BUSINESS PARTNER

digital

GoldProvider
Authorized
Warranty Service

Service Maintenance Manual

STARION 400i - 900i PC Family

EK-A0852-SV. A01

S
T
A
R
I
O
N

4
0
0
i
-
9
0
0
i

January 1996

January 1996

The information in this document is subject to change without notice and should not be construed as a commitment by Digital Equipment Corporation.
Digital Equipment Corporation assumes no responsibility for any errors that might appear in this document.
The software, if any, described in this document is furnished under a license and may be used or copied only in accordance with the terms of such license. No responsibility is assumed for the use or reliability of software or equipment that is not supplied by Digital Equipment Corporation or its affiliated companies.
Restricted Rights: Use, duplication, or disclosure by the U.S. Government is subject to restrictions as set forth in subparagraph (c) (1) (ii) of the Rights in Technical Data and Computer Software clause at DFARS 252.227-7013.

Copyright Digital Equipment Corporation

All Rights Reserved

The following are trademarks of Digital Equipment Corporation:
STARION and the Digital logo.

The following are third party trademarks:
MS-DOS and Windows and Windows NT and Windows NT Server are trademarks of Microsoft Corp.
Novell and Netware are trademarks of Novell, Inc.
SCO and Open Desktop are trademarks of The Santa Cruz Operation, Inc.
UNIX is a registered trademark of UNIX System Laboratories, Inc.
All other trademarks and registered trademarks are the property of their respective holders.

Created by:

MCS Logistics Engineering - Nijmegen

Printed in Ireland

Table of Contents

S
T
A
R
I
O
N

4
0
0
i
-
9
0
0
i

Table of Figures

S
T
A
R
I
O
N

4
0
0
i
-
9
0
0
i

Revision History

Revision	Date	Description of change
A01	January 1996	First release of the Service Manintenance Manual describing the *STARION 400i/500i/600i/700i/800i/900i* series computer

S
T
A
R
I
O
N

4
0
0
i
-
9
0
0
i

Preface

The Digital Starion 400i/500i/600i/700i/800i/900i PC Family Service Maintenance Manual is a troubleshooting guide that can be used for reference when servicing the Starion 400i - 900i line of PC's.
Digital Equipment Corporation reserves the right to make changes to the Digital Starion 400i - 900i 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.

STARION 400i - 900i

Chapter 1   Product Description

Product Introduction

Starion 400i/500i/600i/700i/800i/900i /1000i computers are high-performance personal computers equipped with the latest in computing technology. They can be used as stand-alone computers, as clients, or as servers in a network environment. Developed using the following state-of-the-art technology, these computers are the most value packed mini-deskside computers in their class:

♦ *Microprocessor*
  ◊ 75MHz, 90 MHz or 100MHz Pentium processor

♦ *System Memory*
  ◊ Starion 400i/500i/600i/700i/900i, 8 MB System RAM, expandable up to 128 MB
  ◊ Starion 800i, 16 MB System RA, expandable up to 128 MB

♦ *Standard Secondary Cache*
  ◊ 256KB

♦ *PCI Local Bus Technology*

♦ *Graphic Controller*
  ◊ S3 Trio 32

♦ *Video Memory*
  ◊ standard with a minimum of 1 MB of onboard DRAM

♦ *Fax/Modem/Sound Card*
  ◊ 14,400 bps internal Hayes-compatible fax/modem (V.32bis)
  ◊ Error correction (V.42) and data compression (V.42bis)
  ◊ Fax capability directly from Microsoft Ò Windows 3.1 applications
  ◊ Digital telephone answering machine

♦ *Quad-speed CD-ROM reader*
  ◊ Industry-standard IDE/ATAPI interface and audio capability

S T A R I O N 4 0 0 i - 9 0 0 i

Starion Models

Product	Model	CPU	HDD	Memory
Starion 400i	FR-902AA-A3	75 MHz Pentium	840MB	8MB
Starion 500i	FR-902AA-A4	75 MHz Pentium	1GB	8MB
Starion 600i	FR-903AA-A3	90 MHz Pentium	1GB	8MB
Starion 700i	FR-903AA-A2	90 MHz Pentium	1GB	8MB
Starion 800i	FR-904AA-A2	100 MHz Pentium	1GB	16MB
Starion 900i	FR-904AA-A1	100 MHz Pentium	1GB	8MB

Product	Model	Video	Cache	CDROM
Starion 400i	FR-902AA-A3	S3 Trio 32	256KB	4X-Speed
Starion 500i	FR-902AA-A4	S3 Trio 32	256KB	4X-Speed
Starion 600i	FR-903AA-A3	S3 Trio 32	256KB	4X-Speed
Starion 700i	FR-903AA-A2	S3 Trio 32	256KB	4X-Speed
Starion 800i	FR-904AA-A2	S3 Trio 32	256KB	4X-Speed
Starion 900i	FR-904AA-A1	S3 Trio 32	256KB	4X-Speed

Chapter 2   Server Utilities & Configuration

System Utilities

Starion Minitower PC computers come with several utility programs and device drivers that are factory-installed as image files (on computers that came with a hard disk drive) and supplied on diskettes. Additional utility programs and device drivers are factory-installed and ready for use.
This chapter also describes PHLASH.EXE, which is not supplied with the computer. This utility is available only via bulletin board distribution to customers needing BIOS upgrades.

Before Using System Utilities and Video Drivers

When unfamiliar with utility programs, video drivers and their uses, carefully read this chapter before attempting to use any of the utilities or to install video drivers.

Using Utilities & Video Drivers

The system utilities and video drivers enable to take full advantage of the computers enhanced video features. Use the following information to reset the video mode of the monitor, or to load MS-DOS application drivers if they are using various non-Windows CAD or business software.

NOTE	If this is the first time using these utility programs and/or video drivers, it is recommended to follow the procedures in the order given.

1) Turn on or reboot the computer. If POST detects an error, refer to *Chapter 4, "Troubleshooting"* for possible causes and suggested solutions.
2) If necessary, run PHLASH.EXE to upgrade or restore the computer's BIOS.
3) Install any applicable DOS or CAD application video drivers. Additional information about these drivers is provided later in this chapter.
4) Install any Windows 3.x video drivers. Additional information about these drivers is provided later in this chapter.

S T A R I O N 4 0 0 i - 9 0 0 i

PHLASH .EXE

All computers have BIOS software in a read-only, non-volatile memory (ROM) chip. This BIOS initializes hardware and boots the operating system when the computer is turned on. The BIOS also provides access to other services such as keyboard and disk drives.

Starion Desktop PC computers are equipped with flash memory. This means that the computer's BIOS can be restored simply by running the PHLASH.EXE utility. The computer's BIOS can also be upgrated to future releases by running PHLASH.EXE along with any flash BIOS update diskette if necessary.

Before Using PHLASH.EXE

A crisis recovery diskette should be created before PHLASH.EXE is used to upgrade the computer's BIOS. Then this diskette can be used to reprogram the computer's BIOS in case the flash process built into the computer fails.

The following items are needed to create this diskette:

♦   A blank 3½-inch 1.44 MB formatted diskette
♦   A diskette copy of the BIOS upgrade diskette

NOTE	PHLASH utilities are not shipped with Starion 400i/500i/600i/700i/800i/900i computers. However, they are available on the Digital Bulletin Board System.

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

     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*.
     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*.**.
4)   Insert a blank formatted diskette into drive A.
     On drive A, make a directory for the files previously copied. For example, from the DOS prompt enter: *A:MD UPGRADE*.
5)   Return to the hard disk drive and copy the files. From the DOS prompt, enter: *C:MAKECRD*.
     The makecrd command prompts you for a recovery diskette to be placed in drive A and then automatically copies the files to drive A.

6) Remove the crisis recovery diskette from drive A and store it in a safe place.

**S
T
A
R
I
O
N

4
0
0
i

-

9
0
0
i**

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, remove the cover and set the recovery mode jumper **(J10)** to Recovery Mode (jumpered).
2)   Replace the cover, insert the crisis recovery diskette into drive A and then power on the computer.
3)   The computer automatically boots from drive A and upgrades the BIOS. Upon completion, the computer sounds a beep code and attempts to restart.
4)   After the BIOS is restarted, turn off power to the computer and remove the crisis recovery diskette from drive A.
5)   Remove the cover and set the recovery jumper **(J10)** to normal.
6)   Replace the cover and turn the power back on for normal operation.

Upgrading the Computer's BIOS

Perform the following steps to update the computer's BIOS in the flash memory to a new updated one:

1)   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.
2)   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.
3)   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.
4)   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.
5)   Remove the BIOS diskette.

Ultilities and Video Drivers

Setting High Resolution Mode for The Monitor Display

When purchasing a high resolution monitor, you might want to run the Galileo video setup utility supplied with the computer. Galileo is a Windows-based utility used to change video resolutions, color depths and refresh rates to match the capabilities of the monitor.

When using Galileo to change video resolution, perform the following steps:

1)   From the Windows Program Manager, double click on the Control Panel icon.
2)   Next, double click on the Galileo icon to display the video console.
3)   Select the monitor resolution, color depth and refresh rate to match the monitor's specifications.
4)   Select "Switches" that apply to the CAD software package. Digital recommends to leave these settings to the "Enabled" or "On" position when not sure about their functions.
5)   Click "OK" to save the settings and exit the utility.

NOTE	Video selections shaded gray are not a valid choice due to the computer's maximum video memory or installed controller type.

> ⚠️ **CAUTION**
>
> **Do not select a monitor type setting that exceeds the monitor's resolution, refresh rate (vertical synchronization)and interlace or non-interlace specifications. Refer to the monitor's support documentation for performance specifications.**

Windows Video Drivers

The computer comes with the required Windows video display driver pre-installed at the factory. However, if the hard disk drive becomes corrupted, you might need to re-load the Windows video driver that has been provided on the Windows video driver diskette that is made using "Program Disks" and the "Driver Disks" tab from Digital Getting Started. Before installing a video device driver, read the information in the README.TXT file provided on the diskette.

To re-load the Windows driver, perform the following steps:

1)   Type *CD WINDOWS* at the C:\> prompt, then press **[Enter]**.
      The following prompt appears: *C:\WINDOWS>*.
2)   Type *SETUP* and press **[Enter]**.
      The computer displays the SETUP screen.
3)   Select the Display option and press **[Enter]**.
4)   Toggle through the Display option to select the appropriate Windows 3.x driver.
5)   Select the desired video resolution, then press **[Enter]**.

6)   If the appropriate video driver resides on a separate diskette, toggle through the `Display` option to
     select `Other (Requires disk provided by hardware manufacturer)`.
     Insert the diskette that contains the appropriate video driver and press **[Enter]**.
     Select the desired video resolution then press **[Enter]**.
     The MS-DOS prompt appears when SETUP completes.
7)   Type *WIN* and press **[Enter]** to start Microsoft Windows.

MS-DOS and Windows Application Video Drivers

Various software drivers for popular MS-DOS based CAD and business applications have been provided
on the "S3 TRIO 32 Video Drivers and Utilities" diskette that has been made using the "Driver Disks"
section of "Getting Started". When using an older non-Windows application such as ACAD or Lotus for
DOS, loading one or more of these drivers may be necessary.
Before installing a video device driver, read the information in any README.TXT file provided on the
diskette.

Using the S3refrsh Utility

S3refrsh.EXE is an MS-DOS-based utility that works in conjunction with Galileo to set the video
controller monitor resolution and refresh rates. This utility has been pre-installed and configured at the
factory to meet most monitor resolution needs. In most cases it is never necessary to use this utilityand
Galileo you should only be used to select high resolution video modes. However, when Galileo cannot
successfully be used to set the required monitor mode, run S3refrsh.EXE as follows:

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 you when wishing to save the changes in the AUTOEXEC.BAT file.

CO/Session and Remote Support

The "System Utility and Remote Support" diskette supplied with Starion Desktop PC computers includes
Triton's CO/Session Remote Communications Software. This software allows to remotely troubleshoot an
improperly functioning computer via a telephone/modem connection. Proper use of this software might
enable some computer problems to be corrected without requiring a further service call.

When the software is enabled, tasks that can be performed via telephone on the user's computer include:

♦   Editing system files such as AUTOEXEC.BAT, CONFIG.SYSand WIN.INI.
♦   Transmitting files, such as updated device drivers, to the remote PC.
♦   Relaying instructions to the user via a "chat mode" display.
♦   Printing information to the user's printer.

Consult appropriate documentation and training materials for information on using the Co/Session software.

S
T
A
R
I
O
N

4
0
0
i
-
9
0
0
i

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 necessary. In addition,it might be necessary to use the BIOS Setup utility to modify the configuration after hardware has been added or removed, or computer settings has been 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.

S
T
A
R
I
O
N
4
0
0
i
-
9
0
0
i

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.
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, heads and 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 400i - 900i systems.

Memory and Cache (continued)

Menu Fields	Settings	Comments
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.
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.

S
T
A
R
I
O
N

4
0
0
i
-
9
0
0
i

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.
Quiet boot	Enabled Disabled	Enabled inhibits the display of POST messages and instead displays the Digital logo. Disabled allows the display of POST messages when booting.
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.

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		Sets the onboard parallel port mode.
	Compatible	Standard printer connection.
	Bi-directional	PS/2 compatible mode and able to receive data.
Serial port 1	Auto Disabled 3F8, IRQ 4 2F8, IRQ 3 3E8, IRQ 4 2E8, IRQ 3	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. If Auto is selected, Setup configures COM1 to address = 3F8h and IRQ = 4.
Serial port 2	Auto Disabled 3F8, IRQ 4 2F8, IRQ 3 3E8, IRQ 4 2E8, IRQ 3	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. If Auto is selected, 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 0/1 controller. Note that both must be enabled for proper system operation.

S T A R I O N 4 0 0 i - 9 0 0 i

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 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 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.
VGA feature connector	Enabled Disabled	The VGA Feature connector is used for special-purpose Multi-Media applications. Set to Enabled to use this Feature.
Monitor type	Auto Mono Color	Set to Color or Mono if auto-detection fails.
Onboard VGA IRQ	Auto Enabled Disabled	If any additional videocard is installed, this must be set to Disabled.

Security Options

Menu Fields	Settings	Comments
Supervisor password is	Not user selectable	Indicates whether or not the supervisor's password is enabled or disabled.
User password is	Not user selectable	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 (whichever is in effect). This option is not allowed to change. Custom sign-on banner Enabled/Disabled (whichever 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	Disabled (Not user selectable)	Indicates whether the custom sign-on banner is enabled or disabled.
Custom sign-on banner		Press [Enter] to enter a custom sign-on banner that displays during POST. For example, the user might enter "Welcome to John's machine." Up to two lines of text, each containing up to 50 characters, can be entered.
Diskette access	Supervisor User	Controls who has access to diskette drives. If Supervisor is selected, access to the diskette drive is 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.
Keyboard quick lock	Enabled Disabled	When enabled, the keyboard will be quick locked.
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.

S
T
A
R
I
O
N
4
0
0
i
-
9
0
0
i

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 you often cannot see or feel it.

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.

STARION 400i - 900i

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 Euipment 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.**

STARION 400i - 900i

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.
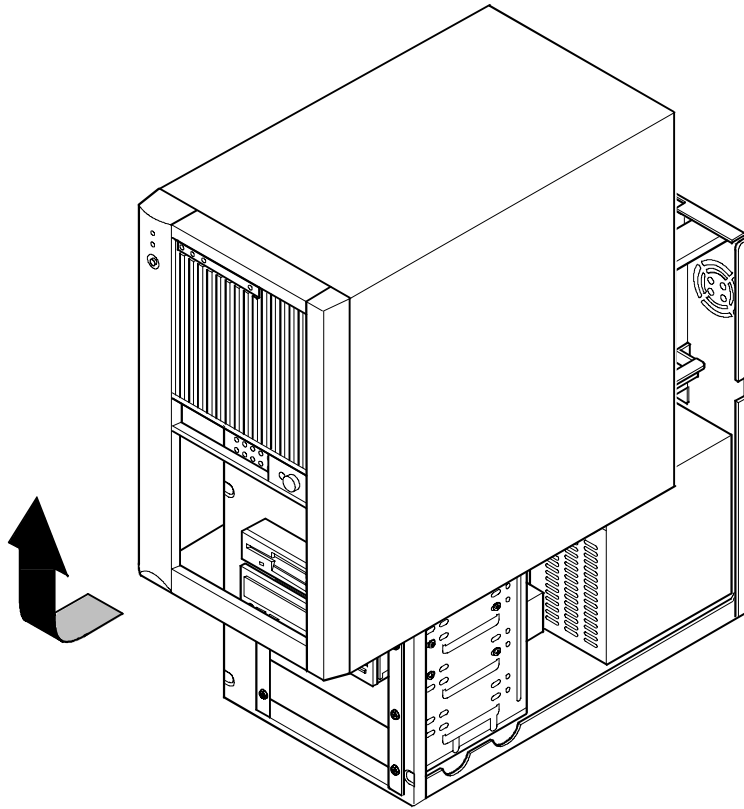
DEC00423-2

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
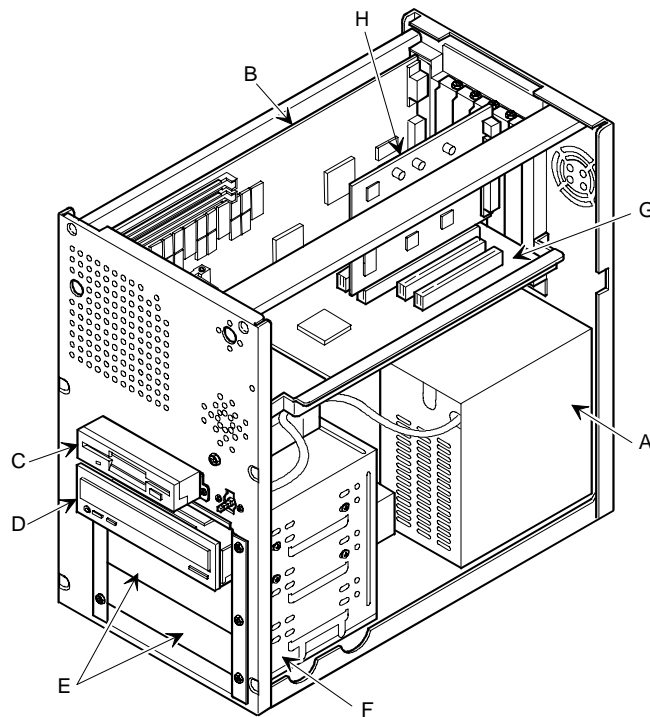
Figure 3 - 2 Computer Components

S T A R I O N 4 0 0 i - 9 0 0 i

Expansion Slots

The Starion Minitower PC riser card contains six slots for installing:

♦   Three ISA expansion cards and two PCI expansion card or
♦   Four ISA expansion card and one PCI expansion cards

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

The computer's ISA expansion slots support industry-standard full-length 16-bit expansion cards. The PCI slots support full-length, 32-bit PCI local bus expansion cards. Refer to the legend for more specific information.

NOTE	When installing expansion boards, always read the accompanying documentation for computer memory address and IRQ requirements. Compare that information to the computer memory and IRQ requirements in *Chapter 5, "Device Mapping"*. If conflicts are detected, the expansion board must be configured to alternate settings.

Expansion Slot Types & Locations

Expansion Slot	Slot Type	Rear Panel Location
J1 - J3	ISA (full-length)	Support industry-standard, 16-bit ISA expansion cards
J4	ISA (full-length)	Supports industry-standard, 16-bit ISA expansion card Designated as a shared slot with PCI slot J5
J5	PCI (full-length)	Supports 32-bit PCI local bus expansion card Designated as a shared slot with ISA slot J4
J6	PCI (half-length)	Supports 32-bit PCI local bus expansion card

J1   J2   J3   J4   J5   J6
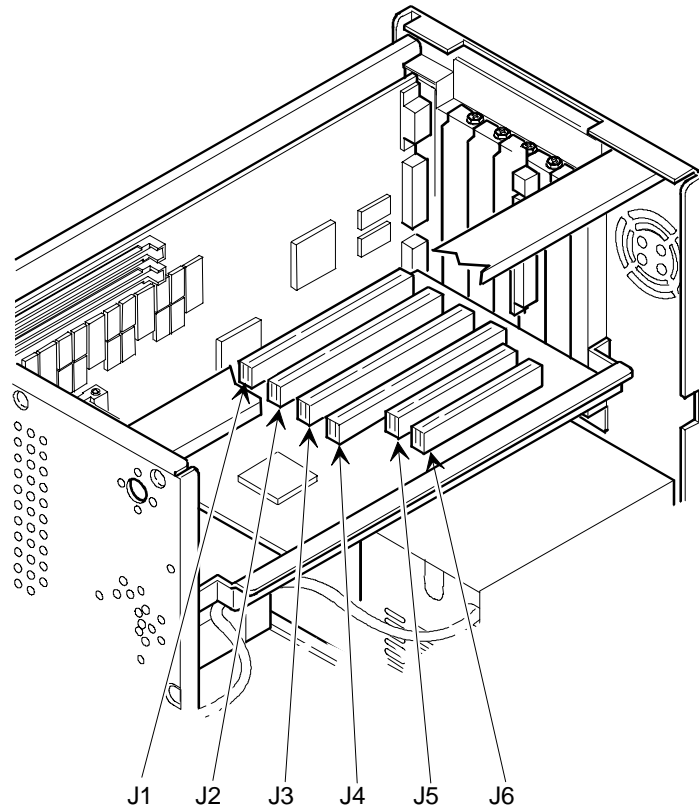
Figure 3 - 3 Expansion Slots

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	75 MHz	J22, open
		J21, open
	90 MHz	**J22, open**
		J21, jumpered
	100 MHz	J22, jumpered
		J21, jumpered
CPU core/bus frequency	3/2	J27, open
	2/1	J27, jumpered
Recovery mode	**Normal**	**J10, open**
	Recovery mode	J10, jumpered
Password clear	**Normal mode**	**J11, open**
	Password clear (MFG test)	J11, jumpered
CMOS clear	**Normal**	**J16, pins 1 and 2 jumpered**
	Discharge	J16, pins 2 and 3 jumpered

Main Logic Board Jumper Locations
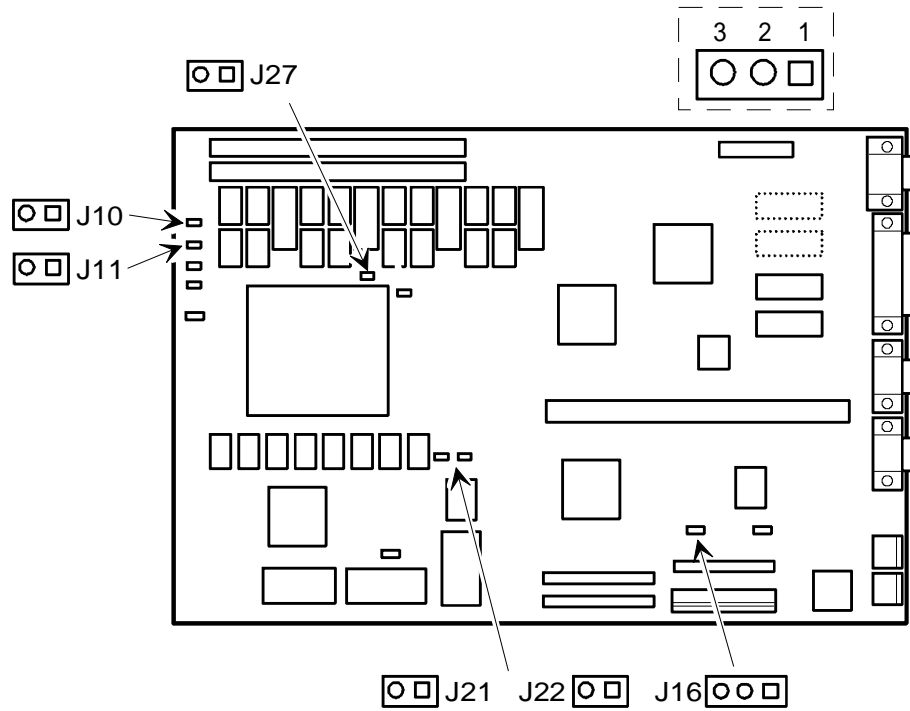
Figure 3 - 4 Main Logic Board Jumper Locations

S
T
A
R
I
O
N

4
0
0
i
-
9
0
0
i

Computer Memory Configurations

Adding more memory allows the computer to run larger, more complicated software and 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, size and speed. Therefore, a 4-MB SIMM in Bank 0 requires a 4 MB SIMM in Bank 1.

Memory Configurations

Onboard	Bank 0	Bank 1	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
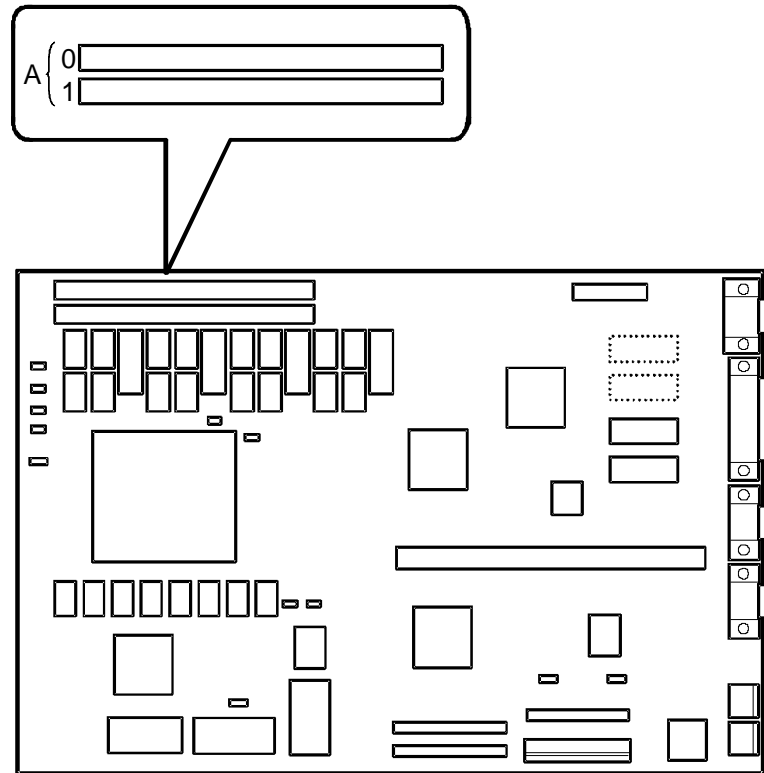
Figure 3 - 5 SIMM Socket Locations

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*".
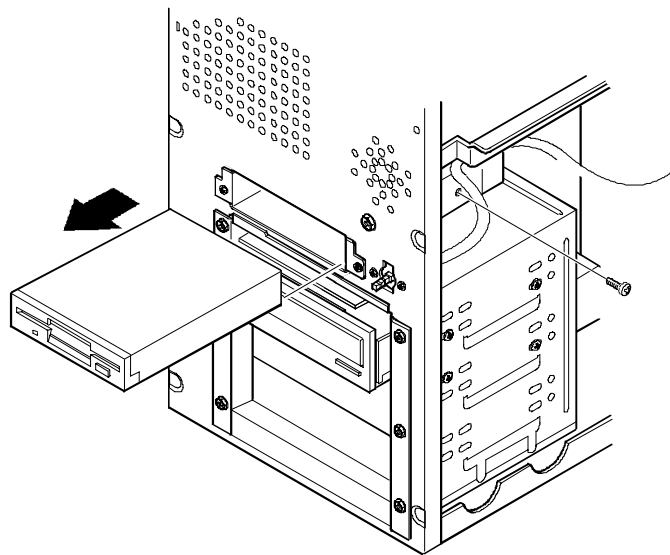
Figure 3 - 6 Removing the 3½-Inch Diskette Drive

Removing a 5¼-Inch Device

To remove a 5¼-inch device:

1)   Turn off the computer.
2)   Disconnect external devices, ac power and 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.

.
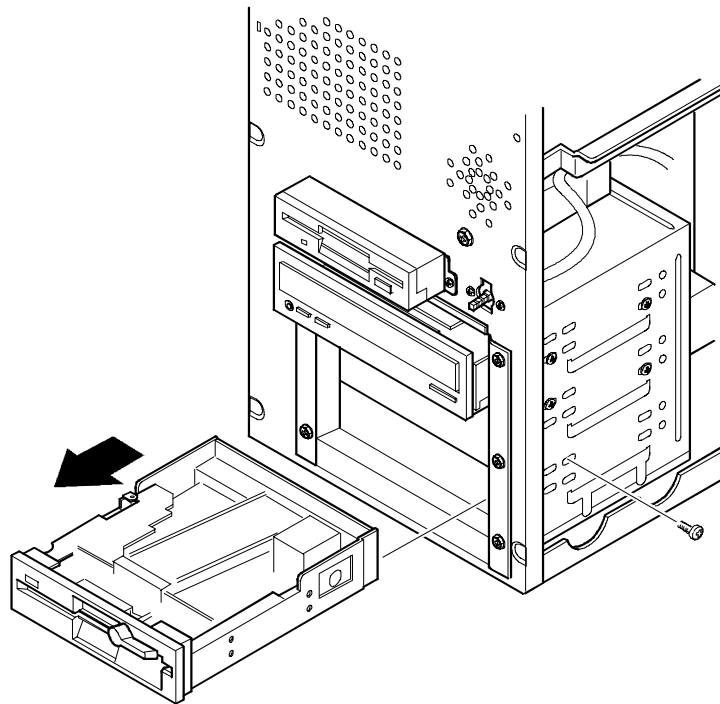
Figure 3 - 7 Removing a 5¼-Inch Device

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*".
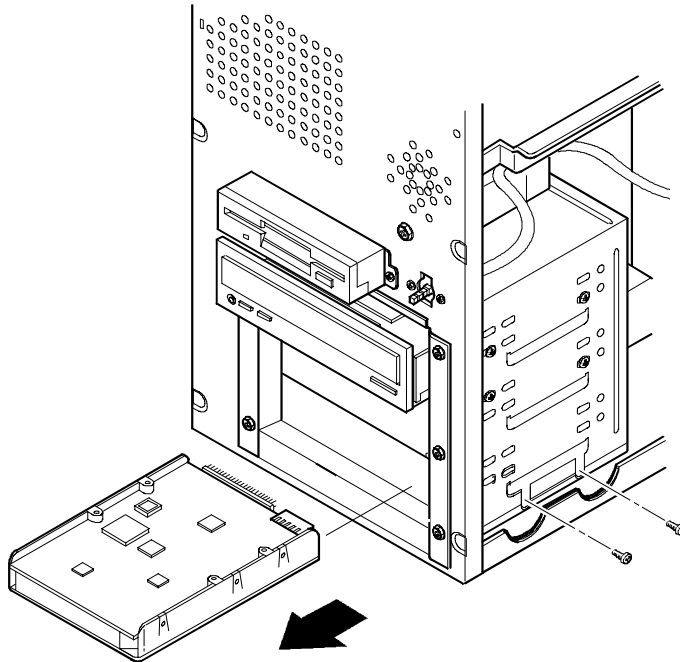
Figure 3 - 8 Removing the IDE Hard Disk Drive

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.
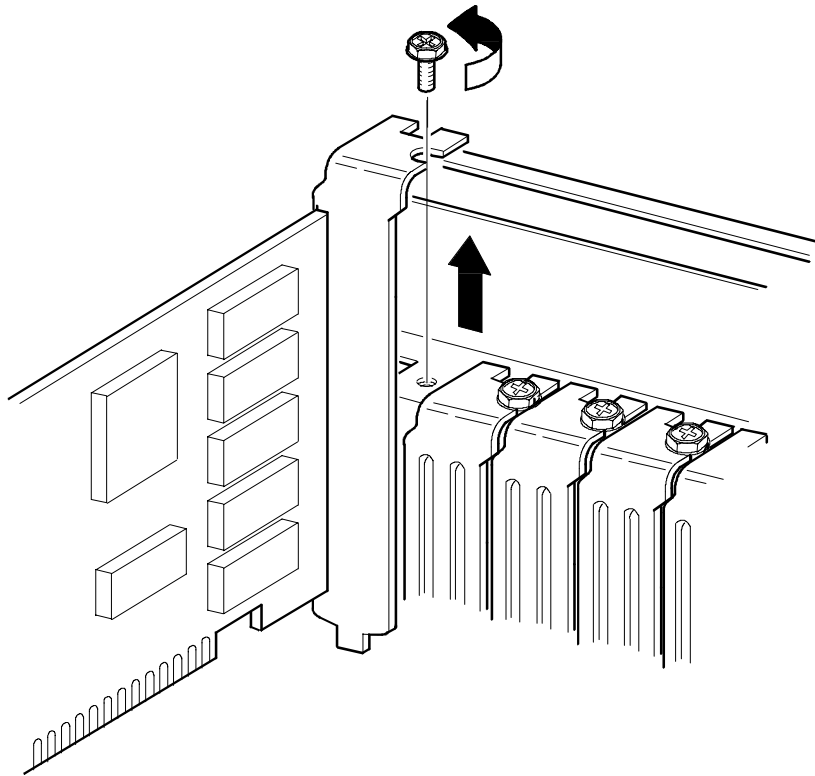
Figure 3 - 9 Removing Expansion Boards

**S
T
A
R
I
O
N

4
0
0
i
-
9
0
0
i**

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.
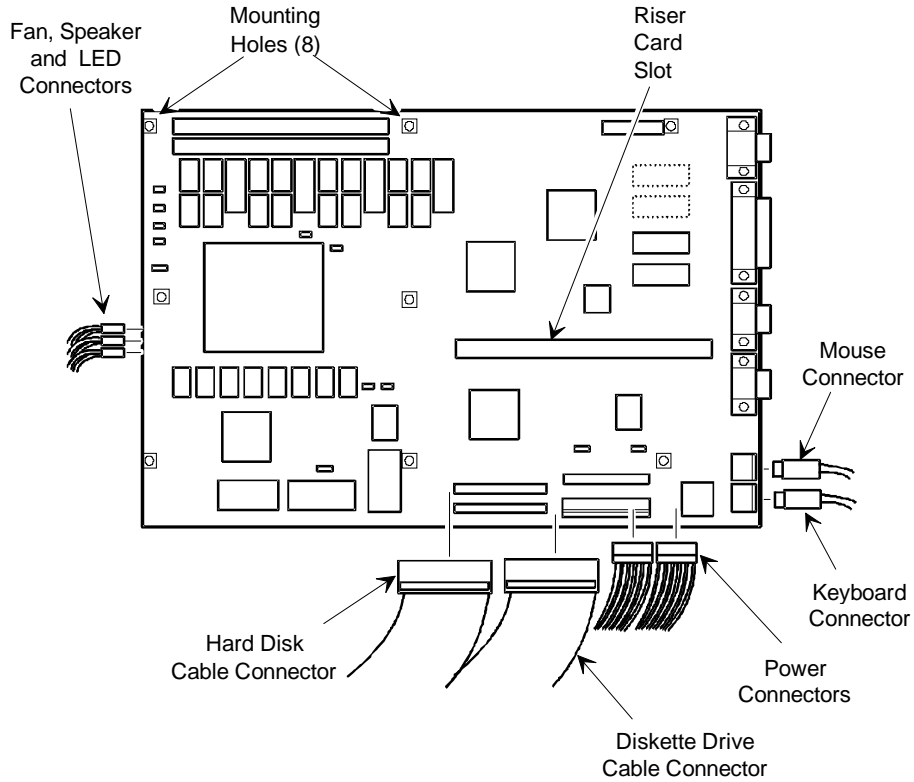
Figure 3 - 10 Removing the Main Logic Board

**S
T
A
R
I
O
N

4
0
0
i
-
9
0
0
i**

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.
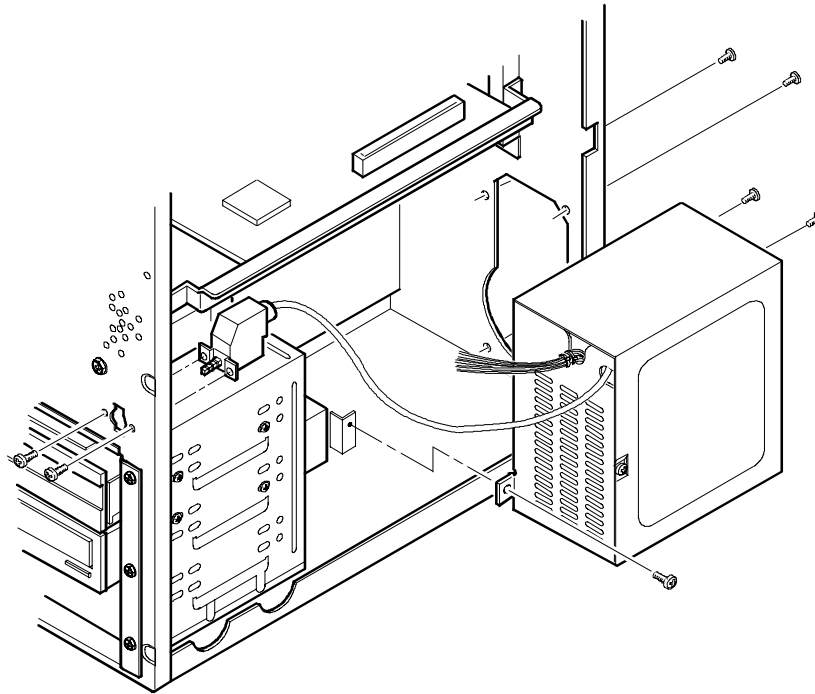
Figure 3 - 11 Removing the Power Supply

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.
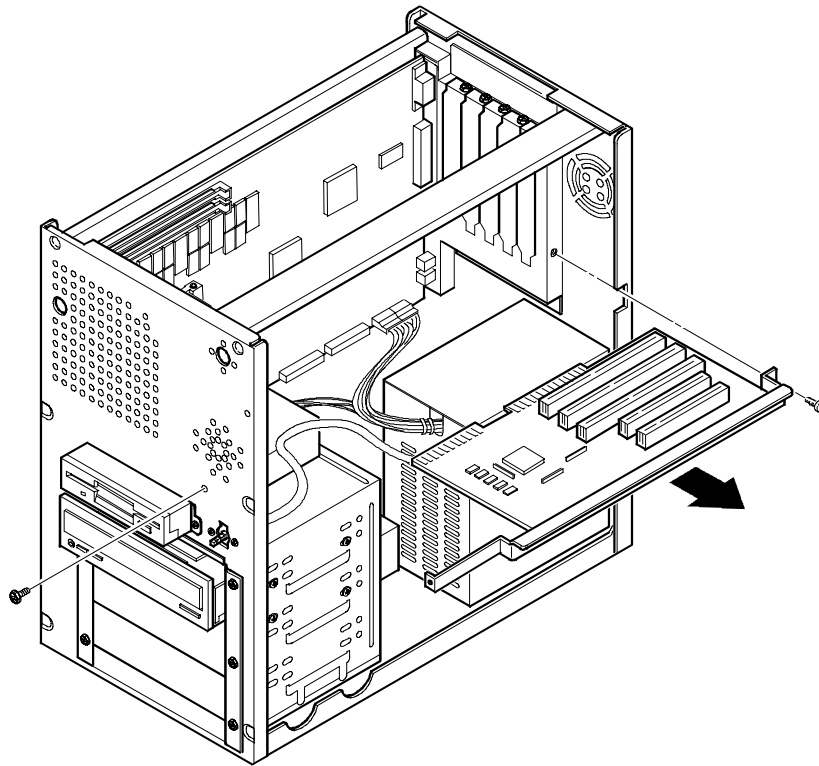
DEC00539-2

Figure 3 - 12 Removing Riser Card & Bracket

Installation Procedures

Installing a Higher Performance CPU

The Starion Minitower PC main logic board is equipped with a Pentium processor installed in a ZIF socket.

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.

NOTE	The higher-performance CPU you are installing might require a different voltage regulator than the one currently installed. Check the contents of the CPU kit for a voltage regulator. If it is necessary to change the voltage regulator, refer to Installing the CPU Voltage Regulator.

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.
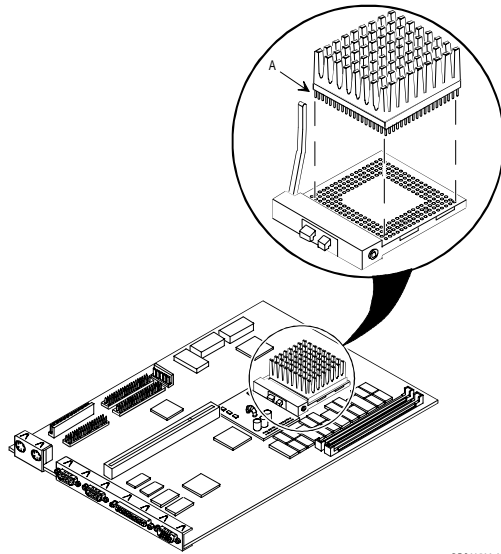
Figure 3 - 13 Installing a Higher Performance CPU

DEC00508-2

Installing the CPU Voltage Regulator

The Starion Minitower PC computer's CPU requires a separate voltage regulator in order to operate correctly. If a new CPU is installed, a new voltage regulator might also be required. If this is the case, the new voltage regulator will be included in the CPU upgrade kit.

To install the voltage regulator:

1)   Turn off the computer, disconnect external devices, ac power and monitor power.
2)   Unlock and remove cover.
3)   Carefully pinch the harpoon ends on the plastic standoffs and remove the voltage regulator.
4)   Install new voltage regulator.   Make sure socket on voltage regulator is aligned with pins on main logic board connector.
5)   Align standoffs with holes in voltage regulator circuit card and carefully press down on voltage regulator until socket is fully seated and standoffs have secured circuit card.
6)   Replace and lock cover and connect external devices and restore power.
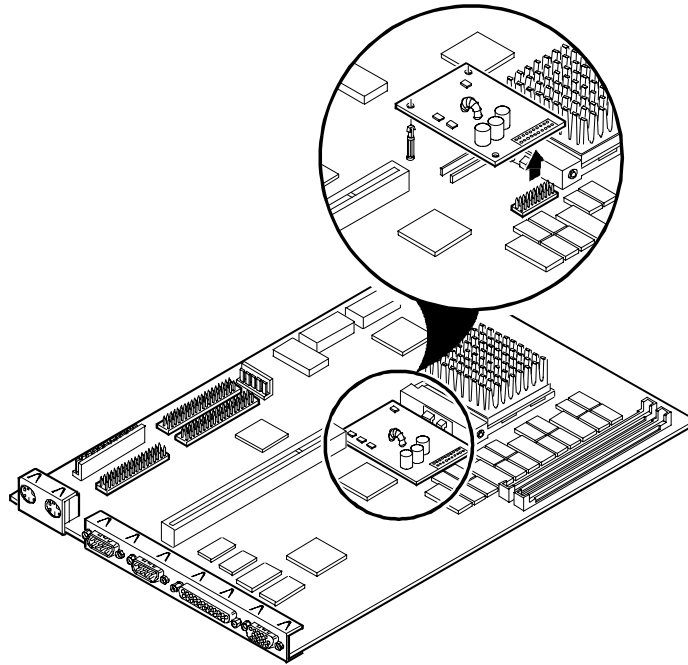
DEC00508-3

Figure 3 - 14 Installing the CPU Voltage Regulator

Removing and Replacing the Real-Time Clock (RTC)

The Starion Minitower PC computer RTC integrates a battery with the computer clock and retains any setup information when it is turned off. If the computer ever fails to retain the correct date, time or configuration settings when it is turned on, the computers RTC must be replaced.

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.
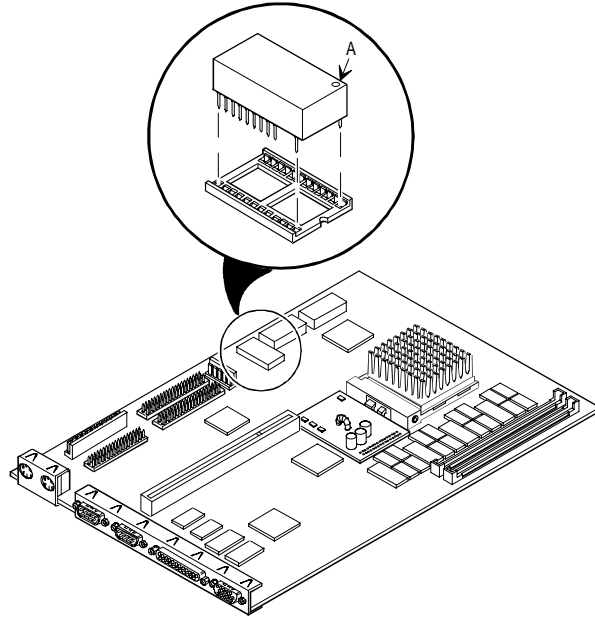
**Figure 3 - 15 Replacing the
Computer Battery**

DEC00508-4

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, pin 1 of cable has to be connected 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..

S
T
A
R
I
O
N

4
0
0
i
-
9
0
0
i

Diskette and IDE Data Cable Connections

Legend	Device Component
A	Power supply
B	Power connections
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
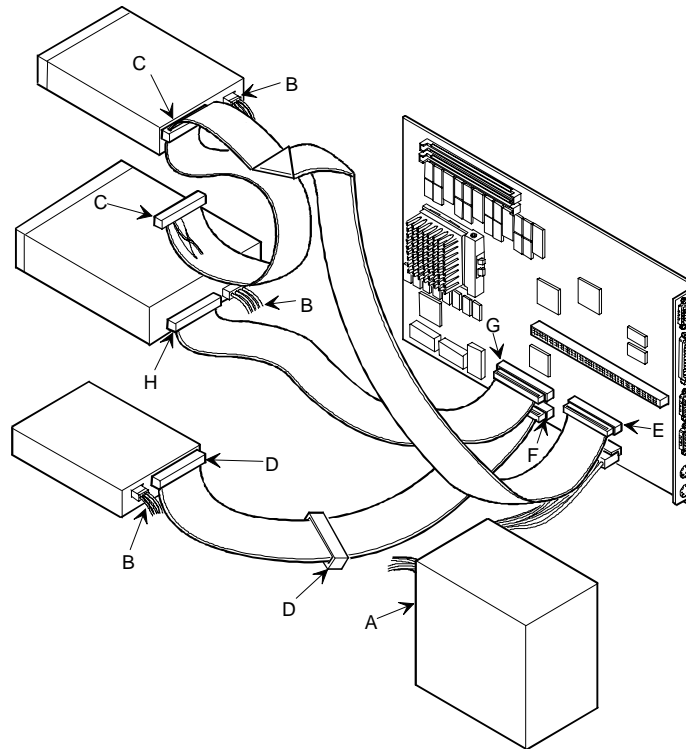
Figure 3 - 16 Diskette and IDE Data Cable Connections

Chapter 4   Troubleshooting

The following pages provide initial troubleshooting procedures and tables listing specific problems, probable causes and recommended actions to take if the computer fails after it has been configured or after optional hardware or software has been installed.

Refer to the documentation supplied with additional options when experiencing problems with specific options that are installed.

Initial Troubleshooting

Follow these general procedures to troubleshoot the Starion 400i/500i/600i/700i/800i/900i 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 *Chapter 4, "Troubleshooting"* 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, printer and 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!!

S
T
A
R
I
O
N

4
0
0
i
-
9
0
0
i

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

The following error messages are arranged in alphabetical order.

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.

S
T
A
R
I
O
N

4
0
0
i
-
9
0
0
i

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.

POST and Boot Error Messages (continued)

Message	Problem	Solution
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.
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.

S
T
A
R
I
O
N

4
0
0
i
-
9
0
0
i

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.
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 & Video Drivers"*.
	Video controller has failed.	Replace the video controller.

Computer Troubleshooting (continued)

Problem	Possible Cause	Action
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 operates incorrectly after installing optional SIMMs	SIMMs installed incorrectly.	Remove SIMMs and reinstall.
	Did not rerun BIOS Setup utility.	Rerun BIOS Setup utility.
	BIOS Setup utility changes not saved before exiting.	Rerun BIOS Setup utility and save changes.
	SIMMs have failed.	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.	Remove external cache module and reinstall.
	External cache module has failed.	Replace external cache module.
Computer fails to retain setup information	Computer battery has failed.	Replace computer battery.
	CMOS clear Jumper (J16) enabled.	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 Loose cables.	Run the BIOS Setup utility to identify the correct drive type. 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 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.

STARION 400i - 900i

Computer Troubleshooting (continued)

Problem	Possible Cause	Action
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.
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.	Refer to the supplied kit installation instructions.
	Loose or incorrectly installed cables.	Make sure all cables are correctly installed.
	IDE drive type incorrect. Onboard IDE interface disabled.	Run the BIOS Setup utility to identify the correct drive type.
		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.	Turn on the monitor.
	Power indicator is defective.	Replace the failed component.
No screen display	Configuration error.	Run the BIOS SETUP UTILITY to configure the computer for VGA operation. Set the jumper for VGA operation. "*Refer to Main Logic Board Jumpers*"..
	Monitor brightness and contrast controls are incorrectly set.	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.

S
T
A
R
I
O
N

4
0
0
i
-
9
0
0
i

Monitor Troubleshooting (continued)

Problem	Possible Cause	Action
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.

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 Buffer	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 - 22F	Sound card
278 - 27A	LPT2
2E8 - 2EF	COM4
2F8 - 2FF	COM2
378 - 37A	LPT1
3BC - 3BE	LPT3
3B0 - 3DF	VGA register
3E8 - 3EF	COM3
3F0 - 3F7	Diskette (floppy disk) controller
3F6 - 3F7	Primary/secondary IDE controller (alt status, device address)
3F8 - 3FF	COM1
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	Modem or COM2
IRQ4	COM1
IRQ5	Sound Blaster emulation or LPT2
IRQ6	Diskette (floppy disk) drive (if enabled)
IRQ7	LPT1, LPT3 (if enabled)
IRQ8	Real Time Clock (RTC)
IRQ9	Available
IRQ10	Boca sound card wave table player/recorder
IRQ11	Available
IRQ12	Mouse
IRQ13	Math co-processor
IRQ14	IDE primary
IRQ15	IDE secondary CD-ROM

DMA Channel Assignment

Channel	Controller	Function
0	1	Boca sound card - full-duplex
1	1	Sound card
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

STARION 400i - 900i

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 and
                      Sequential write/random read (**Destructive Tests !!**))
♦   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
   ◊   OS/2 version 3.0
   ◊   SCO UNIX Version 3.2.4.2
   ◊   Windows NT
   ◊   SCO Open Server Enterprise System Version 3.0
   ◊   SCO Open Server Network System Version 3.0

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 400i/500i/600i/700i/800i/900i* product line.

Modem Settings

The modem must be configured to operate using a specific serial (COM) port and interrupt request line (IRQ). This is done using the board's JB2 jumper block, containing jumpers J1 through J10.

Factory default settings are given in ***Bold Italics***

Serial Port	Jumpers	IRQ Setting	Jumpers
COM1	J8, J10 jumpered	IRQ3	J1 jumpered
COM2	J8-J9 jumpered	IRQ4	J2 jumpered
COM3	***J7, J10 jumpered***	IRQ5	J3 jumpered
COM4	J7, J9 jumpered	IRQ7	J4 jumpered
		IRQ10	***J5 jumpered***
		IRQ11	J6 jumpered

Telecommunications Software Settings

The following settings are recommended to allow the factory-installed fax/modem/sound board to work effectively with telecommunications software. Refer to appropriate telecommunications software documentation for information on configuring the software to these specifications.

Setting	Value
Baud Rate	19,200
Parity	None (N)
Data Bits	8
Stop Bits	1
Flow Control	RTS/CTS

S
T
A
R
I
O
N

4
0
0
i
-
9
0
0
i

Sound Card Settings

Sound card settings are defined using the board's JB1 jumper block, containing jumpers J1 through J14.

Factory-default settings are given in *Bold Italics*

I/O Address		IRQ Setting		DMA Channel	
I/O	**Jumpers**	**IRQ**	**Jumpers**	**DMA**	**Jumpers**
220	*J2, J4 jumpered*	*IRQ5*	*J6-J7 jumpered*	0	J10-J11 jumpered
230	J2-J3 jumpered	IRQ7	J5, J8 jumpered	*1*	*J9,J12 jumpered*
240	J1, J4 jumpered	IRQ7	J5, J8 jumpered	3	J9,J11 jumpered
250	J1, J3 jumpered	IRQ7	J5, J8 jumpered	none	J10-J12 jumpered
		IRQ9	J6, J8 jumpered		
		IRQ10	J5, J7 jumpered		

Disabling Fax/Modem/Sound Board Features

It might be necessary to disable certain functions of the factory-installed fax/modem/sound card to allow a separately installed joystick, modemand/or sound card to operate correctly. The following jumper settings can be used for this purpose. Factory default settings are given in *Bold Italics*.

Feature	Jumper Block	Setting	Jumper
Joystick	JB1	*Enabled* Disabled	*J13 jumpered* J14 jumpered
Fax/Modem	JB4	*Enabled* Disabled	*J1 jumpered* J2 jumpered
Sound	JB5	*Enabled* Disabled	*J1 jumpered* J2 jumpered

Appendix B   Other Useful Information

Related documentation

Document Titles	Order's
Starion 400i - 900i Quick Reference Guide	EK-A0854-RG
Starion Desktop PC Quick Setup Guide	ER-901A2-IA
Starion Desktop PC User's Guide	ER-901A2-UA
Starion Service Maintenance Manual Spare Parts Catalogue	EK-A0860-SV
ISA Configuration Utility (ICU) User's Guide	ER-PNPAL-UA

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**

S
T
A
R
I
O
N
4
0
0
i
-
9
0
0
i

Document Feedback

If you have comments on the contents or layout of this document we highly appreciate your feedback.
We will do our best to make this document a valuable support to your service efforts for Digital.
Please fill - out the reader feedback form and send or fax it to:

Digital Equipment Parts Center b.v.
Att: MCS Logistics Engineering Call Desk
P.O. Box 6774
6503 GG Nijmegen
Holland

If you have questions about this document please do not hesitate to get in contact with our Call Desk.
The number is:

Phone: xx31-24-3529666

Fax: xx31-24-3563106

STARION 400i - 900i

Personal Notes

Personal Notes

Personal Notes

Personal Notes

READERS COMMENTS

Digital STARION 400i - 900i Service Maintenance Manual
EK-A0852-SV Rev A01

This form is for documents only. Commitments submitted on this form are used at Digital's direction.
Did you find errors in this manual? If so, specify by page.

....
....

....
....

....
....

What is your general reaction to this manual (format, completeness, organisation etc.)?

....
....

....
....

....
....

Is the documentation understandable, usableand sufficient for your needs? What material is missing?

....
....

....
....

....
....

Additional comments:

....
....

....
....

....
....

....
....

Name
....
....

Title
....
....

Company .... **Dept**
....

Address
....
....

City   .... **State**
....

Country
....
....