Installation
Guide

INSTALLATION GUIDE

WARNING

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It 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. Operation of this equipment in a residential area is likely to cause interference, in which case the user at the user's own expense will be required to take whatever measures may be required to correct the interference.

CONTENTS

This manual is one of a set that documents the Convergent™ Family of Information Processing Systems. The set can be grouped as follows:

Introductory
    Installation Guide
    Operator's Guide
    Executive Manual
    Context Manager Manual
    Status Codes Manual
    Installation Guide (NGEN)
    Operator's Guide (NGEN)

Hardware
  NGEN
    Processor Manual: Model CP-001
    Dual Floppy Disk Manual
    Floppy/Hard Disk Manual
    Diagnostics Manual
    Keyboard Manual
    Power System Manual
    Monochrome Monitor Manual: Model VM-001
    Color Monitor Manual
    Graphics Controller Manual: Model GC-001
  IWS
    Workstation Hardware Manual
    Peripherals Hardware Manual
    IWS Peripherals Hardware Manual (SMD Version)
  AWS
    AWS-210 Hardware Manual
    AWS-220, -230, -240 Hardware Manual
    AWS Color Workstation Hardware Manual

Operating System
    CTOS™ Operating System Manual
    System Programmer's Guide

Guest Operating Systems
    CP/M-86™
    MS™-DOS (and GW™-BASIC)
    XENIX™

Programming Languages
    COBOL Manual
    FORTRAN Manual
    FORTRAN-86 Manual
    BASIC Manual
    BASIC Compiler Manual
    Pascal Manual
    Assembly Language Manual

Program Development Tools
    COBOL Animator
    Editor Manual
    Debugger Manual
    Linker/Librarian Manual

Data Management Facilities
    CT-DBMS™ Manual
    ISAM Manual
    Forms Manual
    Sort/Merge Manual
    Query Manual

Text Management Facilities
    Word Processing User's Guide
    Word Processing Reference Manual
    Word Processing Quick Reference

Applications Facilities
    Project Planner Manual
    CT-MAIL™ User's Reference Manual
    CT-MAIL™ Administrator's Reference Manual
    Multiplan
    Business Graphics User's Guide
    Business Graphics Reference Manual
    Graphics Programmer's Guide
    Font Designer Manual

Communications
    Asynchronous Terminal Emulator Manual
    3270 Terminal Emulator Manual
    Enhanced BSC 3270 Emulator Manual
    2780/3780 RJE Terminal Emulator Manual
    SNA Network Gateway Manual
    SNA 3270 Emulator Manual
    SNA RJE Manual
    X.25 Network Gateway Manual
    Multimode Terminal Emulator User's Guide
    Multimode Terminal Emulator Reference Manual

This section outlines the contents of these manuals.

INTRODUCTORY

The Installation Guide describes the procedure for unpacking, cabling, and powering up a system.

The Operator's Guide addresses the needs of the average user for operating instructions. It describes the workstation switches and controls, keyboard function, and floppy disk handling.

The Executive Manual describes the command interpreter, the program that first interacts with the user when the system is turned on. It describes available commands and discusses command execution, file management, program invocation, and system management. It also addresses status and execution of batch jobs. This manual now incorporates the System Utilities and Batch Manuals.

The Context Manager Manual describes and teaches the use of the Context Manager, which allows the user to run applications concurrently and interchange them on the screen almost instantly.

The Status Codes Manual contains complete listing of all status codes, bootstrap ROM error codes, and CTOS initialization codes. The codes are listed numerically along with any message and an explanation.

The NGEN Installation Guide describes the procedure for unpacking, assembling, cabling, and powering up an NGEN workstation.

The NGEN Operator's Guide is a link between the operator, the NGEN workstation, and the workstation's documentation. The Operator's Guide describes the operator controls and the use of the floppy disk drives, as well as how to verify that the workstation is operational and how to use software release notices.

HARDWARE

NGEN

The Processor Manual: Model CP-001 describes the Processor Module, which houses the Processor board, Memory board, I/O board, Video/Keyboard board, and Motherboard. It details the architecture and theory of operation of the printed circuit boards, external interfaces, and the Memory Expansion Cartridge, as well as the X-Bus specifications.

The Dual Floppy Disk Manual and the Floppy/Hard Disk Manual describe the architecture and theory of operation for the respective NGEN modules. They discuss the applicable disk drives and controllers, and contain the applicable OEM disk drive manuals.

The Diagnostics Manual describes the diagnostics available for the NGEN workstation. It discusses the Processor Module's bootstrap ROM program and error codes, and individual software diagnostics for modules in the workstation.

The Keyboard Manual describes the architecture, theory of operation, and external interfaces for the NGEN keyboard.

The Power System Manual describes the operation and connections for the 36-Volt Power Supply and the dc/dc converters used with the NGEN workstation.

The Monochrome Monitor Manual: Model VM-001 describes the operation and connections of the 12-inch Monochrome Monitor used with the NGEN workstation.

The Color Monitor Manual describes the operation and connections of the 15-inch Color Monitor used with the NGEN workstation.

The Graphics Controller Manual: Model GC-001 describes the architecture, theory of operation, and external interfaces for the Graphics Controller Module, which accomodates either a monochrome or color monitor.

IWS

The Workstation Hardware Manual describes the mainframe, keyboard, and video display for the IWS family of workstations. It specifies system architecture, printed circuit boards (Motherboard, Processor, I/O Memory, Multiline Communications Processor, Video Control, Graphics Control Board, ROM and RAM Expansions), keyboard, video monitor, Multibus interface, communications interfaces, power supply, and environmental characteristics of the workstation.

The Peripherals Hardware Manual describes the non-SMD single-board Mass Storage Subsystem (MSS) and Mass Storage Expansion (MSX) disk subsystems for the IWS family of workstations. It contains descriptions of the disk controller Motherboard, the two controller boards for floppy and Winchester disks, power supplies, disk drives, and environmental characteristics.

The IWS Peripherals Hardware Manual (SMD Version) describes the SMD MSS and MSX disk subsystems having one controller board.

AWS

The AWS-210 Hardware Manual describes the mainframe, keyboard, and video display of the AWS-210 workstation. It specifies architecture, theory of operation of the printed circuit boards (Motherboard, Deflection, and CPU), keyboard, video monitor, expansion interface, cluster communications interface, power supply, and environmental characteristics of the workstation.

The AWS-220, -230, -240 Hardware Manual describes the main-
frame, keyboard, disk controllers, and video display of the AWS-
220, -230, and -240 workstations. It specifies architecture,
theory of operation of the printed circuit boards (Motherboard,
Deflection, 8088 CPU, 8086 CPU, Floppy Disk Controller, and
Hard Disk Controller), keyboard, video monitor, cluster commun-
ications interface, external interfaces, power supply, and envi-
ronmental characteristics of the workstation.

The AWS Color Workstation Hardware Manual describes the
mainframe, keyboard, and color video display of the AWS Color
Workstation. This manual reports the architecture and theory of
operation of the printed circuit boards (Motherboard, Graphics
Control Board, Hard Disk Controller, Color Video, Color
Deflection, and CPU), keyboard, color monitor, peripheral inter-
faces, cluster communications interface, power supply, and envi-
ronmental characteristics of the workstation. This manual also
contains four OEM disk drive manuals and a summary of adjust-
ments for the color monitor.

OPERATING SYSTEM

The CTOS™ Operating System Manual describes the operating
system. It specifies services for managing processes, messages,
memory, exchanges, tasks, video, disk, keyboard, printer, timer,
communications, and files. In particular, it specifies the
standard file access methods: SAM, the sequential access
method; RSAM, the record sequential access method; and DAM,
the direct access method.

The System Programmer's Guide addresses the needs of the
system programmer or system manager for detailed information
on operating system structure and system operation. It
describes (1) cluster architecture and operation, (2) procedures
for building a customized operating system, and (3) diagnostics.

GUEST OPERATING SYSTEMS

The CP/M-86™ and MS™-DOS Manuals describe the single-user
operating systems originally designed for the 8086-based personal
computer systems.

The GW™-BASIC Manuals describe the version of BASIC that
runs on the MS™-DOS operating system.

The XENIX™ Manuals describe the 16-bit adaptation of the
UNIX system, including the XENIX environment for software
development and text processing.

PROGRAMMING LANGUAGES

The COBOL, FORTRAN, FORTRAN-86, BASIC (Interpreter), BASIC Compiler, PASCAL, and Assembly Language Manuals describe the system's programming languages. Each manual specifies both the language itself and also operating instructions for that language.

The Pascal Manual is supplemented by a popular text, Pascal User Manual and Report.

The Assembly Language Manual is supplemented by a text, the Central Processing Unit, which describes the main processor, the 8086. It specifies the machine architecture, instruction set, and programming at the symbolic instruction level.

PROGRAM DEVELOPMENT TOOLS

The COBOL Animator describes the COBOL Animator, a debugger that allows the user to interact directly with the COBOL source code during program execution.

The Editor Manual describes the text editor.

The Debugger Manual describes the Debugger, which is designed for use at the symbolic instruction level. It can be used in debugging FORTRAN, Pascal, and assembly-language programs. (COBOL and BASIC, in contrast, are more conveniently debugged using special facilities described in their respective manuals.)

The Linker/Librarian Manual describes the Linker, which links together separately compiled object files, and the Librarian, which builds and manages libraries of object modules.

DATA MANAGEMENT FACILITIES

The CT-DBMS™ Manual describes Convergent's data base management system (CT-DBMS), which consists of (1) a data manipulation language for accessing and manipulating the data base and (2) utilities for administering the data base activities such as maintenance, backup and recovery, and status reporting.

The ISAM Manual describes both the single- and the multiuser indexed sequential access method. It specifies the procedural interfaces (and how to call them from various languages) and the utilities.

The Forms Manual describes the Forms facility that includes (1) the Forms Editor, which is used to interactively design and edit forms, and (2) the Forms run time, which is called from an application program to display forms and accept user input.

The Sort/Merge Manual describes (1) the Sort and Merge utilities that run as a subsystem invoked at the Executive command level, and (2) the Sort/Merge object modules that can be called from an application program.

The Query Manual describes the Query application, which is used to interactively query and update a CT-DBMS data base from a workstation. The manual explains Query's screen layouts, forms, menus, and point-and-type user interface, and provides information for data base administrators and programmers who use CT-DBMS.

TEXT MANAGEMENT FACILITIES

The Word Processing User's Guide introduces the Word Processor to the first-time user. It provides step-by-step lessons that describe basic word processing operations. The lessons show how to execute operations and apply them to sample text.

The Word Processing Reference Manual is a reference tool for users already familiar with the Word Processor. Efficient use of the various facilities of the Word Processor is discussed and each Word Processing command is described in detail. Information is included on list processing, programmer specific operations, and printer and print wheel configurations.

The Word Processing Quick Reference provides a concise summary of all word processing operations and briefly describes the keyboard and commands.

APPLICATIONS FACILITIES

The Project Planner schedules and analyzes tasks, milestones, and the allocation of resources in a project. By means of diagrams and several kinds of bar charts, Project Planner presents time and resource allocation results and shows the occurrence of project milestones. The Project Planner Manual explains the use of the program and also serves as a reference once the user is familiar with it.

The CT-MAIL™ User's Reference Manual introduces the first-time user to the CT-MAIL electronic mail system. It provides step-by-step instructions for using the basic CT-MAIL operations to create, send, and receive mail.

The CT-MAIL™ Administrator's Reference Manual provides the System Administrator with instructions for installing, configuring, and maintaining the CT-MAIL electronic mail system; setting up communication lines; creating and maintaining mail centers; adding mail users; creating distribution lists; and troubleshooting.

Multiplan is a financial modeling package designed for business planning, analysis, budgeting, and forecasting.

The Business Graphics User's Guide introduces Business Graphics to the first-time user. It provides step-by-step lessons that describe basic Business Graphics operations. The lessons show how to execute operations and apply them to sample charts.

The Business Graphics Reference Manual is a reference tool for users already familiar with Business Graphics. It describes the Business Graphics keyboard and screen; box and arrow cursor movement; obtaining information from Multiplan; operations; and plotter configurations.

The Graphics Programmer's Guide is a reference for applications and systems programmers. It describes the graphics library procedures that can be called from application systems to generate graphic representations of data, and it includes a section on accessing Business Graphics from an application system.

The Font Designer Manual describes the interactive utility for designing new fonts (character sets) for the video display.

COMMUNICATIONS

The Asynchronous Terminal Emulator Manual describes the asynchronous terminal emulator.

The 3270 Terminal Emulator Manual describes the 3270 emulator package.

The Enhanced BSC 3270 Emulator Manual describes the installation and operation of the CRT and Printer subsystems and the Control Unit Emulator that are provided by this emulator package.

The 2780/3780 RJE Terminal Emulator Manual describes the 2780/3780 emulator package.

The SNA Network Gateway Manual describes the SNA Network Gateway, which supports data communications over an SNA network. The SNA Network Gateway comprises the Transport Service and Status Monitor. The gateway emulates an IBM SNA cluster controller and forms the foundation for Convergent SNA products.

The SNA 3270 Emulator Manual describes the SNA 3270 emulator package. The SNA 3270 emulator provides CRT and printer subsystems in addition to a Virtual Terminal Interface for use in interactive application programs.

The SNA RJE Manual describes the SNA RJE subsystem. Built on the SNA Network Gateway, SNA RJE allows multiple, concurrent Logical Unit sessions with remote IBM-compatible hosts. The manual describes user interface features, installation, and a procedural interface for user-defined RJE application systems.

The X.25 Network Gateway Manual describes the X.25 Network Gateway, which supports CCITT Recommendation X.25 communications over a public data network. There are three levels of access to the network: packet, X.25 sequential access method, and the Multimode Terminal Emulator X.25 communications option.

The Multimode Terminal Emulator User's Guide introduces the Multimode Terminal Emulator to the first-time user. It describes the MTE video display, keyboard, display memory, and advanced operations for the X.25 communications option.

The Multimode Terminal Emulator Reference Manual is a reference tool for sophisticated users of the Multimode Terminal Emulator. It describes the MTE escape sequences and field verification program.

This Installation Guide shows you how to install or upgrade an NGEN workstation. The guide is organized as follows:

Section 1, "Overview," is what you're reading right now. Don't stop.

Section 2, "Processor Module," shows how to install a Processor Module, add Memory Expansion Cartridges, and plug input/output (I/O) devices into the I/O panel. It describes the operator controls and indicators on the Processor Module.

Section 3, "Module Connection," shows how the latching mechanism works and how to add modules to the workstation.

Section 4, "Graphics Controller Module," shows how to install a Graphics Controller Module.

Section 5, "Storage Modules," shows how to install both floppy and hard disk modules.

Section 6, "Monitors," shows how to install the monitor supplied for your workstation and describes the operator controls.

Section 7, "Keyboard," shows how to connect a keyboard to the monitor.

Section 8, "Power Connection and Final Assembly," shows how to install the 36-Volt Power Supply for your workstation, reassemble the module covers, and power up the workstation.

Section 9, "Configuration Recommendations," lists recommendations for installing and upgrading an NGEN workstation.

We suggest that you follow this guide from start to finish. If your workstation does not have a specific module, skip that section.

If you are upgrading a workstation (or simply moving a module to another workstation), make sure that you refer to all relevant sections of the Installation Guide.

UNPACKING

Find the box containing the Processor Module and open it from the top.

Lay the open box on its side and slide out the Processor Module with its packing material.

Remove the packing material.

REMOVING THE SIDE COVER

Find the tab at the bottom of the side cover on the Processor Module. Push the top of the tab in while gently pulling the cover out along the bottom edge.

Side Cover

Front
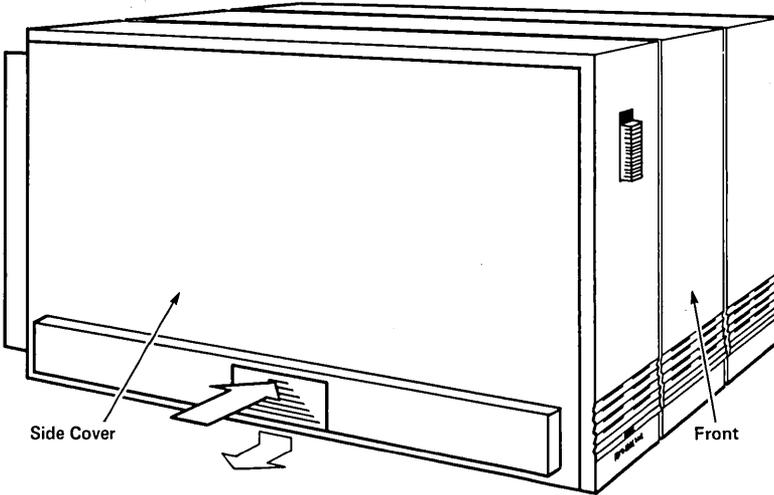
Pull the side cover down and off to reveal the three Memory Expansion Cartridge slots.
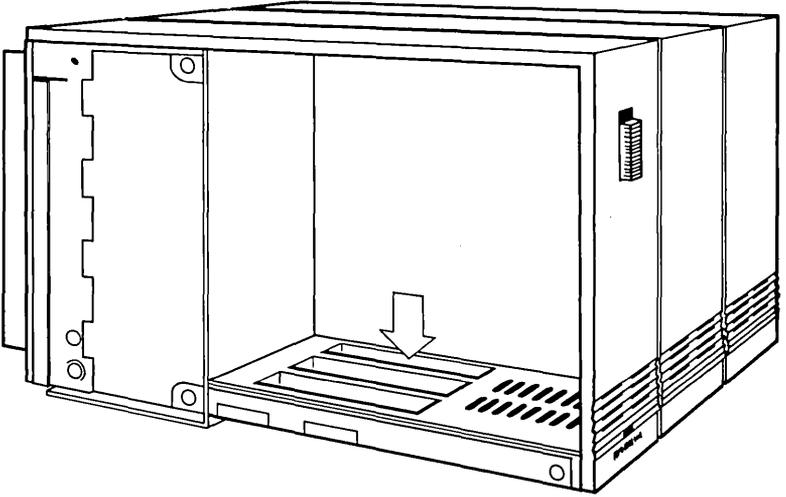
INSTALLING A MEMORY EXPANSION CARTRIDGE

You can install up to three Memory Expansion Cartridges in the slots of the Processor Module. Unpack all Memory Expansion Cartridges for your workstation.

Note that each Memory Expansion Cartridge has a small hinged door opposite its connector end. Open the door to reveal the two finger grip holes.

Grasp the Memory Expansion Cartridge by the two finger grip holes and insert it **vertically** into the slot closest to the inner metal wall of the Processor Module. **(Be careful not to insert the Memory Expansion Cartridge at an angle. You could bend the connectors if the Memory Expansion Cartridge is not vertical when you press it down.)**

When the Memory Expansion Cartridge is in the slot, press down firmly on the finger grip holes to fully engage the cartridge in the slot. Then press down with your finger on the open hinged door to lock the cartridge in place.

Close the hinged door.

To install a second or third Memory Expansion Cartridge, repeat the above procedure. Install the cartridges next to each other. **Do not skip any slots.** (Processor Module model number CP-001/7 uses a maximum of two Memory Expansion Cartridges.)

To remove a Memory Expansion Cartridge, lift it straight up. Do not pull it out at an angle.
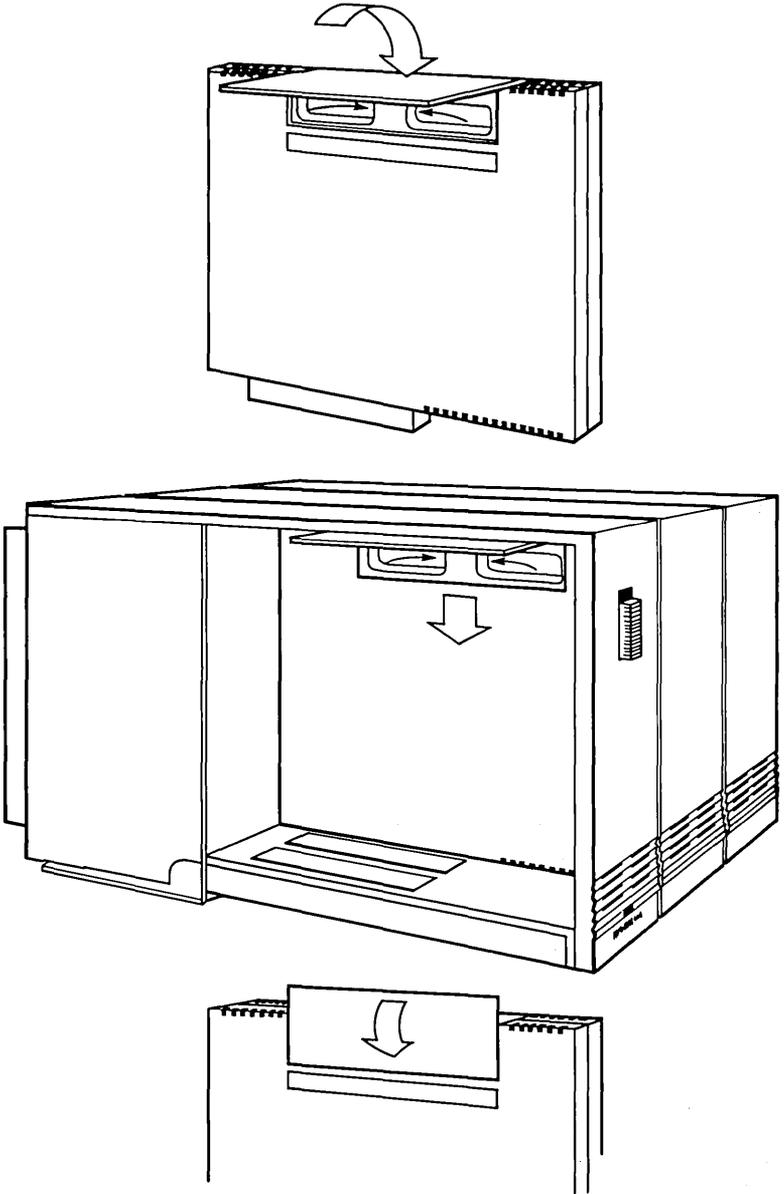
CONNECTING I/O DEVICES

Pull out the two button fasteners at the top and bottom of the I/O cover on the Processor Module. Open the door to reveal the connectors.
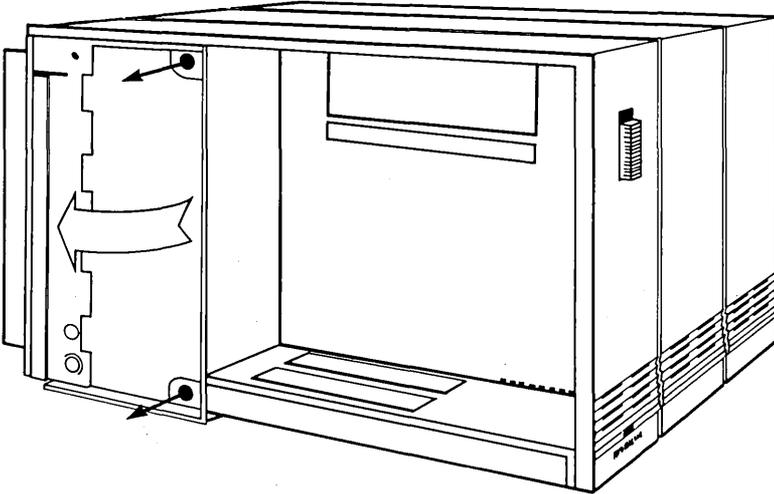

Notice that RS-232-C, parallel, and cluster communications connectors are provided on the Processor Module's I/O panel. The top row of I/O connectors contains RS-232-C Channel A, the video (monitor) connector, and RS-232-C Channel B. The bottom row contains the parallel printer port and two cluster communications connectors. A diagram on the I/O cover indicates the relative locations of these connectors, as shown below.

See the "External Interfaces" section of the Processor Manual for your workstation for technical information on the RS-232-C, parallel, and cluster communications interfaces.

When connecting cables to these connectors, note the correct orientation of the pins. Make sure the connections are firm, and use a small screwdriver to secure the cables in their connectors.

If two cluster communications cables are used, either connector can be used for either cable. If only one cluster communications cable is used, either connector can be used, but a terminator is recommended for the remaining connector.
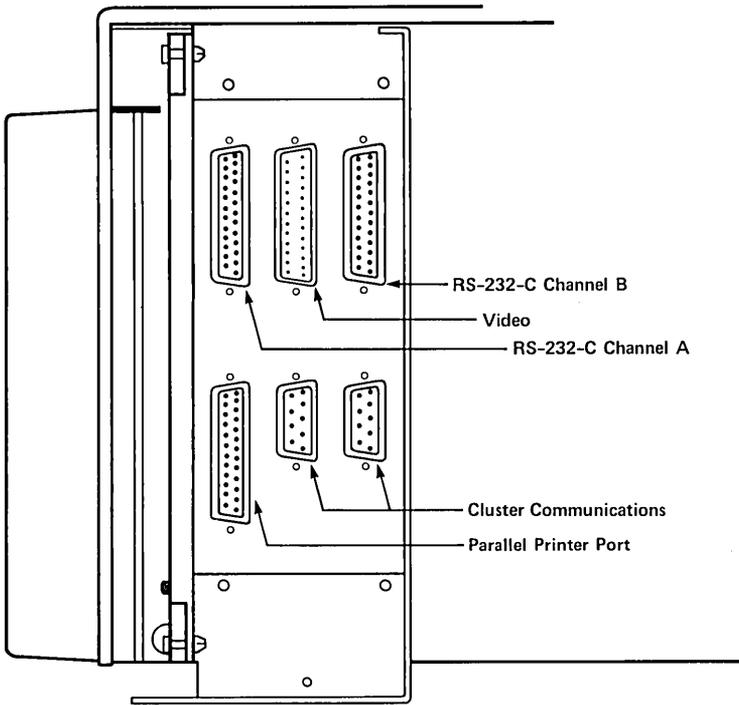
As the cables are plugged into their connectors, feed the cables through the cable exit runway provided underneath the back of the Processor Module.

Do not close the I/O cover or replace the side cover yet.

OPERATOR CONTROLS AND INDICATORS

On the front of the Processor Module is the power switch. To
turn the Processor Module on and to enable power to other
modules, the switch is slid up. **(Do not slide the switch yet.)**
When the Processor Module is powered up, an LED at the
bottom of the module lights up.

On the top back of the Processor Module is a small reset
button. The reset button is used to set all circuitry in the
Processor Module at an initial state. (The Operator's Guide
contains more information about using this button properly.)

Power Switch

LED

Reset Button
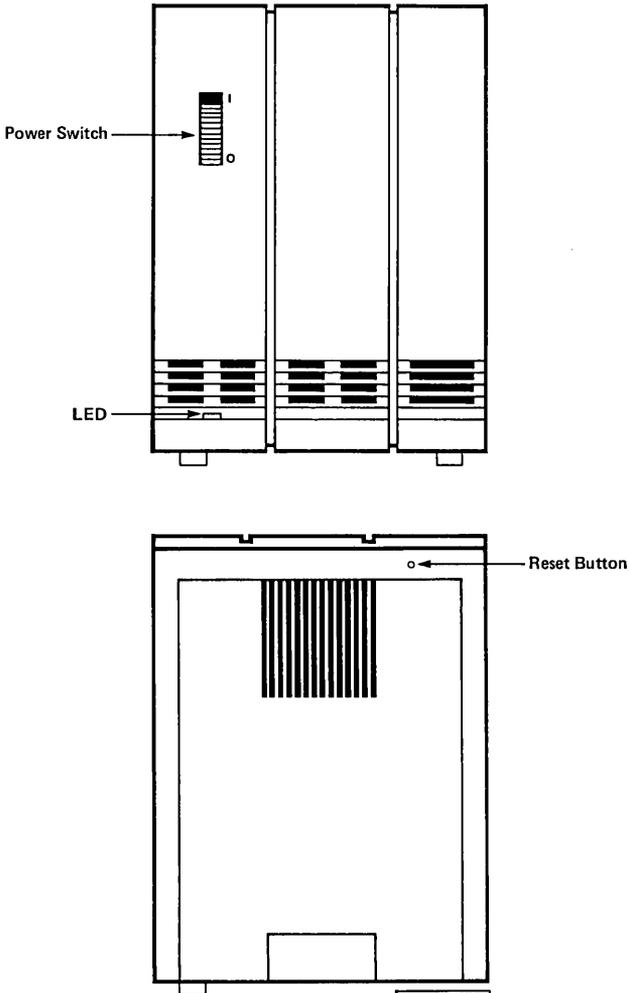
PROCESSOR MODULE

When the workstation is viewed from the front, the leftmost module is always the Processor Module. The next module is electrically and mechanically connected to the Processor Module by a simple latching mechanism. The right side panel of the Processor Module has three pairs of rectangular openings, and the left side panel of the module to be attached has three pairs of rectangular prongs.

REMOVING THE X-BUS CAP

Remove the X-Bus cap from the right side of the Processor Module by lifting up at the bottom of the cap and pulling it off.

Latch Handle
(Up Position)

X-Bus Cap

Processor Module
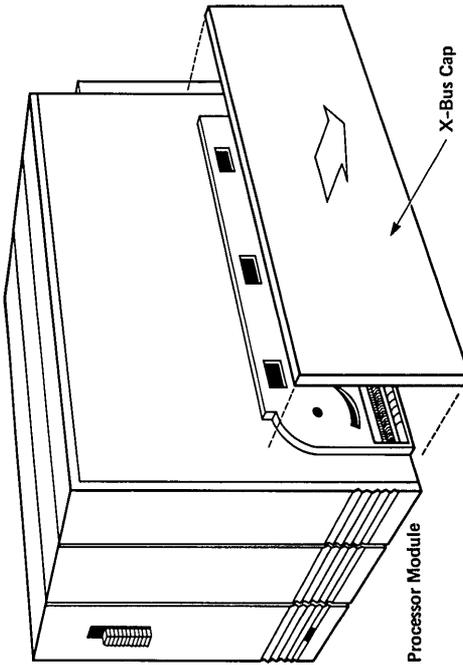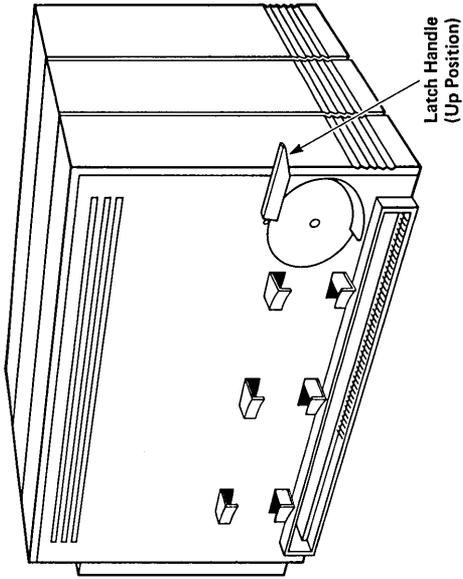
LATCHING THE MODULES

The following instructions describe how to latch any two NGEN modules together. Read these instructions now so that you are familiar with them. You will probably want to refer to them as you assemble your workstation in Sections 4 and 5.

Set the two modules on a table so that the two side panels of the modules to be connected face each other. Make sure that the latch handle at the front of the righthand module is all the way up as shown.

Push the modules together. It may help to push the back of the two modules together first and then move them together at the front.

A moderate force is required on the latch to lock the modules together. Do not force the latch or you may break it. If the latch does not move, verify that there are no bent connector pins. Then try refitting the modules. Push the latch all the way down to lock the two modules together.
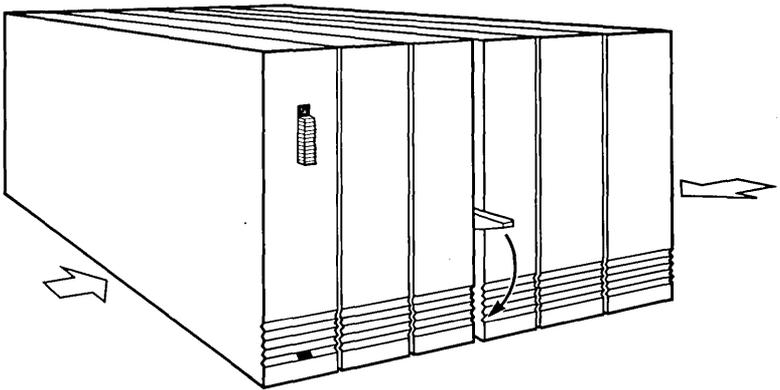
NOTE

After the modules are locked together, push them together at the bottom to ensure complete electrical contact of the module connectors.

UNPACKING

Find the box containing the Graphics Controller Module and open it from the top.

Lay the open box on its side and slide out the Graphics Controller Module with its packing material.

Remove the packing material.

INSTALLATION

When the workstation is viewed from the front, the Graphics
Controller Module must be the first module connected to the
right of the Processor Module. (If you are upgrading an existing
system, as shown below, you will thus need to first unlatch the
module that is currently connected to the Processor Module.
Then insert the Graphics Controller Module next to the Pro-
cessor Module and reconnect the other modules to the system.)

Processor Module   Dual Floppy Module

Processor Module   Graphics Controller   Dual Floppy Module
                              Module
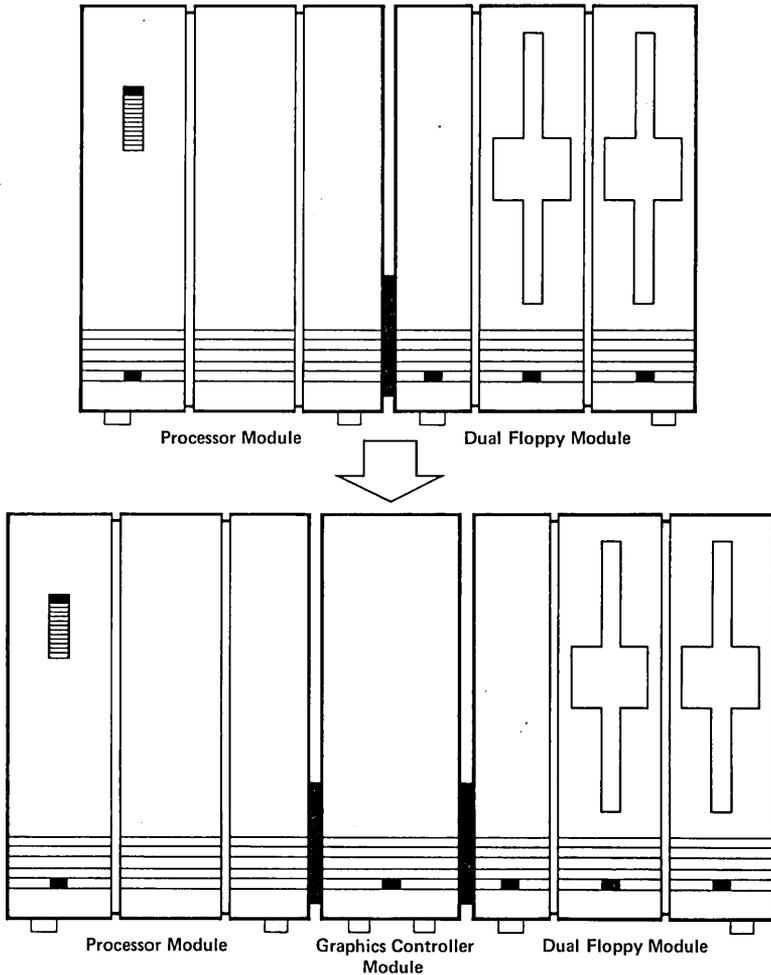
Connect the Graphics Controller Module to the workstation as described in Section 3, "Module Connection."

To connect the monitor cable to the back of the Graphics Controller Module, refer to either the "12-inch Monochrome Monitor" subsection or the "Color Monitor" subsection of Section 6, "Monitors."

OPERATOR INDICATORS

When the system is powered up, an LED at the bottom front of the Graphics Controller Module lights up to indicate that the module is recognized by the system.

DUAL FLOPPY DISK MODULE

UNPACKING

Find the box containing the Dual Floppy Disk Module and open it from the top.

Lay the open box on its side and slide out the Dual Floppy Disk Module with its packing material.

Remove the packing material.

INSTALLATION

Connect the Dual Floppy Disk Module to the workstation as described in Section 3, "Module Connection." (Also see Section 9, "Configuration Recommendations," for instructions on combining disk modules.)
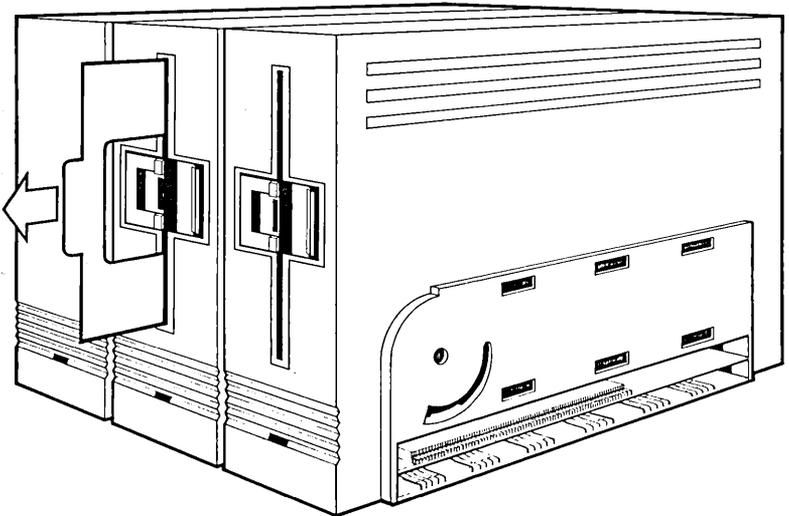
Remove the two cards (one in each drive). These cards protect the read/write heads in the floppy disk drives during shipment. **The read/write heads will be damaged if the cards are not removed before you power up the workstation.**

Keep the cards. Remember to reinsert them when the Dual Floppy Disk Module is shipped to another location.

OPERATOR CONTROLS AND INDICATORS

When the system is powered up, an LED at the bottom left side of the Dual Floppy Disk Module lights up to indicate that the module is recognized by the system. LEDs directly below each disk drive indicate when that drive is active.

The Operator's Guide describes how to operate the floppy disk drives.

FLOPPY/HARD DISK MODULE

UNPACKING

Find the box containing the Floppy/Hard Disk Module and open it from the top.

Lay the open box on its side and slide out the Floppy/Hard Disk Module with its packing material.

Remove the packing material.
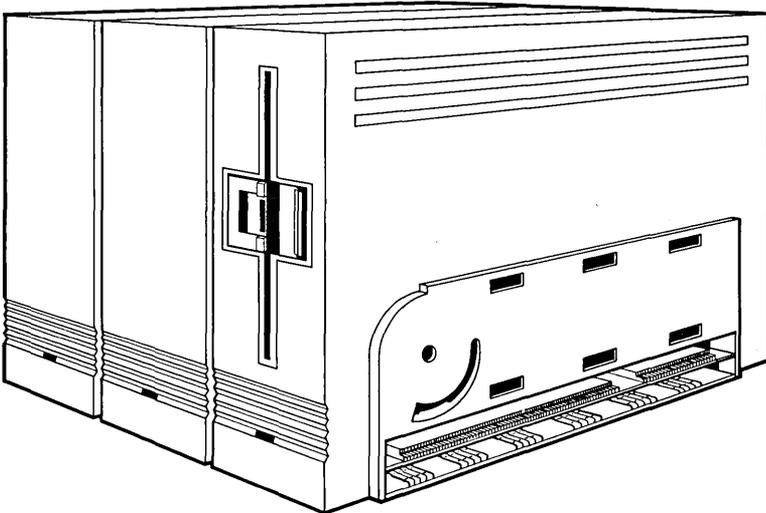
INSTALLATION

Connect the Floppy/Hard Disk Module to the workstation as described in Section 3, "Module Connection."

Remove the card from the floppy disk drive. This card protects the read/write heads in the floppy disk drive during shipment. **The read/write heads will be damaged if the card is not removed before you power up the workstation.**

OPERATOR CONTROLS AND INDICATORS

When the system is powered up, an LED at the bottom left side of the Floppy/Hard Disk Module lights up to indicate that the module is recognized by the system. LEDs directly below each disk drive indicate when that drive is active.

The Operator's Guide describes how to operate the floppy disk drive.

HARD DISK EXPANSION AND UPGRADE MODULES

UNPACKING

Find the box containing the Hard Disk Expansion or Hard Disk Upgrade Module and open it from the top.

Lay the open box on its side and slide out the Hard Disk Expansion Module with its packing material.

Remove the packing material.

INSTALLATION

Connect the Hard Disk Expansion or Hard Disk Upgrade Module to the workstation as described in Section 3, "Module Connection."

When viewed from the front, a Hard Disk Expansion Module must be immediately to the right of a Floppy/Hard Disk Module or a Hard Disk Upgrade Module. (To help you identify the modules, Hard Disk Expansion Modules are labeled HX-ZZZ. Floppy/Hard Disk Modules and Hard Disk Upgrade Modules are labeled HD-ZZZ. An HX module must thus be immediately to the right of an HD module.)

OPERATOR INDICATORS

When the system is powered up, an LED at the bottom left side of the Hard Disk Expansion or Hard Disk Upgrade Module lights up to indicate that the module is recognized by the system. The LED on the right side of the module indicates when that drive is active.

Floppy/Hard Disk   Hard Disk Expansion   Hard Disk Upgrade   Hard Disk Expansion
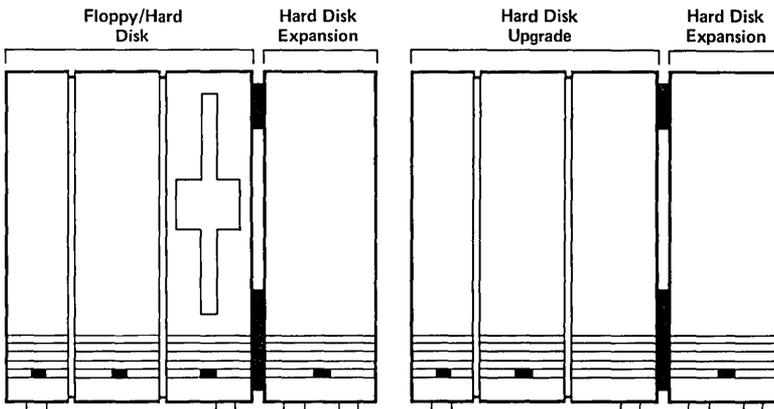
12-INCH MONOCHROME MONITOR

UNPACKING

Find the box containing the 12-inch Monochrome Monitor and open it from the top.

Lay the open box on its side and slide out the Monochrome Monitor with its packing material.

Remove the packing material and place the monitor on the desk or table where you will use it.   Make sure that the monitor is not more than 10 feet away from the Processor Module.

Use a knife or scissors to cut the plastic ties holding the monitor cable coil.

INSTALLATION

Without a Graphics Controller Module

Plug the end of the Monochrome Monitor cable into the video connector in the middle of the top row of the Processor Module I/O panel.

Use a small screwdriver to tighten the screws at the top and bottom of the plug. Then feed the cable underneath the back panel as shown.
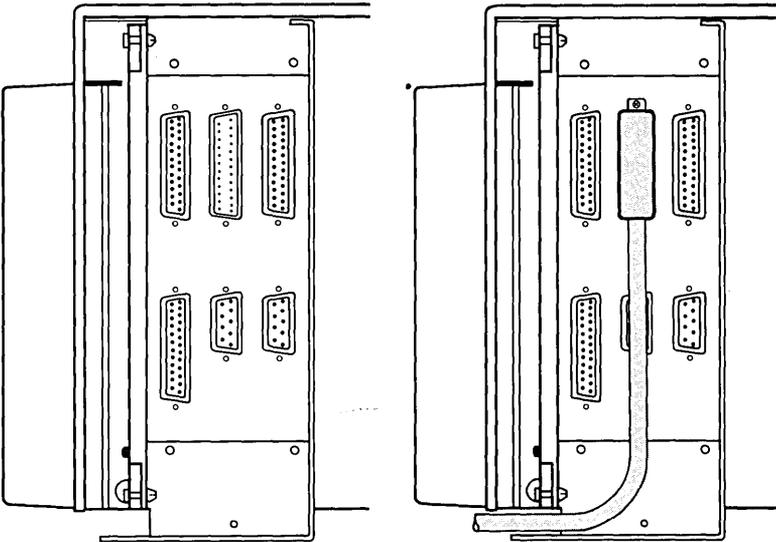
With a Graphics Controller Module

**New System.** Remove the I/O cap from the I/O panel at the
back of the Graphics Controller Module by pressing in on both
sides near the bottom of the cap, then lifting it up and off.
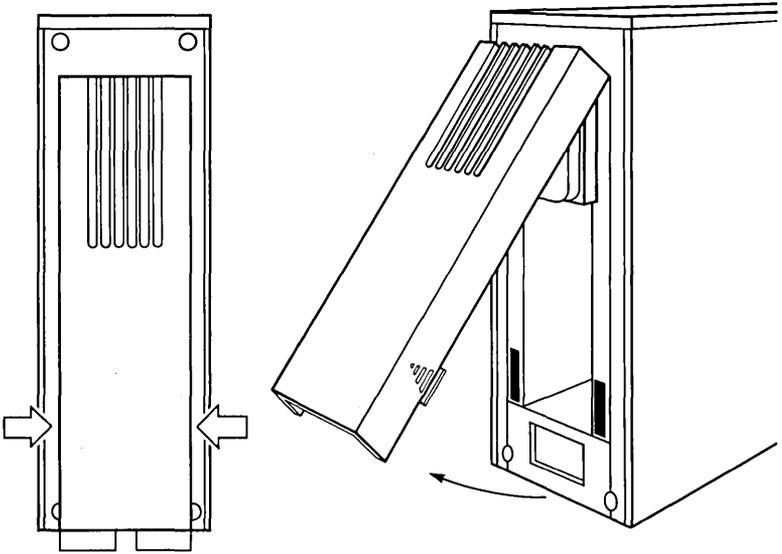
Take the end of the Monochrome Monitor cable and plug it into
the connector on the I/O panel of the Graphics Controller
Module as shown. Use a small screwdriver to tighten the
screws at the top and bottom of the plug.

Position the cable to the left or to the right so that it lies
underneath the rear of the other modules, as shown below.
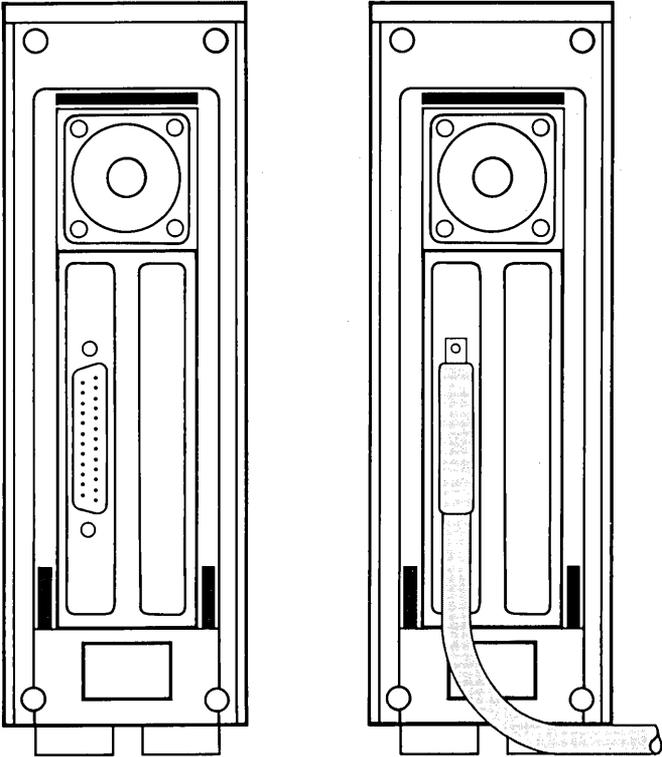
Replace the I/O cap on the rear panel by sliding the top of the
cap up and into the slot near the top of the rear cover. Then
rotate the cap downward to the vertical position and snap the
hooks near the bottom of the I/O cap into place in the rear
cover.

Upgrading an Existing System. Remove the I/O cap from the I/O panel at the back of the Graphics Controller Module by pressing in on both sides near the bottom of the cap, then lifting it up and off.
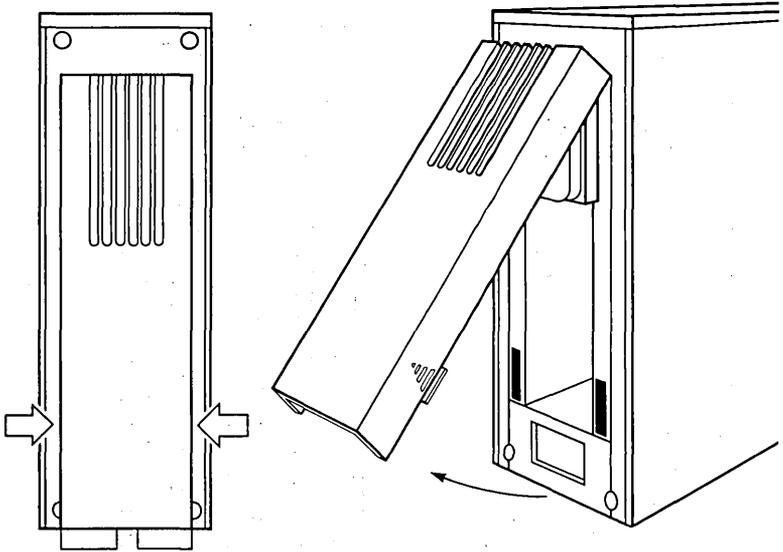
Unplug the Monochrome Monitor cable from the Processor Module I/O panel by first loosening the screws at the top and bottom of the plug with a small screwdriver.
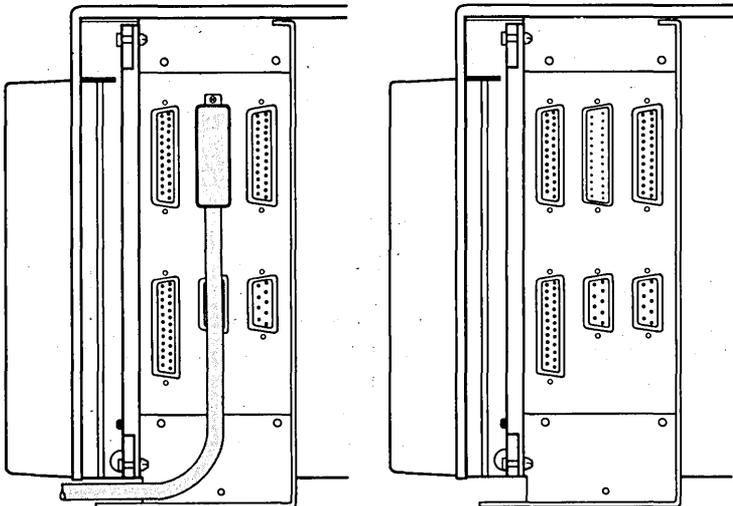
Remove the Monochrome Monitor cable from the Processor
Module I/O panel and plug it into the connector on the I/O
panel of the Graphics Controller Module. Use a small screw-
driver to tighten the screws at the top and bottom of the plug.
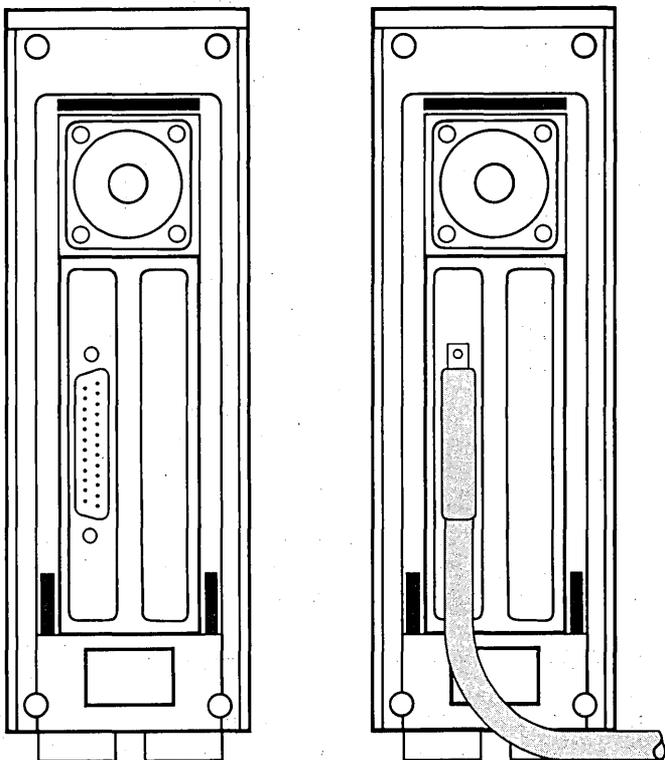

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                        NOTE

Be sure to plug the Monochrome Monitor cable into the
I/O panel at the back of the Graphics Controller Module.
The Graphics Controller Module cannot operate without this
direct connection to the monitor.
```

Replace the I/O cap on the rear panel by sliding the top of the cap up and into the slot near the top of the rear cover. Then rotate the cap downward to the vertical position and snap the hooks near the bottom of the I/O cap into place in the rear cover.

OPERATOR CONTROLS

To adjust the brightness of the monitor, turn the thumbwheel control under the left front edge of the monitor. Turning the control toward you makes the screen brighter.

Brightness Control
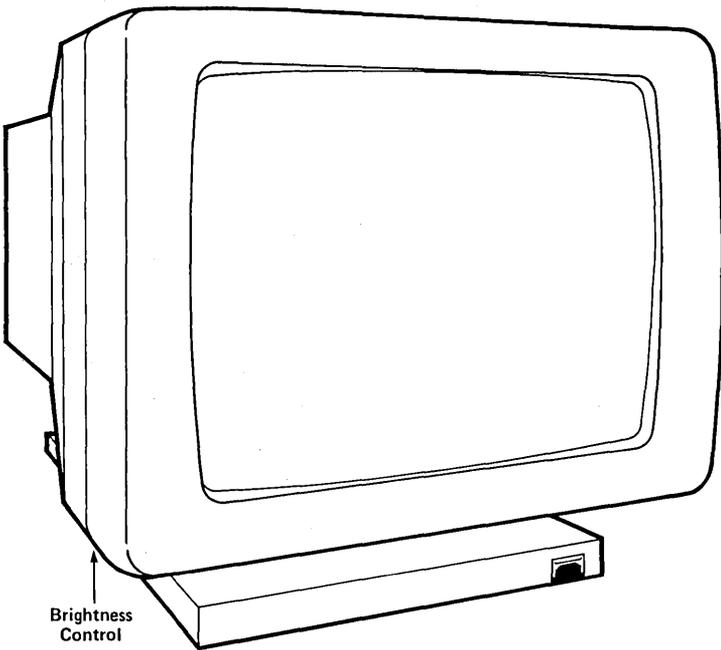
To adjust the viewing angle of the monitor, grasp both sides of the monitor housing and tilt it for the most comfortable viewing position.

COLOR MONITOR

UNPACKING

Find the box containing the Color Monitor and open it from the top.

Lay the open box on its side and slide out the Color Monitor with its packing material.

Remove the packing material and place the monitor on the desk or table where you will use it. Make sure that the monitor is not more than 10 feet away from the Processor Module.

Use a knife or scissors to cut the plastic ties holding the monitor cable.

Find the box containing the ac line cord, open the box, and remove the cord from the box.

INSTALLATION

Remove the I/O cap from the I/O panel at the back of the Graphics Controller Module by pressing in on both sides near the bottom of the cap, then lifting it up and off.
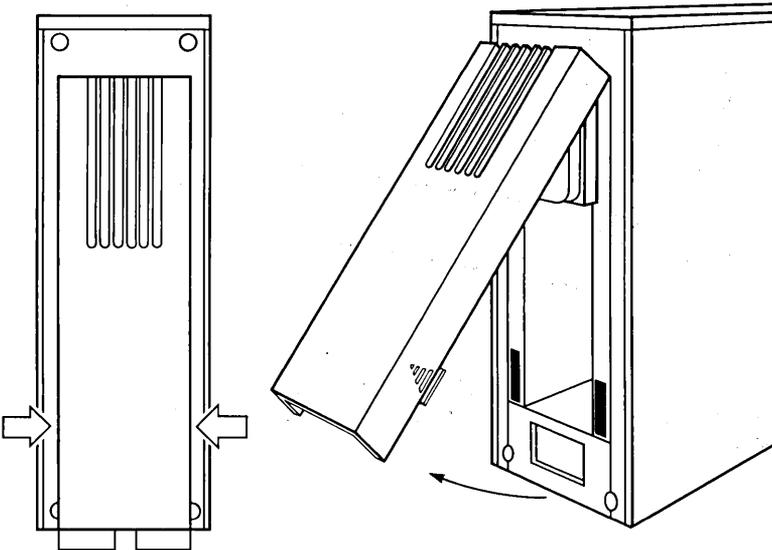
Take the end of the Color Monitor cable and plug it into the
connector on the back of the Graphics Controller Module as
shown.   Use a small screwdriver to tighten the screws at the
top and bottom of the plug.
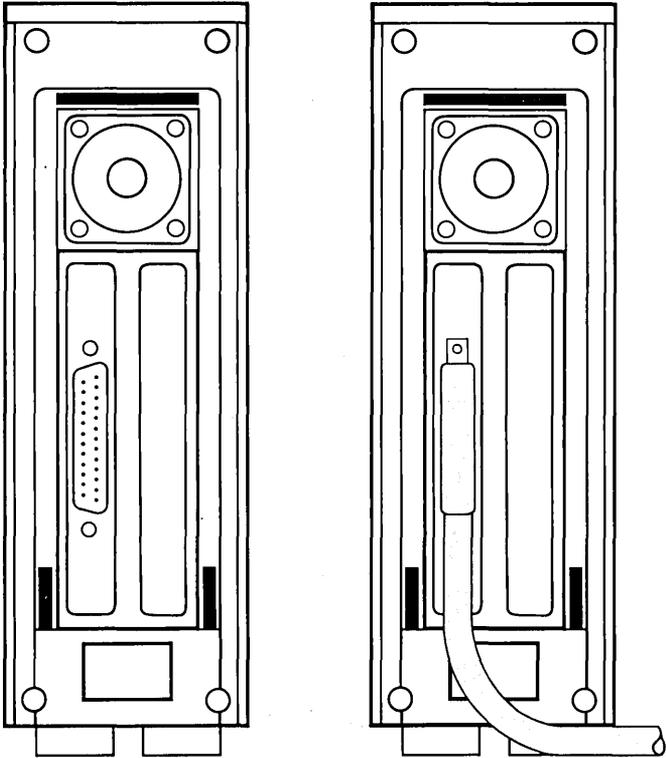


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                          NOTE

Be sure to plug the Color Monitor cable into the I/O panel
of the Graphics Controller Module (not the I/O panel of
the Processor Module).   If your screen shows an unusual
pattern when the system is powered up (see Section 8),
check to be sure the Color Monitor is cabled correctly.
```

Route the cable to the left or to the right so that it lies at the base of the back panels of the other modules, as shown below.

(If you are also using the power input on the Graphics Controller Module, as described in Section 8, "Power Connection and Final Assembly," plug the flat power cable into the Graphics Controller Module first. Then, if the Color Monitor cable is being routed from the right, feed it <u>under</u> the flat power cable and plug it into the Graphics Controller Module. In this case, if you are routing the Color Monitor cable to the right, it lies <u>under</u> the flat power cable, as shown below.)
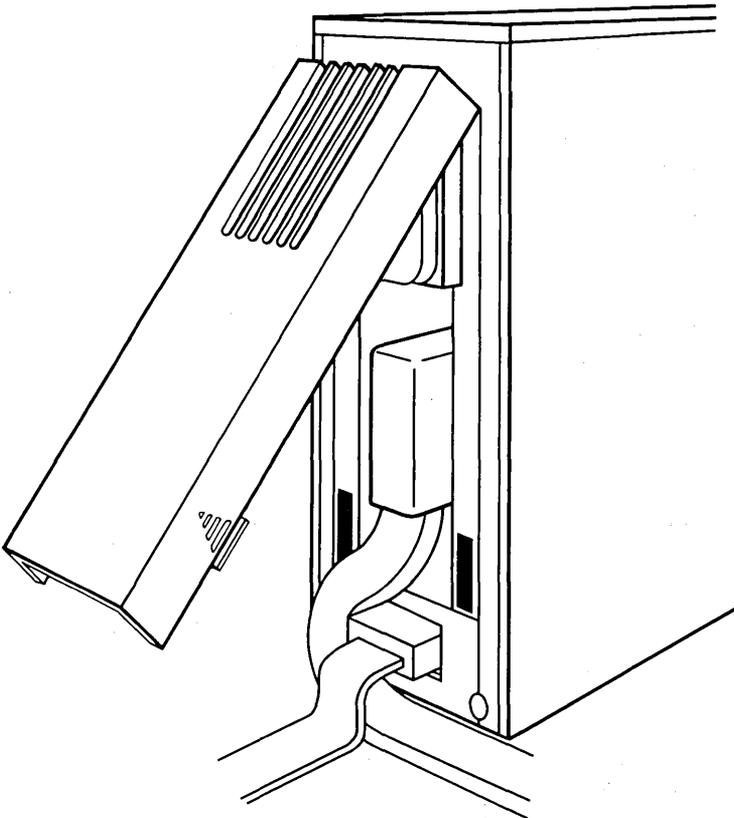
When the cable is routed correctly, it will be easier to replace the I/O cap on the rear panel. Replace the I/O cap on the

rear panel by sliding the top of the cap up and into the slot near the top of the rear cover. Then rotate the cap downward to the vertical position and snap the hooks near the bottom of the I/O cap into place in the rear cover.

On the rear panel of the Color Monitor, make sure that the power switch at the lower right is pushed in at the 0 (off) side. Plug one end of the ac line cord into the ac jack. Do not plug the other end of the ac line cord into the ac power receptacle at this time.

In the center of the rear panel of the Color Monitor is the line selector switch. Make sure that the switch is set to the correct voltage, either 115 or 230 V ac.

Backview
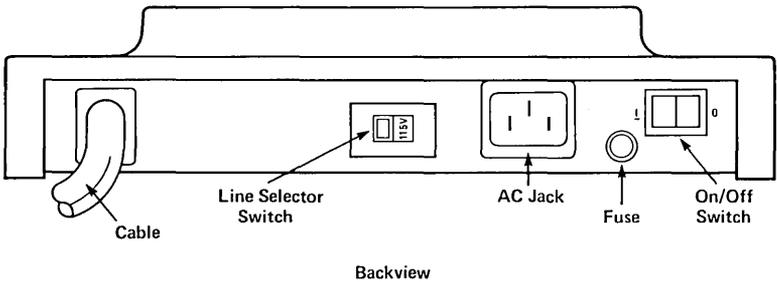
OPERATOR CONTROLS

When you are facing the monitor, the power switch is on the lower left side of the rear panel. Power is applied to the monitor when the switch is pushed in on the I (on) side. Power is disconnected from the monitor when the switch is pushed in on the 0 (off) side.

To adjust the brightness of the monitor, turn the thumbwheel control under the left front edge of the monitor. Turning the control toward you makes the screen brighter.

Next to the brightness control is a degaussing button to correct color impurities on the screen. To degauss the screen, press the button. After you press this button, wait five minutes before you press the degaussing button again so that the degaussing has time to take effect.

To adjust the viewing angle of the monitor, grasp both sides of the monitor housing and tilt it for the most comfortable viewing position.

Degaussing Button

Brightness Control
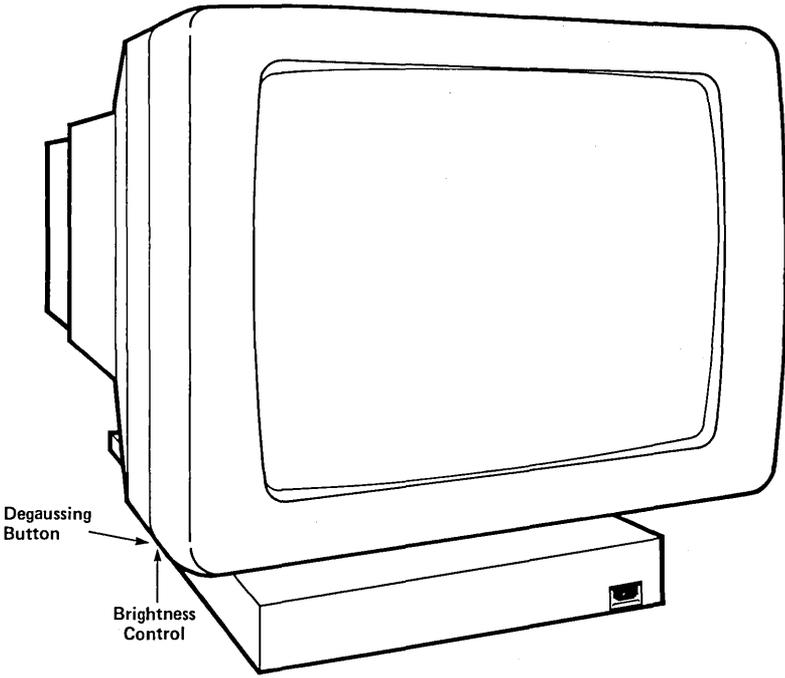
UNPACKING

Find the box containing the keyboard and open it from the top.

Lay the open box on its side and slide out the keyboard with its packing material and the coiled keyboard cable.

Remove the packing material and place the keyboard in front of the monitor on the desk or table where you will use it.

INSTALLATION

There are two keyboard connection jacks, one at each end of the keyboard as shown.   Use either jack to connect the keyboard to the monitor.
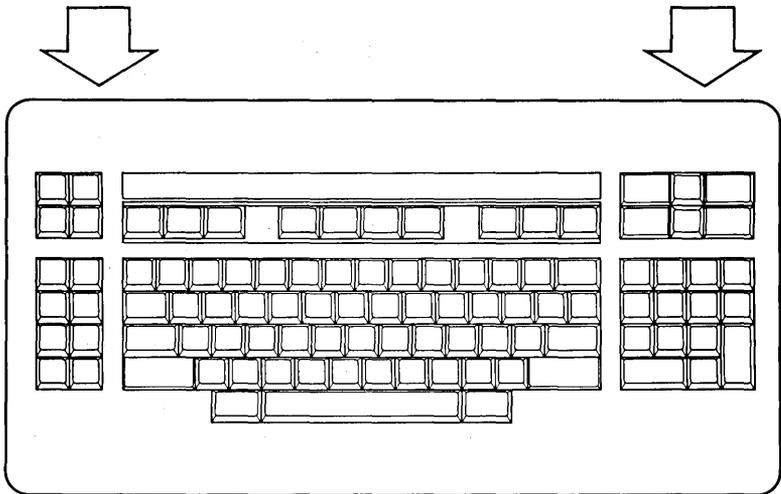
Push one end of the keyboard cable into the keyboard jack. Note that the keyboard cable connector fits into the keyboard jack only one way.   You should hear a click when the connector is inserted correctly.
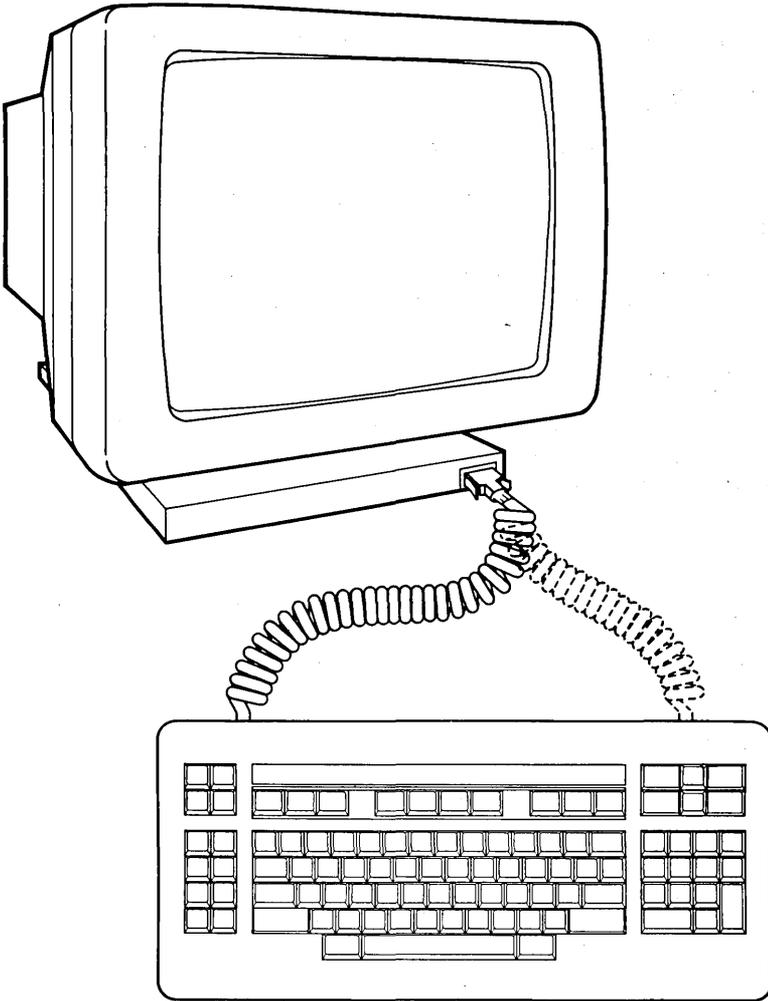
Next, push the other end of the keyboard cable into the monitor jack at the front edge of the monitor. The connector fits into the monitor jack only one way. You should hear a click when the connector is inserted correctly.

The power requirements for the workstation are based on a power code, where each 36-Volt Power Supply can supply a total power code of 10.   The flat power cable from the first 36-Volt Power Supply is always plugged into the back of the Processor Module.

Each module has a label on its back panel indicating its power code.   For example, notice on the back of the Processor Module that its power code is 4.   When a 12-inch Monochrome Monitor (with a power code of 3) is connected to the Processor Module, their total power code is 7.   If a Dual Floppy Disk Module (also with a power code of 3) is connected directly next to the same Processor Module, the total power code for the workstation is 10.   If another module is added to the workstation, the sum of the power codes exceeds 10.   Another 36-Volt Power Supply must be plugged into the back of that added module and connected to the first 36-Volt Power Supply (see the "Installation" section below) or connected directly to an ac power receptacle.

Every module (except for components like keyboards and monitors) can accept power input from a 36-Volt Power Supply. Be sure to add another 36-Volt Power Supply for every 10 power units the workstation needs (see also Section 9, "Configuration Recommendations," below).

36-VOLT POWER SUPPLY

UNPACKING

Find the box containing the 36-Volt Power Supply and open it from the top.

Lay the open box on its side and remove the 36-Volt Power Supply with its packing material and two cables (flat power cable and short extension cable).

Remove the packing material and place the 36-Volt Power Supply on the floor near the workstation.

Find the box containing the ac line cord, open the box, and remove the cord from the box.

INSTALLATION

Plug one end of the flat power cable into the output jack of the 36-Volt Power Supply. The cable fits into the output jack only one way. You should hear a click when it is inserted correctly.

36-Volt Power Supply
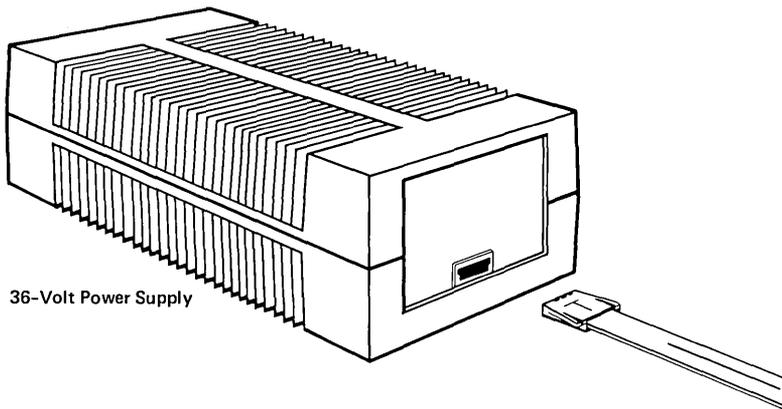
Plug the other end of the flat power cable into the connector at the back of the Processor Module. The cable fits into the connector only one way. You should hear a click when it is inserted correctly.
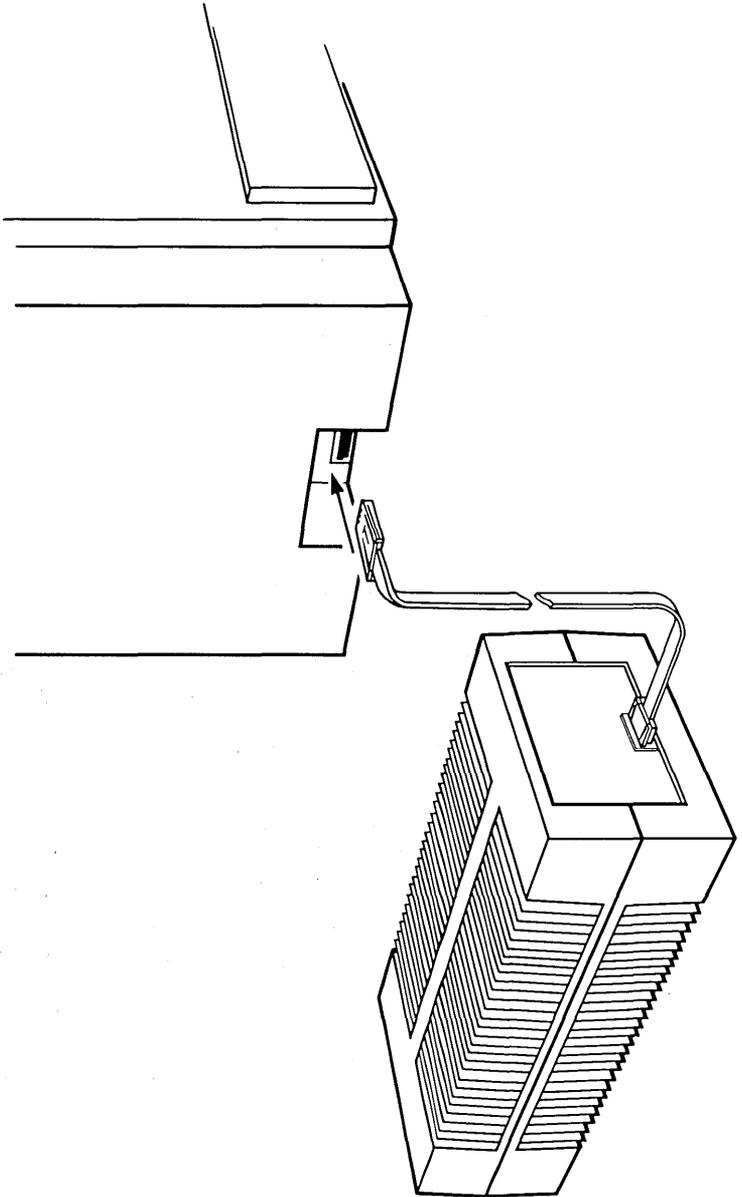
Next, plug the female end of the ac line cord into the ac jack on the 36-Volt Power Supply.
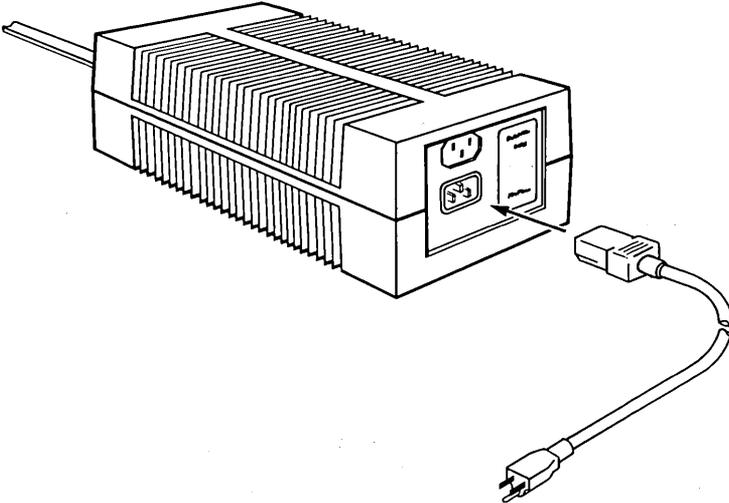
Plug the flat power cable from each additional 36-Volt Power Supply into any module that causes the cumulative 36-Volt Power Supply power code to exceed 10. Plug the female end of an additional ac line cord into the ac jack on the 36-Volt Power Supply.

You can also stack two 36-Volt Power Supplies to reduce the number of ac line cords needed. Use the short extension cable to make the ac connection from one 36-Volt Power Supply to another as shown. No more than two 36-Volt Power Supplies should be connected in this manner. If a third 36-Volt Power Supply is required, connect the flat power cable for the third 36-Volt Power Supply directly to the connector on the rear panel of one of the modules. (Later, you will connect its ac line cord directly to the ac power receptacle.)

**Do not plug the ac line cord into the ac power receptacle yet.**
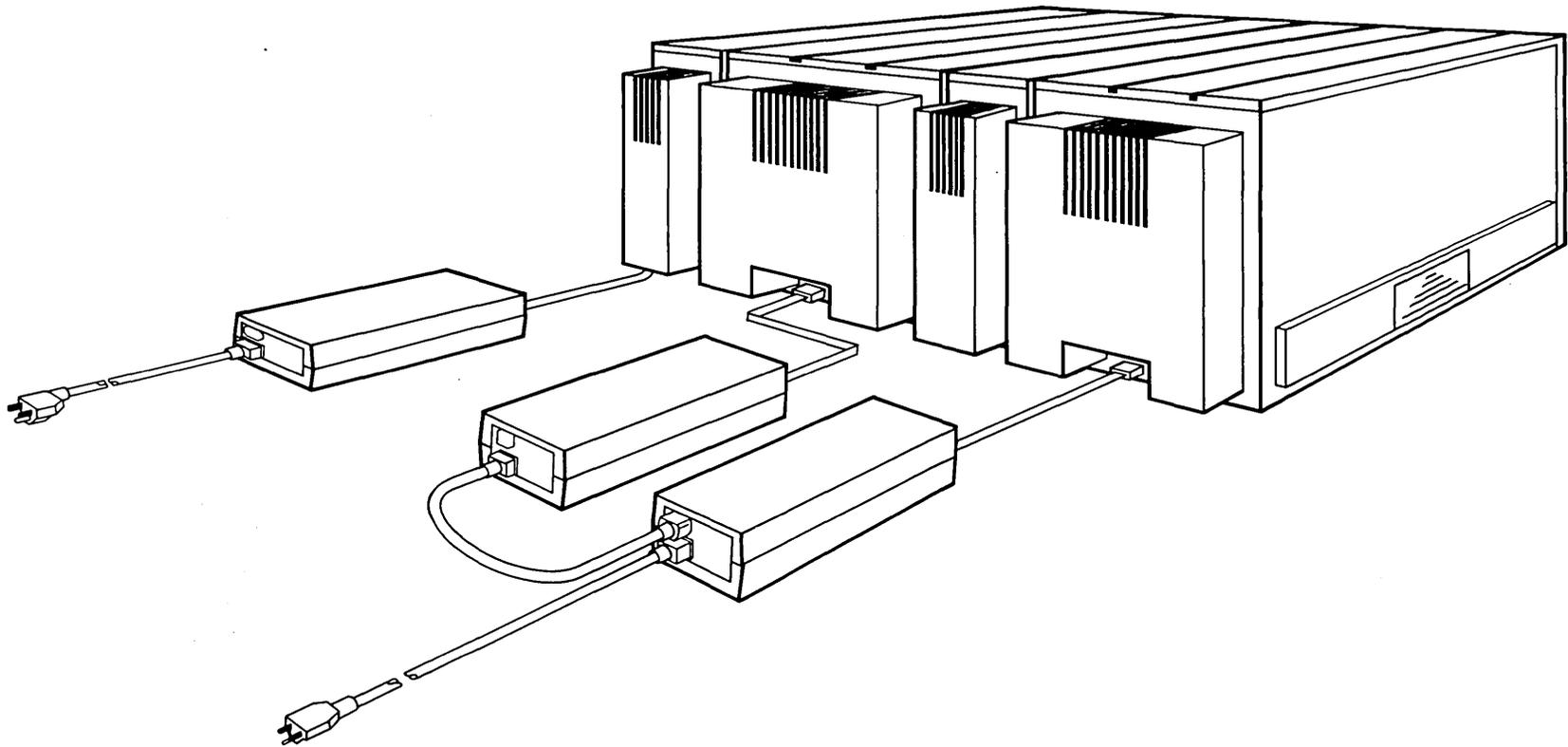
FINAL ASSEMBLY

PROCESSOR MODULE I/O COVER AND SIDE COVER

On the Processor Module, make sure that all of the I/O cables are plugged into the I/O panel and that the cables run underneath the back of the Processor Module.

Close the I/O cover on the Processor Module firmly. Press on the two button fasteners until they click into place.

Reinstall the side cover on the Processor Module by sliding the side cover up into the groove underneath the top and front cover piece. Press on the bottom of the side cover as shown until it clicks into place.
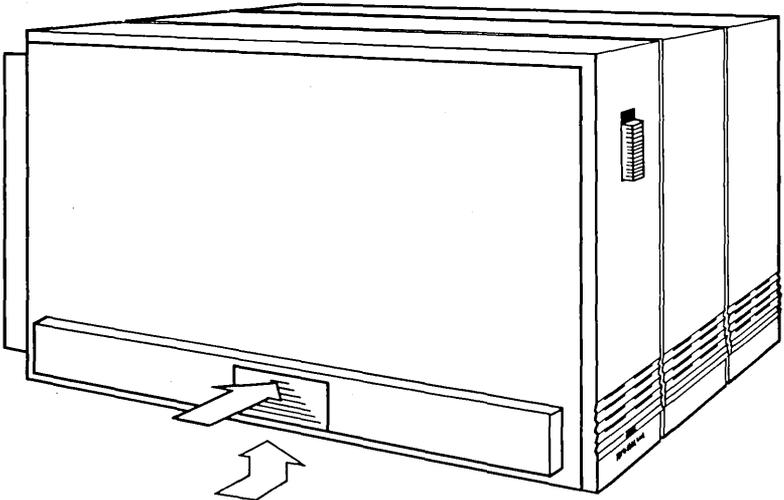
X-BUS CAP

Place the X-Bus cap (see Section 3, "Module Connection," above) over the long connector on the right panel of the rightmost module in your system and snap the cap in place.

INSTALLATION CHECK AND POWER UP

Check to be sure that the power switch on the Processor Module is in the off (down) position. Then plug the ac line cord from the 36-Volt Power Supply into a convenient ac power receptacle.

If you have a Color Monitor, plug its ac line cord into a convenient ac power receptacle.

Move the power switch on the Processor Module to the on (up) position. If you have also installed a Color Monitor, press in on the I (on) side of the power switch on the rear panel of the monitor base. Observe the following indications of a successful power up:

o   The fan inside each module is running.

o   An LED on each module lights up.

o   The monitor shows a "T" and several asterisks (*) indicating the memory test is executing. (You might have to adjust the brightness thumbwheel to see this.)

If any of these indications does not appear, turn off the power to your workstation, **disconnect the ac line cord(s) from the ac power receptacle(s)** and check your installation. It could be that the power cables are not installed correctly or that the modules are not connected correctly.

If the power up is successful, the next step is to test the workstation with the software diagnostics. Refer to the Diagnostics Manual for more information about how to run the diagnostics for the workstation. Then refer to the Operator's Guide for an introduction to using the workstation.

9   CONFIGURATION RECOMMENDATIONS

There are several configuration recommendations that you should be aware of when installing a workstation.

o   Each workstation must have a Processor Module, Monitor Module, keyboard, and appropriate power supplies and cables.

o   The maximum number of Processor Modules per workstation is one. The Processor Module must be at the extreme left end of the workstation.

o   The maximum number of monitors per workstation is one.

o   The maximum number of modules per workstation is eight, not counting monitors or keyboards.

o   The recommended maximum number of 36-Volt Power Supplies is three.

o   The maximum number of disk modules per workstation is four. Only one of the modules can be a Dual Floppy Disk Module. Only two of the modules can be labeled HD (Floppy/Hard Disk Module or Hard Disk Upgrade Module). Both HD modules can have one Hard Disk Expansion Module. Thus, a workstation can have four hard disk drives.

o   The maximum number of Graphics Controller Modules per workstation is one. If present, it must be immediately to the right of the Processor Module.

o   The maximum physical length of the connected modules should not exceed 36 inches (24 inches, exclusive of the leftmost and rightmost modules).

USER'S COMMENT SHEET

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