attached Attendant Intercom Selector providing additional space for intercom buttons) are most appropriate for an attendant or receptionist.

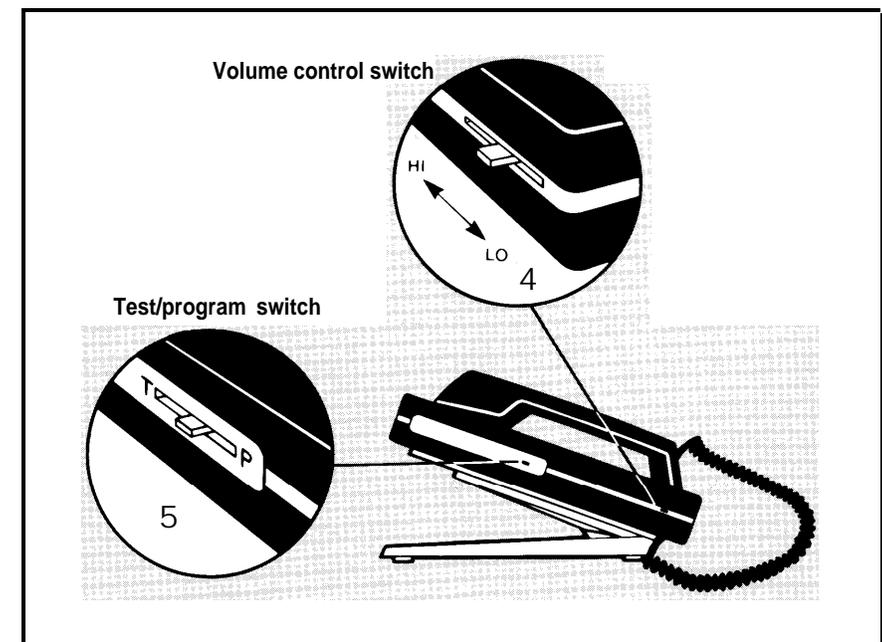
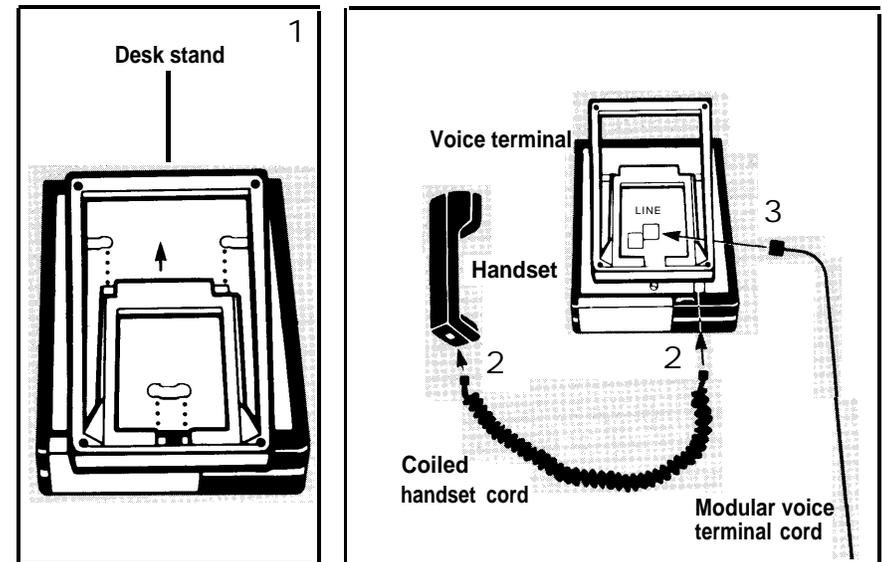
Each voice terminal has the following components, which come boxed together:

- Voice terminal body
- Handset
- Coiled handset cord
- Modular voice terminal cord
- Desk stand and/or wall mount

To assemble a voice terminal and desk stand:

- 1 Slide the stand onto the voice terminal, following the directions that come with the components.
- 2 Plug one end of the coiled handset cord into the handset, and the other end into the jack next to the handset symbol at the base of the voice terminal body.
- 3 Plug the modular voice terminal cord into the jack labeled Line on the back of the voice terminal.
- 4 Slide the volume control switch to the center position.
- 5 Check the switch labeled T/P on the left side of the voice terminal. Make sure it is set in its center position. If the switch is set at *P* or *T*, the voice terminal will begin to ring as soon as you plug it in.

NOTE: If you want to mount a voice terminal on a wall, follow the instructions that come with the wall mount.



CONNECT EACH VOICE TERMINAL TO THE SYSTEM

- 1 Place each voice terminal in its designated location.
- 2 Plug the loose end of the modular voice terminal cord into the modular wall jack.

A red light comes on next to a button.

- 3 Slide the T/P switch to *T* and hold it there.

All the red and green lights on the voice terminal begin to flash, and a tone sounds.

If the lights do not flash, make sure the green power light is lit on each Power Module in the control unit, and check the wiring connections associated with that voice terminal (circled in the drawing, *right*).

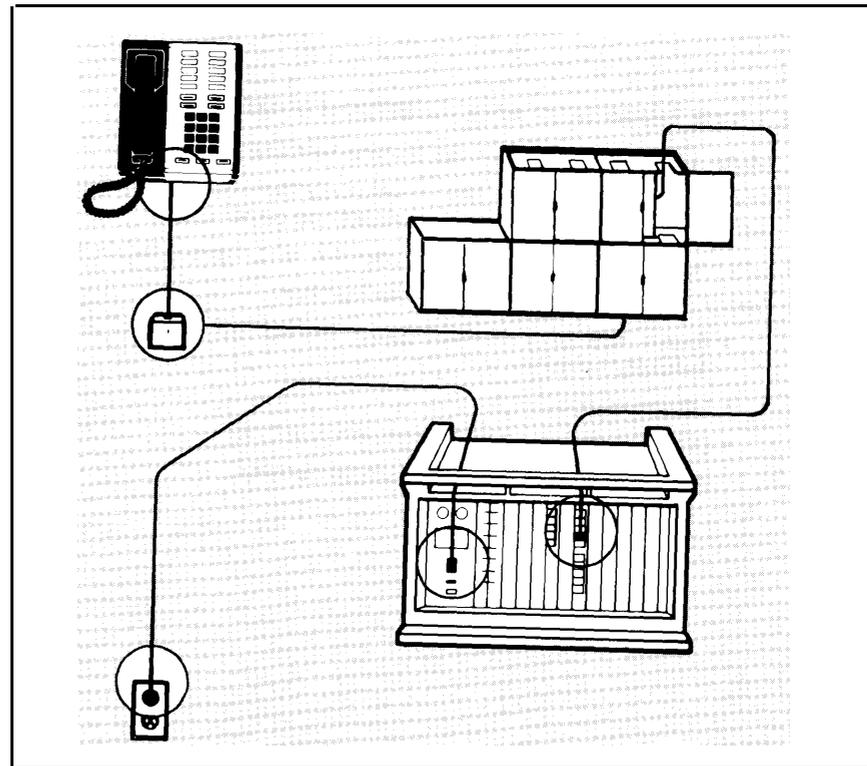
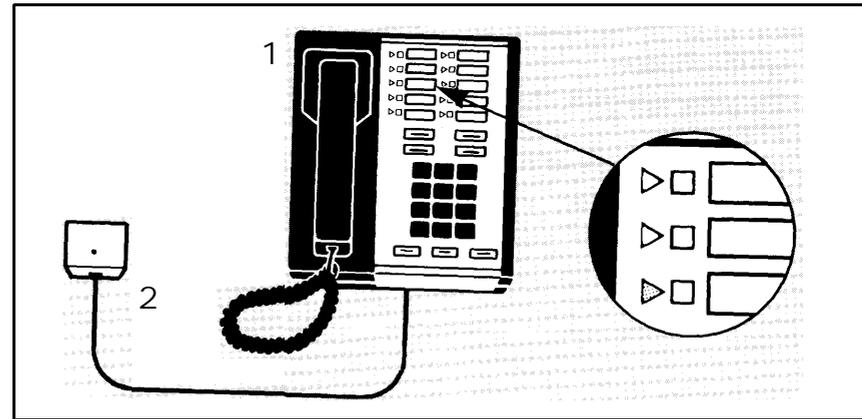
If the tone does not sound, make sure the voice terminal's volume control switch is set in the center position.

If the tone still does not sound and/or the lights do not flash, make a note of it, and refer to the Troubleshooting Table, page 30, when you've completed the installation.

- 4 Slide the T/P switch to the center position.

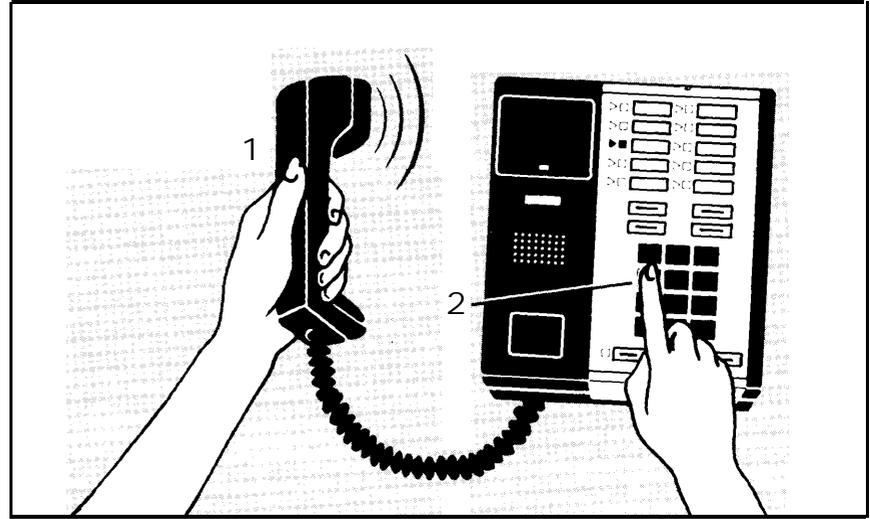
The lights stop flashing, and the tone stops.

NOTE: If you need to connect a voice terminal directly to the control unit (for example, to perform system tests or to program system restrictions), plug the voice terminal cord directly into one of the jacks in a Voice Terminal Module in the control unit.



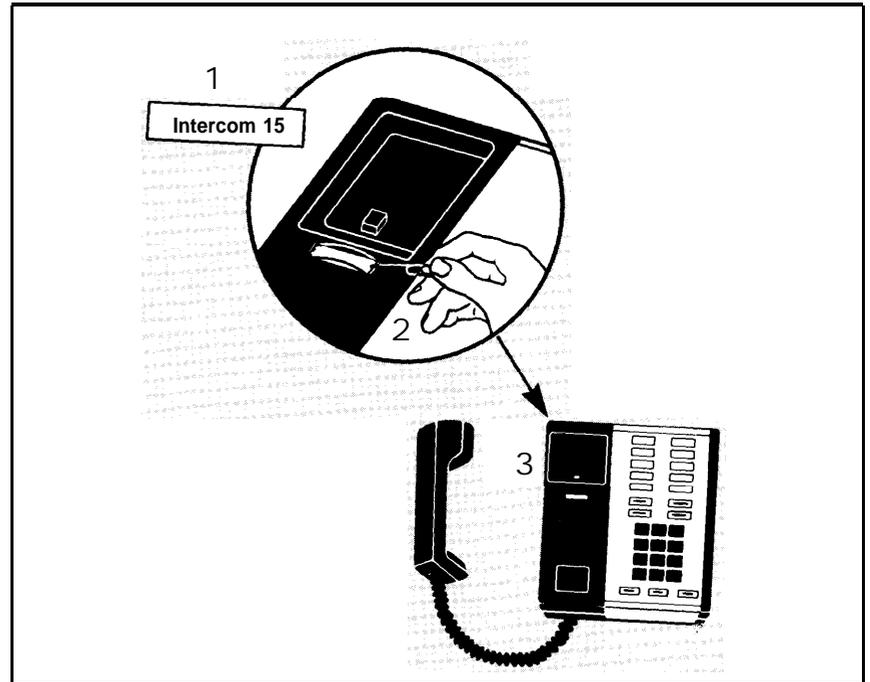
TEST EACH VOICE TERMINAL FOR A DIAL TONE

- 1 Lift the handset.
The green light goes on next to the shining red light, and you hear a dial tone.
- 2 Press one or more of the dial pad buttons.
The dial tone stops.



LABEL VOICE TERMINALS WITH INTERCOM NUMBERS

- 1 Make an intercom label for each voice terminal.
- 2 Pry the plastic intercom number cover away from its slot below the handset using an object such as a straightened paper clip.
- 3 Lay the intercom number card in the slot, and replace the cover.
- 4 Verify the voice terminal's intercom number:
 - Touch the fifth button down in the left row of buttons (**Intercom-Ring**).
 - Lift the handset.
 - Dial the voice terminal's intercom number.
A busy signal verifies the intercom number.



Installing Accessories

Once you have installed your basic MERLIN system, you may want to add accessories to enhance your system's capabilities.

FEATURE ACCESSORIES

With a Services Module in your control unit, you can add features such as Music-on-Hold, Loudspeaker Page, Extra Alert, and Power Failure Transfer telephones. To add a Services Module and related accessories to your system, follow the instructions that come with the module.

Also available are headsets, headset adapters, and Hands-Free Units for your voice terminals, as well as accessories that make it possible for you to connect modems, autodialers, and answering machines to your voice terminals.

POWER ACCESSORIES

You may find it necessary to add auxiliary power components to your system. For example, you'll need a Voice Terminal Power Supply for every 34-button deluxe voice terminal connected to an accessory, for every attendant console with an Attendant Intercom Selector, and for every voice terminal more than 1000 feet from the control unit. If you have an expansion unit, and if you have more than 20 outside lines and more than 60 voice terminals, you'll also need a Supplementary Power Module. And you may need as many as three Auxiliary Power Units for your control unit and expansion unit if one or more of the following conditions exist in your office:

- You have the maximum number of voice terminals connected to your system (30 for Model 1030 and 70 for Model 3070).
- You have several voice terminals with accessories (and the voice terminals do not have a Voice Terminal Power Supply).
- There are long wiring runs between your control unit and your voice terminals.
- The lights on some of your voice terminals become dim or go out altogether when many employees use their voice terminals simultaneously.

A system with many voice terminals and accessories may require one or more Auxiliary Power Units. The graph, *right*, can help you determine if you need additional power components and, if so, how many you need.

To determine if the Power Module in slot number 1 in the control unit needs an Auxiliary Power Unit, do this:

1. Count the voice terminals and Hands-Free Units connected to the Voice Terminal Modules in your control unit, and add the two numbers together. (Do not count 34-button deluxe voice terminals or voice terminals that have a Voice Terminal Power Supply.)
2. Count the 34-button deluxe voice terminals connected to the Voice Terminal Modules in your control unit. (Do not count 34-button deluxe voice terminals that have a Voice Terminal Power Supply.)

3. Plot the two numbers from steps 1 and 2 on the graph as shown. This will tell you if you need an Auxiliary Power Unit (or perhaps two) for your control unit.

EXAMPLE: If you have twenty 10-button voice terminals, ten Hands-Free Units, and ten 34-button deluxe voice terminals connected to the Voice Terminal Modules in your control unit, the graph shows that you need one Auxiliary Power Unit for the Power Module in slot number 1.

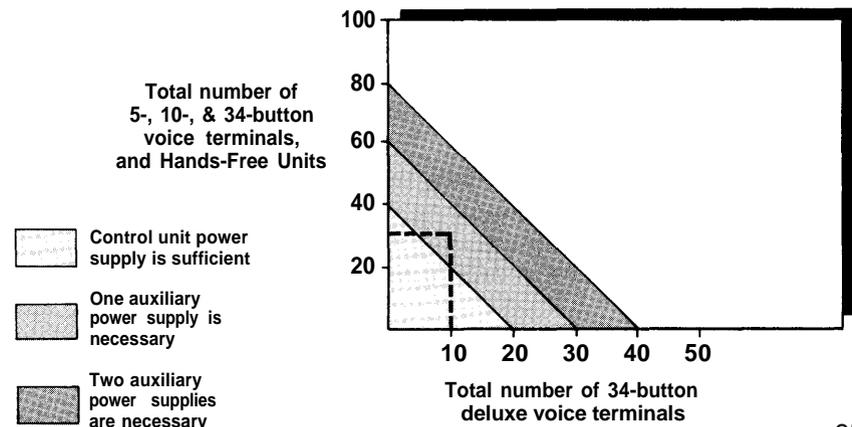
To determine if the Power Module in slot number 16 in your expansion unit needs an Auxiliary Power Unit, repeat steps 1, 2, and 3, above, for the expansion unit, but do *not* count voice terminals, Hands-Free Units, or 34-button deluxe voice terminals connected to the Voice Terminal Module in slot number 24 (slot number 26 if your system has Feature Module 3).

NOTE: It's highly unlikely that a Power Module in slot number 27 would require an Auxiliary Power Unit.

If you have one Auxiliary Power Unit connected to a Power Module, plug it into the leftmost auxiliary power supply jack on the module.

Depending on how many voice terminals and accessories you have connected to your system, it may be more economical to provide Voice Terminal Power Units for individual voice terminals rather than to provide Auxiliary Power Units for your control unit or expansion unit. Your equipment supplier can help you make the most cost-effective addition to your system.

If you know you need additional power supplies, do not use all your accessories until you can provide enough power to your system. To add power supplies and other accessories to your system, carefully follow the instructions that come with the components.



System Tests

Now that your system equipment is in place, you need to test it to make sure it is operating properly. The following tests help you determine if you have installed your system correctly and if all your system components are operable. If these tests reveal any problems, refer to the Troubleshooting Table on page 30.

TEST THE JACKS IN THE VOICE TERMINAL MODULES FOR A DIAL TONE

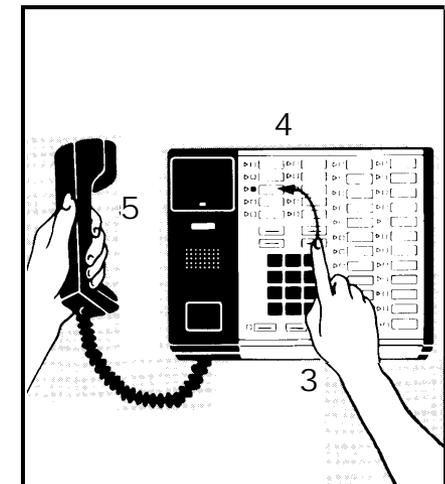
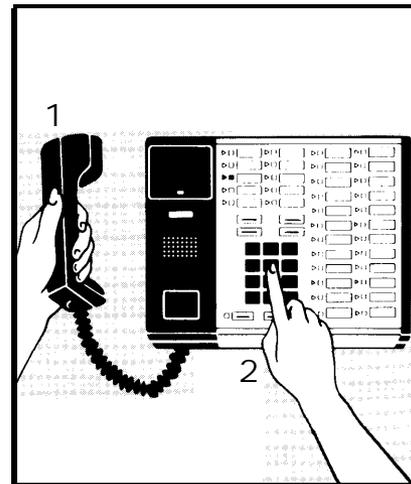
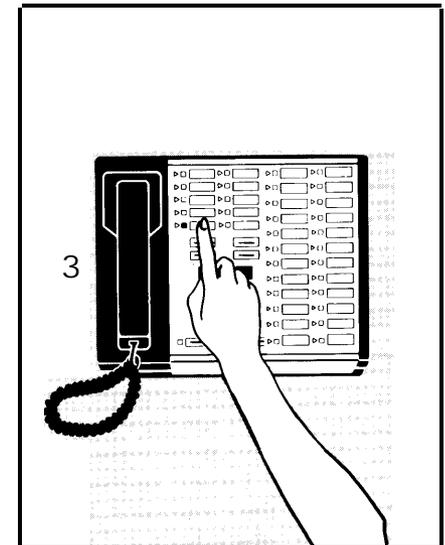
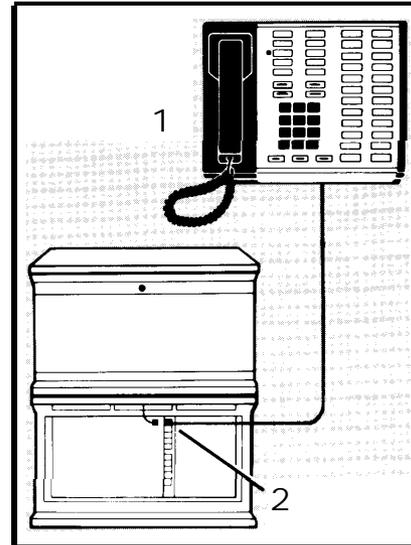
- 1 Move a 34-button deluxe voice terminal to the control unit.
The red light goes on next to the middle button in the left row of flat buttons.
- 2 Unplug the jumper cord from the Voice Terminal Module jack for intercom 10, and plug the voice terminal's modular line cord into the jack.
The red light goes on next to the middle button in the left row of flat buttons.
- 3 Touch the fifth button down in the leftmost row of buttons (**Intercom-Ring**); then pick up the handset and verify a dial tone.
The green and red lights go on next to the button.
- 4 Repeat this step for every intercom and line button on the voice terminal.
- 5 Repeat this procedure for every Voice Terminal Module jack you want to test.

If there is no dial tone at one or more line buttons, refer to the Troubleshooting Table on page 30.

PLACE AN OUTSIDE CALL

Using the same voice terminal at the control unit or any other voice terminal connected to the system:

- 1 Lift the handset.
The green light goes on next to the red light.
- 2 Dial an outside number (for example, a friend's home).
- 3 After the call is answered, place the call on hold by touching **Hold**.
The green light next to the line button flashes rapidly.
- 4 Return to the call on hold by touching the line button next to the flashing green light.
- 5 Verify two-way communication, then hang up the handset.
- 6 If you have performed this test at the control unit, unplug the voice terminal from the control unit, plug the jumper cord into the intercom 10 jack, and return the voice terminal to its office location.



PLACE AN INTERCOM CALL TO A VOICE TERMINAL

Make the test call from one voice terminal to another voice terminal. Have another person available to answer the intercom call.

- 1 From a voice terminal, touch the fifth button down in the leftmost row of buttons on the voice terminal (**Intercom-Ring**) without lifting the handset.

The red light next to the button goes on.

- 2 Lift the handset.

The green light next to the button goes on.

- 3 Dial your partner's intercom number (a 2-digit number such as 11).

You hear an intermittent ringing.

- 4 Wait for your partner to answer before speaking into the handset.

*When the call comes through at the called voice terminal, three short rings sound, the red light glows steadily next to the fourth button down in the left row of buttons (**Intercom-Voice**), and the corresponding green light flashes until the handset is lifted.*

- 5 When your partner lifts the handset at the called voice terminal, verify two-way communication, and then hang up the handsets at both voice terminals.

The lights on both voice terminals go out, and the red light goes on next to the third button down in the leftmost row of buttons.

- 6 Repeat steps 1 through 5 for every voice terminal you want to test.

TEST EACH LINE NUMBER

Use a 34-button deluxe voice terminal at intercom 10. Have someone place calls from another voice terminal (preferably another 34-button voice terminal).

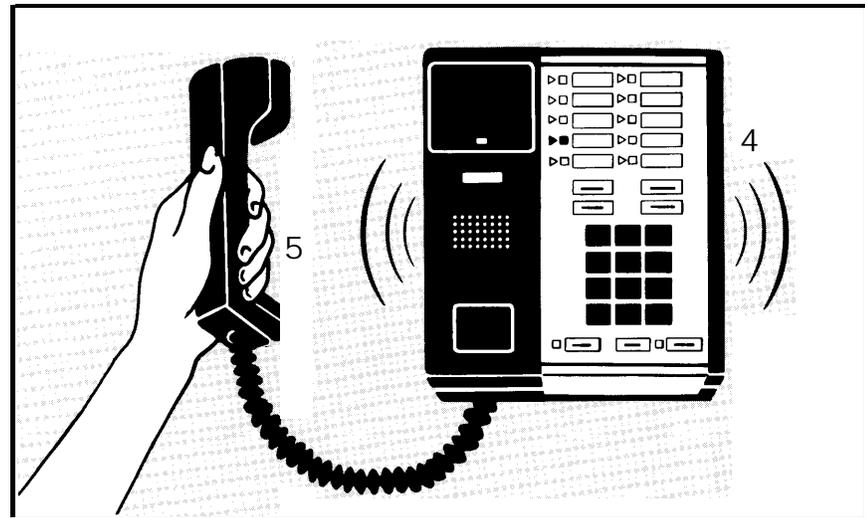
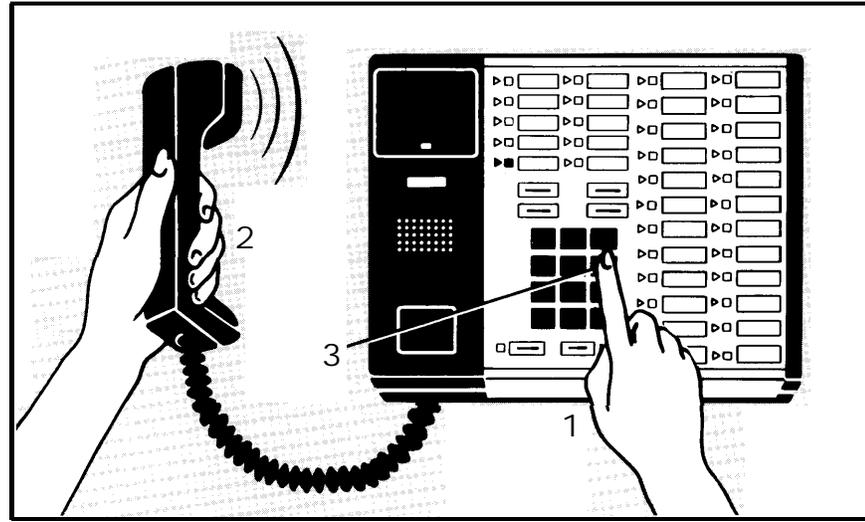
- 1 Have your partner dial one of your outside line numbers.

When your voice terminal starts to ring, the green light flashes and the red light goes on next to the appropriate line button.

If the green light flashes next to the wrong line button on the 34-button deluxe voice terminal, make sure connections are correct between the control unit line jacks and the network interface jacks. (For example, you may have plugged the outside line cord into the wrong control unit Line Module jack.)

- 2 Lift the handset at the answering voice terminal, verify two-way communication, and then hang up the handsets at both voice terminals.

- 3 Repeat this procedure for each of your outside lines.



What's Next?

Now that your MERLIN system is installed, you need to program it to meet your business needs. Refer to the administration manual to learn how to:

- Assign voice terminals to attendants
- Administer your MERLIN system
- Assign individual lines and calling restrictions to individual voice terminals
- Establish Night Service
- Program individual voice terminals

Once you've customized the system to meet your business needs, review the user's guide to learn how to use the MERLIN system custom features.

This installation guide contains information about system changes and troubleshooting. Keep it for later reference.

System Changes

Your MERLIN communications system is designed to make system changes quickly and easily. You can increase your system's capacity and capability simply by adding a module to your control unit. Modular plugs on much of the system wiring and the labels you placed on key components enable you to reorganize the system easily in the event of office rearrangements.

The following are the most common system changes.

ADDING AN OUTSIDE LINE

If your MERLIN system becomes so busy that people in your office frequently must wait to make calls, you may want to add one or more outside lines to your system. A Model 1030 can support up to 10 outside lines (up to 20 outside lines with Feature Module 3). A Model 3070 can support up to 30 outside lines (50 with Feature Module 3).

- 1 Have your local telephone company add the outside line(s) and network interface jack(s) to those you already have in place.

If all the Line Module jacks in your control unit are full, you need another Line Module. If no empty Line Module slots remain in your control unit, you need a Model 1030 Expansion Unit in addition to a Line Module in order to increase your system's capacity.

- 2 See the directions for adding these components and the new lines to your system in the sections "Attach the Model 1030 Expansion Unit to the Control Unit," page 12, "Insert the Modules," page 14, and "Connect the Control Unit to the Outside Lines," page 18.
- 3 Label a new line button on each voice terminal that will have access to the new line(s). If you are using line pools, you can add the line to a pool, or you must administer this line appearance on all the voice terminals where you want the line to appear. Refer to the administration manual for instructions.
- 4 Record the changes in your system and user directories.

ADDING A VOICE TERMINAL

You can easily add more voice terminals to your MERLIN system as your business and communication demands increase. A Model 1030 can support up to 30 voice terminals (20 with Feature Module 3); a Model 3070 can support up to 70 voice terminals (50 with Feature Module 3).

To add a voice terminal to your system:

- 1 See that the necessary wiring, jacks, and jumper cords are installed between the control unit and the new voice terminal location (see "Getting Started," page 2).

If all the Voice Terminal Module jacks in your control unit are full, you need another Voice Terminal Module. If all the Voice Terminal Module slots in your control unit are full, you need a Model 1030 Expansion Unit in addition to the Voice Terminal Module.

- 2 To add these components and the new voice terminals to your system, refer to the sections "Attach the Model 1030 Expansion Unit to the Control Unit," page 12, "Insert the Modules," page 14, and "Connecting Voice Terminals," page 22.
- 3 At the jack field, label each new jack with its wiring run endpoint (for example, "workshop" or "reception area").
- 4 Record the addition in your system and user directories.
- 5 Refer to your administration manual for instructions on administering your additional voice terminals.

MOVING A VOICE TERMINAL

You can easily move a voice terminal from one location to another without having to reprogram the voice terminal or change the system labeling.

To move a voice terminal:

- 1 Make sure the necessary wiring is in place (refer to "Getting Started," page 2).
- 2 Go to the jack field and find the jack for the wiring run that ends at the voice terminal's present location (for example, "workshop").
- 3 Unplug the jumper cord from that jack and plug it into the jack for the wiring run that ends at the voice terminal's new location (for example, "reception area").
TIP: If two employees are trading places, the jumper cords labeled with the employees' intercom numbers simply swap jacks in the jack field.
- 4 Go to the voice terminal's location and unplug the voice terminal's modular voice terminal cord from the modular jack.
- 5 Take the voice terminal to the new location, plug the voice terminal's modular voice terminal cord into the modular jack there, and make sure the voice terminal has a dial tone.
- 6 Record the change in your system and user directories.

NOTE: You don't have to change any labels in the system.

CHANGING TOUCH-TONE/ROTARY SERVICE

If you are changing your telephone service from rotary to Touch-Tone or vice versa, refer to the instructions in your administration manual.

Troubleshooting

Refer to the following table if you have trouble with your MERLIN system. Identify the symptom in the "Trouble" column of the table, and perform the recommended steps to isolate and correct the problem. If you are unable to identify a particular problem, perform the General Test on page 34 before calling your equipment supplier for help. Once you have programmed and administered your system, you may obtain the *Service and Maintenance Manual: Models 1030 and 3070* for additional information on how to troubleshoot your system.

TROUBLESHOOTING TABLE

| Trouble | Possible Cause | Do This | If | Then |
|---|---|---|---|---|
| You have difficulty placing intercom and/or outside calls from one or more voice terminals. | Incorrect Touch-Tone/Rotary settings for one or more outside lines. | Refer to the administration manual to learn how to determine the Touch-Tone/Rotary settings for your outside lines. | one or more lines are set for Touch-Tone and you have rotary (pulse) telephone service | set the line(s) for rotary (pulse) signals. |
| | | | one or more lines are set for Rotary and you have Touch-Tone telephone service | set the line(s) for Touch-Tone service. |
| | | | the lines are set for the appropriate telephone service | look for a more specific description of the problem in the "Trouble" column. If you don't find it, see the General Test on page 34. |
| When you lift the handset on one or more voice terminals, the green light goes on next to the red light, but there is no dial tone. | Faulty MERLIN system components | 1. Try to place both outside and intercom calls from several voice terminals. | the trouble appears only on intercom calls or the trouble appears on only one voice terminal | the trouble is caused by a component in your system. Refer to "There is trouble with voice terminal lights, speaker, or ringing." |
| | | | the trouble appears only on outside calls | go to step 2. |
| | Faulty telephone company wiring | 2. At the control unit location, unplug the line cords from the network interface, and in their place, plug in a basic telephone. Do <i>not</i> use a MERLIN system voice terminal. Try to place an outside call from each network interface jack. | the trouble appears on the basic telephone, and the interface uses a line adapter | go to step 3. |
| | | | the trouble appears on the basic telephone, and the interface does <i>not</i> have a line adapter | your outside telephone lines are faulty. Report the trouble to your local telephone company representative. |
| | | | the trouble still appears on the basic telephone | your outside telephone lines are faulty. Report the trouble to your local telephone company representative. |
| | Faulty network interface line adapter | 3. Replace the network interface line adapter with another one. Plug the basic telephone into each of the jacks, and try to place an outside call. | the trouble does <i>not</i> appear on the basic telephone | the old line adapter is faulty. Replace it with a new line adapter. |
| | | | the trouble persists | go to step 4. |

TROUBLESHOOTING TABLE (continued)

| Trouble | Possible Cause | Do This | If | Then |
|---|---|---|--|--|
| When you lift the handset on one or more voice terminals, the green light goes on next to the red light, but there is no dial tone. (continued) | Faulty cable connections between the network interface and the control unit | 4. Reconnect the line cords to the network interface jacks. Unplug the line cords from the Line Module jacks in the control unit. Plug each line cord into a basic telephone (<i>not</i> a MERLIN system voice terminal) and listen for a dial tone. | one or more line cords do not pass on a dial tone to the basic telephone | the line cords that do not pass on a dial tone are faulty. Replace the faulty line cords. |
| | | | all line cords pass on a dial tone | go to step 5. |
| | A loose Line Module | 5. Set the power switch(es) on the Power Module(s) to <i>Off</i> . Remove each Line Module from the control unit and reinsert it so that each Line Module is securely seated in its slot. Set the power switch(es) to <i>On</i> . (If you have an expansion unit, switch it <i>On</i> first.) Reconnect the line cords to the Line Modules in the control unit, and try to get a dial tone on your MERLIN system voice terminals. | the trouble no longer occurs | you've corrected the problem. |
| | | | the trouble remains | your control unit is faulty. Call your equipment supplier. |
| Voice terminal doesn't ring. | Volume control switch | 1. Check the volume control setting on the voice terminal. Slide the switch to a higher setting. | the trouble persists | go to step 2. |
| | Ring option set incorrectly | 2. Slide the voice terminal's T/P switch to <i>P</i> . | the red light next to the third button down in the leftmost row of buttons does not glow steadily | touch the button to correct the problem. |
| | | | the red light next to the third button down in the leftmost row of buttons glows steadily | go to step 3. |
| | Do Not Disturb feature activated | 3. Slide the voice terminal's T/P switch to <i>P</i> , touch the fifth button down in the leftmost row of buttons (Intercom-Ring), and dial *71. | the red and green lights come on next to the fifth button down in the leftmost row of buttons (Intercom-Ring) | the Do Not Disturb feature is activated. Deactivate the feature following the instructions in the administration manual. |
| | | | either the green light or both lights do not go on | the Do Not Disturb feature is not activated. Refer to the test for trouble with lights, speaker, and ringing. |

TROUBLESHOOTING TABLE (continued)

| Trouble | Possible Cause | Do This | If | Then |
|---|---|--|--|--|
| There is trouble with voice terminal lights, speaker, or ringing. | Control unit | 1. Slide the T/P switch on the side of the voice terminal to the <i>T</i> position. | some (but not all) of the lights flash continually and/or a tone sounds at irregular intervals | the trouble is caused by either the voice terminal or the cable connection. Go to step 2. |
| | | | all lights are off and a tone sounds continually or irregularly | the trouble is caused by the control unit, the voice terminal, or the cable connection. Go to step 2. |
| | Faulty voice terminal | 2. Unplug the malfunctioning voice terminal, and in its place, plug in a working voice terminal. Slide its T/P switch to the <i>T</i> position. | the same trouble appears on the working voice terminal | the malfunctioning voice terminal probably is not faulty. The trouble is in either the control unit or the cables. Go to step 3. |
| | | | the trouble does <i>not</i> appear on the working voice terminal | the malfunctioning voice terminal is faulty. Contact your equipment supplier. |
| | Faulty control unit or cable connection | 3. Replug the malfunctioning voice terminal into its original jack. Go to the control unit and locate the jumper cords plugged into the intercom jacks for both the malfunctioning and working voice terminals. Unplug both from the control unit, and replug each into the other's jack. See if the trouble occurs on the working voice terminal. | the trouble still occurs | the problem may be caused by your control unit. Go to step 4. |
| | | | the trouble no longer occurs | the trouble is caused by one of the cables running to the malfunctioning voice terminal. Go to step 5. |
| | Inadequate power supply to the control unit | 4. Unplug some of the accessories connected to your system. | the trouble remains | the problem is caused by your control unit. Call you equipment supplier for assistance. |
| | | | the trouble no longer occurs | your system needs an additional power supply. To determine how much additional power you need, refer to the graph and instructions in "Installing Accessories," page 25. <i>Leave accessories unplugged</i> until you have the necessary auxiliary power supplies. |

TROUBLESHOOTING TABLE (continued)

| Trouble | Possible Cause | Do This | If | Then |
|---|--|---|--|--|
| There is trouble with voice terminal lights, speaker, or ringing. (continued) | Cable connections | 5. Replace each cable, one at a time, and test the malfunctioning voice terminal. | the trouble still occurs | the replaced cable is not the faulty one. Replace the next cable. |
| | | | the trouble no longer occurs | You've found the faulty cable. |
| Voice terminal rings constantly. | Voice terminal T/P switch not set in center position | Check the position of the T/P switch. | it is set at either <i>T</i> or <i>P</i> | slide it to the center position. |
| | | | it is in the center position | your voice terminal is faulty. Unplug it from the modular jack, and contact your equipment supplier. |
| All voice terminals have no lights and no dial tone. | Control unit not receiving power | 1. Set the power switch(es) on the Power Module(s) to <i>Off</i> and then set them to <i>On</i> again. (If you have an expansion unit, switch it back <i>On</i> first.) | the green power light on the Power Module is on and the trouble remains | the control unit may be faulty. Call your equipment supplier. |
| | | | the green power light is on and the trouble is gone | the problem was corrected when you reset the control unit. |
| | | | the green power light is off, and the 48V circuit breaker on the front of the Power Module is sticking out | press the circuit breaker back in place. |
| | | | the green power light is off, and the circuit breaker is in place | make sure the control unit is not plugged into an outlet controlled by a wall switch. |
| | | | the green power light is off, the control unit is not plugged into a switch-controlled outlet, and the circuit breaker is in place | go to step 2. |
| | | | the red warning light on the Processor Module is on | go to step 3. |
| | Faulty ac outlet | 2. Test the outlet by plugging in an appliance such as a lamp or a radio. | the appliance doesn't work | the outlet is faulty. |
| the appliance works | | | the control unit is faulty. Call your equipment supplier. | |

TROUBLESHOOTING TABLE (continued)

| Trouble | Possible Cause | Do This | If | Then |
|---|-----------------------|--|----------------------------------|--|
| All voice terminals have no lights and no dial tone. (continued) | A loose module | 3. Set the switch(es) on the Power Module(s) to <i>Off</i> . Remove and replace each module, making sure each is securely seated in its slot. Set the power switch back to <i>On</i> . (If you have an expansion unit, switch it <i>On</i> first.) | the red warning light goes out | the problem is solved. One of the modules was not securely in place. |
| | | | the red warning light remains on | contact your equipment supplier. |

GENERAL TEST

If you are having a problem not described in the previous tests, or if none of the tests reveal a specific problem, try the following procedure before calling your equipment supplier.

| Trouble | Possible Cause | Do This | If | Then |
|---|------------------------------------|---|---------------------|---------------------------------|
| The system isn't working properly and the trouble isn't described in the Troubleshooting Table. | Control unit may need to be reset. | 1. Set the power switch(es) on the Power Module(s) to <i>Off</i> and then <i>On</i> again. (If you have an expansion unit, switch it <i>On</i> first.) | the trouble is gone | you have corrected the problem. |
| | | | the trouble remains | go to step 2. |
| | A module may be loose. | 2. Set the power switch(es) on the Power Module(s) to <i>Off</i> . Pull out each module and reinsert it so that each module is seated securely in its slot. Then set the power switch(es) <i>On</i> . (If you have an expansion unit, switch it <i>On</i> first.) | the trouble is gone | you have corrected the problem. |
| | | | the trouble remains | call your equipment supplier. |

Appendix A: Interference Information

According to Federal Communications Commission (FCC) Rules, you need to know that:

- This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with this installation guide, may cause interference to radio communications.
- The equipment has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment.
- Operating this equipment in a residential area is likely to cause interference, in which case the user, at his or her own expense, will be required to take whatever measures may be necessary to correct the interference.

Appendix B: FCC Registration and Repair Information

This equipment is registered with the FCC in accordance with Part 68 of its Rules. In compliance with the Rules, you are to be advised of the following:

- *Means of Connection:* Connection of this equipment to the telephone network must be through several standard network interface jacks USOC RJ11C or RJ14C, or a multiline network interface cable and connector USOC RJ21. You can order these from your local telephone company. This equipment may not be used with party lines or coin telephone lines.
- *Notification to the Local Telephone Company:* Before connecting this equipment, you or your equipment supplier must notify your local telephone company's business office. Tell them the:
 - Telephone numbers you will be using with this equipment
 - Equipment's registration number and the ringer equivalence number (REN)

You must notify your local telephone company if and when this equipment is permanently disconnected from the line(s).

- *Installation and Operational Procedures:* This guide and the administration manual contain information about installation and operational procedures.
- *Repair Instructions:* If you experience trouble because your equipment is malfunctioning, the FCC requires that the equipment not be used and that it be disconnected from the network until the problem has been corrected.

Repairs to this equipment can only be made by the manufacturers, their authorized agents, or by others who may be authorized by the FCC.

- *Rights of the Local Telephone Company:* If this equipment causes harm to the telephone network, the local telephone company may discontinue your service temporarily. If possible, they will notify you in advance. But if advance notice is not practical, you will be notified as soon as possible. You will also be informed of your right to file a complaint with the FCC. Your local telephone company may make changes in its facilities, equipment, operations, or procedures that affect the proper functioning of this equipment. If they do, you will be notified in advance to give you an opportunity to maintain uninterrupted telephone service.
- *Hearing Aid Compatibility:* The custom telephone sets for this system are compatible with inductively coupled hearing aids as prescribed by the FCC.

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NETWORK LINK TEST
Crosstalk On Merlin 1030/3070

Most times crosstalk on the larger Merlin systems is the result of a defective line module, voice terminal module, or a basic telephone module.

The following is a step-by-step outline on the trouble shooting procedures to determine which module(s) are defective.

1) Determine how many links your system has

- a) Multiply the number of line modules by 18
- b) Multiply the number of voice terminal modules by 6
- c) Multiply the number of basic telephone modules by 6
- d) Add all your answers, a, b, and c together, this equals total number of links

| | | | |
|--------|----------------------------|----------|----|
| (e.i.) | (3) Line modules | 3 x 18 = | 54 |
| | (4) Voice terminal modules | 4 x 6 = | 24 |
| | (1) Basic telephone module | 1 x 6 = | 6 |

| | |
|-----------------------|------|
| Total Number of Links | = 84 |
|-----------------------|------|

*Note: If total is less than 48, always assume there are at least 48 links.

2) Cycle Power (Turn power off, then on at control unit)

*Note: If system has an upper expansion unit (3070), and there is not a voice terminal module in the upper carrier in slots 21, 22, or 23, at this time insert a voice terminal module into slot 21. It is o.k. to swap a voice terminal module out of the lower cabinet for the purpose of this test.

3) Using any model Merlin voice terminal (5, 10, or 34 btn. voice terminal)

- a) (1030) Plug voice terminal into any port in your 1st voice terminal module (slot 9)
 (3070) plug voice terminal into any port in any voice terminal module (slot 21, 22, 23)
- b) Depress intercom voice, then depress speaker, and adjust the volume lever to the center position.
- c) Quickly alternate between intercom voice and intercom ring buttons 24 times.
- d) Depress recall twice.

e) Then quickly alternate between intercom voice and intercom ring the remainder of your links.

(e.i.) A Merlin system having a total of 84 links

Alternate between intercom voice and ring 24 times.

Depress recall 2 times.

Alternate between intercom voice and ring 60 times.

4) If a loss or low volume of intercom tone is heard during any alternation, a defective line module, voice terminal module or basic telephone module is present.

*Note: It is very important that the system is in use while performing this test. If necessary tie up a few c.o. lines on main console.

5) Once a defective line module, voice terminal module, or basic telephone module is detected.

- a) Power down control unit and remove all line modules, voice terminal modules, and basic telephone modules, except the 1st line module (slot 7), and the voice terminal module your testing voice terminal is plugged into.
- b) Alternate between the intercom voice and ring buttons (repeat steps 3b through 3e)
- c) If a failure is detected, check for bent pins, replace the line module, or voice terminal module until no failure is heard.
- d) If/when no failure is heard, power down and re-insert one module at a time, repeating the test (steps 3b through 3e) after each module is re-inserted. If a failure is detected, the last module inserted is the defective module.