STARION 9xx-20xx

Service Maintenance Manual

STARION 9xx & 20xx PC Family

EK-A0853-SV. A01

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Created by:

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Revision History

Revision	*Date*	*Description of change*
A01	Janary 1996	First release of the Service Manintenance Manual describing the *STARION 9xx & 20xx* series computer

Preface

The Digital Starion 9xx & 20xx PC Family Service Maintenance Manual is a troubleshooting guide that can be used for reference when servicing the Starion 9xx & 20xx line of PC's.
Digital Equipment Corporation reserves the right to make changes to the Digital Starion 9xx & 20xx series without notice. Accordingly, the diagrams and procedures in this document may not apply to the computer(s) you are servicing since many of the diagnostic tests are designed to test more than one product.

CAUTION

Digital recommends that only A+ certified engineers attempt to repair this equipment. All troubleshooting and repair procedures are detailed to support subassembly/module level exchange. Because of the complexity of the indivual boards and subassemblies, no one should attempt to make repairs at component level or to make modifications to any printed wiring board. Improper repairs can create a safety hazard. Any indications of component replacement or printed wiring board modifications may void warranty or exchange allowances.

Chapter 1 Product Description

Product Introduction

The Starion Minitower PC computers are high-performance personal computers featuring the latest in computing technology. Developed using the following state-of-the-art technology, these computers are the most value packed minitower computers in their class.

- ***Model/Processor/Speed***
  - Starion 910 Pentium 75MHz
  - Starion 915 Pentium 100MHz
  - Starion 920 Pentium 75MHz
  - Starion 917 Pentium 100MHz
  - Starion 930 Pentium 100MHz
  - Starion 932 Pentium 120MHz
  - Starion 940 Pentium 133MHz
  - Starion 942 Pentium 133MHz
  - Starion 2001 Pentium 133MHz

- ***Pentium OverDrive Support***

- ***System Memory***
  - Starion 910/915/917 - standard 8MB, expandable to 128MB
  - Starion 920/930/932/940/942/2001 - standard 16MB, expandable to 128MB

- ***Secondary Cache***
  - Starion 930/932/940/942: 256KB

- ***I/O Slots 5 total (4 available)***
  - 2 PCI
  - 2 ISA
  - 1 ISA occupied with Diamond multimedia card

Product Introduction (continued)

- ***Drive Bays***
  - 5
- ***Hard Disk Drives***
  - 850MB Starion 910/915
  - 1200MB Starion 9/17/920/930/932/940
  - 1600MB Starion 942/2001
- ***Video DRAM***
  - 1MB (upgradable to 2MB on Starion 930/932/940/942)
- ***PCI Local Bus Graphics***
- ***CD-ROM Drive: Quad-speed CD-ROM***
- ***Fax/Data/Voice Modem***
  - Starion 910/915/920: 14.4 fax/data/voice modem
  - Starion 917/930/932/940: 28.8 fax/data/voice modem
- ***16-bit stereo sound***
- ***JBL Subwoofer***
  - Only on the Starion 2001

Product Models Information

Starion Models

Product	*Model*	*CPU*	*HDD*	*RAM*
Starion 910	FR-901AA-A7	75 MHz Pentium	850 MB	8 MB
Starion 915	FR-902AA-A6	75 MHz Pentium	850 MB	8 MB
Starion 917		100 MHz Pentium	1.2 GB	8 MB
Starion 919	FR-901AA-A9	100 MHz Pentium		
Starion 920	FR-902AA-A6	90 MHz Pentium	1.2 GB	16 MB
Starion 930	FR-902AA-A7	100 MHz Pentium	1.2 GB	16 MB
Starion 932	FR-902AA-A8	100 MHz Pentium	1.2 GB	16 MB
Starion 935	FR-903AA-A5	120 MHz Pentium		
Starion 940	FR-903AA-A4	133 MHz Pentium	1.2 GB	16 MB
Starion 941	FR-903AA-A7	133 MHz Pentium		
Starion 942	FR-902AA-A9	133 MHz Pentium	1.6 GB	16 MB
Starion 2001	FR-903AA-A6	133 MHz Pentium	1.6 GB	16 MB

Starion Models

Product	*Model*	*Video*	*Cache*	*CDROM*
Starion 910	FR-901AA-A7	S3 Trio 32	None	4X-Speed
Starion 915	FR-902AA-A6	S3 Trio 32	None	4X-Speed
Starion 917			None	
Starion 919	FR-901AA-A9		None	
Starion 920	FR-902AA-A6	S3 Trio 32	None	4X-Speed
Starion 930	FR-902AA-A7	64 bits	256KB	4X-Speed
Starion 932	FR-902AA-A8		256KB	4X-Speed
Starion 935	FR-903AA-A5			
Starion 940	FR-903AA-A4	64 Bits	256KB	4X-Speed
Starion 941	FR-903AA-A7			
Starion 942	FR-902AA-A9		256KB	4X-Speed
Starion 2001	FR-903AA-A6	64 Bits		4X-Speed

Chapter 2 Server Utilities & Configuration

System Utilities

The Starion computer has been set up at our factory with all system software, utilities and drivers pre-installed and ready for use. Most system software can be launched from Digital's "Getting Started" program by selecting the *Multimedia* and *Productivity* selections. Look through these selections for a complete listing of all software supplied with the computer.

This chapter describes how to use some important utilities installed on the computer. It also explains how to restore the computer's software in the event of a hard disk failure or if the software becomes corrupted.

The following system utilities and device drivers are available for the Starion computers:

- Software Applications and Backup Media
- BIOS Utilities and Drivers
- Setting High Resolution Mode for the Monitor
- Additional Utilities and Drivers

Backup Media

The following backup software is supplied with the computer in the event restoring the computer to the out-of-the-box condition as configured from our factory is necessary.

- Windows 95 backup CD (included with the Windows 95 user manual and software license kit)
- Starion System Software Restore CD
- Starion System Software Restore/Boot diskette
- Remote Support diskette

Store the software in a safe place for future use when it is ever needed to re-install the computer's software. Also, have the Remote Support diskette available when calling Digital for service support. Master backup copies of other application programs and games installed on the computer are provided only on the Starion System Restore CD.

Restoring Factory-Installed Software

In the event of a hard disk failure or the software becomes corrupted, restoring all or some of the factory installed software might be necessary. To re-load all factory installed software will be needed to use the System Software Restore CD and the System Software Restore/Boot diskette supplied with the computer. Individual program applications can be re-installed using the *Restore Factory Programs* selection included in the "Getting Started" *Service* selection.

A Windows 95 Backup CD is also included should you choose to install the Windows 95 operating system only. However, when using only this restore method the computer will not be optimized with the various utilities and system application software integrated and fully supported by Digital.

Restore All Factory-Installed Software

To restore all factory software proceed as follows:

1) Close and save any open files, close all applicationsand shut down Windows 95.
2) Insert the System Software Restore/Boot diskette into the diskette drive.
3) Insert the System Software Restore CD into the CD-ROM drive.
4) Reboot the computer.
   The computer will then prompt for confirmation that you want to perform the software restore procedure and format the hard disk drive.
5) Enter **[Y]** to proceed.
   The system software isl then copied to the hard disk drive. This process will take about 15 minutes.
6) When the files have been successfully copied, remove the System Software Restore/Boot diskette and the System Software Restore CD.
7) Reboot the computer.
   All system software is now loaded to the out-of-box factory condition.
8) The computer will now display several Windows 95 welcome and user registration screens. Select "*Gathering Information",* then enter any requested user registration and COA license information requested.

NOTE If the computer can still perform basic functions, Digital recommends to first make backup diskettes of all important personal files that are created since purchasing the computer. Restoring the factory software will re-format the hard disk and erase all personal data.

Restore Individual Programs

If an individual application has been inadvertently deleted or has become corrupted, it can be restored from the "Getting Started" *Service* selection. To restore any program you must first have a working copy of Windows 95 and "Getting Started" installed on the computer.

To restore an individual application proceed as follows:

1) Close and save any open files and close all application programs.
2) Open Digital's "Getting Started" program and click on the *Service* selection.
3) Click on the *Restore Factory Software* selection.
4) The screen displays a list of all software that can be re-installed to the hard disk drive.
5) Insert the System Software Restore CD into the CD-ROM drive.
6) Select the software program you want to re-install.
7) Follow the screen prompts and enter any requested information.

PHLASH .EXE

Starion computers are equipped with flash memory. This means that users can restore the computer's BIOS simply by running the PHLASH.EXE utility. Users can also upgrade the computer's BIOS to future releases by running PHLASH.EXE along with any flash BIOS update diskette if necessary.

Download the PHLASH Utility and any required BIOS update files from the Digital BBS. Afterwards, PHLASH Utility and BIOS update files can be copied onto diskettes for use. Accessing and using the BBS is described using the "Getting Started" *Services* selection or a Digital service representative can help.

The following files should be copied onto the BIOS Diskette:

- PHLASH.EXE and associated runtime files.
- Binary BIOS images.

Before Using PHLASH.EXE

Before upgrading the BIOS using PHLASH.EXE, make a backup diskette (crisis recovery diskette) of the old BIOS. It is important to make this diskette. Should you find the BIOS upgrade unsuccessful, this crisis recovery diskette can be used to return to the old BIOS.

The following is needed to create this diskette:

- A blank 3½-inch 1.44 MB formatted diskette.
- A diskette copy of the PHLASH Utility downloaded from the Digital BBS.

Creating a Crisis Recovery Diskette

1) Turn on the computer and allow the POST to complete.
   If POST detects an error, refer to *Chapter 4, "Troubleshooting"* to identify and determine how to correct the problem. After the problem has been resolved, restart the computer.
2) Insert the BIOS diskette into the diskette drive and enter: ***A:DIR***.
   The entry should show that the following files are on the diskette:
   MINIDOS.SYS
   PHLASH.EXE
   MAKEBOOT.EXE
   MAKECRD.EXE
   DEVTBLS.DAT
   PHLASH.INI
   STARION.ROM
   Note that there are some additional files as well. Refer to the README file on the diskette for additional information.
3) Create an upgrade directory on the hard disk drive. For example, if the hard disk drive is c:>, enter at the DOS prompt: ***C: MD UPGRADE***.
4) Copy the files from the BIOS diskette into the upgrade directory on the hard disk drive. For example, from the DOS prompt enter: ***COPY A:\UPGRADE*.* C:\UPGRADE*.****.
5) Insert a blank formatted diskette into drive A.
6) On drive A, make a directory for the files previously copied. For example, from the DOS prompt enter: ***A:MD UPGRADE***.
7) Return to the hard disk drive and copy the files. From the DOS prompt, enter: ***C:MAKECRD***.
   The makecrd command prompts for a recovery diskette to be placed in drive A and then automatically copies the files to drive A.
8) Remove the crisis recovery diskette from drive A and store it in a safe place.

Using a Crisis Recovery Diskette

The crisis recovery diskette must be used only if the computer's BIOS fails or if a BIOS upgrade was unsuccessful. If the computer's BIOS failed to flash properly or is corrupted in some way, the following sequence of events occurs:

- *POST detects an error after a normal boot cycle or a BIOS upgrade*. This message appears on the monitor screen, indicating that the computer's BIOS did not flash properly or has failed.
- *The BIOS in the bootblock memory automatically executes*. The computer attempts to find the correct BIOS files to execute the correct boot cycle.
- *The computer beeps several times.* This means the computer cannot properly boot using the BIOS files that were just copied during the flash update.
- *The computer accesses the diskette drive*. The computer is searching for the crisis recovery diskette to restore the BIOS to its previous known state.

Restore the computer's BIOS to its previous known state by performing the following procedures:

1) Turn off the computer, unlock and remove the coverand set the recovery jumper **(J32)** to "Recovery Mode" (jumper on).
   Jumper **J32** controls whether the computer is in recovery or normal operation.
2) Replace the cover, insert the crisis recovery diskette into drive Aand then power on the computer.
   The computer automatically boots from drive A and upgrades the BIOS. Upon completion, the computer sounds a beep code and attempts to restart.
3) After the BIOS is restarted, turn off power to the computer and remove the crisis recovery diskette from drive A.
4) Remove the cover and set the recovery jumper **(J32)** to "Normal" (jumper off).
5) Replace and lock the left-side cover and turn the power back on for normal operation.

Upgrading the Computer's BIOS

1) Perform the following steps to update the computer's BIOS in the flash memory to a new updated one.
2) Locate or create a crisis recovery diskette. (Do not use a crisis recovery diskette created on any other computer.) Refer to *"Creating a Crisis Recovery Diskette"*.
   Insert the BIOS diskette in the diskette drive.
3) Turn on the computer and allow the POST to complete. The computer now boots from the BIOS diskette.
   If POST detects an error, refer to *Chapter 4, "Troubleshooting"* to identify and determine how to correct the problem. After the problem has been resolved, restart the computer.
4) At the MS-DOS prompt, type: ***A:\UPGRADE\PHLASH***.
   A screen appears on the monitor warning that the computer's BIOS is about to be erased.
5) Press **[Enter]** to continue. Press **[Esc]** to cancel.
   If **[Enter]** is pressed, PHLASH.EXE automatically updates the computer's BIOS.
   After the flashing process completes, the computer automatically reboots itself so changes immediately take effect.
6) Remove the BIOS diskette.

Configuring the Boot Block Jumper

Perform the following steps to configure the boot block jumper **(J32)**.

1) Turn off power to the computer.
2) Disconnect external devices and power.
3) Unlock and remove the cover.
4) Change the jumper setting of J32 from position 1 - 2 to position 2 - 3.
5) Close the drive bay subassembly.
6) Replace and lock the cover.
7) Reconnect external devices and restore power.
8) Repeat steps 2 - 5 of the BIOS update procedure.
9) Repeat steps 1 - 4 of this procedure.
10) Restore the jumper setting of J32 to position 1 - 2.
11) Repeat steps 6 - 8 of this procedure. The BIOS should now be successfully upgraded.

Utilities and Video Drivers

Setting High Resolution Mode for the Monitor

When purchasing a high resolution monitor, you might want run the Windows 95 Settings program and access the control panel *Display* selections to change the monitor type, video resolutionsand color depths to match the capabilities of the monitor. Refer to *"Changing System Setting"* section of the Windows 95 manual for more information.

S3refrsh.EXE is an MS-DOS based utility that works in conjunction with Windows 95 *Display* selections to set the video controller monitor refresh rates. This utility has been pre-installed and configured at the factory to meet most monitor resolution needs. In most cases this utility is never needed.

To use S3refrsh.EXE proceed as follow:

1) At the C:\> prompt type: ***S3refrsh.EXE*** and then press **[Enter]**.
   The S3refrsh utility screen appears.
   The refresh options are shown on the left side and the corresponding resolutions are displayed on the top of the matrix.
2) Click on the desired boxes.
   The "X" mark means that a selection is not valid. Selected refresh rates are defined by check marks.
3) Click on EXIT to set the new refresh rate.
   The utility will then prompt when wishing to save the changes in the AUTOEXEC.BAT file. Confirm by entering yes **[Y]**.

Configuring Audio

In most cases, the Starion computer came with audio already configured. If not, there are audio applications included within Windows 95. Use these applications to set up and configure the computer's audio. Any supplied audio drivers are located in the PC Audio directory.

NOTE Audio is already installed in the computer. As a result, the Audio DMA and Audio IRQ options in the BIOS Setup are factory set to Enabled.

Plug and Play

Plug and Play technology eliminates the process of manually configuring optional Expansion Boards for operation in the computer. With Plug and Play, the computer's BIOS and the hardware logic built into Plug and Play expansion boards work together to automatically assign the proper computer resources (interrupt requests (IRQs), I/O and memory addressesand direct memory access (DMA) channels).
Plug and Play technology also makes installing older legacy expansion boards much easier.
Information about Plug and Play depends on what Windows-based operating environment you are using.

- "Windows 95" - Plug and Play is integrated in Windows 95. Refer to the Windows 95 information set.
  Refer to the Windows 95 documentation for additional information and installing legacy expansion boards.

Using The Remote Support Diskette

The Remote Support diskette contains software that enables a Digital service representative to remotely troubleshoot the computer over the telephone lines prior to making a service call. Instructions on using this diskette will be provided by the service representative assisting in troubleshooting the computer. Keep this diskette in a safe place and have it available when calling Digital for service.

BIOS Setup Utility

This chapter provides information on how to configure the computer using the BIOS Setup utility. If the computer was delivered with factory-installed software, it has already been configured.
When familiar with utility programs and their uses, refer to the appropriate sections in this chapter to set up or update the computer. Otherwise, carefully read this chapter before attempting to modify the computer's configuration settings.

Running the BIOS setup Ultility

The BIOS Setup utility enables to select and permanently store information about the computer's hardware and software in the battery-backed memory of the CMOS RAM. This information takes effect each time the computer boots and can be changed each time setup is runned.
Use the BIOS Setup utility when experiencing problems with the hard disk or when reconfiguration of the computer is needed. In addition, the BIOS Setup utility might be necessary to modify the configuration after hardware is added or removed, or computer settings are changed.

To run the BIOS Setup utility, perform the following steps:

1) Turn on the computer and allow the POST to complete.
2) Make a note of any configuration errors listedand then press **[F2]** to display the main menu.
3) Follow the instructions on the monitor screen and any on-line help pop-up screens to configure the computer.

Updating The Computer's Configuration

The following sections list the BIOS Setup utility options that can be updated or modified using the following menu selections:

- Main — enables to set basic computer configuration options (time, date, video, etc.).
- Advanced — enables to set advanced features to increase computer performance (memory, COM ports, LPT port, etc.).
- Security — enables to set passwords and backup data reminders.
- Power — enables to set power saving options to conserve electricity and increase the life of the computer.
- Exit — enables to quit the current menu and save setup changes.

Helpful Hints

Below are some helpful hints when using the BIOS Setup utility:

- Several keyboard function keys and numeric keypad keys are assigned to help to select menus and sub-menus, options, change option valuesand display help information. These keys are displayed at the bottom of the main menu and from the General Help pop-up screen.
- Item-specific help is available anytime during the setup process and appears at the right of the setup screen each time an option is highlighted. This on-line help provides information about a highlighted option.
- Select *"Save Changes & Exit*" to save all Setup values.
- Select *"Discard Changes & Exit"* to exit Setup without recording any changes.
- Select *"Get Default Values"* to set all Setup options to their default values.
- Select *"Load Previous Changes"* to restore all CMOS values from the last session.
- *Select "Save Changes"* to save all selections without exiting Setup.
- Press **[Esc]** to exit the Setup utility.

BIOS Setup Utility Options

The following topics list the BIOS options that can be updated or modified by using the BIOS Setup utility, according to the various sub-menus under which they appear.

NOTE In some cases, options might be listed in a different order than they actually appear in the sub-menus.

Main Menu Options

Menu Fields	*Settings*	*Comments*
System time	Current time	Displays the current time.
System date	Current date	Displays the current date.
Language	English	This field only displays the current language of the BIOS.
Diskette drive A / Diskette drive B	1.44 MB, 3½ 2.88 MB, 3½ Not Installed 1.2 MB, 5¼ 720 KB, 3½	Sets the size and density of diskette drives.
Video system	EGA / VGA CGA 80x25 Monochrome	Sets the video controller type.
System memory	Not user selectable	Displays the amount of base (conventional) memory each time the computer boots.
Extended memory	Not user selectable	Displays the amount of extended memory each time the computer boots.

Hard Disk Options (IDE Adapter 0/1 Master/Slave)

Menu Fields	*Settings*	*Comments*
Autotype fixed disk		Press [Enter] to detect and fill in the installed hard disk drive parameters in the remaining fields.
Type	None to 39 User	Selecting None to 39 automatically fills in the remaining fields in this menu. Selecting User allows the remaining fields to be filled in manually, using the installed hard disk drive's parameters.
Cylinders	0 to 4095	Displays the number of cylinders.
Heads	1 to 64	Displays the number of heads.
Sectors/track	0 to 63	Displays the number of sectors/track.
Landing Zone	0 to 4095	Displays the resting or park position of the heads when the HDD is inactive.
Write precomp	0 to 4095 None	Displays the number of cylinders that have their write timing changed.

Hard Disk Options (IDE Adapter 0/1 Master/Slave) (continued)

Menu Fields	*Settings*	*Comments*
Multi-sector transfers	2 sectors 4 sectors 8 sectors 16 sectors Auto Disabled	Determines the number of sectors per block for multiple sector transfers. Auto refers to the size the disk returns when queried.
LBA control mode	Disabled Enabled	Enabling LBA causes logical block addressing to be used instead of cylinders, headsand sectors.
32 Bit I/O	Enabled Disabled	Enables or disables 32-Bit data transfer with the IDE HDD. If enabled, Read Ahead Mode is also enabled and cannot be changed by the user.
Transfer Mode	Standard Fast PIO1 Fast PIO2 Fast PIO3	Selects the method to transfer data to and from the HDD. If autotype is used to identify the HDD, Setup automatically selects the optimum transfer mode.
Read Ahead Mode	Enabled Disabled	When enabled, the read ahead buffer in the local bus IDE controller increases HDD performance. Enabled is selected automatically if 32-Bit I/O is enabled.

Memory and Cache

Menu Fields	*Settings*	*Comments*
Internal cache	Enabled Disabled	Enables or disables the computer's internal cache.
External cache	Enabled Disabled	External cache is not present or upgradeable on Starion 200i/300i systems.
System BIOS shadow	Not user selectable, permanently set to Enabled.	The main logic board reserves an area of DRAM, called "shadow memory" for a copy of system BIOS ROM. This DRAM is write-protected and has the same addresses as the system BIOS ROM locations. When system BIOS ROM is shadowed, the ROM information is copied into an appropriate area in DRAM. This increases the computer's performance because the system BIOS instructions are in fast DRAM instead of ROM.
Cache system BIOS	Enabled Disabled	This option enables the system BIOS to be cached in the internal cache and external cache (if installed). This increases computer performance because BIOS instructions can be executed in cache instead of RAM.

Video BIOS shadow	Enabled Disabled	The main logic board reserves an area of DRAM, called "shadow Memory", for a copy of video BIOS ROM. This DRAM is write-protected and has the same addresses as the video BIOS ROM locations. When video BIOS ROM is shadowed, the ROM information is copied into an appropriate area in DRAM. This increases the computer's performance because the video BIOS instructions are in fast DRAM instead of ROM. For PCI VGA cards, video BIOS is always shadowed, regardless of this field's setting.

Memory and Cache (continued)

Menu Fields	*Settings*	*Comments*
Cache video BIOS	Enabled Disabled	This option enables the video BIOS to be cached in the internal cache and external cache (if installed). This increases computer performance because video BIOS instructions can be executed in cache instead of RAM.
Shadow 16K at: **C8000h** **CC000h** **D0000h** **D4000h** **D8000h** **DC000h**	Enabled Disabled	Enables or disables shadowing of individual segments of ROM to increase computer performance.
AT bus space	Disabled F80000h, 0.5 MB F00000h, 1 MB	Memory hole not available; upper memory is contiguous. Sets the memory hole at address F80000 with 0.5 MB memory available. Sets the memory hole at address F00000 with 1 MB memory available.
Extended memory report	Compatibility Non-compatibility	Selects the BIOS report mechanism for memory amount.Select Compatibility when using a conventional operating system. Select Non-compatibility for extended memory above 64 MB under Windows NT v3.1.

Boot Options

Menu Fields	*Settings*	*Comments*
Boot sequence	A: only A: then C: C: then A: C: only	Each time the computer boots, it will load the operating system from the sequence selected.
SETUP prompt	Enabled Disabled	Enables or disables the <F2> Setup prompt each time the computer boots. Selecting Disable only disables the prompt indicating when to press <F2> to enter Setup. Setup can still be entered by pressing <F2> before POST completes.
POST errors	Enabled Disabled	Enabling this option causes the computer to pause and display a setup entry or resume the boot prompt if an error occurs at boot. If this option is disabled, the computer will always attempt to boot regardless of a setup entry or error.
Floppy check	Enabled Disabled	Enabling this option causes the computer to verify the diskette type each time the computer boots. Disabling this option speeds up the boot process.
Summary screen	Enabled Disabled	Enabling this option causes the computer to display configuration parameters (in the form of a summary screen) during boot.

Keyboard Features

Menu Fields	*Settings*	*Comments*
Numlock	Auto On Off	Turns Numlock on or off each time the computer boots.
Key click	Disabled Enabled	Enables or disables the audible key click feature.
Keyboard auto-repeat rate	2/sec 6/sec 10/sec 13.3/sec 18.5/sec 21.8/sec 26.7/sec 30/sec	Sets the number of times a second to repeat a keystroke while the key is held down.
Keyboard auto-repeat delay	1/4 sec 1/2 sec 3/4 sec 1 sec	Sets the delay time after a key is held down before it begins to repeat a keystroke.

Advanced Options

Menu Fields	*Settings*	*Comments*
Large disk access mode	DOS Other	Select DOS if MS-DOS is installed. Select Other if another operating system is installed. A large disk drive constitutes one that has more than 1024 cylinders, 16 heads, or 63 tracks per sector.
Plug & Play O/S	Yes No	Select Yes if using a Plug & Play operating system such as Windows 95. Otherwise, select No.
Reset Configuration	Yes No	Select Yes to clear the system configuration data when suspecting it is corrupted, which sometimes occurs after a power outage. This option also clears the Plug & Play databases. After inputting correct settings (or accept the default settings), the computer switches this setting back to No. When clearing of the system configuration data is not needed, leave the setting at No.

Integrated Peripherals

Menu Fields	*Settings*	*Comments*
Mouse port	Disabled Enabled	Enables or disables the mouse port.
Parallel port	Auto Disabled 3BC, IRQ 7 378, IRQ 7 278, IRQ 5	Enables or disables the onboard port at the specified address.
Parallel port mode	 Compatible mode Bi-directional mode ECP mode EPP 1.7 EPP 1.9	Sets the onboard parallel port mode. Standard printer connection. PS/2 compatible mode and able to receive data. Extended capabilities port mode. Enhanced parallel port mode. Selection based on what EPP version the printer supports. Only choose a mode that the parallel port device (such as a printer) supports. Check the parallel port device documentation for this information. If this information cannot be located, use the default setting.
Serial port 1	Auto Disabled 3F8, IRQ 4 2F8, IRQ 3 3E8, IRQ4 2E8, IRQ3	Enables or disables onboard serial port 1 at the specified address.Select Auto unless interrupts IRQ4 and/or IRQ3 are allocated as a computer resource. Two devices cannot share the same IRQ. Choosing Disable makes serial port 1 unusable. When selecting Auto, Setup configures COM1 to address = 3F8h and IRQ = 4.
Serial port 2	Auto Disabled 3F8, IRQ 4 2F8, IRQ 3 3E8, IRQ4 2E8, IRQ3	Enables or disables onboard serial port 2 at the specified address.Select Auto unless interrupts IRQ4 and/or IRQ3 are allocated as a computer resource. Two devices cannot share the same IRQ. Choosing Disable makes serial port 2 unusable. When selecting Auto, Setup configures COM2 to address = 2F8h and IRQ = 3.
Diskette controller	Enabled Disabled	Enables or disables the onboard diskette controller.
Exchange diskette drives	Disabled Enabled	Logically exchanges physical diskette drive designations.
Diskette write protection	Disabled Enabled	Enables or disables the selected diskette drive's write protect option.
IDE adapter 0 **IDE adapter 1**	Enabled Disabled	Enables or disables the onboard IDE controller.

Advanced Chipset Control

CAUTION

The following advanced chipset control options should normally stay at their default values. Change them only if necessary to correct specific operating problems or errors.

Menu Fields	*Settings*	*Comments*
PCI Slot 1 Latency Timer	Default(40h) 08h - F8h	Select Default or a value from 08h to F8h to set the PCI device's latency timer. Default uses the PCI device's power on setting
PCI Slot 2 Latency Timer	Default(40h) 08h - F8h	Select Default or a value from 08h to F8h to set the PCI device's latency timer. Default uses the PCI device's power on setting
VGA palette snoop	Enabled Disabled Default	This option controls how VGA devices handle accesses to their palette areas. Enabling this option causes special palette behavior (a device must not respond to normal accesses). Disabling this option causes a device to treat palette accesses like any other device access. Enable VGA Palette Snoop when a second video adapter is connected to the feature connector of the installed VGA adapter for multi-media devices.
Monitor	Auto Color Monochrome	Sets the monitor type. Auto automatically detects the monitor type. If Auto fails to correctly detect the monitor type, select Color or Monochrome as appropriate.
VGA Feature connector	Enabled Disabled	Use with VGA add-in cards to inform card not to claim VGA palette writes. Use to inform VGA add-in cards to claim VGA palette writes.
Onboard VGA IRQ	Enabled Disabled	Select Enabled if the application requires VGA IRQ.

Security Options

Menu Fields	*Settings*	*Comments*
Supervisor password is	Not user selectable (Disabled)	Indicates whether or not the supervisor's password is enabled or disabled.
User password is	Not user selectable (Disabled)	Indicates whether or not the user's password is enabled or disabled.
Set supervisor password	Press [Enter]	Allows a supervisor password to be set. The supervisor password must be set if a user password is to be used. When the supervisor later enters his or her password, all user selectable features are accessible.

Security Options (continued)

Menu Fields	*Settings*	*Comments*
Set user password	Press [Enter]	Allows a user password to be set. This password can be set only if a supervisor password is entered. When the user has entered his or her name but the supervisor is not logged in, only the following information is accessible: Supervisor password is Enabled. User password is Enabled. Set user password [press enter] to enter a user password. Password on boot Enabled/Disabled (which ever is in effect). This option is not allowed to change. Custom sign on banner Enabled/Disabled (which ever is in effect). This option is not allowed to change.
Password on boot	Enabled Disabled	Enables or disables the enter password on boot option.
Custom sign on banner is	Not user selectable (Disabled)	Indicates whether the custom sign on banner is enabled or disabled.
Custom sign on banner	Press [Enter]	Press [Enter] to enter a custom sign on banner that displays during POST. For example, the user might enter “Welcome to John’s machine.” The maximum number of characters is 50.
Diskette access	Supervisor User	Controls who has access to diskette drives. If Supervisor is selected, access to the diskette drive mouse limited to the supervisor, who must enter his or her password. If User is selected, the diskette drive can be accessed by entering either the supervisor or the user password. Whatever setting is chosen, it only becomes functional if both a Supervisor Password and a User Password have been set (when choosing User for the setting).
Fixed disk boot sector	Normal Write protect	Write protects the boot sector on the hard disk drive.
Network server	Enabled Disabled	This option keeps the computer from being accessed during network operation.
System backup reminder	Disabled Daily Weekly Monthly	Enables or disables the system backup reminder message.
Virus check reminder	Disabled Daily Weekly Monthly	Enables or disables the virus check reminder message.
Keyboard quick lock	Enabled Disabled	Select Enabled to "quick lock" the keyboard. Select Disabled to disable this feature.

Power Options

Menu Fields	*Settings*	*Comments*
Power management	Enabled Disabled	Enable this field to use any of the power management options. If this field is enabled and the other fields are disabled, only minimal power reduction is affected.
System standby timer	Disabled 1 min. 5 min. 10 min. 20 min. 30 min.	After a set period of computer inactivity, the BIOS places the computer in a standby state (medium power savings), that is, the Energy Star-compatible monitor and hard disk are set to a medium power-saving state. Any mouse or keyboard activity quickly returns the computer to operation. Disabling this option prevents this feature from operating. Power management must be enabled to use this option.
System suspend timer	Disabled 1 hour 1.5 hours 2 hours 3 hours 6 hours 12 hours	After a set period of computer inactivity, the BIOS places the computer in a suspend state (maximum power savings), that is, the Energy Star-compatible monitor, hard disk, CPU and fan are shut off. If a timer is set for the field, set Power Management to Enabled. Disabling this option prevents this feature from operating. Power management must be enabled to use this option.
Suspend Lock system	No Yes	When enabled, the system locks the keyboard and the mouse until the power-on password is entered.
Quick suspend	Disabled User-selected key sequence	Selects the key combination used to put the system in suspend mode.

Chapter 3 Service Procedures

Safety Requirements

WARNING

Static electricity collects on non-conductors such as paper, cloth, or plastic. A static discharge can be damaging even though it often cannot be felt or seen.

The following safety precautions must be observed to insure product and personal safety and prevent damage to circuit boards and/or components.

- Always wear an ESD wrist strap when handling ESD sensitive material and be sure it is properly connected.
- Keep circuit boards and components away from non-conductors.
- Keep clothing away from circuit boards and components.
- Keep circuit boards in anti-static bags.
- Be cautious when AC power is exposed when working on an assembly.
- Always use an ISOLATION TRANSFORMER when diagnosing any terminals, monitors or power supplies when AC power is applied.
- Be cautious of very high voltage potentials when working with monitors.

There should be an approved insulating mat (for technician safety) in front of any workbench where monitors, terminals or power modules are being serviced when power is applied.

NOTE Do NOT wear ESD straps when working on terminals,monitors or power supplies when AC power is applied. This is to avoid the hazard of electrical shock.

Recommended Tools

The following tools are needed for servicing Digital PC systems. Note that test equipment must be calibrated.

- Multimeter (4 1/2 digit)
- A philips screwdriver
- An antistatic wrist strap

Other Materials Needed

Cleaning agent should be an all purpose cleaner that is used in-house.

Remedial Diagnostic Test Software

- ***QAPLUS/fe*** , PC Advanced Diagnostic Software, latest version.
  Supplier information:
  Diagsoft, Inc.
  5615 Scotts Valley Drive, Suite 140
  Scotts Valley, California 95066, U.S.A
  Voice: 1-408-438-8247
  Fax: 1-408-438-7113
  Internet: http://www.diagsoft.com (Diagsoft, Inc. homepage)

Recommended Virus Detection and Cleanup Software

- ***F-PROT***, Virus Detection and Cleanup Software, latest version.
  Supplier information:

  North America, South America, Australia and New Zealand:
  Command Software Systems Inc.
  Tel: +1-407-575 3200
  Fax: +1-407-575 3026

  Most of Europe, Africa, Middle and Far East:
  Data Fellows Ltd
  Paivantaite 8
  FIN-02210 ESPOO
  FINLAND
  tel: +358-0-478 444
  fax: +358-0-478 44 599
  e-mail: f-prot@datafellows.fi
  Internet: http://www.datafellows.fi (Data Fellows Ltd. homepage)

ECO/FCO Information

BIOS version information

Refer to the Digital DECpc Bulletin Board Support (telephone number: **1-508-496-8800** for the latest information on BIOS upgrades).

NOTE This BBS is **NOT** a source for technical support. For advice, please call the Digital Equipment Service Representative **1-800-354-9000**

Unlocking and Removing the Cover

Before removing the cover, do the following:

1) Turn off power to all external devices connected to computer.
2) Turn computer off.
3) Unplug power cord from wall outlet.
4) Disconnect power cord and monitor cord from computer.

WARNING

You might injure yourself or damage the computer if you attempt to remove the cover before unplugging ac and monitor power cords.

Removing the cover

The computer's cover must be removed prior to install any hardware option.

To remove the cover:

1) Loosen and remove three screws along perimeter of rear panel to release cover from chassis.
2) Carefully slide cover toward front of chassis until it clears rear panel.
3) Carefully lift cover from chassis.

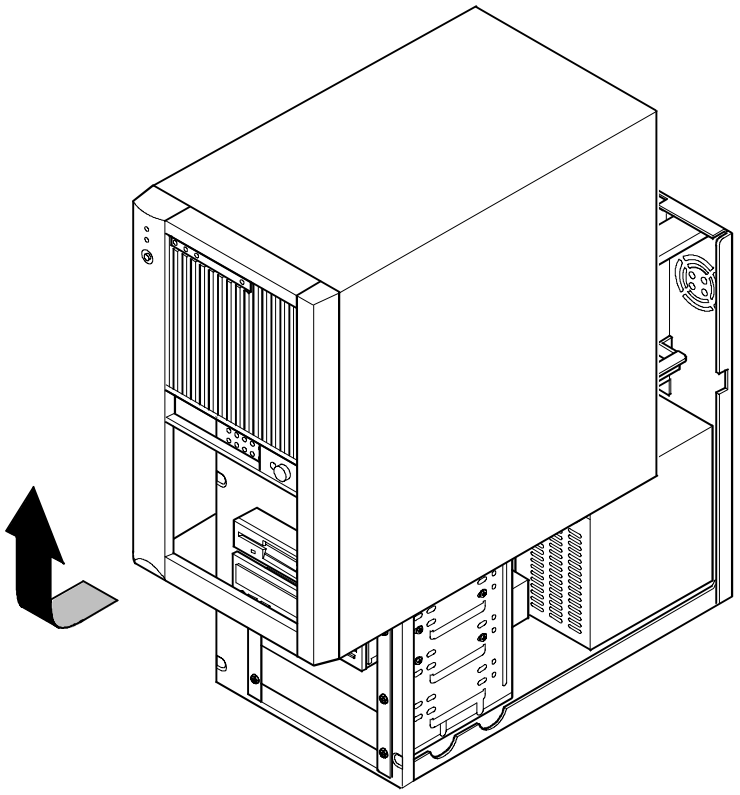

Figure 3 - 1 Removing the Cover

Computer Components

Legend	*Component*
A	Power supply
B	Main logic board
C	3½-inch diskette drive
D	CD-ROM drive
E	Front drive bays
F	Internal drive bay
G	Riser card; supports up to five expansion cards: 2 PCI and 3 ISA or 4 ISA and 1 PCI
H	FAX/Modem/Sound card

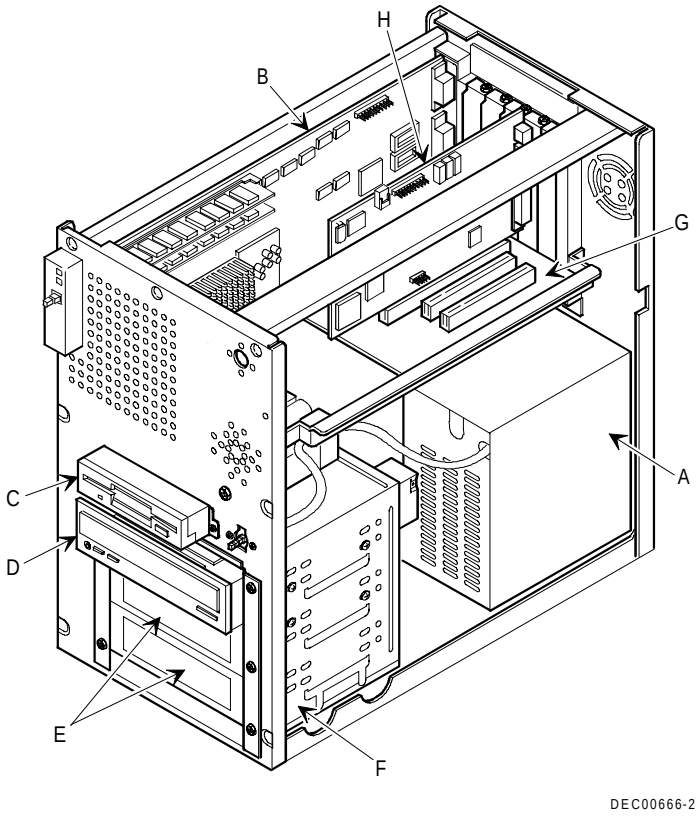

Figure 3 - 2 Computer Components

Expansion Slots

The Starion riser card contains six slots for installing:

- Three ISA expansion boards and two PCI expansion boards or
- Four ISA expansion board and one PCI expansion boards (refer to the table).

The computer automatically assigns the necessary resources to any installed Plug and Play-compatible expansion board so it operates at maximum performance. When planning on installing non-Plug and Play expansion boards, it may be necessary to manually set jumpers on the board based on the computer resources already allocated.

Expansion Slot Types & Locations

Expansion Slot	*Type*	*Description*
J1	ISA	Supports half-length industry-standard 16-bit ISA expansion boards
J2 and J3	ISA	Supports full-length industry-standard 16-bit ISA expansion boards
J4	ISA	Supports full-length industry-standard 16-bit ISA expansion boards Designated as a shared slot with PCI slot J5[(1)]
J5	PCI	Supports full-length 32-bit PCI local bus expansion boardsDesignated as a shared slot with ISA slot J4[(1)]
J6	PCI	Supports full-length 32-bit PCI local bus expansion boards

[(1)] Only one expansion board can reside in slot J5 and J4 at any one time. These slots have to share the slot opening at the rear
panel

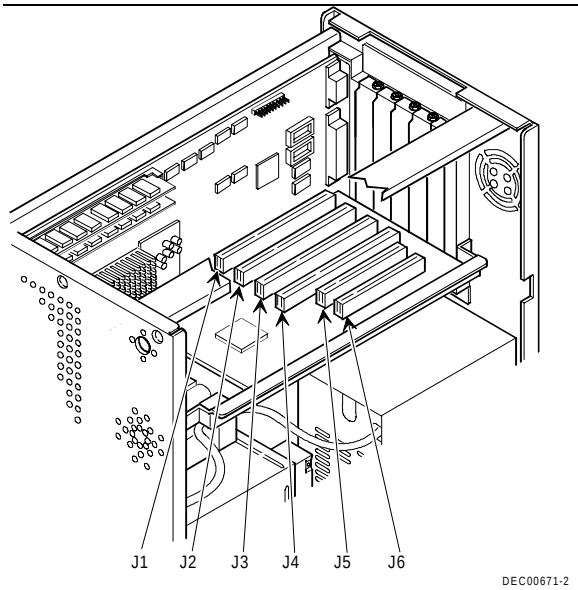

Figure 3 - 3 Expansion Slots

Main Logic Board Jumpers

Jumper pins allow to set specific computer parameters. They are set by changing the pin location of jumper blocks. Note that the square pin of each jumper block is pin 1. A jumper block is a small plastic-encased conductor (shorting plug) that slips over the pins. To change a jumper setting, remove the jumper from its current location. Place the jumper over the two pins designated for the desired setting. Press the jumper evenly onto the pins. Be careful not to bend the pins.

CAUTION

Do not touch any electronic component unless you are safely grounded. Wear a grounded wrist strap or touch an exposed metal part of the system box chassis. A static discharge from your fingers can result in permanent damage to electronic components.

Main Logic Board Jumper Settings

Settings shown in ***bold italics*** are factory defaults

Feature	*Description*	*Setting*
CPU clock	50 MHz ***60 MHz*** 66 MHz	J22, open J21, open ***J22, open*** ***J21, jumpered*** J22, jumpered J21, jumpered
CPU core/bus frequency	2/1	J27, jumpered
Recovery mode	***Normal*** Recovery mode	***J10, open*** J10, jumpered
Password clear	Normal mode Password clear (MFG test)	J11, open J11, jumpered
Boot block write protect	***Disable BIOS boot block from being rewritten*** Enable BIOS boot block write	***J32, pins 2 and 3 jumpered*** J32, pins 1 and 2 jumpered

CAUTION

Use of the BIOS boot block jumper is normally reserved for factory use only. Keep this jumper in the factory default (disabled) position at all times and only use when instructed by a Digital service representative. Unauthorized use can cause the computer to operate incorrectly.

Main Logic Board Jumper Locations

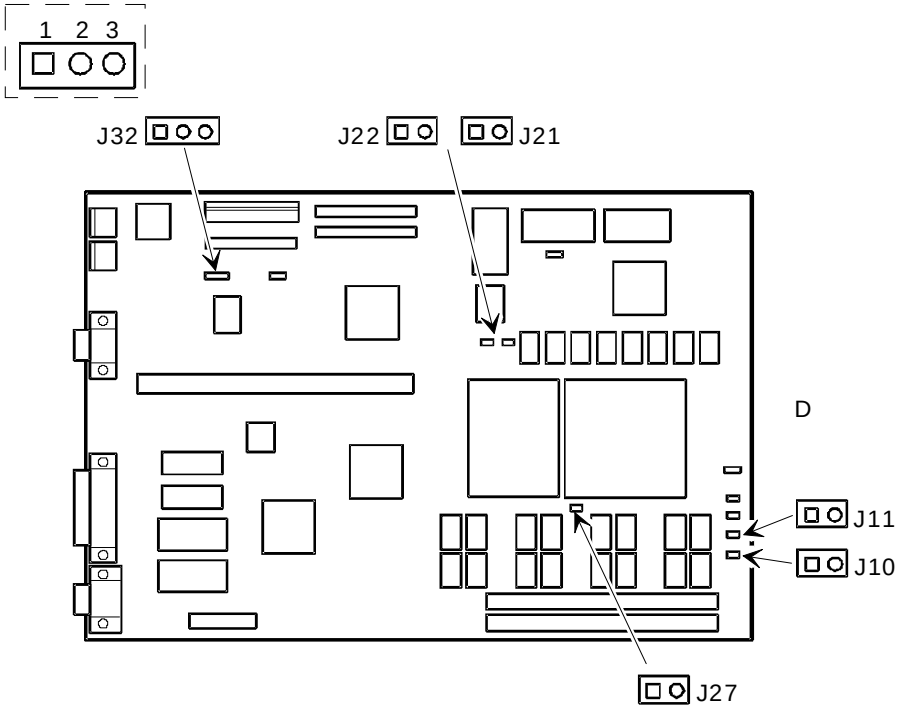

Figure 3 - 4 Main Logic Board Jumper Locations

Computer Memory Configurations

Adding more memory allows the computer to run larger, more complicated software and to run it faster. The computer comes with 8 MB of memory hardwired to the main logic board. Additional memory can be installed, to a maximum of 128 MB, using the two SIMM sockets on the main logic board.

When adding SIMMs, be sure to:

- Install a matching pair only.
- Install 32-bit SIMMs having an access time of 70 ns or less. Supported SIMM sizes: 4 MB, 8 MB, 16 MB, 32 MB or 64 MB.
- For improved performance, Starion Minitower PC computers are designed with interleaved memory. This feature requires to populate both sockets. Ensure that the SIMM in each socket is the same type, sizeand speed. Therefore, a 4-MB SIMM in socket J23 requires a 4 MB SIMM in socket J24.

Memory Configurations

Onboard	*Socket J23*	*Socket J24*	*Total*
8 MB			**8 MB**
8 MB	4 MB	4 MB	**16 MB**
8 MB	8 MB	8 MB	**24 MB**
8 MB	16 MB	16 MB	**40 MB**
8 MB	32 MB	32 MB	**72 MB**
Disabled	64 MB	64 MB	**128 MB**

Starion SIMM Sockets Locations

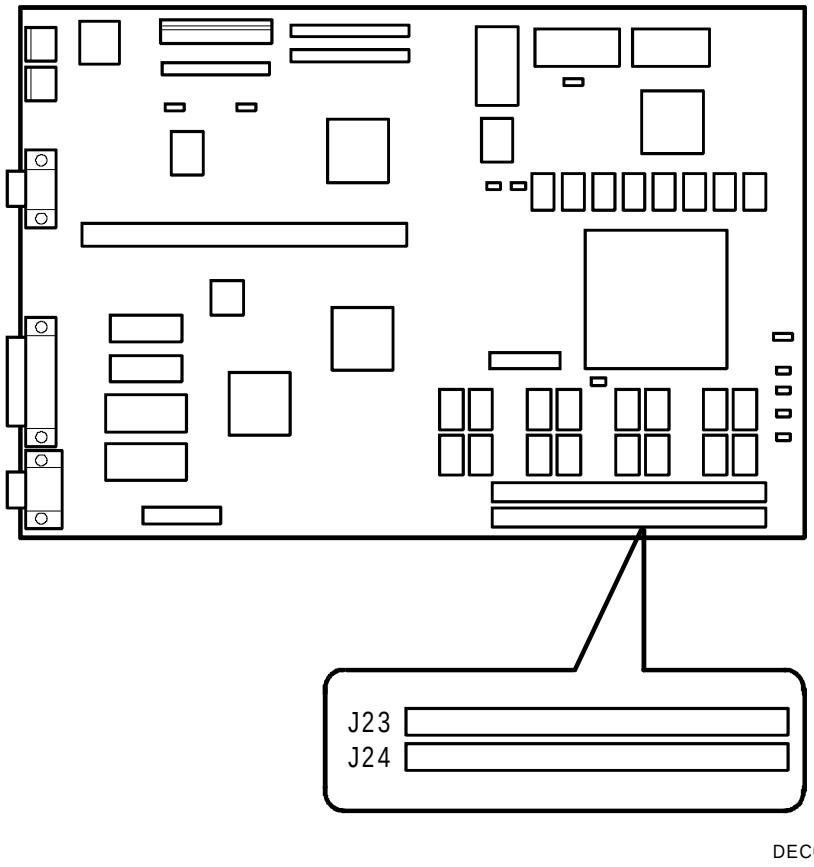

Figure 3 - 5 SIMM Socket Locations

Part Removal and Replacement

Removing the 3½-Inch Diskette Drive

To remove the 3½-inch diskette drive:

1) Turn off the computer.
2) Disconnect external devices, ac power and monitor power.
3) Remove cover.
4) Remove two screws securing the diskette drive to front panel.
5) Disconnect power cable.
6) Slightly lift front of drive to clear front panel and slide diskette drive out of the front of the chassis.
7) Disconnect ribbon cable.
8) Refer to "*Connecting Diskette and IDE Devices"*.

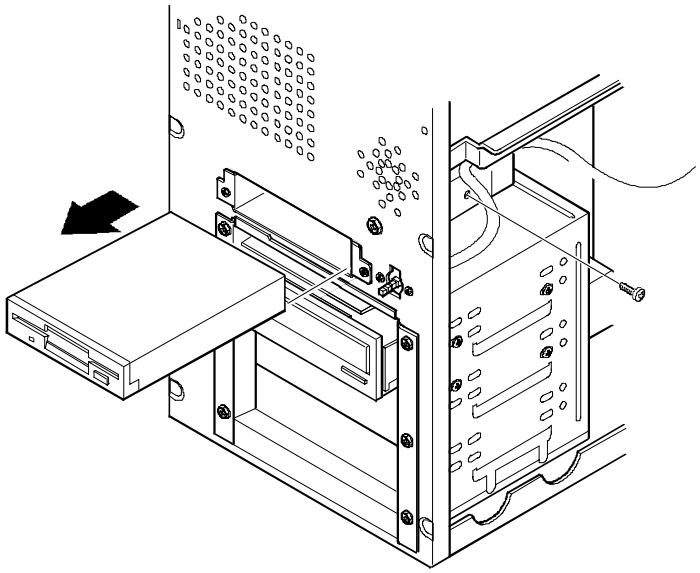

Figure 3 - 6 Removing the 3½-Inch Diskette Drive

Removing a 5¼-Inch Device

To remove a 5¼-inch device:

1) Turn off the computer.
2) Disconnect external devices, ac powerand monitor power.
3) Remove cover.
4) Remove four screws securing the device to device bay.
5) Disconnect power and data/audio cables.
6) Refer to "*Connecting Diskette and IDE Devices"*.
7) Slide device out of the front of the chassis.

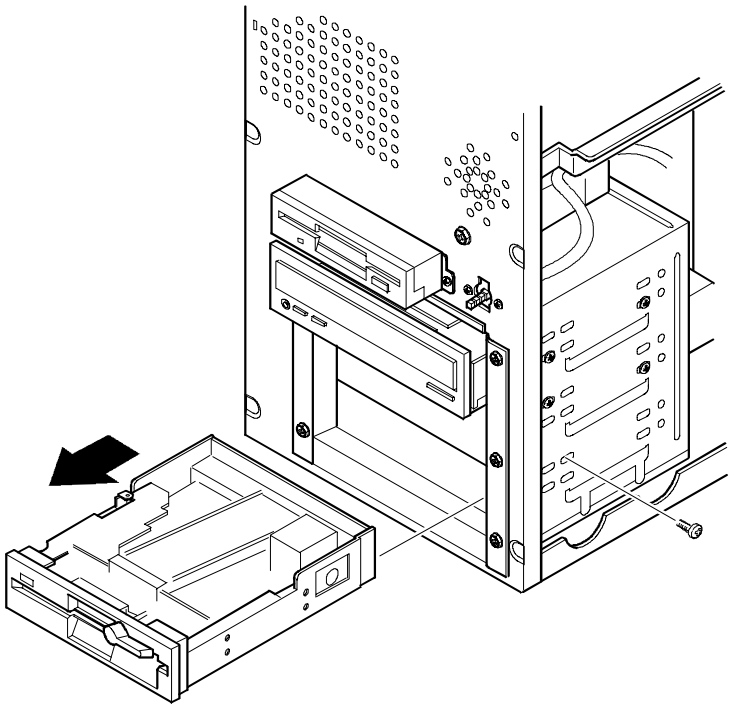

Figure 3 - 7 Removing a 5¼-Inch Device

Removing the IDE Hard Disk Drive

To remove the IDE hard disk drive:

1) Turn off the computer.
2) Disconnect external devices, ac power and monitor power.
3) Remove cover.
4) Remove metal filler plate.
5) Remove four screws securing hard disk drive to device bay.
6) Disconnect power and ribbon cables.
7) Slide drive toward rear of computer to clear guide tab on left side.
8) Lift front of device up and over guide tab and slide drive out of the front of the chassis. Refer to "*Connecting Diskette and IDE Devices*".

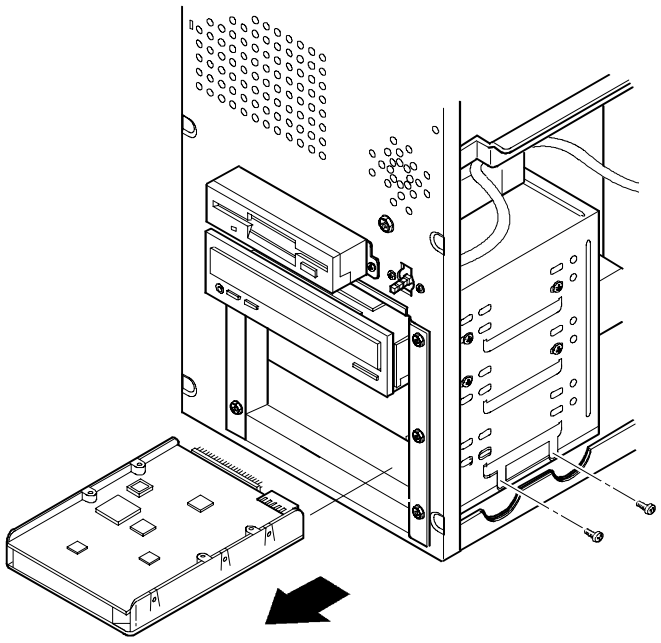

Figure 3 - 8 Removing the IDE Hard Disk Drive

Removing Expansion Boards

To remove an expansion board:

1) Turn off the computer.
2) Disconnect external devices, ac power and monitor power.
3) Unlock and remove cover.
4) Remove screw from metal filler plate.
5) Gently pull board outward.

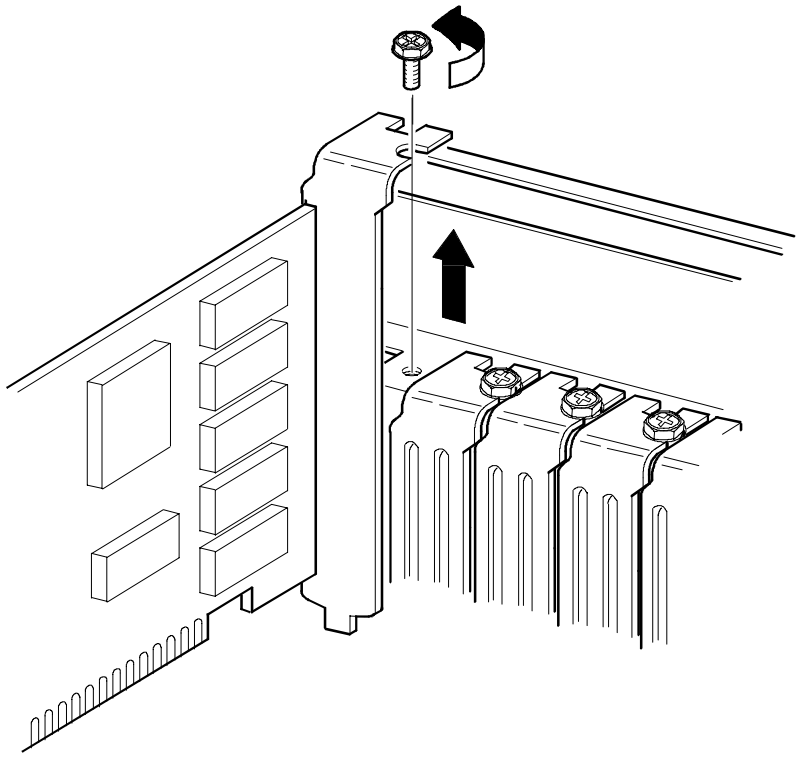

Figure 3 - 9 Removing Expansion Boards

Removing the Main Logic Board

To remove the main logic board:

1) Turn off the computer.
2) Disconnect external devices, ac power and monitor power.
3) Unlock and remove cover.
4) Remove all connectors.
5) Remove all expansion boards.
6) Remove the riser card and bracket.
7) Remove screws and lift the board out.

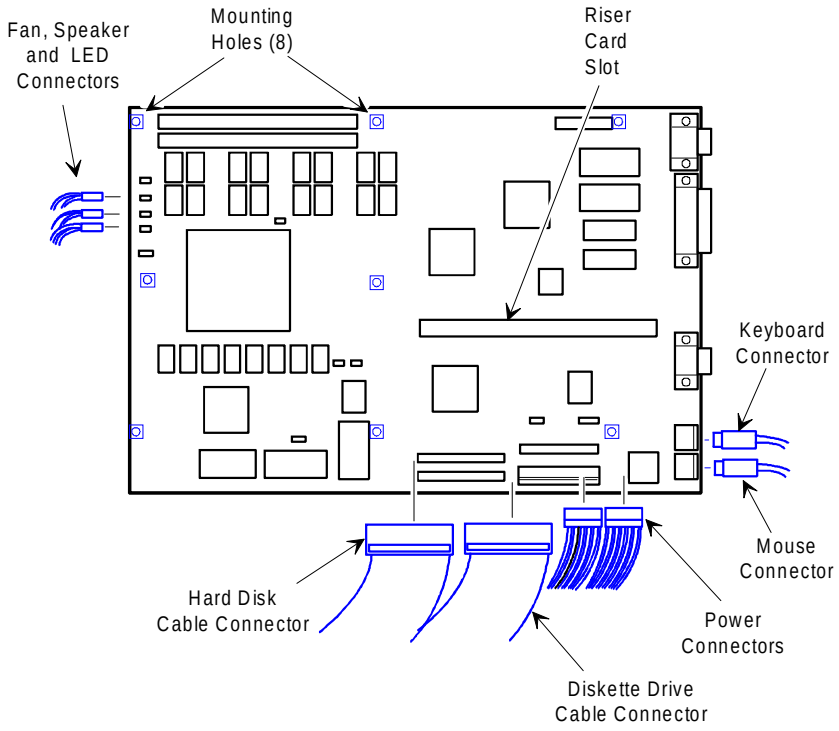

Figure 3 - 10 Removing the Main Logic Board

Removing the Power Supply

To remove the power supply:

1) Turn off the computer.
2) Disconnect external devices, ac power and monitor power.
3) Remove cover.
4) Disconnect power supply cabling from main logic board noting the proper orientation.
5) Disconnect power supply cables from all devices.
6) Loosen two screws securing power on/off switch to chassis.
7) Remove screws securing power supply to chassis (bracket on bottom of case (one) and rear panel (four).
8) Remove power supply and power on/off switch from the chassis.

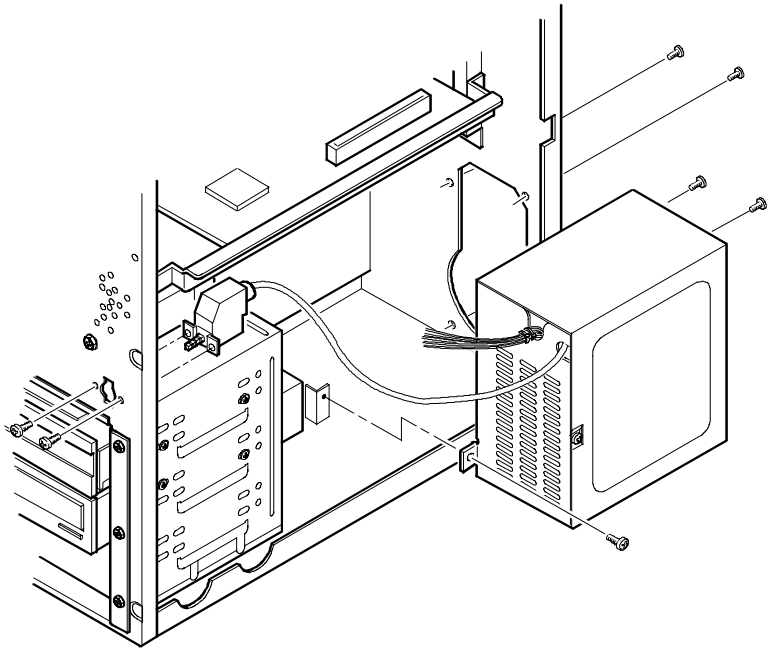

Figure 3 - 11 Removing the Power Supply

Removing Riser Card & Bracket

To remove the riser card and bracket:

1) Turn off the computer.
2) Disconnect external devices, ac power,and monitor power.
3) Remove cover.
4) Remove all expansion boards.
5) Remove screws securing bracket to front panel and expansion slot panel.
6) Carefully pull bracket and riser card from computer.

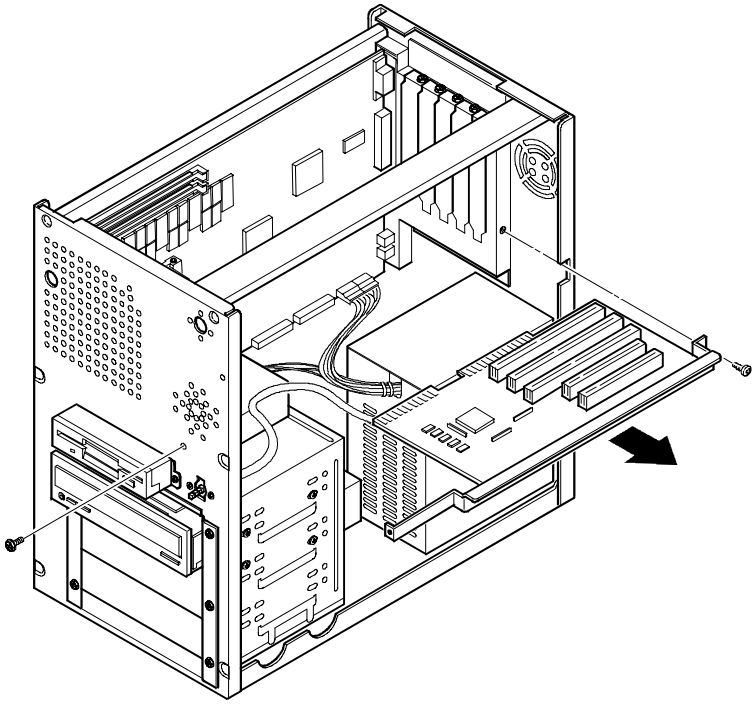

Figure 3 - 12 Removing Riser Card & Bracket

Installation Procedures

Installing a Higher Performance CPU

The Starion main logic board is equipped with a Pentium processor installed in a ZIF socket (Socket 5 type) and a voltage regulator that supports 3.3V dc Pentium Processors.

To install a higher-performance CPU:

1) Turn off the computer, disconnect external devices, ac power and monitor power.
2) Unlock and remove cover.
3) Lift up on lever to release old CPU.
4) Remove old CPU.
5) Install new CPU.
6) Make sure pin 1 on CPU is aligned with pin 1 on ZIF socket (A).
7) Return release lever to its original position and then set all appropriate CPU jumpers. Refer to *"Main Logic Board Jumper Settings"*.
8) Replace and lock cover and connect external devices and restore power.

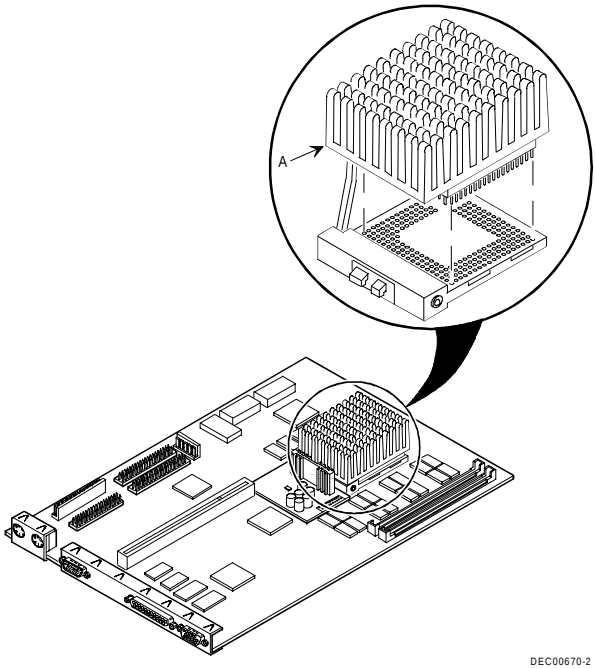

Figure 3 - 13 Installing a Higher Performance CPU

Installing Video Memory

The computer comes standard with 1 MB of video memory. Starion models 930, 940and 2000 can be upgraded to 2 MB by installing two 512 KB video DRAM chips in the designated sockets on the main logic board.

To install the video memory upgrade chip:

1) Turn off the computer.
2) Disconnect external devices, ac power and monitor power.
3) Remove cover.
4) Remove upgrade chips from packaging and install in socket.
5) Make sure pin 1 on chip is aligned with pin 1 on socket **(A).**
6) Replace cover.
7) Connect external devices and restore power.

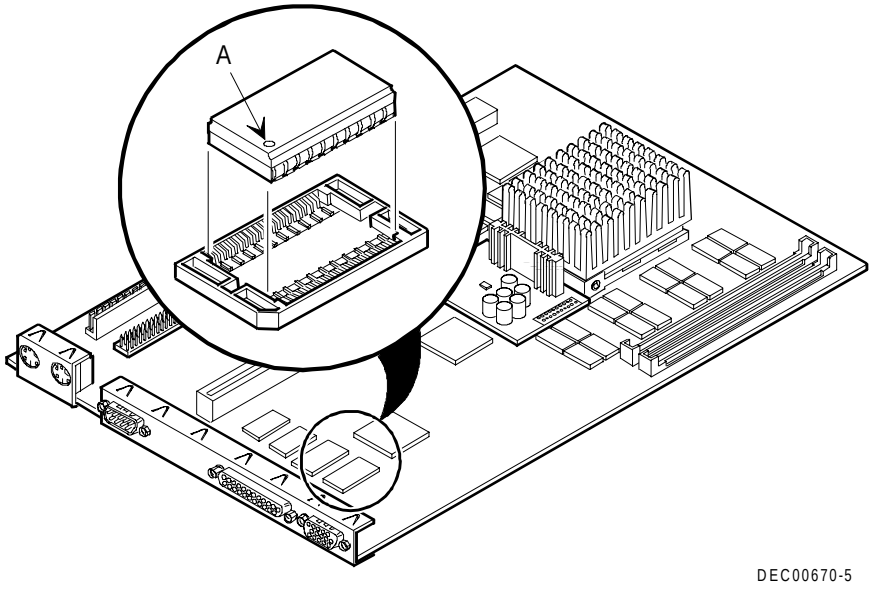

Figure 3 - 14 Installing Video Memory

Replacing the Real-Time Clock (RTC)/ Lithium Battery

The Starion Minitower PC computer Comes either with a Lithium 3V wafer-style battery or a Dallas RTC. If the computer ever fails to retain the correct date, time, or configuration settings when it is turned on, replacement of the installed device is necessary.

To replace the RTC, perform the following:

1) Record computer configuration settings using the BIOS Setup utility.
2) Turn off the computer, disconnect external devices, ac power and monitor power.
3) Unlock and remove cover.
4) Carefully extract old RTC from socket.
5) Install new RTC.

CAUTION

Make sure pin 1 on RTC is correctly aligned with location on socket (A). Incorrect installation can cause faulty computer operation.

6) Replace the cover.
7) Connect external devices and restore power.
8) Run BIOS Setup utility to reconfigure computer using recorded configuration settings from step 1.
9) Refer to BIOS Setup Utility.

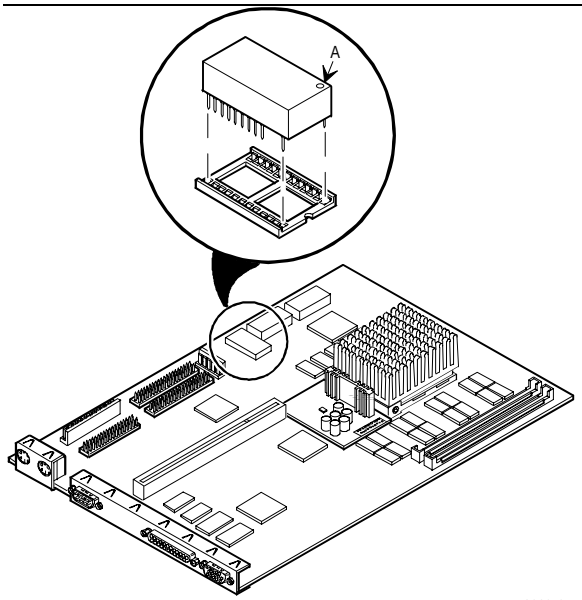

Figure 3 - 15 Replacing the Real-Time Clock (RTC)

Replacing the Computer Battery

To replace the lithium battery, perform the following:

1) Record computer configuration settings using the BIOS Setup utility.
2) Turn off the computer.
3) Disconnect external devices, ac power and monitor power.
4) Remove cover.
5) Carefully lift up on retaining clip and remove old battery.

WARNING

There is a danger of battery explosion if a Lithium battery is incorrectly replaced. To prevent damage to the computer, be sure the + side faces up when installing a new battery. Also be sure to replace the battery with either a Digital (P/N 12-41474-05), Toshiba (P/N CR20302) or equivalent 3V dc Lithium battery.

Depending on your locality, the computers battery might be considered hazardous waste. Make sure to follow any state or local statute to properly dispose of the old battery.

6) Install new battery.
7) When installing new battery, make sure + side faces up.
8) Replace cover.
9) Connect external devices and restore power.
10) Run BIOS Setup utility to reconfigure computer using recorded configuration settings from step 1.

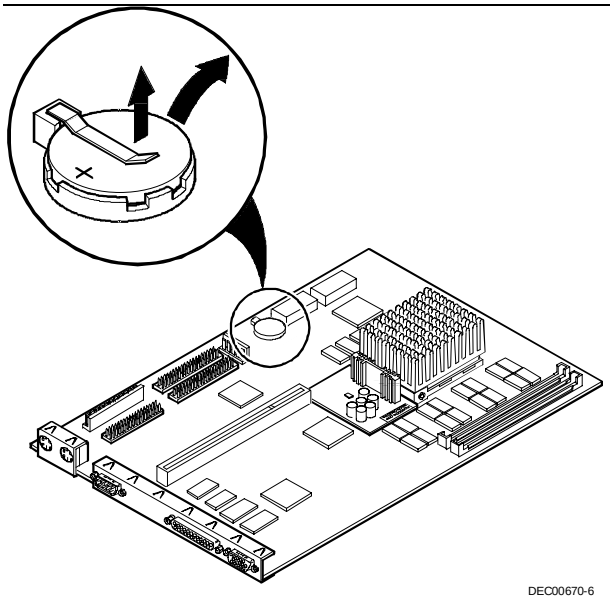

Figure 3 - 16 Replacing the Computer Battery

Mass Storage Devices

The Starion Minitower PC computer contains five mass storage device bays:

- The top device bay contains a factory-installed 3½-inch diskette drive.
- The second device bay contains a factory-installed CD-ROM drive.
- The third and fourth device bays can hold 5¼-inch, half-height devices. For example, a diskette drive or a hard disk drive.
- The internal device bay is not accessible from the front of the computer and contains a factory-installed 3½-inch hard disk drive.

The following procedures and illustrations show a base computer configuration. The specific drive bay configurations and storage devices might vary.

Connecting Diskette and IDE Devices

Refer to the specific data cable connection topics listed below for illustrations of the relevant connections.

To connect diskette and IDE devices, perform the following:

1) Connect supplied ribbon cable to device.
2) Connect a power cable to device.
3) Replace cover.
4) Connect external devices and restore power.
5) Run BIOS Setup utility to configure computer.

NOTE If only one IDE device is installed, make sure to use the ribbon cable connector furthest from the main logic board connector. Also, when having IDE devices installed in both internal drive bays, make sure that the ribbon cable has no twists between the two IDE drives.

Most cables and sockets are keyed so they cannot be connected backwards. If the cable or device is not keyed, connect pin 1 of cable to pin 1 of device's socket.

Pin 1 of cable is on edge with colored stripe. Pin 1 of device's socket should be marked with a number or symbol at one end of socket or with a number or symbol printed on circuit board near one end of socket. If necessary, refer to the device's documentation for pin 1 orientation.

Diskette and IDE Data Cable Connections

Legend	*Component*
A	Power supply
B	Power connection
C	Diskette drive connection
D	IDE drive connection
E	Main logic board diskette drive connection
F	Primary IDE interface for hard disk drive
G	Secondary IDE interface for CD-ROM
H	CD ROM drive connection
I	Audio cable from CD-ROM to sound card

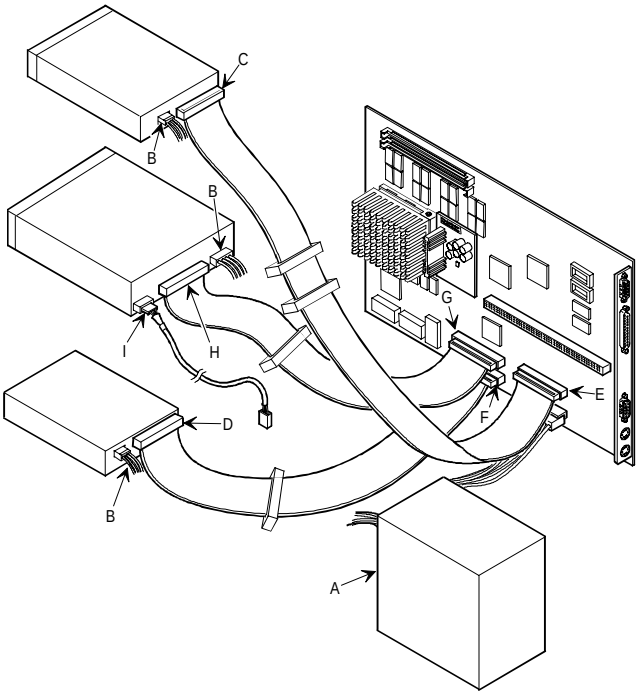

Figure 3 - 14 Diskette and IDE Data Cable Connections

Chapter 4 Troubleshooting

The following pages provide initial troubleshooting procedures and tables listing specific problems, probable causesand recommended actions to take if the computer fails after it nas been configured or after optional hardware or software has been installed.
Refer to the documentation supplied with additional options when experiencing problems with specific installed options.

Initial Troubleshooting

Follow these general procedures to troubleshoot the Starion computers:

- Press [Ctrl] + [Alt] + [Del]. If the computer fails to boot, turn it off, wait until all hard disk drives spin down completelyand then turn it back on.
- If the POST detects an error refer to this chapter and take the appropriate steps to correct the problem. After the problem has been resolved, restart the computer.
- Run the BIOS Setup utility.
- Make sure all necessary changes have been made to the CONFIG.SYS and AUTOEXEC.BAT files.
- Make sure all necessary video, printerand application device drivers are properly installed.
- Ensure that all cables and connections are secure.
- Run the ***QAPLUS/fe*** advanced diagnostic software.
- If these steps do not identify and/or correct the problem, perform the specific troubleshooting procedures appropriate to the circumstances.

NOTE If you need to return a failed component, pack it in its original container and return it to Digital for service.

Fill in the appropriate fields of the Part Exchange Form with the relevant error information!!

Beep Codes

When POST finds an error and cannot display a message, the computer's speaker emits a series of beeps to indicate the error. For example, video failure or configuration error is indicated by a 1 - 2 beep code (a burst of three beeps , one long beep followed by two short beeps).

The following table lists other fatal error and their associated beep codes.
Each code represents the number of short beeps that are grouped together.
Fatal errors (errors that lock up the computer) are generally the result of a failed main logic board or some other add-on component (SIMM, BIOS, computer battery, etc.).

Beep Code	***Error Message***
2-2-3	BIOS ROM checksum
3-1-1	Test DRAM refresh
3-1-3	Test keyboard controller
3-4-1	Test 512K base address lines
3-4-3	Test 512K base memory
2-1-2-3	Check ROM copyright notice
2-2-3-1	Test for unexpected interrupts

POST and Boot Messages

The POST displays messages to alert to errors in hardware, software and firmware or to provide operating information about the computer.
Each time the POST displays a message on the screen, the computer's speaker beeps twice. If an error occurs before the monitor is initialised, specific beep codes sound to alert to a problem. The following table lists a general grouping of system messages. In addition, each message is accompanied by text describing the message and in most cases, a recommended solution to the problem.

NOTE *Italics* indicate variable parts of a message such as memory addresses, hexadecimal valuesand so on. These messages can differ at each occurrence.

POST and Boot Error Messages

Message	*Problem*	*Solution*
Diskette drive A error / Diskette drive B error	Diskette drive has failed.	Run the BIOS Setup utility. Check all connections. If the problem persists, replace the defective diskette drive and/or drive cable.
Extended RAM Failed at offset: nnnn	Extended memory failed or configured incorrectly.	Make sure SIMMs are installed correctly (see Installing SIMMs). If the problem persists, replace defective SIMMs. Run the BIOS Setup utility and restore all settings to original values.
Failing Bits: nnnn	nnnn is a map of the bits at the RAM address which failed the memory test.	Run the BIOS Setup utility and restore all settings to original values. If the problem persists, replace the defective memory.
Fixed Disk 0 Failure Fixed Disk 1 Failure Fixed Disk Controller failure	Hard disk drive and/or controller failed.	Run the BIOS Setup utility. Check all connections. If the problem persists, replace the defective hard disk drive and/or controller.
Incorrect Drive A type - run SETUP Incorrect Drive B type - run SETUP	Diskette drive A and/or B not correctly identified in the BIOS Setup utility.	Run the BIOS Setup utility and properly identify diskette drive A and/or B.
Invalid NVRAM media type	NVRAM access failed.	Run the BIOS Setup utility and restore all settings to original values. If the problem persists, replace the defective component.

Keyboard controller error **Keyboard error** **Keyboard locked - Unlock key switch**	Keyboard and/or keyboard controller failed.	Check the keyboard connection. If the connection is secure, the keyboard or keyboard controller might have failed. If the problem persists, replace the defective keyboard and/or controller.

POST and Boot Error Messages (continued)

Message	*Problem*	*Solution*
Monitor type does not match CMOS - Run SETUP	Monitor type has been incorrectly specified.	Run the BIOS Setup utility and set the correct monitor type.
Operating system not found	The operating system cannot be found on drive A or drive C.	Run the BIOS Setup utility and correctly identify drive A or drive C. Correctly install the operating system. Refer to the supplied operating system documentation.
Press <F1> to resume, <F2> to Setup	This message appears after any recoverable error message.	Press <F1> to reboot or <F2> to enter the BIOS Setup utility to make any necessary changes.
Real time clock error	Real-time clock failed BIOS test.	Replace real-time clock and then run the BIOS Setup utility to restore previous configuration information.
System cache error - Cache disabled	RAM cache failed.	Run the BIOS Setup utility and restore all settings to original values. If the problem persists, replace the defective cache memory.
System CMOS checksum bad - run SETUP	Battery/real-time clock failed.	Correct the address conflict using the BIOS Setup utility. If the problem persists, replace the battery/real-time clock.
System RAM failed at offset: nnnn	System RAM failed.	Run the BIOS Setup utility and restore all settings to original values. If the problem persists, replace the defective memory.
System timer error	The computer's timer test failed.	Run the BIOS Setup utility and restore all settings to original values. If the problem persists, replace the defective component.
Shadow RAM Failed at offset: nnnn	Shadow RAM failed.	Run the BIOS Setup utility and disable failed shadow memory region.
System battery is dead - Replace and run SETUP	Battery/real-time clock failed.	Replace the battery and then run the BIOS Setup utility to restore previous configuration information.

POST and Boot Informational Messages

Message	*Description*
nnnn Cache SRAM Passed	Where nnnn is the amount of computer cache (in kilobytes) that tested successfully.
Entering SETUP	BIOS Setup utility runs.
Extended RAM Passed	Where nnnn is the amount of extended memory (in kilobytes) that tested successfully.

nnnn Shadow RAM passed	Where nnnn is the amount of shadow RAM (in kilobytes) that tested successfully.

POST and Boot Informational Messages (continued)

Message	*Description*
System BIOS shadowed	This indicates that the computer's BIOS was successfully copied to shadow RAM.
nnnn System RAM passed	Where nnnn is the amount of system RAM (in kilobytes) that tested successfully.
UMB upper limit segment address: nnnn	Displays the address of the upper limit of UMB. This indicates the released segments of the BIOS that can be reclaimed by a virtual memory manager.
Video BIOS shadowed	This indicates that the computer's video BIOS was successfully copied to shadow RAM.

Computer Troubleshooting

Problem	*Possible Cause*	*Action*
No response when the computer is turned on	Main logic board failure.	Replace main logic board.
	Main logic board jumpers incorrectly set.	Set all appropriate jumpers. Refer to *"Main logic board jumpers"*.
	CPU has failed.	Replace CPU.
	Power Supply failed.	Replace Power Supply.
Power is on, but there is no screen display	Brightness and contrast controls are not correctly set.	Adjust the brightness and contrast controls.
	The Power Management has shut the monitor off.	Press [Shift] to reactivate monitor.
	Monitor cable is incorrectly installed.	Check all monitor connections.
	Incorrect VGA drivers installed.	Install the correct VGA drivers. Refer to "*Utilities and Video Drivers"*.
	Video controller has failed.	Replace the video controller.

Computer operates incorrectly after installing optional expansion board	Expansion board installed incorrectly.	Remove expansion board and reinstall.
	Did not run ICU to configure expansion board before installation.	Run the ICU to properly configure expansion board and then reboot the computer. Refer to the supplied ICU documentation.
	Expansion board has failed.	Remove expansion board and reboot. If computer boots without errors, replace expansion board.

Computer Troubleshooting (continued)

Problem	*Possible Cause*	*Action*
Computer operates incorrectly after installing optional SIMMs	SIMMs installed incorrectly. Did not rerun BIOS Setup utility. BIOS Setup utility changes not saved before exiting. SIMMs have failed.	Remove SIMMs and reinstall. Rerun BIOS Setup utility. Rerun BIOS Setup utility and save changes. Remove SIMMs and reinstall. Make sure bank 0 is filled with the correct SIMM size, speedand type. Replace SIMMs.
Computer operates incorrectly after installing optional external cache module	External cache module installed incorrectly. External cache module has failed.	Remove external cache module and reinstall. Replace external cache module.
Computer fails to retain setup information	Computer battery has failed. CMOS clear Jumper (J16) enabled.	Replace computer battery. Disable CMOS clear Jumper (J16).

Computer Troubleshooting (continued)

Problem	*Possible Cause*	*Action*
Computer does not boot from an IDE hard disk drive	Operating system software is not installed on the IDE hard disk drive.	Install the appropriate operating system.
	IDE hard disk drive is not correctly formatted or the requested partition does not exist.	Format the IDE hard disk drive or partition the IDE hard disk drive using the supplied operating system software.
	There is no software on the requested partition.	Install software on the requested partition.
	IDE hard disk drive jumpers incorrectly set.	Refer to the supplied IDE hard disk drive kit installation instructions.
	IDE drive type incorrect.	Run the BIOS Setup utility to identify the correct drive type.
	Loose cables.	Secure all cable connections.
	Onboard IDE interface disabled.	Run the BIOS Setup utility and set the IDE controller option to “Enabled”.
	IDE hard disk is connected to the wrong IDE connector.	Connect the boot disk to the inner IDE connector on the main logic board.
	There might be a boot sector virus.	Run appropriate software to detect and remove viruses (F-PROT).
	Hard disk boot sector is missing.	For DOS, boot from a DOS diskette then enter the following commands: ***c:*** ***cd\dos*** ***fdisk/mbr***

Computer Troubleshooting (continued)

Problem	*Possible Cause*	*Action*
Computer does not recognize an internal or external SCSI device	SCSI device jumpers incorrectly set.	Refer to the supplied SCSI device kit installation instructions.
	SCSI cable not terminated.	Terminate each end of the SCSI bus.
	SCSI device not plugged in.	Check power and SCSI cables.
	Terminating resistors not removed from the SCSI device.	Remove terminating resistors.
	SCSI adapter failure.	Replace SCSI adapter.
	SCSI ID conflicts.	Set SCSI IDs correct.
Computer does not boot from an internal SCSI hard disk drive	Operating system software is not installed on the SCSI hard disk drive.	Install the appropriate operating system on the SCSI hard disk drive.
	Requested partition does not exist.	Partition the SCSI hard disk drive and then reload the operating software.
	Computer not configured for SCSI hard disk drive operation.	Run the BIOS Setup utility and set the IDE controller option to "Disabled." This disables the IDE interface. **Note:** When having both IDE and SCSI hard disk drives installed, the computer uses the IDE hard disk drive as the boot device.
Computer does not boot from a target diskette drive	Drive ID incorrectly set.	Make sure the drive ID is correctly set.
	Diskette drive not enabled.	Run the BIOS Setup utility to enable the diskette drive.
	Diskette boot option disabled.	Run the BIOS Setup utility and set and set the proper boot sequence.
	Onboard diskette controller disabled.	Run the BIOS Setup utility and set the diskette controller option to "Enabled".
	Diskette does not contain start-up files.	Insert a diskette with the correct start-up files.
No response to keyboard commands	Keyboard is password protected.	Enter the keyboard password.
	Keyboard is connected to the mouse port.	Power down the computer and connect the keyboard to the keyboard port.
	Computer operation halted.	Reboot Computer.

Computer Troubleshooting (continued)

Problem	*Possible Cause*	*Action*
No response to mouse commands	Mouse is password protected.	Enter the keyboard and mouse password.
	Mouse is connected to the keyboard port.	Power down the computer and connect the mouse to the mouse port.
	Mouse driver not installed.	Install the appropriate mouse driver.
	Computer operation halted.	Reboot Computer.

Disk Drive Troubleshooting

Problem	*Possible Cause*	*Action*
IDE/SCSI hard disk drive cannot read or write information	Incorrect disk drive jumper settings.	
	Loose or incorrectly installed cables	Refer to the supplied kit installation instructions. Make sure all cables are correctly installed.
	IDE drive type incorrect.	Run the BIOS Setup utility to identify the correct drive type.
	Onboard IDE interface disabled.	Run the BIOS Setup utility and set the IDE controller option to “Enabled”.
	IDE/SCSI hard disk drive is not correctly formatted or partitioned.	Format and partition as required using the supplied operating system.
Target diskette drive cannot read or write information	Onboard diskette controller disabled.	Run the BIOS Setup utility and set the diskette controller to “Enabled”.
	Diskette write protection is enabled	Run the BIOS Setup utility and set the diskette write protection to “Disabled”.

Monitor Troubleshooting

Problem	*Possible Cause*	*Action*
Monitor power indicator is not on	Monitor is turned off. No power at wall outlet. Power indicator is defective.	Turn on the monitor. Use another outlet. Replace the failed component.
No screen display	Configuration error. Monitor brightness and contrast controls are incorrectly set.	Run the BIOS SETUP UTILITY to configure the computer for VGA operation. Set the jumper for VGA operation. Refer to *"Main Logic Board Jumpers"*. Adjust the monitor brightness and contrast controls.
No monitor display while loading Windows video drivers	Monitor type incorrectly set.	Set the correct monitor type. Refer to appropriate video driver documentation.
Distorted-rolling-or flickering screen display-or wrong/uneven color	Monitor incorrectly adjusted. Monitor signal cable incorrectly installed.	Adjust accordingly. Straighten any bent connector pins and then reconnect.
Color monitor displaying monochrome	Computer was turned on before the monitor was turned on. Video jumper incorrectly set.	Turn off the computer, turn on the monitor, then turn the computer back on. Set the jumper for VGA operation.
Monitor fails to switch to high-resolution mode	Appropriate high-resolution video drivers are not installed or incorrectly installed.	Correctly install all appropriate high-resolution video drivers. Refer to the documentation supplied with the monitor and/or video drivers.
Monitor display not centered while loading Windows video drivers	Monitor type incorrectly set.	Set the correct monitor type. Refer to appropriate video driver documentation.

CD-ROM Troubleshooting

Problem	*Possible Cause*	*Action*
Cannot access the CD-ROM drive. Error message reading drive X	Device drivers not installed. Disc is dirty or damaged.	Install correct device drivers. Carefully clean the disc using appropriate materials. Also try another disc.
Power is on but indicator shows no activity	No disc in the CD-ROM drive. Cables are loose or incorrectly connected.	Insert a disc. Properly connect all cables.

Audio Troubleshooting

Problem	*Possible Cause*	*Action*
Nothing seems to work	Address contention. Two or more devices may be trying to access the same address. Device drivers missing or improperly installed. Cables improperly connected or not fully connected.	Check IRQ, I/O address and DMA settings. Change settings as required. Reinstall device drivers. Check cable connections for proper location. Reconnect cables. Refer to manufacturers documentation.
Audio does not work	Sound, MIDI, mixer drivers not installed. Cables loose or not properly connected.	Check the error messages for the necessary drivers. In Windows Control Panel, select “Drivers”, then “Add” and install the necessary driver(s). Make sure speaker and mic plugs are in correct jacks. Reconnect cables.
Voice sounds distorted	Microphone or telephone handset too close to mouth.	Move the telephone mouthpiece 2 to 3 inches away from the mouth, when speaking. When using the microphone, make sure that it is positioned 1 to 2 feet away from the mouth.
Speakers squeal when computer is turned off	Normal operation.	No corrective action required.

QAPlus/FE Error Messages

Component	*Messages*	*Solution*
CPU	Arithmetic Function Failed. General Functions Failed. Exception Interrupt in Protected Mode. Refresh Failure. Logic Functions Failed.	Reset CPU. Replace CPU.
Hard disk	Butterfly Cylinder Access Test Failed. Cylinder 0 Errors. Random Cylinder Access Failed. Linear Cylinder Access Failed.	Low-level format hard disk. Replace disk.
Hard drive/controller	Controller Diagnostic Test Failed. Questionable Controller Card. Hard drives failed.	Run Setup, Check connections. Reset controller, Replace controller. Replace disk.
Floppy diskette	Media Mismatch. Drive Not Ready Write Protected Media Unformatted Media	Use known good diskette. Check size and density of diskette Close drive door. Remove write protection. Format diskette.
Floppy drive	Floppy Drives Failed	Check connections, Replace drive.
Battery/clock	Clock Stopped. Invalid Date. RTC Interrupt Failed.	Run Setup. Replace battery/clock.
CMOS	CMOS Clock Test Failed.	Change time from Setup menu in QAPLUS.
Serial port	COM port failed. Serial Chip Error. Serial Compare Error. Serial Timeout Error.	Check COM device. Check connections. Replace COM device. Replace COM device.
Video adapter	Video Failed. Error in Video.	Replace video adapter. Replace video adapter.

Chapter 5 Device Mapping

This section provides a series of tables listing mapping and address information related to computer memory and various main logic board devices (keyboard controller, interrupt controller, DMA controller, etc.).
The computer's memory and address locations are allocated at the factory to operate within a standard PC environment. However, due to the number of optional devices and/or expansion boards that are available, sometimes memory and address locations need to be changed. For example, some network expansion boards require a specific memory location. If that location is already allocated, a memory conflict results and the expansion board will not operate as expected. Note that some memory, I/O and interrupt locations can be changed using the BIOS Setup utility.

NOTE Plug and Play add-in cards are automatically configured by the computers BIOS. The ICU must be run to properly configure computer resources for use with legacy ISA cards (that is, not Plug and Play ISA), in order to avoid conflicts with Plug and Play cards.

CAUTION

Before changing any memory or address location, refer to the documentation supplied with the optional device, expansion board, or software application and make sure adequate information is available.

CPU Memory Address Map (Full Range)

Range	*Function*	*Notes*
0 KB to 640 KB	main memory	PC compatibility range
640 KB to 1024 KB (1MB)	main memory	PC compatibility range ISA memory lower limit
1MB to 16 MB	main memory	ISA memory upper limit
16 MB to 128 MB	main memory	Computer memory upper limit

I/O Address Map

Range (hexadecimal)	*Function*
000 - 00F	DMA controller one
020 - 021	Interrupt controller one
040 - 043	Interval timer
060 - 06F	Keyboard controller
070 - 07F	Real-time clock (RTC), NMI
080 - 08F	DMA page register
0A0 - 0A1	Interrupt controller two
0C0 - 0CF	DMA controller two
0F0	Clear math co-processor busy
0F1	Reset math co-processor
0F8 - 0FF	Math co-processor
170 - 177	Secondary IDE controller
1F0 - 1F7	Primary IDE controller
220, 240	Diamond SoundBlaster emulation
278 - 27A	LPT2
300, 320, 330, 340	Diamond MPU-401 emulation (optional)
530, 604, E80, F40	Diamond Windows sound system emulation
2E8 - 2EF	COM4
2E8, 2F8, 3E8, 3F8	Diamond data/fax modem
2F8 - 2FF	COM2
378 - 37A	LPT1
3BC - 3BE	LPT3
3E8 - 3EF	COM3
3F0 - 3F7	Diskette (floppy disk) controller
3F6 - 3F7	Primary/secondary IDE controller (alt status, device address)
3F8 - 3FF	COM1
3B0 - 3DF	VGA register
46E8	VGA enable register
42E8, 4AE8, 82E8, 86E8, 8AE8, 8EE8, 92E8, 96E8, 9AE8, 9EE8, A2E8, A6E8, AAE8, AEE8, B2E8, B6E8, BAE8, BEE8, E2E8, E2EA	VGA enhanced mode registers

Computer Interrupt Levels

Interrupt Number	*Interrupt Source*
IRQ0	Timer tick
IRQ1	Keyboard controller
IRQ2	Cascade interrupt
IRQ3	COM2 (Modem)
IRQ4	COM1
IRQ5	SoundBlaster emulation and Windows sound system
IRQ6	Diskette (floppy disk) drive, if enabled
IRQ7	LPT1, LPT3, if enabled
IRQ8	Real-time clock (RTC)
IRQ9	Wavetable/MIDI-port
IRQ10	Available
IRQ11	Available
IRQ12	Mouse interrupt, if enabled
IRQ13	Math co-processor
IRQ14	IDE primary, if enabled
IRQ15	IDE secondary, if enabled

DMA Channel Assignment

Channel	*Controller*	*Function*
0	1	Diamond TeleCommander and SoundBlaster sound
1	1	Not used
2	1	Diskette (floppy disk) controller, if enabled
3	1	ECP
4	2	Cascade DMA
5	2	Not used
6	2	Not used
7	2	Not used

Chapter 6 Pass / Fail Criteria

As Final Acceptance Test the following tests should be run to meet the Pass/Fail criteria:

1) **Successful completion of the POST tests.**

2) **Successful completion of the following QAPLUS/fe module tests (one pass):**

- System Board (All Tests)
- Memory (All Tests)
- Video (All Tests)
- Hard Disk (All Tests, except: Sequential write/read (destructive test !!) Sequential write/random read **(destructive test !!)**)
- Floppy Disk (All Tests)
- Keyboard (All Tests)
- COM Ports (All Tests)
- LPT Ports (All Tests)
- Pointer device (All Tests)

3) **Successful bootstrap of the on the computer installed Operating System.**

Operating Systems Supported:
- MS-DOS version 6.22 and earlier
- Windows 3.11
- Windows 95
- Windows NT Workstation
- OS/2 version 3.0 Warp
- SCO UNIX Version 3.2.4
- Novell Netware 3.12 client

Remove any software that was put on the hard drive to enable repair of the system before shipping.

When completed, carefully clean outside of unit with cleaning solution.

Appendix A Services Notes

This appendix contains the current *Service Notes* for the *Starion 9xx & 20xx* product line.

Appendix B Useful Information

Related documentation

Document Titles	*Order's*
STARION 9XX Quick Reference Guide	EK-A8054-RG
STARION Quick Setup Guide	ER-901A3-IA
STARION User's Guide	ER-901A3-UA
TeleCommander 2500XL User's Guide	ER-90FM3-UA
Warranty & service card	EK-PCHWW-CA
SMM Spare Parts Catalogue STARION PC Family	EK-A0860-SV

On-Line Bulletin Boards

The most current product information and technical support is also available on line. The most current device drivers, Setup diskettes and technical tips can be found on all of these bulletin boards.

- ***DECpc Bulletin Board Server***
  DECpc BBS provides an easy-to-use, menu-driven bulletin board providing on-line access to the latest PC product information, device drivers, shareware and freeware.
  For access to the DECpc BBS, dial **1 - 508 - 496 - 8800**.
- ***CompuServe***
  Digital hosts a number of conferences on Compuserve featuring a wide range of topics.
  Enter **GO DEC** to reach Digital's main menu page.
  For information on PC integration, enter: **GO DEC PC**.

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