CLIPPER Hardware Setup and

Maintenance Guide Change Pages

DSA025121

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INTERGRAPH

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Preface

This guide provides general setup instructions for Intergraph® workstations and servers. It consists of the following chapters:

- [ ] Adjusting the Hardware
- [ ] Identifying Main Components and Ports
- [ ] Configuring for Peripheral Devices
- [ ] Using the RS-232 Splitter Cable
- [ ] Maintaining the Hardware
- [ ] Glossary of Hardware Components

Chapter 1, Adjusting the Hardware, explains procedures for setting up and adjusting monitors, keyboards, twelve-button cursors, floating menu tablets, digitizing tables, and boom assembly units. This chapter is divided into sections by monitor type. Each section contains setup and adjustment procedures for workstations with that monitor type.

Chapter 2, Identifying Main Components and Ports, includes illustrations displaying main components and ports for each type of electronics cabinet and also for InterAct and InterView workstations. Each section contains a different mechanical configuration.

Chapter 3, Configuring for Peripheral Devices, discusses the peripheral devices that can be connected to the RS-232, RS-449, SCSI, or plotter port of an Intergraph workstation or server. It also includes information for connecting, configuring, and using Intergraph peripheral devices.

Chapter 4, Using the RS-232 Splitter Cable, describes the RS-232 splitter cable and its auxiliary ports, how to connect the cable to a workstation or processor, and how to configure the ports for the workstation or processor.

Chapter 5, Maintaining the Hardware, presents procedures for maintaining the workstation, main unit, keyboard, mouse and twelve-button cursor, hard disk drive, floppy disk drive and floppy disks, and cartridge tape drive and cartridge tapes.

Chapter 6, Glossary of Hardware Components, describes hardware components that make up individual Intergraph workstations and servers.

Document Conventions

The following conventions and symbols appear in this guide:

- *Workstation* applies to InterPro, InterAct, and InterView workstations, Intergraph's C100 or C300 CLIPPER workstations.

- *Server* refers to the InterServe processors, Intergraph's C100 or C300 CLIPPER processors.

- *Workstation/server* is used when the procedure or information applies to all Intergraph workstations and servers covered.

- **Cautions** emphasize critical information or potential errors.

- **Notes** emphasize important information.

Reference Bar Legend

Reference bars are provided on this page and at the beginning of each section to aid in locating a particular section. To use the bars, find the section listing on this page. Look at the edge of the document, find the corresponding bar, and open the document to that page.

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Chapter 6: Glossary of Hardware Components

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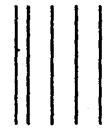
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Chapter 1:
Adjusting the Hardware

This chapter explains procedures for setting up and adjusting monitors, keyboards, twelve-button cursors, floating menu tablets, digitizing tables, and boom assembly units. It is divided into sections by monitor type. Each section contains setup and adjustment procedures for workstations with that monitor type. Table 1-1 refers you to the subsection that contains setup and adjustment procedures for your workstation type. This chapter contains the following sections:

This chapter explains procedures for setting up and adjusting monitors, keyboards, twelve-button cursors, floating menu tablets, digitizing tables, and boom assembly units. This chapter is organized into subsections by monitor type. Each section contains setup and adjustment procedures for workstations with a specific monitor type.

The following chart displays the section that contains setup and adjustment procedures for each monitor type (procedures are different for each monitor type). Use this chart to determine the section to refer to for setup and adjustment procedures for your workstation.

Table 1-1. Monitor Types

Monitor Type	Section
15/19-inch, Single Monitor	1.1
27-inch, Single Monitor	1.2
InterAct Dual Monitors	1.3
InterView Dual Monitors	1.4

Note:
The Workstation/Server Capabilities chart on page 1-3 displays information concerning capabilities and configurations of all Intergraph workstation/server models. Refer to this chart if you are unsure of your workstation/server's mechanical configuration.

Table 1-2. Workstation/Server Capabilities

Model	MIPS	Main Memory	Hard Disk	Graphics Engine	Monitor #-Size	Main Proc	I/O Proc	ASAP	VME	Mechanical Configuration
IP125	4	6/12 MB	156 MB	GS	1-15/19"	C100	80186	No	No	Cube
IS200	5	8/16 MB	156 MB	N/A	N/A	C100	80186	N/A	Yes	Cube
IA220	5	8/16 MB	156 MB	GS	2-19"	C100	80186	No	No	Attached Digitizing Table
IV220	5	8/16 MB	156 MB	GS	2-19"	C100	80186	No	No	Detached Digitizing Table
IP225	5	16 MB	156 MB	GS	1-19"	C100	80186	No	Yes	Cube
IS300	5	16 MB	156 MB	N/A	N/A	C100	80386	N/A	Yes	Suitcase
IS305	5	16 MB	355 MB	N/A	N/A	C100	80386	N/A	Yes	Lowboy
IP340	5	8/16 MB	156 MB	GX	1-19"	C100	80386	No	Yes	Suitcase
IA340	5	8/16 MB	156 MB	GX	2-19"	C100	80386	No	Yes	Attached Digitizing Table
IV340	5	8/16 MB	156 MB	GX	2-19"	C100	80386	No	Yes	Detached Digitizing Table
IS3005	10	16 MB	670 MB	N/A	N/A	C300	80386	N/A	Yes	Lowboy
IP3050	10	16 MB	355/670 MB	GZ	1-19"	C300	80386	No	Yes	Suitcase
IA3050	10	16 MB	355/670 MB	GZ	2-19"	C300	80386	No	Yes	Attached Digitizing Table
IV3050	10	16 MB	355/670 MB	GZ	2-19"	C300	80386	Yes	Yes	Detached Digitizing Table
IP3055	10	16 MB	670 MB	GZ	1-19"	C300	80386	No	Yes	Lowboy
IP3070	10	16 MB	355/670 MB	GX	1-27"	C300	80386	No	Yes	Suitcase
IP3075	10	16 MB	670 MB	GX	1-27"	C300	80386	No	Yes	Lowboy
IS4000	10	16 MB	584MB	N/A	N/A	C300	80386	N/A	Yes	Two-Bay

IP = InterPro workstation   MIPS = Million Instructions Per Second   GS = Graphics Standard
IA = InterAct workstation   ASAP = Application-Specific Acceleration Processor   GX = Graphics Extension
IV = InterView workstation   VME = Virtual Memory Expansion   GZ = Graphics Z-Buffer
IS = InterServe processor   MB = Megabyte

1.1   Workstations with 15/19-Inch Single Monitors

This section describes setup procedures for workstations with 15- or 19-inch, single monitors. The procedures include setting up the monitor and the keyboard. Refer to the following 15/19-inch monitor illustrations throughout this section as needed.
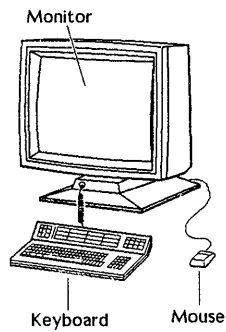
Figure 1-1.   15/19-Inch Monitor
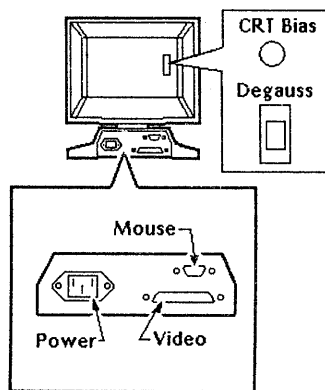
Figure 1-2.   15/19-Inch Monitor Ports

1.1.1 Monitor Setup

To set up a 15/19-inch monitor, adjust the monitor angle, screen brightness, and CRT bias and degauss the screen.

Adjusting the Monitor Angle

The 15/19-inch single monitor pivots on a rolling ball attached to the base. The monitor can be adjusted horizontally plus or minus 160 degrees and vertically plus or minus 10 degrees. Grasp the monitor and adjust it to a comfortable position.

Adjusting the Screen Brightness

Increase the brightness of the screen display by holding down the <Ctrl> key while tapping the ↑ key. Decrease the brightness by holding down the <Ctrl> key while tapping the ↓ key. The ↑ and ↓ keys are on the lower right side of the keyboard.

> **Note:**
> The monitor should be on for 20 to 30 minutes before you adjust the screen.

Degaussing the Screen

The 15/19-inch single screen builds up a stray magnetic field over time or after moving the unit, causing the display to be discolored. To restore the display, press and hold the black degauss button located on the back of the monitor for five to seven seconds. If you think it is necessary to degauss the screen again, wait at least three to five minutes before a second degaussing.

Adjusting the CRT Bias

The CRT bias controls the background brightness and screen color intensity. If necessary, adjust the CRT bias to a level appropriate for the lighting in your work area. Follow these steps to adjust the CRT bias:

1. Find the CRT bias knob on the back of the monitor above the degauss button.

2. Turn the knob all the way to the right so that lines are clearly visible on the screen.

3. Turn the knob slowly to the left and stop when the lines disappear.

1.1.2 Keyboard Setup

To set up the keyboard, attach the keyboard to the monitor and adjust the keyboard angle.

Attaching the Keyboard

The keyboard attaches to the keyboard outlet on the front of the base. To attach the keyboard, push the keyboard plug in the outlet until it snaps in place.

Adjusting the Keyboard Angle

The keyboard can be adjusted to four positions. To adjust, lift the levers on the back of the keyboard until the feet drop to the desired angle. Release the levers to lock the feet in place.

1.2   Workstations with 27-Inch Single Monitors

This section describes setup and adjustment procedures for workstations with
27-inch single monitors. The procedures include setting up the monitor and
keyboard. Refer to the following 27-inch monitor illustration throughout this
section as needed.
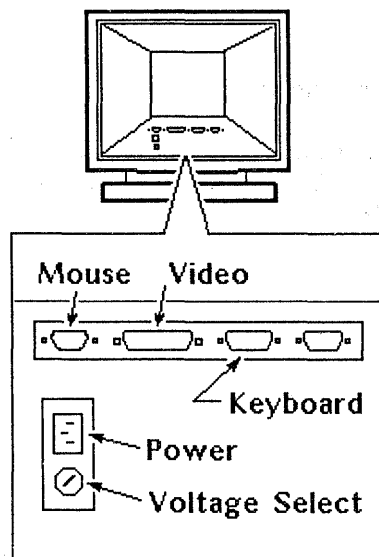
Figure 1-3.   27-Inch Monitor Ports

1.2.1 Monitor Setup

To set up a 27-inch monitor, adjust the monitor angle, screen brightness, CRT bias, and color purity and degauss the screen.

Find the control panel on the top of the monitor head. You will use the power switch on this panel (and the power switch on the base) to power up the monitor. Then, you will use the other switches on this panel to make the screen adjustments discussed in this chapter.
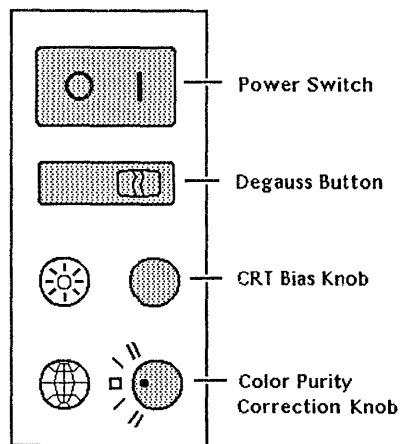
Figure 1-4.   27-Inch Monitor Control Panel

Adjusting the Monitor Angle

You can adjust the monitor horizontally by 60 degrees in both directions. Vertically, you can adjust it 3 degrees forward and 5 degrees backward.

Grasp the monitor and adjust it to a comfortable position.

Note:
The monitor should be on for 20 to 30 minutes before you adjust the screen.

Adjusting the Screen Brightness

Increase the brightness of the screen display by holding down the <Ctrl> key while tapping the ↑ key. Decrease the brightness by holding down the <Ctrl> key while tapping the ↓ key. The ↑ and ↓ keys are on the lower right side of the keyboard.

Degaussing the Screen

The InterPro workstation screen builds up a stray magnetic field over time or after moving the unit, causing the display to be discolored. To restore the display, press and hold the degauss button for seven to ten seconds. If you think it is necessary to degauss the screen again, you should wait at least three to five minutes before a second degaussing.

Adjusting the CRT Bias

The CRT bias controls the background brightness and screen color intensity. If necessary, adjust the CRT bias to a level appropriate for the lighting in your work area. Follow these steps to adjust the CRT bias:

1. Find the CRT bias knob on the control panel.

2. Turn the CRT bias knob clockwise as far as it will go so that retrace lines are clearly visible on the screen.

3. Turn the knob slowly counterclockwise and stop when the lines disappear.

Adjusting the Color Purity

The electron beam that travels from the back of the monitor to the screen can be displaced by the earth's magnetic fields before it reaches the screen. This displacement causes discoloration on the screen. The Color Purity Correction knob allows you to correct this discoloration.
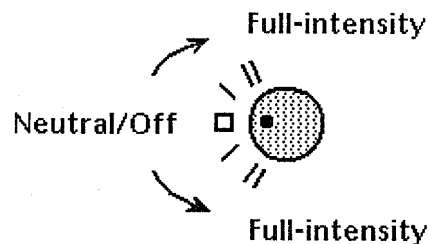
Figure 1-5. Color Purity Correction Knob Settings

Determining the Color Purity Correction knob setting depends on these two factors:

- Which hemisphere you are in (Northern or Southern)
- Which direction your workstation faces (North or South, East, or West)

If your workstation is facing East or West, turn the knob to the Neutral/Off position regardless of which hemisphere you are in.

If your workstation is facing North or South, use the following chart to determine which direction to turn the Color Purity Correction knob.

Table 1-3. Color Purity Correction Knob

Hemisphere you are in	Direction workstation is facing	Turn knob
Northern	North (away from equator)	Clockwise
Northern	South (toward equator)	Counterclockwise
Southern	North (toward equator)	Counterclockwise
Southern	South (away from equator)	Clockwise

You will notice that you can move the knob to two specific positions in either direction. These positions determine *intensity*. The positions farthest from the Neutral/Off position are full-intensity settings.

Try both knob positions in the direction that you selected and notice how the color purity of your screen display appears in each position. Set the knob to the best position for your workstation.

Changing the Voltage Setting

Your 27-inch monitor will come factory-set to the appropriate voltage for your site according to your purchase order. If you ever need to change your voltage setting, contact Intergraph Field Service to make the necessary adjustments and fuse replacements on the monitor and electronics cabinet.

Caution:
Do not attempt to change your workstation's voltage setting. You could cause serious damage to your workstation if you perform the procedure improperly.

1.2.2 Keyboard Setup

To set up the keyboard, attach it to the monitor and adjust its angle.

Attaching the Keyboard

The keyboard attaches to the keyboard outlet at the back of the monitor. To attach the keyboard, connect the keyboard cable to the keyboard outlet.

Adjusting the Keyboard Angle

The keyboard can be adjusted to four positions. To adjust, lift the levers on the back of the keyboard until the feet drop to the desired angle. Release the levers to lock the feet in place.

1.3 InterAct Workstation Dual Monitors

This section describes setup and adjustment procedures for InterAct workstations. The procedures include setting up the monitors, keyboard, 12-button cursor, floating menu, and digitizing table. Refer to the following InterAct workstation illustration as needed.
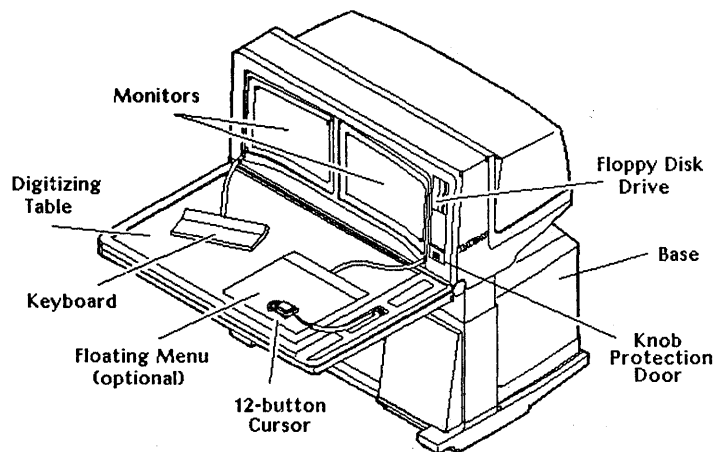
Figure 1-6. InterAct Workstation Dual Monitors

1.3.1 Monitor Setup

To set up InterAct dual monitors, adjust the monitor head angle, screen brightness, and CRT bias and degauss the screens.

Adjusting the Monitor Head Angle

The monitor head pivots on a hinge under the front edge of the monitors. This hinge allows you to adjust the monitor head forward or backward 15 degrees (30-degree range). Follow these steps to adjust the monitor head angle:

1. Press the unlock switch on the adjustment panel on the digitizing table's lower right corner. This unlocks the monitor head angle switch immediately below the unlock switch.

2. Press the left arrowhead to tilt the monitor head toward you. Press the right arrowhead to tilt it away from you. When the monitor head angle is adjusted to the position you want, release the adjustment switch.

3. Select the lock switch to lock the monitor head angle in place.

Adjusting the Screen Brightness

Increase the brightness of the screen display by holding down the <Ctrl> key while tapping the ↑ key. Decrease the brightness by holding down the <Ctrl> key while tapping the ↓ key. The ↑ and ↓ keys are on the lower right side of the keyboard.

> **Note:**
> The monitor should be on for 20 to 30 minutes before you adjust the screen.

Degaussing the Screens

The workstation screen builds up a stray magnetic field over time or after moving the unit, causing the display to be discolored. To restore the display, open the knob protection door on the front right corner of the monitor head and press and hold the degauss button for five to seven seconds. If you think it is necessary to degauss the screen again, wait at least three to five minutes before a second degaussing.

If your terminal is not equipped with a degauss button, the screens automatically degauss during the power-up procedure.

Adjusting the CRT Bias

The CRT bias controls the background brightness and screen color intensity. Adjust the CRT bias to a level appropriate for the lighting in your work area when necessary. Follow these steps to adjust the CRT bias:

1. Find the two knobs behind the knob protection door on the front right corner of the monitor head. The right knob controls the CRT bias for the right screen and the left knob is for the left screen.

2. Turn the right knob clockwise until faint horizontal lines appear on the right screen.

3. Slowly turn the knob counterclockwise until the lines are no longer visible and the black portions of the screen become a deep black.

4. Repeat the procedure for the left screen.

1.3.2 Keyboard Setup

To set up the keyboard, attach the keyboard to the monitor head and adjust the keyboard angle.

Attaching the Keyboard

The keyboard attaches to the lower left corner of the monitor head. To attach the keyboard, locate the keyboard outlet and push the keyboard plug in the outlet until it snaps in place.

Adjusting the Keyboard Angle

The keyboard can be adjusted to four positions. To adjust, lift the levers on the back of the keyboard until the feet drop to the desired angle. Release the levers to lock the feet in place.

1.3.3 Twelve-Button Cursor Setup

The InterAct hand-held cursor is also called the 12-button cursor. The cursor attaches to the center of the digitizing table's right edge in the outlet above the adjustment panel. Push the 12-button cursor plug in this outlet until it snaps in place.

1.3.4 Floating Menu Tablet Setup

The optional floating menu attaches to the right side of the monitor head. Plug the floating menu in the outlet until it snaps in place.

1.3.5 Digitizing Table Setup

To set up the digitizing table, adjust the table height and angle.

Adjusting the Digitizing Table Height

The digitizing table can be raised or lowered to set its height 27 to 40 inches above the floor. Follow these steps to adjust the digitizing table's height:

1. Press the unlock switch on the adjustment panel.

2. Press the up arrow on the digitizing table's height adjustment switch to increase the table height or the down arrow to decrease it.

3. Press the lock switch to lock the table in place.

Adjusting the Digitizing Table Angle

The digitizing table angle can be adjusted downward from a horizontal position up to 35 degrees. Follow these steps to adjust the digitizing table angle:

1. Grasp the front right corner of the table and lift the table angle lever on the underside of the digitizing table.

   Caution:
   Do not allow the table to drop.

2. Raise or lower the table to the desired angle.

3. Release the table angle lever to lock the table in place.

1.4 InterView Workstation Dual Monitors

This section describes setup and adjustment procedures for InterView workstations. The procedures include setting up the monitors, keyboard, 12-button cursor, floating menu, and boom assembly. Refer to the following InterView workstation illustration as needed.
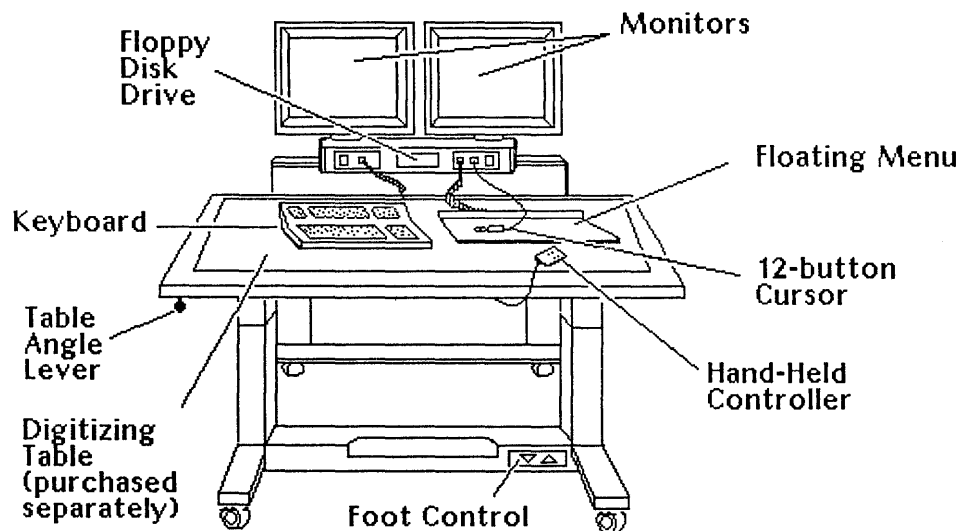
Figure 1-7. InterView Workstation Dual Monitors

1.4.1 Monitor Setup

To set up the monitors, adjust the monitor angle, screen brightness, and CRT bias and degauss the screens.

Adjusting the Monitor Angle

InterView workstation monitors are attached to the boom assembly. The entire boom assembly with monitors can be turned nearly 120 degrees in either direction; the monitors cannot be turned individually. The monitors can, however, be tilted forward and backward individually. Grasp the monitor and adjust it vertically to a comfortable viewing position.

The boom assembly and monitors can be raised or lowered with the hand-held controller. An up/down switch on the boom assembly's left, front side also raises and lowers the boom assembly. However, Intergraph recommends using the hand-held controller, designed for comfort and easy use.

Adjusting the Screen Brightness

Increase the brightness of the screen displays by holding down the <Ctrl> key while tapping the ↑ key. Decrease the brightness by holding down the <Ctrl> key while tapping the ↓ key. The ↑ and ↓ keys are on the lower right side of the keyboard.

> **Note:**
> The monitor should be on for 20 to 30 minutes before you adjust the screen.

Degaussing the Screens

The workstation screen builds up a stray magnetic field over time or after moving the unit, causing the displays to be discolored. To restore the displays, press and hold the degauss buttons on the back of each monitor for five to seven seconds. If you think it is necessary to degauss the screen again, wait at least three to five minutes before a second degaussing.

Adjusting the CRT Bias

The CRT bias controls the background brightness and screen color intensity. If necessary, adjust the CRT bias to a level appropriate for the lighting in your work area. Follow these steps to adjust the CRT bias:

1. Find the CRT bias knobs on the back of each monitor above the degauss button.

2. Turn the knob all the way to the right so that lines are clearly visible on the screen.

3. Turn the knob to the left until the lines disappear.

1.4.2 Keyboard Setup

To set up the keyboard, attach the keyboard to the front panel of the boom assembly and adjust the keyboard.

Attaching the Keyboard

The keyboard attaches to the front panel of the boom assembly (the front left outlet next to the up/down switch). Push the keyboard plug in the outlet until it snaps in place.

Adjusting the Keyboard Angle

The keyboard can be adjusted to four positions. To adjust, lift the levers on the back of the keyboard until the feet drop to the desired angle. Release the lever to lock the feet in place.

1.4.3 Twelve-Button Cursor Setup

The InterView hand-held cursor is called a 12-button cursor. The cursor attaches to the front panel of the boom assembly (the front right outlet next to the power switch). Push the cursor plug in the outlet until it snaps in place.

1.4.4 Floating Menu Setup

The floating menu attaches to the front panel of the boom assembly (the outlet to the right of the floppy disk drive). Plug the floating menu in the outlet until it snaps in place.

1.4.5 Boom Assembly Setup

The Boom Assembly is the rectangular base below the monitors. It houses the following hardware:

● Up/down switch (left front corner) and power switch (right front corner)

● Three connecting ports for the keyboard, a 12-button cursor, and a floating menu

● Floppy disk drive

1.4.6 Digitizing Table Setup

To set up the digitizing table, attach the digitizing table and adjust the table height and angle.

Attaching the Digitizing Table

The following three cables attach the digitizing table to the workstation base:

- Digitizing connecting cable
- Power cord
- Motor control interconnect cable

Both ends of the digitizing connecting cable are identical. They connect from the outlet on the back under the table to the outlet on the front between the boom assembly and base.

The ends of the power cord are marked with symbols for **table** and **workstation** for easy identification. Both ends of the motor control interconnect cable are identical.

The outlets for the power cord and motor control interconnect cable are together at the back of the table's base. Both cords connect from these outlets on the table to the outlets in the lower front right corner of the workstation base.

Adjusting the Digitizing Table Height

To raise or lower the digitizing table, press the up or down buttons above the table icon on the hand-held controller.

You can also press the up/down arrow of the foot control on the lower right front corner at the table's base. However, Intergraph recommends that you use the hand-held controller, designed for comfort and easy use.

Adjusting the Digitizing Table Angle

Follow these steps to adjust the digitizing table angle:

1. Grasp the table angle lever knob in the table's front left corner and move it to the right to release the table.

2. Raise or lower the table to the desired angle.

3. Release the table angle lever to lock the table in place.

Chapter 2: Identifying Main Components and Ports

Chapter 2:
Identifying Main Components and Ports

Electronics cabinets house disk drives and processor boards. A workstation/server's ports are on the back of its electronics cabinet. Intergraph produces four types of electronics cabinets: cube, suitcase, lowboy, and two-bay.

InterPro workstations consist of an electronics cabinet and a monitor. InterServe processors consist of an electronics cabinet only. InterAct and InterView configurations do not include electronics cabinets. Thus, this chapter illustrates the main component and port locations for the mechanical configurations in the following sections. Refer to the section appropriate for your workstation's configuration to discover the locations of ports and various hardware components.

2.1   Cube Configuration
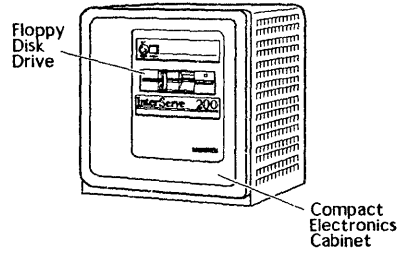
Figure 2-1. Cube Electronics Cabinet Main Components
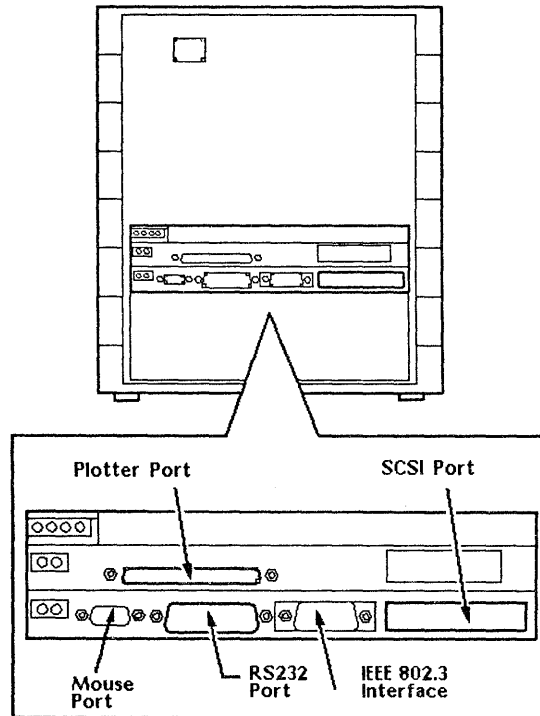
Figure 2-2.   Cube Electronics Cabinet Ports

2.2   Suitcase Configuration
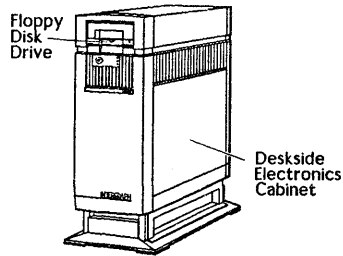
Figure 2-3. Suitcase Electronics Cabinet Main Components
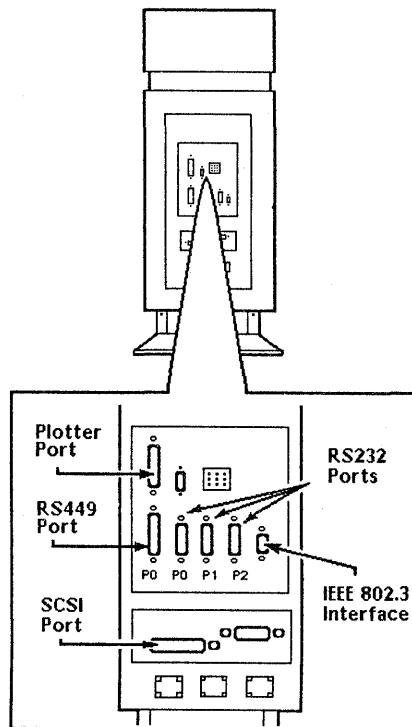
Figure 2-4.   Suitcase Electronics Cabinet Ports

2.3 Lowboy Configuration
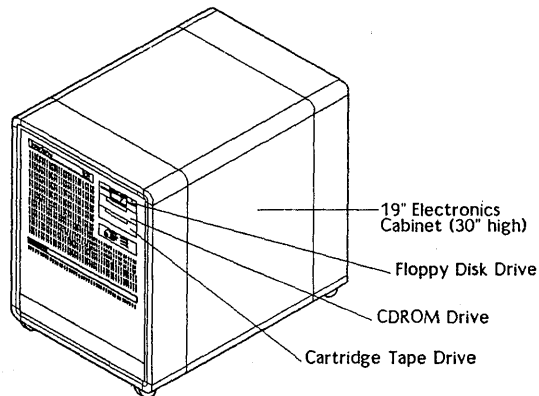
Figure 2-5. Lowboy Electronics Cabinet Main Components
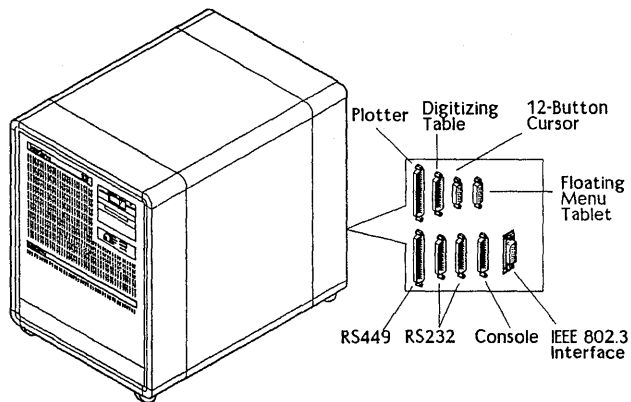
Figure 2-6. Lowboy Electronics Cabinet Ports

Note:
The floating menu tablet, 12-button cursor, and digitizing table ports are not included on InterServe processors.

2.4 MiniCase Configuration
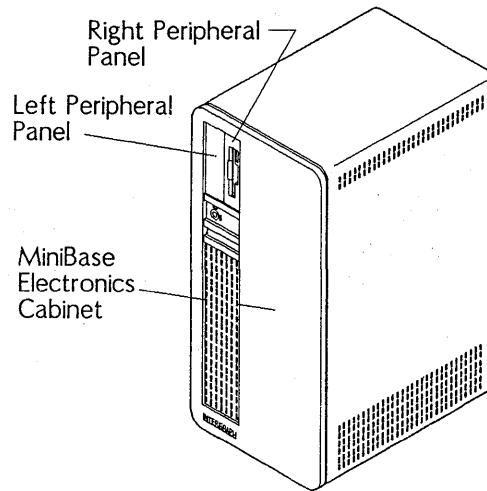
Figure 2-7. Minicase Electronics Cabinet Main Components

Note:
The MiniCase configuration comes with a 3½-inch floppy disk drive in the right peripheral panel. The left peripheral panel can include one of the following peripheral devices: cartridge tape drive, CDROM drive, 3½-inch floppy disk drive, or 5¼-inch floppy disk drive.
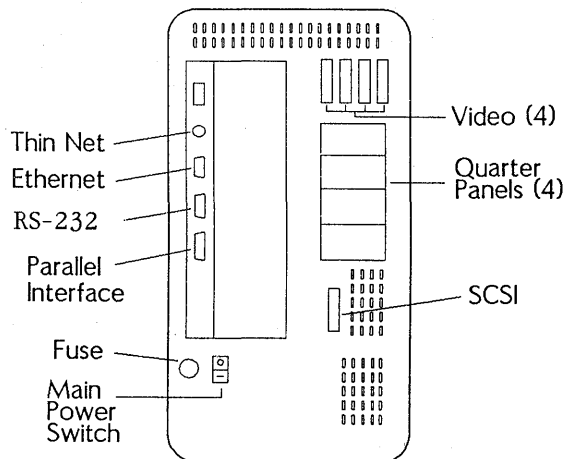
Figure 2-8. Minicase Electronics Cabinet Ports

2.5   Two-Bay   Configuration
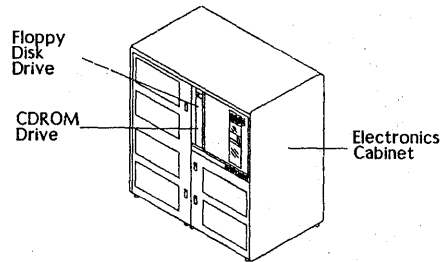
Figure 2-9.   Two-Bay   Electronics   Cabinets   Main   Components
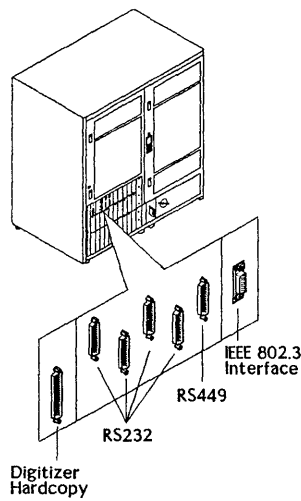
Figure 2-10.   Two-Bay   Electronics   Cabinets   Ports

2.6   InterAct   Workstations
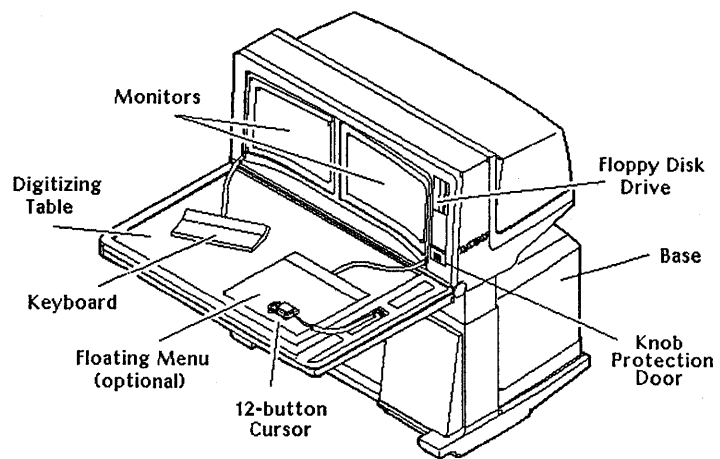
Figure 2-11.   InterAct Main Components

The ports on the InterAct workstations are behind the removable panel on the right side of the workstation base.

Follow these steps to access the ports:

1. Remove the right side panel of the InterAct workstation by loosening the retainer screw under the ledge. Lift the panel out of the slot.

2. Connect the cable(s) from the peripheral device(s) to the appropriate port(s) as shown below.

3. Replace the side panel. The cables extend through an opening on the bottom of this panel's base assembly.
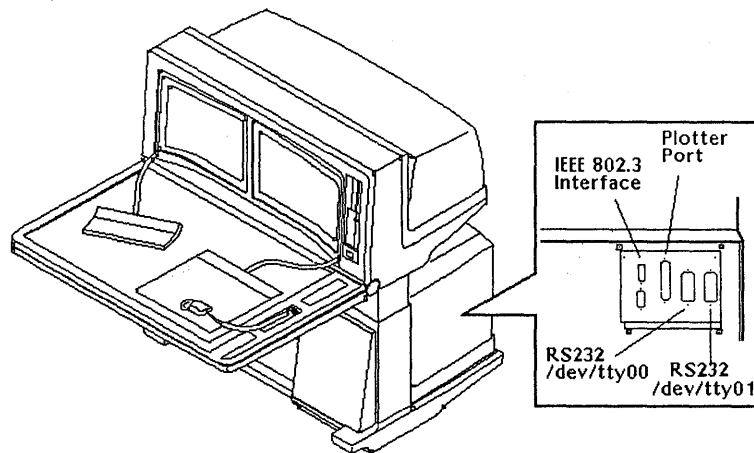
Figure 2-12. InterAct Ports

2.7   InterView Workstations

Floppy Disk Drive

Monitors

Floating Menu

Keyboard

12-button Cursor

Table Angle Lever

Hand-Held Controller

Digitizing Table (purchased separately)

Foot Control
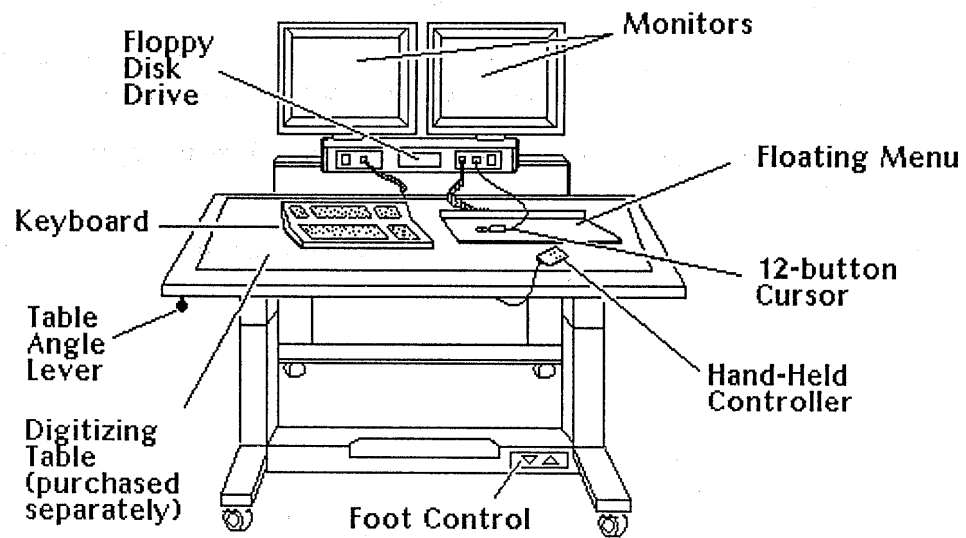
Figure 2-13.   InterView Main Components

The ports on the InterView workstations are behind the removable panel on the left side of the workstation base.

Follow these steps to access the ports:

1. Remove the left side panel of the InterView workstation by loosening the retainer screw under the ledge. Lift the panel out of the slot.

2. Connect the cable(s) from the peripheral device(s) to the appropriate port(s) as shown below.

3. Replace the side panel. The cables extend through an opening near the floor on the bottom of this panel's base assembly.
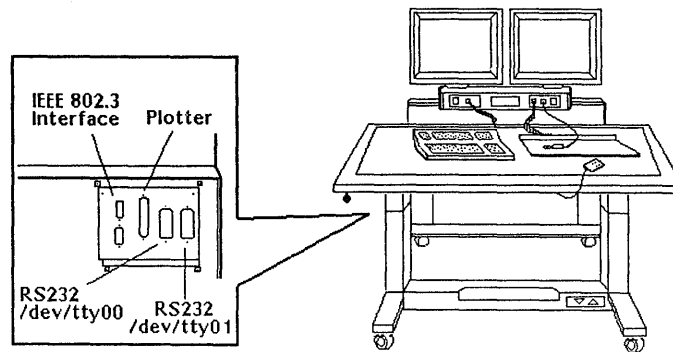
Figure 2-14. InterView Ports

Chapter 3:
Configuring for Peripheral Devices

This chapter discusses the peripheral devices that can be connected to the RS-232, RS-449, SCSI, or plotter port of an Intergraph workstation or server. In most cases, the information for connecting, configuring, and using Intergraph peripheral devices is provided with the unit.

To determine the location of the peripheral ports on each workstation or server, refer to the illustrations in Chapter 2, "Identifying Main Components and Ports." This chapter includes the following topics:

3.1 Plotter Port

The plotter (V80) port can support electrostatic, laser, color thermal hardcopy, or Intergraph Film Recorder (PCR or QCR) output devices for all Intergraph workstations and servers. You can connect Versatec-Differential devices (most Versatec Electrostatic plotters, Intergraph Film Recorders, and the Intergraph Laser Printer 811) to the workstation/server by connecting the cable that come with the device directly to the plotter port and to the appropriate port on the device.

To connect TTL or Centronics devices to a workstation/server, first connect one of the following interface conversion assemblies (which comes with the workstation/server) to the plotter port. This plotter port is an adapter to which you can then connect the device cable.

● The Differential/V80 conversion assembly (FINF355) is used with TTL Devices (V80 plotters or Benson Electrostatic plotters).

● The Differential/Centronics conversion assembly (FINF356) is used with Centronics devices such as the Color Thermal Hardcopy.

The Intergraph workstation and server plotter ports can support up to four output devices if they are connected to an Intergraph Plotter Multiplexer/Selector (purchased separately) to which the devices are also connected. See the *Plotter Multiplexer/Selector User's Guide* for directions on connecting and using the Plotter Multiplexer/Selector.

The following hardcopy devices from the Intergraph workstation/server plotter port are supported. The procedures for connecting, configuring, and using these devices are delivered with each peripheral.

● Versatec V80 Screencopier/Plotter
● C5602 Color Thermal Plotter
● CHC-635 Color Thermal Hardcopier
● Intergraph Laser Printer 811
● Intergraph QCR and PCR

These are hardcopy devices for servers and CLIPPER workstations only:

- Versatec CE 3236
- Versatec CE 3224
- Versatec CE 3244
- Versatec CE 3436
- Versatec CE 3424
- Versatec CE 3444
- Versatec 7236
- Versatec 7222
- Versatec 7224
- Versatec 7244
- Versatec 7436
- Versatec 7422
- Versatec 7424
- Versatec 7444
- Benson 9624
- Benson 9636
- Benson 9644

3.2   RS-232 and RS-449 Ports

All Intergraph workstations and servers feature RS-232 ports for connecting standard RS-232-compatible devices such as modems, printers, or plotters. In addition, workstations and servers with the suitcase, lowboy, or two-bay electronics cabinet configuration feature an RS-449 port for connecting RS-449-compatible modems, printers, or plotters.

3.2.1   RS-232 Ports

Workstations and servers with a single RS-232 connector (cube electronics cabinet configuration) can connect up to three devices to the RS-232 port with a special RS-232 splitter cable. This cable, which splits the RS-232 port into three separate RS-232 connectors, is provided with each workstation/server. You may purchase additional RS-232 splitter cables from Intergraph. InterAct and InterView workstations have two RS-232 ports that you can use, while the system reserves the third for the digitizer table.

3.2.2   RS-449 Ports

Suitcase, lowboy, and two-bay configurations feature an RS-449 port that the IOP board defines as serial port 0. Since the board also defines one RS-232 port as 0, the RS-449 and RS-232 port 0 cannot be used simultaneously.

3.2.3 RS-232-Compatible Devices

The following are several RS-232-compatible devices that the RS-232 port on Intergraph workstations/servers supports and that you can purchase from Intergraph. The procedures for connecting, configuring, and using these devices are delivered with each peripheral.

- HP7570 Pen Plotter
- HP7475 Pen Plotter
- HP7595 Pen Plotter
- HP7596 Pen Plotter
- Calcomp 1076 Pen Plotter
- Calcomp 1077 Pen Plotter
- CIT-224 Alphanumeric Terminal
- P600 Line Printer
- DX2200 136-Column Dot Matrix Printer
- DX2100 80-Column Dot Matrix Printer
- LA120 DECWriter III
- Standard Asynchronous Modems

3.2.4 Using the RS-232 and RS-449 Ports

All Intergraph workstations/servers feature an RS-232 port configured to support three RS-232-compatible serial ports: aux00, aux01, and aux02 (auxiliary ports 0, 1, and 2). However, workstations and servers with the suitcase, lowboy, or two-bay configurations support three RS-232 ports *or* one RS-449 port and two RS-232 ports.

Port 0 transmits and receives data, has RTS and CTS signals, and is the only port that can generate modem control signals (RI, DTR, and DTS). That is, port 0 is the only port that can automatically terminate a remote session when you are disconnected but have not logged off from the system. Ports 1 and 2 transmit and receive data and have RTS and CTS signals.

The InterPro workstations support an optional digitizing table or tablet with a digitizer controller connected to the RS-232 port. Port 2 is the only port to which a digitizer controller can be connected. Procedures for connecting a digitizer controller are delivered with the controller.

Auxiliary Port Features

The following chart shows the features that each auxiliary port supports.

Table 3-1. Auxiliary Port Features

	aux00	aux01	aux02
Is accessed from UNIX operating system	X	X	X
Transmits and receives data	X	X	X
RTS, CTS	X	X	X
RI, DTR, DTS	X		
Has a digitizer attachment			X

To access the ports from the UNIX System V environment, refer to aux(7) change pages in the *UNIX System V Administrator's Reference Manual.*

Default Parameters for Auxiliary Ports

From the Peripheral Configuration Utility menu of the workstation/server, you can establish default parameters for each port. Intergraph set the default parameters for standard RS-232 and RS-449 devices. However, you can change these parameters to support the peripheral devices you want to attach. Documentation for an RS-232 or RS-449 peripheral device should supply the necessary parameters. Chapter 8 in the *CLIPPER Operator's Guide* describes each RS-232 and RS-449 parameter found in the Utility Pages.

3.2.5 Setting Configuration for InterServe Alphanumeric Terminals

The following procedures describe how to configure the terminal and RS-232 port for the terminal.

Configuring the Terminal

If multiple settings are available for your alphanumeric terminal communication settings, set the terminal to the following recommended values:

Baud Rate	9600 bits
Word Size	8 bits
Parity	None
Stop Bits	1
Auto XON/XOFF	Yes (enabled)

Refer to the user documentation accompanying the terminal for directions on setting the parameters.

Configuring the RS-232 Port for the Terminal

1. Power up the InterServe and access the Startup Utility menus from the InterServe Introductory screen.

2. Configure the appropriate RS-232 port for the alphanumeric terminal according to the directions in subsection 3.2.3, "Configuring the Workstation or Server for RS-232 Devices."

   If the alphanumeric terminal has fixed values for communication settings, set the values on the Peripheral Configuration menu to match the list of values provided with the alphanumeric terminal.

   If the recommended values were set according to the directions in the preceding section, set the values on the Peripheral Configuration menu to match the recommended values. For example, set the port settings for an Alphanumeric Video Terminal connected to auxiliary port 0 on the Peripheral Configuration menu as follows:

Peripheral Configuration Menu

AUX__select	(0)
Baud__Rate	(9600)
Word__Size	(8)
Stop__Bits	(1)
Parity	(None)
auto__XON/xoff	(Yes)
incoming__XOFF	(Yes)
auto__RTS/cts	(Yes)
Slave__Device	(No)
UTility	[go to main utility menu]

See Chapter 8 in the *CLIPPER Operator's Guide* for a complete description of the InterServe Peripheral Configuration menu.

3.2.6   Configuring the Workstation or Server for RS-232 Devices

Step-by-step procedures for configuring the workstation and server for RS-232 devices follow.

Configuring the Workstation

1. Select the **Utility** screen button from the introductory screen.

2. Select the **Peripheral Configuration** screen button from the Utility Page.

3. When the Peripheral Configuration page appears, find the **Aux Port Select** roll-through box.

4. If a peripheral is connected directly to the RS-232 port, leave the setting for the **Aux Port Select** at **aux00.** If the RS-232 splitter cable is used, select the name of the RS-232 port to be configured. For dual-screen workstations, select the port setting that corresponds to the port number connected to the peripheral.

To configure ...	*Set Aux Port to ...*
Auxiliary port 0	aux00
Auxiliary port 1	aux01
Auxiliary port 2	aux02

5. When the name of the port to be configured displays, establish all other settings (such as baud rate, parity, and word size) for that port. These settings should be sent with the peripheral.

6. Once a port is configured, select the **Save** button at the bottom of the screen to save the settings for that port.

7. Select the **System V** screen button to load the System V operating system.

Configuring the Server

1. Power up the InterServe and access the Startup Utility menus from the InterServe introductory screen.

2. Key in **UT** at the Startup Configuration Utility introductory menu to display the Main Utility Menu.

3. Key in **PS** at the Main Utility Menu to display the Peripheral Configuration menu.

   • If a peripheral is connected directly to the RS-232 port, key in the following to display 0 beside the **AUX_select** option.

   $ AUX 0

   • If the RS-232 splitter cable is used, indicate the port connected to a device as follows. (The appropriate port number displays beside the **AUX_select** option.)

To configure . . .	*Key in . . .*
Auxiliary port 0	**AUX 0**
Auxiliary port 1	**AUX 1**
Auxiliary port 2	**AUX 2**

4. Establish all other settings by keying in the capital letters from each option name and then keying in the setting as an argument. (A list of the settings is included with the peripheral.) For example, key in the following to set the baud rate to 1200:

    Option: **BR 1200**

    The keyed-in settings appear beside the appropriate option. Chapter 8 in the *CLIPPER Operator's Guide* explains the various settings.

5. Once the appropriate settings are established, key in **SA** to save the settings for the port selected in step 3.

3.2.7   Using a Workstation as a Console Device

The workstation can be connected to a host computer and used as a console device (serial line terminal). The following procedures describe how to connect, configure, and access a host computer.

Connecting a Host Computer

A host computer can be connected directly to the RS-232 port(s) on a workstation.

Configuring the Workstation

The procedures used for configuring the RS-232 port for a modem, printer, or plotter can also be used for configuring a host computer. The following illustration shows the console device settings for auxiliary port 0:

Using the Create Terminal Menu to Access a Host Computer

You can use the following procedure to access a host computer and create a console window:

1. Select the **Terminal** option from the Workstation menu.

2. When the **Create Terminal** menu appears, select the RS-232 option.

3. Select the **OK** screen button to exit the menu and the console window is automatically created.

    Note:
    Since an auxiliary port is not specified in this procedure, the system automatically checks for an available host to connect to. For example, if a host computer is connected to port 0 and another host computer is connected to port 1, the system checks first to determine whether port 0 is available. If port 0 is not available, the system then checks port 1.

Using the vterm Command to Access a Host Computer

The **vterm** command allows you to access a host computer connected to a specific port with one of the RS-232 splitter cables. In this example, the **vterm** command is keyed in from a local window on the workstation to access a host computer connected to port 1 of the splitter cable.

vterm -a01

A console window displaying the window name "aux01 - VT220" is automatically created.

3.3   SCSI Port

The SCSI port is an industry-standard interface that allows optional devices, such as internal or external hard disk drives and tape drives, to communicate with an Intergraph workstation/server. The Intergraph External Hard Disk Drive, Single Optical Disk Drive, External Cartridge Tape Drive, and 1600/6250 bpi Tape Drive can be connected to the SCSI port on InterPro workstations and InterServe processors. The Standalone Optical Disk Drive is available for InterPro 340 workstations, 3000-series workstations/servers, and 4000-series workstations/servers only. For information on backup and restore procedures, see Chapter 5 in the *CLIPPER Operator's Guide*.

The SCSI bus of InterPro workstations and InterServe processors allows many optional SCSI devices consisting of disks and tape drives to be connected in a daisy chain. The SCSI bus allows 20 feet of cable to be used to configure a system of SCSI devices. These devices will be connected to an InterPro workstation or server. See the following section for instructions to decide the feasibility of multiple SCSI devices with your workstation or server.

The InterAct and InterView workstations support up to four standard hard disk controllers (not optical disks) and one cartridge tape controller internally. Only an Intergraph Field Service representative can connect a cartridge tape drive or additional hard disk drives to an InterAct or InterView workstation's SCSI port.

If you wish to add SCSI devices to your current configuration, contact your Intergraph Sales Representative to determine whether a desired combination of SCSI devices is feasible.

Chapter 4:
Using the RS–232 Splitter Cable

This chapter describes the RS-232 splitter cable and its auxiliary ports. It then explains how to connect the cable to a workstation or processor and how to configure the ports for the workstation or processor. It contains the following sections:

4.1   The RS-232 Splitter Cable

Although an InterPro workstation or InterServe processor has a single RS-232 connector, up to three standard RS-232 devices can be connected to an InterPro workstation or InterServe processor RS-232 port with the RS-232 splitter cable. This cable splits the RS-232 port into three separate 25-pin RS-232 connectors. These connectors serve as auxiliary ports to which devices such as printers, plotters, modems, and other computers can be connected.
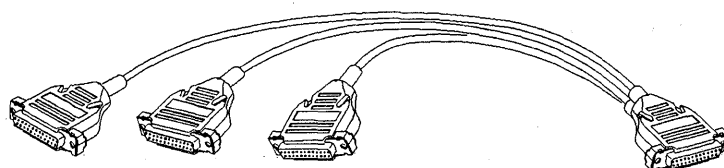
Figure 4-1. The RS-232 Splitter Cable

4.2   RS-232 Auxiliary Ports

The RS-232 port is configured to support three RS-232-compatible serial ports: aux00, aux01, and aux02 for auxiliary ports 0, 1, and 2. All three auxiliary ports can be accessed from the System V UNIX environment as /dev/tty00, /dev/tty01, and /dev/tty02.

Port 0 transmits and receives data, has RTS and CTS signals, and is the only port that can generate modem control signals (RI, DTR, and DTS). That is, port 0 is the only port that can terminate a session automatically when the user hangs up (or is accidentally cut off) or that can hang up automatically when a program is terminated.

Ports 1 and 2 transmit and receive data and also have RTS and CTS signals. Port 2 is the only port to which a digitizer can be connected.

4.3 Accessing RS-232 Ports from UNIX and PC-DOS Environments

To learn how to access the ports from the System V UNIX environment, refer to aux(7) documentation in the *System V Administrator Reference Manual.*

4.4 Connecting the RS-232 Splitter Cable

Follow these steps to connect the splitter cable to an InterPro workstation or InterServe processor:

1. Attach the RS-232 splitter cable's main connector to the RS-232 port on the InterPro workstation or InterServe processor.

    Note:
    See Chapter 2, "Identifying Main Components and Ports," to learn the RS-232 port's location on your InterPro workstation or InterServe processor.

2. Connect the 25-pin cable (that comes with the RS-232 device) to the appropriate connector on the splitter cable.

    To connect to a printer, do not use the cable that comes with it. Instead, use the extra cable that comes with the RS-232 splitter cable. Attach this cable to the appropriate connector on the splitter cable.

3. Attach the RS-232 cable to the appropriate port on the RS-232 device.

4.5 Configuring the RS-232 Auxiliary Ports

The following subsections contain instructions for configuring the RS-232 auxiliary ports for the InterPro workstation and InterServe processor.

4.5.1 InterPro Workstations

Follow these steps to configure the InterPro workstation RS-232 from the Utility pages:

1. Boot the workstation and select the **Utility** screen button from the blue introductory screen.
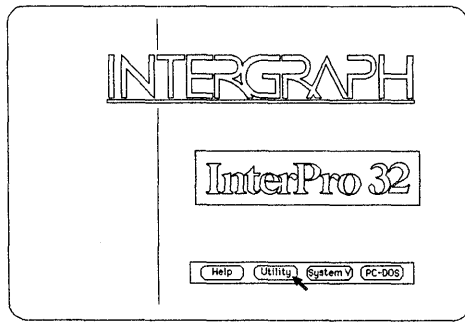
2. Select the **Peripheral Configuration** screen button on the Main Utility Page.
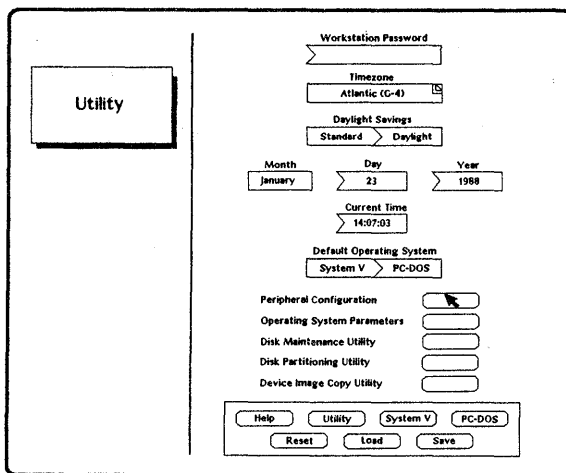
3. When the Peripheral Configuration Page appears, find the **Port Select** roll-through box.
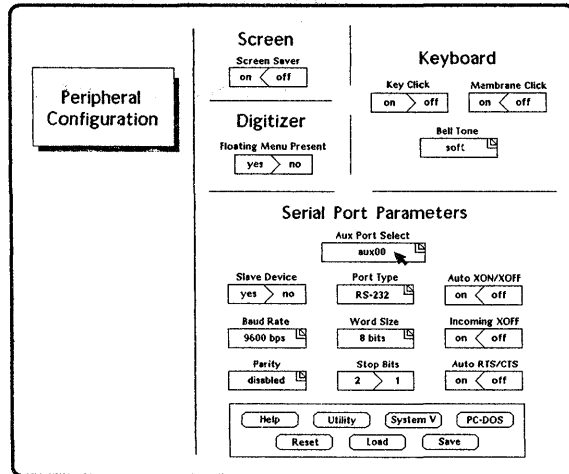
4. Select the name of the RS-232 port that will be configured.

To configure . . .	*Set the port to . . .*
Auxiliary port 0	aux00
Auxiliary port 1	aux01
Auxiliary port 2	aux02

5. Establish all other port settings (such as baud rate, parity, and word size). The values for these settings should be provided in documentation accompanying the peripheral device. Refer to Chapter 8 in the *CLIPPER Operator's Guide* for directions for setting the values of Peripheral Configuration menu parameter fields.

6. Once all ports are configured, select the **Save** button at the bottom of the screen to save the settings for each port.

7. Select the System V screen button to load the System V operating system.

4.5.2 InterServe Processors

Follow these steps to configure the InterServe processor RS-232 auxiliary ports from the alphanumeric Utility menus:

1. Boot the InterServe processor and press any key when the following message appears.

   Intergraph   Corporation
   InterServe   processor
   ================

   Strike any key within 5 seconds to
   access Startup Utility Menus.

2. When the following menu appears, key in **UT** to display the Main Utility menu.

   _____

   Startup   Configuration   Utility
   _____

   UTility   [go to main utility menu]
   UNix   [boot unix operating system]
   Help

   Key in your selection at the Option prompt.
   Capitals indicate key-in abbreviations.

   Option: **UT**

3. At the Main Utility menu, key in **PS** to display the Peripheral Configuration Menu.

Main Utility Menu

PassWord	(inactive)
DAte	(Mon Dec 14 10:51:01 1987)
Peripheral__Settings	[go to peripheral config menu]
Operating__System	[go to unix config menu]
Disk__Maintenance	[go to disk maintenance menu]
Disk__Partitioning	[go to disk partition menu]
Device__image__CoPy	[go to device copy menu]

Standard Options:

UNix   SAve   LOad   REset   Help

Option: **PS**

4. At the Peripheral Configuration Menu, key in the following to display **RS-232** in the Port Type field.:

    Option: **rs-232**

5. Select the name of the RS-232 port to be configured.

To configure . . .	*Key in . . .*
Auxiliary port 0	Option: **AUX 0**
Auxiliary port 1	Option: **AUX 1**
Auxiliary port 2	Option: **AUX 2**

    The **AUX__select** field then displays the number of the port selected.

6. Establish all other port settings (such as baud rate, parity, and word size). The values for these settings should be provided in documentation accompanying the peripheral device. Refer to Chapter 8 in the *CLIPPER Operator's Guide* for directions on setting Peripheral Configuration Menu field parameters.

   The following is the Peripheral Configuration Menu when port 1 is configured with standard settings.

Peripheral Configuration Menu

AUX__select	(1)
Port_Type	(rs-232)
Baud__Rate	(9600)
Word__Size	(8)
Stop__Bits	(1)
Parity	(None)
auto__XON/xoff	(Yes)
incoming__XOFF	(Yes)
auto__RTS/cts	(Yes)
Slave__Device	(No)
UTility	[go to main utility

Standard Options:

UNix   SAve   LOad   REset   Help

Option:

7. Once all ports are configured, key in the following to save settings for each port:

   Option: **SA**

8. At the next menu, key in the following to load the System V operating system.

   Option: **UN**

Chapter 5: Maintaining the Hardware

This chapter presents general procedures for maintaining the workstation, main unit, keyboard, mouse and 12-button cursor, hard disk drive, floppy disk drive and floppy disks, and cartridge tape drive and cartridge tapes. It also describes maintenance procedures for preventing hardware problems from occurring. This chapter covers the following topics:

5.1 Precautions and Preventive Maintenance

This section provides you with precautions and problem prevention procedures for the workstation/server. It also supplies information about how to solve hardware and software problems.

5.2 Important Safeguards

Warning

There are no user serviceable parts inside this equipment.
There are voltages and energy levels in this equipment that
may be harmful if accessed. Contact the Intergraph field
service if the unit requires service.

Avertissement

Aucune des pieces de cet équipement ne peut être
entretenue par l'utilisateur. Certains voltages et niveaux
énergétiques dans cet équipement peuvent être d'un contact
dangereux. S'adresser au bureau d'entretien en clientele
Intergraph si la machine nécessite un entretien.

Avvertènza

A l'intèrno di questo equipaggiamento non ci sono parti che
possano essere riparate dall'utente. Voltaggio e livelli
tensióne energetici possono essere pericolosi si se tenta
stabilire contatto. Si l'unita necessiti di reparazione contatte
l'ufficio de servizio d'Intergraph.

Warnung

In diesem Gerät sind keine Teile enthalten, die vom
Benutzer repariert werden können. Im Inneren dieses
Gerätes treten Spannungen und Stromstärken auf, die
gefährlich sein könnten. Benachrichtigen Sie den Intergraph
Aussendienst, wenn dieses Gerät Wartung benötigt.

Advertencia

En el interior de este equipo, no hay piezas que el usario
puede reparar. Los niveles de tensión y potencia que
existen en este equipo pueden resultar peligroso si se
establece contacto. Si la unidad necesita alguna reparación,
comuniquese con la oficina de servicios de Intergraph.

5.3   Maintaining the Workstation

This section describes how to maintain the following hardware on the workstation:

- Main unit
- Screens
- Keyboard
- Mouse or twelve-button cursor
- Hard disk drive
- Floppy disk drive
- Floppy disks
- Cartridge tape drive
- Cartridge tapes

5.3.1   Maintaining the Main Unit

Maintaining the main unit involves ensuring that the workstation/server has a suitable environment, powering the unit on and off properly, cleaning the unit, and cleaning the screens.   This subsection covers each of these procedures.

Controlling the Environment

The workstation/server is designed for use in an office environment with minimal exposure to dust, moisture, and electromagnetic interference.   The following chart shows the allowable temperature and humidity levels where the workstation/server will operate reliably.

	Temperature	Humidity
Minimum	50 F (10 C)	20%
Optimum	70 F (21 C)	50%
Maximum	80 F (27 C)	80%

Place the workstation or server in an area with constant air circulation to cool its internal components.   Fans for these units keep a continual flow across the main circuit boards and power supply.   A built-in convection system cools the workstation monitors.   To keep the air flowing through the units, do not block the ventilation.

Powering the Unit On and Off

If you and others use the workstation/server most of the day, it is best to leave the unit powered on.

If the workstation/server is used occasionally, turn it off to save power and reduce noise and heat.   Always use the proper power-down procedure described in the *Basic Operations Guide.*

Cleaning the Unit

Clean the workstation/server with a damp, lint-free cloth. Use a mild dishwashing detergent if necessary. Do not let water reach the internal components.

Cleaning the Screens

It is best to clean the screens when they are warm. Clean the screens shortly after turning off the workstation or while it is still running.

Follow these steps to clean the screens:

1. Apply a nonabrasive glass cleaner.

2. Gently wipe the screens with a soft, lint-free cloth such as a cotton handkerchief.

5.3.2 Maintaining the Keyboard

If water is spilled on the keyboard, disconnect it immediately and let it dry out. Turn the keyboard over and drain the water out. Let the keyboard dry overnight at room temperature.

The keyboard can be ruined if sticky liquids such as soft drinks are spilled on it. If this happens, the keyboard probably needs to be replaced. Contact Intergraph Customer Support for information on ordering a new keyboard.

5.3.3 Maintaining the Mouse and Twelve-Button Cursor

The mouse and twelve-button cursor require no special care other than basic precautions and periodic cleaning.

- Do not drop the mouse or cursor or let it dangle from its cords.

- Do not stretch the cords.

- Keep the area where the mouse or cursor is used clean and free of dust, lint, and abrasive particles.

Cleaning the Mouse

As you roll the mouse over the desk or table top, it can pick up dust and lint, which can prevent it from rolling smoothly.

Follow these steps to clean the mouse:

1. Remove the tracking ball. With your thumb, push the retaining ring toward the side marked OPEN. The other edge will lift up enough to slide the retainer ring out.

2. Turn the mouse over and the tracking ball will drop out.

3. Blow gently into the case to remove dust.

4. Moisten a cotton swab with alcohol and use it to clean the three rollers inside the case.

5. Wipe the ball with a clean, dry cloth. DO NOT use tissue paper, flannel or anything else that will leave lint on the ball. Also, do not use water, alcohol or any other cleaning fluid.

6. Place the ball back in the mouse and replace the retainer ring.

Cleaning the 12-Button Cursor

Clean the bottom surface of the clear plastic on the cursor to remove lint and residue.

5.3.4 Maintaining the Hard Disk Drive

The hard disk drive requires the following maintenance:

- Leave the unit on as much as possible (if it is used frequently).
- Power down the unit properly.

We recommend that you back up the system regularly in case the file system becomes corrupted or the hard disk is damaged.

5.3.5 Maintaining the Floppy Disk Drive and Floppy Disks

The 5¼-inch and 3½-inch floppy disk drives requires no special service or precautions. However, you should clean the drive periodically. To do so, use a special cleaning disk (available from computer stores) and follow the instructions that come with it.

Floppy disks are a reliable medium to store and retrieve data from the workstation. To care for your 5¼-inch and 3½-inch floppy disks, follow these guidelines:

- Hold the disk by the end with the label. Do not touch the disk's exposed area.

- Keep the floppy disk away from magnets.

- To mail a floppy disk, protect it with cardboard on both sides or use a cardboard box designed for mailing floppy disks.

- Do not bend the disk. Folding the disk can damage the magnetic coating on its surface, making it unreadable.

- Do not write on the disk with a pencil or ballpoint pen. The best way to label a floppy is to write on the label and then apply the label to the floppy disk.

- When you are not using the floppy disk, store it in its protective sleeves and put it in a floppy storage box.

5.3.6 Maintaining the Cartridge Tape Drive and Cartridge Tapes

The cartridge tape drive requires no special service or precautions. However, it is a good idea to clean the drive periodically. To do so, use a special cartridge tape cleaner (available from computer stores) to clean the drive's tape head. The operating environment, frequency of use, and media storage conditions determine how often you need to clean the drive.

> **Note:**
> Cleaning kits are provided with 8mm (2.3 gigabyte) cartridge tape drives.

Cartridge tapes are a reliable medium for storing and retrieving data from the workstation. Follow these guidelines to care for your cartridge tapes:

- Do not touch the tape surface.
- Do not drop the cartridge tape.
- Keep the cartridge tape away from magnets.
- When you are not using the cartridge tape, store it in its protective container.

5.3.7 Maintaining the CDROM Drive

The CDROM drive requires periodic cleaning. If your drive is running slower than usual, try the following cleaning procedures to improve its performance.

The disc caddy should be cleaned periodically to prevent dust and dirt from getting in the drive unit and on the disc. Wipe the caddy clean with a soft cloth.

The CDROM drive pickup lens should be cleaned periodically. The cleaning frequency depends on how often the CDROM drive is used. Clean the drive once or twice a month if it is used nearly every day. If the drive is used less frequently, clean it every other month.

To clean the pickup lens use the LLC-1 lens cleaning disc (available from computer stores). The LLC-1 cleaning disc has a special cleaning brush on the signal tracks that cleans the pickup lens surface of the CDROM drive as the cleaner disc rotates. Proceed through the following steps to clean the CDROM drive pickup lens:

1. Use a small brush to straighten the cleaning brush on the underside of the cleaning disc.

2. Place the cleaning disc in the disc caddy with the red triangular mark at the front of the caddy.
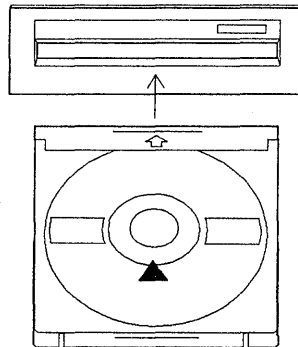
Figure 5-1. Cleaning Disc Installation

3. Insert the caddy in the drive. The disc activity light flashes.

4. When the disc activity light stops flashing, eject the cleaning disc.

5. Reload the cleaning disc as described in step 2.

6. Repeat steps 3 through 5 ten times.

   Note:
   If the drive is used in an oily environment, apply a few drops of alcohol to the cleaning brush on the underside of the cleaning disc before using it.

5.3.8 Maintaining the CDROM Media

Follow these guidelines to protect your CDROM media.

- Hold the CDROM by its edges; avoid touching its face.

- Store the CDROM in its jewel case.

- Wipe dust or fingerprints from the CDROM with a clean, lint-free, dry, soft cloth. Wipe in a straight line from the center of the CDROM to the edge. Never wipe in a circular motion.

- Wipe grease or oil from the CDROM with a soft cloth dampened with ethyl alcohol. Then, wipe it dry.

- Do not use any type of solvent or abrasive cleaner on the CDROM.

- Do not write on either side of the CDROM.

- Do not attach labels to either side of the CDROM.

- Do not expose the CDROM to heat (direct sunlight or other heat sources).

Note:
Refer to the inserts in both the CDROM jewel case and the CDROM caddy for additional care and handling tips.

Chapter 6:
Glossary of Hardware Components

This chapter briefly describes the major hardware components that make up the individual Intergraph workstations/servers. The components are listed in alphabetical order as follows:

6.1   1600/6250 Tape Drive

The 1600/6250 tape drive is an IBM-compatible, dual-density streaming tape drive. It reads from and writes to ANSI-standard, nine-track, half-inch magnetic tape in 6250- or 1600-bpi (bits per inch). This direct reel-to-reel servo-type tape drive consists of a tape transport mechanism, tape motion control electronics, dual-density read/write circuitry, and data-formatting electronics.

The 1600/6250 tape drive is an optional peripheral device to use with InterServe processors and InterPro workstations.

6.2   800/1600/3200/6250 Tape Drive

The 800/1600/3200/6250 tape drive is an IBM-compatible, quad-density streaming tape drive. It reads from and writes to ANSI-standard, nine-track, half-inch magnetic tape in 800-, 1600-, 3200-, or 6250-bpi. In addition to the four recording densities, the quad-density tape drive includes the following features:

- 100 ips (streaming) tape speed
- 100 percent data verification while writing in streaming mode
- Automatic loading and self-threading
- Automatic speed control
- 256 Kb buffer on SCSI controller

The quad-density tape drive is an optional peripheral device for InterPro workstations and InterServe processors.

6.3   Alphanumeric Terminal

A VT100-compatible alphanumeric terminal is a console device for the InterServe processors. The user's manual for the alphanumeric terminal details information on installing and operating the terminal.

6.4   Application-Specific Acceleration Processor

The application-specific acceleration processor (ASAP) (also known as a floating-point engine) is a pipelined, microprogrammable engine with 8 MB of memory dedicated to data storage and 1 MB of writable control store. The ASAP decreases execution time for graphics and application tasks. It also reduces the return time for application program calculations.

6.5 Boom Assembly

The boom assembly is the small cabinet on top of the InterView workstation bases. The front panel of the boom assembly houses the following components:

- Floppy disk drive
- Connecting ports (for the keyboard, floating menu, and twelve-button cursor)
- Power switch
- Up/down switch

6.6 Cartridge Tape Drive

The optional cartridge tape drive is a high-capacity, 1/4-inch tape drive that uses standard, readily available, 600-foot DC600A or equivalent tapes to store 60 MB of formatted data. The tape drive uses the QIC-24 recording format, an industry standard.

Intergraph Field Service installs the optional cartridge drive in the workstation for the InterPro 340 workstations and InterServe 300 processors. The optional cartridge tape drive comes as an external peripheral for all other workstations/servers.

6.7 CDROM Drive

The Compact Disk Read Only Memory (CDROM) drive is used to download new Intergraph software products from a delivery CDROM. Each CDROM holds approximately 600 MB of data; thus, CDROM customers can deliver software from several CDROMs rather than from numerous cartridge tapes or floppy disks. CDROM drives are included as standard internal drives for InterServe 3005 and 4000 processors and are offered as external drives for other Intergraph workstations/servers.

6.8 CLIPPER Processor

Intergraph's CLIPPER, which resides on the main processor/dual-port memory board, is the main processor for CLIPPER workstations and servers. The CLIPPER C100 is the main processor for three-digit models, while the CLIPPER C300 is the main processor for 3000- and 4000-series models. The CLIPPER consists of three chips: one dual-bus CPU and two cache memory management chips (one for instructions and one for data). During System V operations, the CLIPPER is the central processing unit (CPU), while the 80186 or 80386 device is a slave I/O processor.

6.9 Digitizer Processor Board

The digitizer processor board, standard for InterAct and InterView 220 workstations, controls all digitizing table, 12-button cursor, and floating menu input/output data. An Intel 80188 microprocessor controls digitizer processing.

6.10 Digitizer/Hardcopy (Plotter) Processor Board

This board controls most digitizing table, 12-button cursor, and floating menu input/output operations for 300-series and 3000 and 3005 workstations and servers. The board contains a dedicated Intel 80386 microprocessor for digitizer processing. This board also provides the workstation with a direct memory access (DMA) port that is an interface to a Versatec or Centronics output device.

> Note:
> When you use the Intergraph 1813 menu tablet with InterPro 300-series workstations, the I/O processor board controls the 1813 menu tablet operations. The tablet connects to the RS-232 port.

6.11 Digitizing Table

The digitizing tables for InterAct (attached table) and InterView (free-standing table) workstations allow you used the 12-button cursor to supply information from the table to a process. For example, you can select a command from a command menu on the digitizing table. Or, you can enter points from a map placed directly on the digitizing table.

The digitizing table can have user-defined input regions, each associated with a process or processes on the screen. The digitizing surface's tracking region tracks 12-button cursor movement on the table and moves the screen cursor respectively.

6.12 Floating Menu Tablet

The optional floating menu tablet is a small, flat, rectangular surface. It enables you to attach a paper menu to its surface and then move the floating menu freely about the digitizing table without needing to reinitialize the paper menu. This peripheral is helpful if you are using the dual-screen workstations for tracing large maps, charts, or drawings.

The floating menu tablet comes with the digitizing tables or tablets (which must be purchased separately) used with InterView or InterPro workstations. You can also purchase floating menu tablets separately (without digitizing tables or tablets) to use with InterAct and InterView workstations.

6.13 Floppy Disk Drive

The 5¼-inch floppy disk drive uses standard 5¼-inch floppy disks. The 3½-inch floppy disk drive uses standard 3½-inch floppy disks. The 5¼-inch drive can read from and write to high-density (2,400 blocks of data for the 5¼-inch drive, 2880 blocks of data for the 3½-inch drive, 512 bytes per block) and low-density (712 blocks of data for the 5¼-inch drive, 1440 blocks of data for the 3½-inch drive, 512 bytes per block) floppy disks. The floppy disk drive can access and archive software for System V and PC-DOS.

6.14 Graphics Engines

A graphics processor and frame buffer memory compose a graphics engine. The graphics processor performs graphics primitives such as window clipping, vector generation, polygon fill, raster text generation, and block raster move operations. Frame buffer memory stores the data that specifies each pixel on the screen.

Intergraph provides the following four types of graphics engines for its workstations:

☐ Graphics standard (GS)
☐ Graphics extension (GX)
☐ Graphics Z-buffer (GZ)
☐ Extensible Display Geometry Engine (EDGE I)

6.14.1 GS Engine

The GS engine contains two boards: the raster operations processor (ROP) and the frame buffer. A 29116 bit-slice microprocessor is the heart of the ROP. The frame buffer contains six planes of single-buffered video memory, supporting 1-megapixel displays. InterPro GS engines contain one ROP and one frame buffer board; InterAct and InterView GS engines contain one ROP and two frame buffer boards (one for each screen). GS is the graphics engine for 200-series workstations.

6.14.2 GX Engine

The GX engine is a single board—the integrated frame buffer (IFB). A 32-bit, custom-designed graphics processor is the heart of the IFB. The GX engine contains nine planes of double-buffered video memory, supporting 1- or 2-megapixel displays. GX can perform Gouraud shading, which allows high-quality shaded images such as surface and solids modeling to display.

When you run applications using Gouraud shading, the GX engine requires 4 MB of main memory for workstations with a 1-megapixel display and 8 MB of main memory for workstations with 2-megapixel display. GX is the graphics engine for 340, 3070, and 3075 workstations.

6.14.3 GZ Engine

The GZ engine is a single board, the IFB. A 32-bit, custom-designed graphics processor is the heart of the IFB. The GX engine contains nine planes of double-buffered video memory, supporting 1-megapixel displays. The GZ engine contains additional video memory, allowing on-board Gouraud shading (enabling fast display for high-quality shaded images). GZ is the graphics engine for 3050 and 3055 workstations.

6.14.4 EDGE I Engine

The EDGE I engine supports 8 planes, plus one highlight plane, of double-buffered graphics, achieving the display of 256 colors, plus one highlight color, from a palette of 16.7 million. Graphics primitives are executed by a third-generation DSP (digital signal processor) operating at 33 megaflops peak performance. The basic single-board subsystem supports both single and dual 19-inch displays and single 27-inch displays. Dual 27-inch displays require a second EDGE I graphics board.

6.15 Hard Disk Drives

Intergraph provides 156-, 180-, 355-, 584-, and 670-MB hard disk drives for its workstations/servers. The 156-, 180-, 355-, and 670-MB hard drives are 5¼-inch Winchester disk drives. The 584-MB drive is an 8-inch Winchester disk drive.

Three-digit workstation/server models have 156-MB hard drives. 3000-series workstations, depending on the model, have 355-MB, 670-MB, or removable hard disks as options. The 4000-series workstation/server models have 584-MB hard drives. The 6000-series workstation/server models, depending on the model, have 180-MB, 355-MB, or 670-MB hard disk drives.

A hard disk drive can also be purchased separately and connected through the SCSI port to a workstation/server. InterPro workstations and InterServe processors can have external hard disks while hard disks can be added to the bases of InterAct and InterView workstations.

In addition, removable disk drives can be added to InterAct/InterView 3050 workstations and workstations/servers with 19-inch racks. Removable drives are 156-, 355-, or 670-MB hard drives that are easily inserted in and removed from workstations/servers for security. InterAct and InterView 3050 workstations can contain up to four removable drives. Workstations/servers with 19-inch racks can contain two removable drives for each rack.

6.16 I/O Processor Board

The Intel 80186 or 80386 processor on the workstation/server I/O processor board controls input/output and most system diagnostics for Intergraph workstations and servers. The 80186 processor is featured on all workstations and servers except the 300-, 3000-, and 4000-series models, which feature the 80386. In addition to having standard functions, the 80186 includes 1/2 MB, while the 80386 includes 2 MB of local memory.

During UNIX System V and PC-DOS operations, the 80186 or 80386 processor controls all input and output interfacing to the following devices:

- Mouse
- Internal hard disk drive and any auxiliary device connected to the SCSI port
- Internal floppy disk drive
- Ethernet® port
- RS-232 ports
- Keyboard

6.17 Keyboard

The low-profile keyboard provided with Intergraph workstations is used for entering text, issuing special keyboard commands, and selecting function-key menu commands. Active emulation (InterAct, alphanumeric terminal) controls the workstation. This keyboard has the following key groups:

- Typewriter
- Numeric keypad
- Terminal emulation
- Membrane function

6.18 Monitor

Intergraph provides three sizes of workstation monitors: 15-, 19-, and 27-inch. All three sizes are 60-Hz, noninterlaced color graphics monitors. The screen of a 15-inch (diagonal) monitor has a 1184 X 884 pixel matrix, achieving a 100-pixel-per-inch resolution. The 19-inch monitor also has a 1184 X 884 pixel matrix and a 82 pixels-per-inch resolution. The 27-inch monitor has a 1664 X 1248 pixel matrix and a 82 pixels-per-inch resolution. The 27-inch monitors are available only for InterPro 3070 and 3075 workstations. The monitor angle for all monitor sizes can be adjusted horizontally and vertically.

6.19 Mouse

The three-button mouse, used to move the cursor on the screen, is a rolling-ball tracking device that measures cumulative distance. The cursor's position on the screen reflects this cumulative motion.

The 80186 or 80386 (mouse driver) software detects and distinguishes the up and down motion for each of the three buttons.

When used for IBM® PC applications, the three-button mouse emulates a Microsoft™ mouse.

6.20 Optical Disk Drive

The 12-inch Write Once Read Many (WORM) optical disk drive is an optional storage device that allows data to be written permanently to the disk and then read from the disk as often as needed. A manual load optical disk drive is available for InterPro workstations and InterServe processors. The optical disk with optical disk jukebox may be used on InterPro 340 workstations and 3000- and 4000-series workstations/servers. The optical disk with jukebox provides automated access to multiple platters; the manual-load optical disk drive provides manual access to a specific optical disk platter.

6.21 Optical Disk Jukebox

The optical disk jukebox, an option for the InterPro 340 and 3000- and 4000-series, contains optical disk drives, a rack that holds optional platters, and robotics that can select a platter from the rack and mount it on a drive. This peripheral device allows you to access multiple platters simultaneously.

Two models of jukeboxes are available. Each jukebox contains a maximum of five drives. One jukebox model holds approximately 51 platters, while the other holds approximately 131. Depending on the number of drives and the model type, jukebox capacity ranges from 122 to 314 gigabytes. An RS-232 and SCSI port control interface to the jukebox. Time required to move a platter from the rack to a drive and spin up the drive is no more than 11 seconds.

6.22 Pipe Starter Board

The pipe starter board, used only on 340, 3050, and 3055 workstations, converts signals from the shared resource (SR) bus to the pipeline bus.

6.23 Plotter Interface Board

The plotter interface board is a direct memory access (DMA) engine, the interface between the CLIPPER UNIX engine and a transistor-transistor logic (TTL) device with a Centronics device; both have converters. After the CLIPPER UNIX engine prepares a plot request and sends it to main memory, the processors on this board gather the data from memory and send the processed information to the plotter port for output. In addition, this board monitors the plotting status indicators on the plotting device and reports the status to the main processor, which displays them on the console screen.

6.24 12-Button Cursor

The 12-button cursor controls the cursor's movement on the screen, selecting options from a menu tablet and tracing from the digitizing surface. The cursor's movement on the screen corresponds to the 12-button cursor's movement.

When you select commands from the tablet menu, the crosshairs on the 12-button digitizing cursor are placed over the box containing the command to be executed; the cursor's position on the screen is irrelevant. The cursor driver software detects and distinguishes the up and down motion of each button.

6.25 VME Card Adapter

The optional VME card adapter, used on 225, 340, and all 4-digit workstations/servers, is a special interface board that supports one VME card. This card expands interface capabilities of workstations or servers to various products designed to operate on the VME bus. This expansion enables IEEE-448 interface, 16-line serial interface, SDLC, BISYNC, and other communication options. The number of VME adapters and cards that can be installed varies among the eligible workstations and servers.

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