Cycle
Computer Corporation
Inc

Cycle 5-IP: Upgrade Board
Owners Manual
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TOOLS REQUIRED

Hardware:

You will require the following Hardware to complete the installation of your new Cycle 5-IP upgrade board. (not supplied with the board).

1) Phillips #3 Screwdriver
2) Phillips #1 Screwdriver
3) Flat Head #1 Screwdriver
4) Socket Drive 3/16"

The following is supplied with your Cycle 5-IP kit:
1) Cycle 5-IP Motherboard with Backpanel attached
2) Wrist Strap
3) Recyclable Cardboard Box and antistatic bag for return of your recycled Motherboard.
4) Plastic tool for 30 Pin memory removal.
5) Speaker assembly kit (necessary if using 30 pin memory)
6) Cycle label for attachment to the front of the upgraded system

Software:

You will require Solaris or SunOS Software that provides Kernel support for the microSPARC II processor used on the Cycle 5-IP Motherboard. This minimum release of Solaris and the equivalent SunOS are:

<table>
<thead>
<tr>
<th>SunOS Version</th>
<th>Solaris Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.3</td>
<td>2.3</td>
</tr>
<tr>
<td>5.4</td>
<td>2.4</td>
</tr>
<tr>
<td>4.1.3 _U1 Ver B</td>
<td>1.1.1 Ver B</td>
</tr>
<tr>
<td>4.1.4</td>
<td>1.1.2</td>
</tr>
</tbody>
</table>

YOU MUST ENSURE YOU HAVE A COPY OF THE APPROPRIATE SOFTWARE UPGRADE CDROM BEFORE COMMENCING THIS INSTALLATION. (ELSE YOUR BOARD WILL NOT BE BOOTABLE ONCE INSTALLATION IS COMPLETE).

This upgrade is available through your authorized Cycle Reseller if required.
POINTS OF IMPORTANCE

1) Bank 0 select (SW1):

THE BOARD SHIPS WITH BANK 0 SELECTED AS THE 72 PIN IPX STYLE MEMORY. IF YOU ARE ONLY LOADING 30 PIN IPC STYLE SIMM's THEN SET SW1 #5 OFF, FACTORY DEFAULT IS ON, ELSE BOARD WILL NOT BOOT. [REFER STEP 6.1, PAGE 21 BELOW]

2) Different Kernel Architectures:

IT IS IMPORTANT TO NOTE THAT THE CYCLE 5-IP PRODUCTS (and SPARCstation 5) AND THE SPARCSTATION IPC and IPX, HAVE DIFFERENT KERNEL ARCHITECTURES. [REFER ITEM (4a) BELOW]

3) Ethernet address and Host ID Number

CYCLE 5-IP SHIPS WITH A UNIQUE SPARCstation 5 STYLE HOST ID NUMBER (FIRST 2 DIGITS ARE "80") THAT IS DIFFERENT FROM THE IPC or IPX SYSTEM YOU ARE UPGRADING FROM. YOUR EXISTING HOST ID NUMBER CAN NOT BE TRANSFERRED TO CYCLE. CYCLE 5-IP ALSO SHIPS WITH A NEW ETHERNET ID NUMBER. [REFER STEP D, PAGE 9 BELOW]
SOFTWARE REQUIRED

1) Determining your current software release:

1a) The following table shows the various SunOS and Solaris releases that they relate to each other. TO RUN CYCLE 5-IP PRODUCTS (and any SPARCstation 5 or SuperSPARC Revision 3.5 or higher processor products) YOU MUST HAVE SOLARIS 1.1.1 REV B (SUNOS 4.1.3_U1 REV B) OR SOLARIS 2.3 (SUNOS 5.3) OR GREATER. THESE VERSION ARE SHOWN IN BOLD ITALIC SCRIPT IN THE TABLE BELOW.

<table>
<thead>
<tr>
<th>SunOS Release</th>
<th>Solaris Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>SunOS 4.1</td>
<td>Solaris 1.0</td>
</tr>
<tr>
<td>SunOS 4.1.2</td>
<td>Solaris 1.0.1</td>
</tr>
<tr>
<td>SunOS 4.1.3</td>
<td>Solaris 1.1</td>
</tr>
<tr>
<td>SunOS 4.1.3_U1 Rev A</td>
<td>Solaris 1.1.1 Rev A</td>
</tr>
<tr>
<td><strong>SunOS 4.1.3_U1 Rev B</strong></td>
<td><strong>Solaris 1.1.1 Rev B</strong></td>
</tr>
<tr>
<td>SunOS 4.1.4</td>
<td>Solaris 1.1.2</td>
</tr>
<tr>
<td>SunOS 5.0</td>
<td>Solaris 2.0</td>
</tr>
<tr>
<td>SunOS 5.1</td>
<td>Solaris 2.1</td>
</tr>
<tr>
<td>SunOS 5.2</td>
<td>Solaris 2.2</td>
</tr>
<tr>
<td><strong>SunOS 5.3</strong></td>
<td><strong>Solaris 2.3</strong></td>
</tr>
<tr>
<td><strong>SunOS 5.4</strong></td>
<td><strong>Solaris 2.4</strong></td>
</tr>
</tbody>
</table>

1b) To determine your current release of software on your SPARCstation key the following command

"showrev"

this will display the full version number of your current software, for example if you have SunOS 4.1.3_U1, but are uncertain as to the revision, this command will display the Revision A or B, for you.
2) Cost of an Upgrade:

2a) The following table shows the various software upgrades that are applicable to a potential Cycle Upgrade User and their associated US List price. All Versions shown in this table are for US versions of the software. Please consult with your SunSoft or Cycle distributor for upgrade prices for International versions of Solaris.

2b) Note: If using Solaris 1.1.1 Revision B, please note the patch ms2 must be loaded as detailed in section 3 below.

<table>
<thead>
<tr>
<th>Description</th>
<th>SunSoft Order Number</th>
<th>Price US List</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solaris 1.x to Solaris 1.1.2 Binary Upgrade (Includes RTU license, CD and End User Documentation)</td>
<td>SSOS-112-CDB-UPG</td>
<td>$149.00</td>
</tr>
<tr>
<td>Solaris 1.x to Solaris 1.1.2 RTU Upgrade</td>
<td>SSOS-112-RTU-UPG</td>
<td>$100.00</td>
</tr>
<tr>
<td>Solaris 1.x or 2.x to 2.3 Upgrade (Includes RTU license, CD and End User Documentation)</td>
<td>SSOS-230-CDB-UP1</td>
<td>$295.00</td>
</tr>
<tr>
<td>Solaris 1.x or 2.x to 2.3 RTU Upgrade</td>
<td>SSOS-230-RTU-UP1</td>
<td>$195.00</td>
</tr>
<tr>
<td>Solaris 1.x or 2.x to 2.4 Upgrade (Includes RTU license, CD and End User Documentation)</td>
<td>SSOS-240-CDB-UP1</td>
<td>$295.00</td>
</tr>
<tr>
<td>Solaris 1.x or 2.x to 2.4 RTU Upgrade</td>
<td>SSOS-240-RTU-UP1</td>
<td>$195.00</td>
</tr>
</tbody>
</table>
3) ms2 Patch for Solaris 1.1.1 Revision B users:

3a) Part of the User Documentation that comes with the Solaris 1.1.1 Version B binary upgrade, includes a booklet entitled “Solaris 1.1.1 Version B Late-Breaking News”. This documentation describes a patch called the “ms2” patch that is specifically created for microSPARC-II based systems.

**This ms2 patch MUST be loaded to support your Cycle 5-IP board if you are using Solaris 1.1.1 version B or SunOS 4.1.3_U1 Rev B.**

4) Hardware Architectures:

4a) IT IS IMPORTANT TO NOTE THAT THE CYCLE 5-IP PRODUCTS (and SPARCstation 5 ) AND THE SPARCSTATION IPX and IPC, HAVE DIFFERENT KERNEL ARCHITECTURES.

<table>
<thead>
<tr>
<th>System</th>
<th>Application Architecture a-arch</th>
<th>Kernel Architecture k-arch</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPARCstation IPC</td>
<td>sun4</td>
<td>sun4c</td>
</tr>
<tr>
<td>SPARCstation IPX</td>
<td>sun4</td>
<td>sun4c</td>
</tr>
<tr>
<td>SPARCstation 5</td>
<td>sun4</td>
<td>sun4m</td>
</tr>
<tr>
<td><strong>Cycle 5-IP Products</strong></td>
<td><strong>sun4</strong></td>
<td><strong>sun4m</strong></td>
</tr>
</tbody>
</table>

4b) This means that when performing a typical Standalone Workstation install, you cannot upgrade your Solaris or SunOS Release using the existing SPARCstation motherboard and then swap out the motherboards for Cycle 5-IP and expect the system to boot; as the install process will automatically put the incorrect kernel architecture (specifically sun4c, rather the sun4m needed for Cycle 5-IP) on the hard disk.
Therefore when doing a software upgrade, first backup the hard disks and then install the Cycle 5 Motherboard and boot the system from the CD drive. Then perform the appropriate OS installation following the appropriate System Installation guide. These steps are summarized as:

**Step A:**
Backup all software on existing system disk that is going to be upgraded. Backing up software from all drives is recommended.

**Step B:**
Remove existing Motherboard and Install Cycle 5-IP product following steps below.

**Step C:**
Install Solaris or SunOS software upgrade (if required, check page 6) from CDROM drive using the Cycle 5-IP Motherboard with the system disk connected. This will typically update partitions “a” and “g” on the system disk with the new OS.

**Step D:**
Your Cycle system ships with a new Ethernet address of the form 0:80:01:0:xx:yy and a new Host ID number of the form 8000xxxxyy, where xx and yy relate to the serial number of your board. Ensure that your network administrator is aware of the new Ethernet address for your system and consider any application software relicensing issues associated with the new Host ID number. Both numbers can be seen at the Banner prompt which can be obtained by typing "banner" at the OK prompt.

**Step E:**
Enjoy your high performance Cycle 5-IP product.
Stage 1: Removing Top Cover and use of ground strap provided.

BOARD INSTALLATION

Stage 1: Separation of Top and Bottom units and removal of the Motherboard using the ground strap provided.

Step 1.1: Turn Power off to the Workstation at the rear switch and turn off the power switch at the wall connector if you have access to it. Do not disconnect the power lead from the wall as the ground lead on the power connector will provide a suitable path to ground onto the chassis with the grounding strap provided.

Step 1.2: Disconnect all the cables but the power cable from the rear connector panel. Leave the power cable connected. The various connectors may be screwed into the Backpanel with hand tightened screw connectors, which you can unfasten without the use of tools.
Stage 1: Removing Top Cover and use of ground strap provided.

Step 1.3: Remove the top cover screw, inside the lock block on the rear of the top cover, using a #3 Phillips screwdriver shown in the figure below. Lift the top cover while simultaneously pressing the latch covers located on each side of the top cover. Lay the top and bottom units out together on a flat bench being careful not to damage the cables connecting the two covers.

Lift Cover after removal of screw while pressing the two latch buttons

Remove lock block by removing single screw securing top cover
Stage 1: Removing Top Cover and use of ground strap provided.

How to use a Wrist Strap:

1. Attach the looped end of the wrist strap, provided in the shipping box, to your wrist as in the diagram below.

2. Attach the end with the alligator clip to a non painted surface on the chassis such as the power supply top.

3. You are now grounded to the computer which in turn is grounded back through the electrical connection to a secure earth.

Alligator Clip to non-painted area on chassis such as Power Supply Cover.
Stage 2: Removal of Motherboard

Step 2.1: Layout of the inside of the cabinet is shown below. The next task is to remove the Motherboard which is attached to the Backpanel of the Bottom Unit with six screws.

IPC Motherboard to be Removed

Cables connecting units

Backpanel

Bottom Unit

Layout of cabinet interior with cover removed

Top Unit

SCSI Disk

Floppy Disk

Power Supply

IPC Motherboard Shown-Plan View
Stage 2: Removal of Motherboard

Step 2.2: Remove the Internal Cables including, SCSI cable, Power Supply Cable and Floppy Disk Cable shown in the figure below connecting the Bottom and Top Units. Keep the wrist strap attached to the Top unit with the Power supply connected to the wall socket to provide a ground connection. Remove any S-Bus cards from the S-Bus Connector and remove the Speaker assembly and cables. Remove the light pipe (plastic assembly).

IPC Motherboard Shown - Plan View
Showing Cable Connector Removal Sequence
Stage 2: Removal of Motherboard

Step 2.3 Remove the six screws securing the Motherboard to the Backpanel as shown below. There are three different types of screws to remove as shown below.

Screws to Remove:

Phillips #1 Screw. Secures 50 pin external SCSI connector to backpanel (2 screws to remove).
[Refer to step 3.1]

Flat Head #1 Screw. the 15 pin AUI Ethernet connector to the backpanel (2 screws to remove).
[Refer to step 3.1]

3/16" Socket Hexagonal Screw secures the 13W3 video cable to the backpanel (2 screws to remove).
[Refer to step 3.1]
Stage 2: Removal of Motherboard

Remove six screws securing Motherboard to Backpanel of Bottom Unit

View of Backpanel showing screw types to remove
Stage 2: Removal of Motherboard

Step 2.4 With all the internal cables removed from the existing board and the screws attaching the Motherboard to the Bottom Unit removed the Motherboard can now be eased from the Bottom Unit as shown below. The Motherboard sits in the bottom unit on three key mounting pins.

To remove Motherboard
pull back (to disengage key mounting pins) and pull up to ease Motherboard out of cabinet

Key Mounting Holes for Board to rest on
Step 3.1: Now the Motherboard is removed from the existing SPARCstation IPC/IPX Cabinet, the new Cycle 5-IP Motherboard can be carefully removed from the shipping box and taken out of the anti-static recyclable bag that contains the board. Please ensure that you handle the board as little as possible and hold the Motherboard on its edges so as to have minimum contact with the various components on the surface of the board. Lay the two boards together on a clean surface that is non-conductive (for example place a piece of cardboard on a bench surface) and place the two boards side by side to assist in the next step which is removal and replacement of the memory from the old to the new Motherboard.
Stage 4: Removal of Existing Memory from existing Motherboard

Step 4.1: The next step is to remove the memory from the old SPARCstation IPC/IPX Motherboard and fit it in a particular order into the new Cycle 5-IP Motherboard.

A special plastic tool is provided in the bag with the Wrist Strap to help with removal of the Single In-line Memory Modules (SIMM’s). SIMM’s are made up of RAM chips grouped together and each SIMM plugs into a SIMM slot located on the Motherboard.

Lever up to lift Simm

Plastic lifting Tool

Removal of memory: Showing use of plastic memory lifting tool provided

Having completed the removal of the memory SIMM’s, place the old Motherboard back into the re-useable protective anti-static bag and place this bag back into the Cycle 5 shipping box for return to your Reseller or Cycle for re-cycling.

Check you Reseller for the latest information on the Cycle Rebate Program for returned motherboards.
Stage 7: Loading existing 30 pin IPC style memory into Cycle 5-IP Motherboard

Stage 5: Memory Overview

Step 5.1: The following diagram shows the location of the 30 pin IPC and 72 pin IPX memory on the Cycle 5-IP Motherboard and the numbering of this memory.
Stage 7: Loading existing 30 pin IPC style memory into Cycle 5-IP Motherboard

Stage 6: Setting Bank 0 memory switch for IPC or IPX memory

Step 6.1  A jumper is provided on the Motherboard in the following location (SW1) to set the Bank 0 memory location. The jumper must be set to either of these two positions depending on the use of IPX or IPC memory as Bank 0.

- **IPC** (30 pin)
  - Assumes memory is loaded in IPC memory banks with a full load of 8, 30 pin simm’s in position M1 through M8
- **IPX** (72 pin)
  - Assumes memory is loaded with IPX 72 pin simm’s in position S0 and S1 (Default setting)

either

OR
Stage 7: Loading existing 30 pin IPC style memory into Cycle 5-IP Motherboard

Step 6.2 If either memory type is set as bank 0 you can still load both IPX and IPC banks with maximum memory capacity as per the following table:

Refer to the following two steps for individual loading information on IPC and IPX memory, including VALID and INVALID memory configurations.

<table>
<thead>
<tr>
<th>Standard Sun SIMM</th>
<th>IPX Type:</th>
<th>SIMM</th>
<th>SIMM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IPC 4MB</td>
<td>IPX 4MB</td>
<td>IPC 4MB</td>
</tr>
<tr>
<td>Number SIMM's</td>
<td>8</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Memory Capacity</td>
<td></td>
<td></td>
<td>56MBytes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Double Density SIMM</th>
<th>IPX Type:</th>
<th>SIMM</th>
<th>SIMM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IPC 4MB</td>
<td>IPX 8MB</td>
<td>IPC 4MB</td>
</tr>
<tr>
<td>Number SIMM's</td>
<td>8</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Memory Capacity</td>
<td></td>
<td></td>
<td>80MBytes</td>
</tr>
</tbody>
</table>

The table above shows only a few of the available VALID possible memory configurations. Many different combinations are possible.
Stage 7: Loading existing 30 pin IPC style memory into Cycle 5-IP Motherboard

**Step 7.1:** Having removed the memory from the old SPARCstation IPC Motherboard, 8 SIMM's of the 12 possible total from the existing IPC SPARCstation can now be loaded into the Cycle 5-IP Motherboard.

IPC style 30 pin memory banks to be loaded with 1MB or 4MB simm modules numbered M1 to M8
Stage 7: Loading existing 30 pin IPC style memory into Cycle 5-IP Motherboard

Step 7.2: However because of the new Cycle 5-IP Processor, requirements only certain memory configurations are supported:

<table>
<thead>
<tr>
<th>Recycled Existing 30 pin IPC Memory: Possible Configurations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Number SIMM’s</strong></td>
</tr>
<tr>
<td>Mem Capacity 8MB</td>
</tr>
<tr>
<td>Number SIMM’s</td>
</tr>
<tr>
<td>Mem Capacity 32MB</td>
</tr>
</tbody>
</table>

The table shows supported IPC 30 pin memory configurations.

Note: This table relates to the existing memory Recycled from the existing SPARCstation IPC. The Cycle 5-IP Motherboard supports an additional six SPARCstation IPX style memory banks. This additional optional memory is discussed in Stage 6.

Memory should always be loaded in banks of 8 SIMM’s if recycling IPX memory. So the 8 available banks on the Cycle 5-IP board are either full or left empty. A load of 4 SIMM's is not valid as shown in the following diagrams.
Stage 7: Loading existing 30 pin IPC style memory into Cycle 5-IP Motherboard

Step 7.3    The following chart shows valid and invalid memory configurations.

**INVALID**: 4 banks only filled, all 8 banks must be filled.

**VALID**: all 8 banks filled or left empty
Memory Capacity: 8MB using 1MB SIMM's or 32MB using 4MB SIMM's

Memory configurations for 30 pin memory
Stage 7: Loading existing 30 pin IPC style memory into Cycle 5-IP Motherboard

Step 7.4: Care should be taken to ensure that the SIMM modules are correctly and firmly SEATED into their sockets on the Cycle 5-IP Motherboard so that locking pins shown below are engaged.

Correct Firm Seating of SIMM's is essential to valid operation
Stage 8: Loading existing IPX style 72 pin memory

Step 8.1: The Cycle 5-IP Motherboard supports and additional 6 banks of IPX style memory which can be added as per the following figure.

NOTE: IPX STYLE MEMORY CAN BE USED STAND ALONE WITH OR WITHOUT THE 8 BANKS OF 30 PIN IPC MEMORY. REFER TO STEP 6 OF THIS MANUAL FOR SETTING THE CORRECT DIP SWITCH SETTING FOR BANK 0, TO TELL THE MOTHERBOARD WHICH MEMORY IS LOADED AS THE DEFAULT SETTING.

IPX style 72 pin memory banks to be loaded with 1MB, 4MB, 8MB or 16MB simm modules numbered S0 to S5
Stage 8: Loading existing IPX style 72 pin memory

Step 8.2: VALID Memory settings with jumper switch SW1 #5 selected to IPX or IPC memory as bank 0: The following are the ONLY VALID IPX 72 pin memory configurations possible.

VALID Configurations with IPX set as bank 0 on SW1 #5 using IPX memory

- S0 to S5 all filled
- S0 and S1, S2, S3, S4, S5 empty
- S0 to S3 filled and S4 and S5 empty
- S0 and S1, S2, S3 and S4 and S5 empty
- S0 to S5 all empty
- S0 and S1, S2, S3, S4, S5 empty
- S0, S1, S4, S5 empty and S2, S3 filled
- S0, S1 filled, S2, S3 empty, with S4, S5 filled
- S0 to S1 empty and S2 to S5 filled
Step 8.3: **INVALID Memory Settings**: The following IPX 72 pin memory configurations are **INCORRECT**. Please note that other invalid memory configurations are possible, these are shown as examples only.

- S0 to S5 all filled, S1 empty
- S0 filled, S1 to S5 all empty
- S0 filled, S2, S3, S4, empty, S5 filled
- S0 empty, S1 to S3 filled and S4 and S5 empty
- S0 to S3 empty, S4 and S5 filled
- S0 empty, S1 filled, S2 and S3 empty, with S4 and S5 filled

**INVALID Sample Configurations using IPX memory banks S0 through S5:** Other INVALID configurations are possible.
Stage 9: Setting Memory and Frequency Speed Jumpers (optional)

Step 9.1: Setting Memory Speed:
The system is configured for shipment with the memory speed selected to the slowest rate. This speed will therefore run most of the commercially available old style 30 pin memory in the existing SPARCstation up to 100ns for Cycle 5-IP products. When using non-Sun third party memory or mixed memory from different manufacturers in the Cycle 5-IP board ALWAYS LEAVE THE MEMORY SWITCH TO FACTORY DEFAULT SLOWEST SETTING (ALL SWITCHES OFF).

Step 9.2: Remember the system must run at the speed of the slowest SIMM module fitted into the system (even if there is only one module at this slow speed).
The following Memory speed selections are possible.

This switch controls the Bank 0 memory select (shown factory default IPX setting)

Fastest Speed Memory

Medium to Fast Speed Memory

Medium to Slow Speed Memory

Slowest Speed Memory (factory default)

These two switches control the frequency of the board (shown factory default fastest setting)

Before altering the memory switch settings from factory default first run the board for several days at the default setting to get some experience with the default setting performance before experimenting with faster settings, which may cause MEMORY errors or other system RESETS due to memory timing faults, if too higher setting is selected.

IF YOU ARE EXPERIENCING ANY SORT OF MEMORY PROBLEM ON BOOT OR DURING PROCESSING leave the speed selected (or reset) to the slowest possible memory speed and this will ensure a valid operation.
Stage 9: Setting Memory and Frequency Speed Jumpers (optional)

Step 9.3: Setting Frequency to slower value:

The Frequency at which the board runs can also be adjusted via the two frequency switches number 3 and 4. However, the board ships with a default setting which runs the processor at the fastest possible frequency setting as designated by the Cycle 5-IP model number purchased. For example, Cycle 5-IP-85 runs at 85MHz and Cycle 5-IP-70 at 70MHz settings.

If you have purchased a higher frequency Cycle 5-IP board, typically 100MHz and above and are having difficulty running older 80 or 100NS 4X9 memory you may wish to slow down the clock frequency to enable you to still run the older memory until resources allow the purchase of faster memory to run the board at the higher frequencies.

This switch 5 controls the Bank 0 memory select (shown factory default IPX setting).

<table>
<thead>
<tr>
<th>Bank 0 Memory Select</th>
<th>Slowest Frequency (say 70MHz)</th>
<th>Medium to Slow Frequency (say 85MHz)</th>
<th>Medium to Fast Frequency (say 90MHz)</th>
<th>Fastest Frequency (say 90MHz) (factory default)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

These two switches control the frequency of the board.

These two switches control memory speed select.

Example Shown for Cycle 5-IP-90 Model
The following table shows the various settings for switch 3 and 4 for the various Cycle 5-IP models and the effect the settings have on the final frequency of the board.

<table>
<thead>
<tr>
<th>Switch settings</th>
<th>Cycle 5 IP-70</th>
<th>Cycle 5 IP-85</th>
<th>Cycle 5 IP-90</th>
<th>Cycle 5 IP-100</th>
<th>Cycle 5 IP-110</th>
<th>Cycle 5 IP-125</th>
</tr>
</thead>
<tbody>
<tr>
<td>SW3 off</td>
<td>70 Default</td>
<td>85 Default</td>
<td>90 Default</td>
<td>100 Default</td>
<td>110 Default</td>
<td>125 Default</td>
</tr>
<tr>
<td>SW4 off</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SW3 off</td>
<td>70</td>
<td>85</td>
<td>90</td>
<td>90</td>
<td>100</td>
<td>110</td>
</tr>
<tr>
<td>SW4 on</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SW3 on</td>
<td>70</td>
<td>85</td>
<td>85</td>
<td>85</td>
<td>90</td>
<td>100</td>
</tr>
<tr>
<td>SW4 off</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SW3 on</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>85</td>
<td>90</td>
</tr>
<tr>
<td>SW4 on</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table shows frequency settings for a given Cycle 5-IP configuration, showing the four frequency settings available.
Stage 10: Re-Insertion of Motherboard and Re-Assembly of Cabinet

Step 10.1: The following is a list of possible jumper settings to check before re-inserting Cycle 5-IP Motherboard.

(I) Memory speed setting, default [off, off], refer page 30
(ii) Frequency select, default [off, off], refer page 32
(iii) Memory Bank 0 select, default IPX, refer page 21
(iv) RS-232 or RS-432 serial mode default RS-232, refer page 43

Step 10.2: The new Cycle 5-IP Motherboard can be Re-Inserted back into the Bottom Unit now the memory has been fitted and the various memory jumpers set correctly. Insertion is the reverse of step 2.4 where the Motherboard is fitted Backpanel first carefully into the cabinet and seated on the three mounting pins and then pushed back to engage the keys on the mounting pins.
Stage 10: Re-Insertion of Motherboard and Re-Assembly of Cabinet

Step 10.2: Re-connection of the various cables to the Cycle 5 Motherboard is the reverse of the sequence performed in Step 2.3 earlier.
Stage 10: Re-Insertion of Motherboard and Re-Assembly of Cabinet

Step 10.3: Re-connection of the various cables to the Cycle 5 Motherboard is the reverse of the sequence performed in Step 2.4 earlier.

Re-attach new Cycle 5-IP Motherboard to Bottom Unit

View of Backpanel showing screw types to re-attach

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Step 10.4: **Speaker Assembly**: The speaker for the IPX and IPC systems cannot be re-inserted into the pocket provided on the side of the chassis if 30 pin IPC memory is used, as the speaker sits on top of the memory SIMM's.

A speaker assembly bracket is included in the Cycle 5-IP kit consisting of an aluminum plate and a set of two screws with nuts and washer. This assembly should be used to mount the speaker onto the floppy diskette drive mounting bracket.

**If 30 pin SIMM's are not used this step is not necessary**, simply re-mount the speaker into the existing pocket on the side of the chassis. If using 30 Pin SIMM's then do the following:

Slide speaker into mounting lugs on bracket provided

Pushing speaker firmly into mounting lugs

Speaker is now ready to be mounted onto floppy mounting bracket assembly using the screws and nuts (if necessary)
Step 10.5: Now mount the speaker assembly bracket with the speaker fitted onto the top of the floppy mounting bracket in the top unit as shown below using #3 Screws provided in speaker assembly kit.

The screws provided will match the floppy mounting screws and are slightly longer to provide attachment of the speaker assembly bracket directly into the screw holes of the floppy drive itself. If no floppy is fitted, two nuts and washers are provided with the speaker bracket assembly to provide assembly of the bracket in the same position on the top of the floppy mounting bracket.
Stage 10: Re-Insertion of Motherboard and Re-Assembly of Cabinet

Step 10.6: Re-Assemble the cabinet using the #3 Phillips Screws as shown below in reverse process to that of Step 1.3.

Replace Cover while pressing the two latch buttons

Press

Replace lock block by inserting single screw securing top cover

Press
Step 11: External Cable connection with new Cycle 5 Motherboard

Stage 11: External Cable connection with new Cycle 5-IP Motherboard

Step 11.1: You have now completed your hardware installation. Reconnect the external cables and fasten the hand tightened screws that secure the rear connectors to the new Cycle 5-IP Motherboard. NOTE: THE NEW CYCLE 5-IP MOTHERBOARD SUPPORTS SOME ADDITIONAL FUNCTIONALITY ON THE BACKPANEL CONNECTORS.

Old SPARCstation Connectors

New Cycle 5-IP Connectors
Step 11: External Cable connection with new Cycle 5 Motherboard

The differences are highlighted further in the following table:

**NOTE:** A PARALLEL PORT IS NOW available via an optional extension cable that can be used with the S-Bus I/O slot or run through to the table top below the S-Bus slot allowing full use of both S-Bus slots.

<table>
<thead>
<tr>
<th></th>
<th>Old SPARCstation Connectors</th>
<th>New Cycle 5-IP Connectors</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>External SCSI</td>
<td>same</td>
<td>same</td>
<td>No Change</td>
</tr>
<tr>
<td>Ethernet</td>
<td>AUI only</td>
<td>AUI OR Twisted Pair (RJ45)</td>
<td>AUI standard, optional Cycle 5-CBL available for RJ45.</td>
</tr>
<tr>
<td>Serial A</td>
<td>yes</td>
<td>same</td>
<td>No Change</td>
</tr>
<tr>
<td>Serial B</td>
<td>yes</td>
<td>same</td>
<td>No Change</td>
</tr>
<tr>
<td>Parallel</td>
<td>no</td>
<td>yes, via optional cable</td>
<td>Optional Cycle 5-PPCBL</td>
</tr>
<tr>
<td>Keyboard/</td>
<td>same</td>
<td>same</td>
<td>No Change</td>
</tr>
<tr>
<td>Mouse</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Audio</td>
<td>same</td>
<td>same</td>
<td>No Change</td>
</tr>
<tr>
<td>Graphics (Video)</td>
<td>Black &amp; White or CG3 on IPC</td>
<td>GX, GX+, TGX, TGX+ or No Load Graphics options</td>
<td>A variety of graphics options are offered on the Cycle 5-IP Motherboard see the following section for clarification.</td>
</tr>
</tbody>
</table>

**Note**: To order connector for Twisted Pair (using RJ45 Connector) order following Cycle 5 part number: **Part Number: Cycle 5-CBL**.

**Note**: To order parallel port optional extension cable order the following Cycle 5 part number: **Part Number: Cycle 5-IP-PPCBL**.
Stage 12: IPX and IPC Motherboards Graphics Support: The IPX motherboard came with 1MB or VRAM and a GX (CG6) graphics chip with the Brooktree Bt458 RAMDAC chip providing support up to 125MHz video data rate giving graphics support up to 1152x900@76Hz.

The IPC motherboard included an on board monochrome frame buffer or a CG3 color frame buffer graphics chip and 1MB of VRAM.

Both IPX and IPC boards also supported 2 SBus slots for graphics expansion cards.

Overview of Graphics support on the Cycle 5-IP products: The Cycle 5-IP products are highly configureable to support the various Graphics Adapter Options available for Sun Workstations.

No Load Configuration: The board can be configured in a no load situation (Cycle 5-IP-NL) with no graphics support on the motherboard and any graphics functionality is provided via the 2 SBus slots. This option would typically be used by IPC upgrades who wish to use an S-Bus card for their graphics options.

Video Ram Options: The board can be configured with 2MB of VRAM, 8 sets of 256x8 Mbit Video Ram, or 4MB of VRAM consisting of 16 sets of 256x8 Mbit Video Ram (8 on the top of the board and 8 on the bottom of the board) fixed to the motherboard (NOT socketed).

Graphics Chip Support: The graphics chip is socketed on the Cycle 5-IP motherboard allowing upgrade of existing GX graphics chip's from the IPX motherboard or field upgrades to GX or Turbo GX graphics accelerator chips. The Cycle 5-IP board can be shipped with various VRAM options loaded and the Graphics Chip vacant allowing for maximum flexibility in field upgrades.

Brooktree RAMDAC Support: Cycle 5-IP supports the Brooktree Bt467 170MHz and 220MHz Brooktree RAMDAC's allowing 1600x1280 bit-mapped color graphics with support for 220MHz video frame rates required for 76Hz systems at this high resolution. Generally the Cycle 5-IP will ship with the Bt467-220 for the TGX+ option and
the Bt467-170 for the TGX, GX+, and GX resolution support. The Bt467 used on the Cycle 5-IP boards is the same RAMDAC as used by Sun on the TGX+ (Turbo GX Plus) video accelerator card, and is fully register-compatible with the Bt458 used by Sun in the GX, GX+, and TGX graphics accelerator boards providing full Bt458 software device driver compatibility with higher performance.

Ordering Cycle 5-IP Graphics Options:

There are a variety of different configurations that are supported by Cycle Computer. These options are summarized in the following table.

### Summary Of Cycle 5 Part numbers for Ordering various Graphics Options

<table>
<thead>
<tr>
<th>Cycle Part #</th>
<th>VRAM</th>
<th>Brooktree Graphics RAMDAC</th>
<th>Chips Chip</th>
<th>Equivalent Sun Graphics Accelerator Card performance level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cycle 5-IP-NL</td>
<td>0MB</td>
<td>none</td>
<td>no socket no Bt loaded</td>
<td>Must use one of the 2 S-Bus slots for graphics.</td>
</tr>
<tr>
<td>Cycle 5-IP-NL1</td>
<td>2MB</td>
<td>Bt467-170Mhz</td>
<td>socket only</td>
<td>User configureable(GX or TGX)</td>
</tr>
<tr>
<td>Cycle 5-IP-NL2</td>
<td>4MB</td>
<td>Bt467-170MHZ</td>
<td>socket only</td>
<td>User configureable(GX+)</td>
</tr>
<tr>
<td>Cycle 5-IP-NL3</td>
<td>4MB</td>
<td>Bt467-220MHz</td>
<td>socket only</td>
<td>User Configureable(TGX+)</td>
</tr>
<tr>
<td>Cycle 5-IP-GX</td>
<td>2MB</td>
<td>Bt467-170MHZ</td>
<td>GX</td>
<td>GX (but with 2MB VRAM not 1MB and Bt170)</td>
</tr>
<tr>
<td>Cycle 5-IP-GX+</td>
<td>4MB</td>
<td>Bt467-170MHZ</td>
<td>GX</td>
<td>GX+ but with Bt170</td>
</tr>
<tr>
<td>Cycle 5-IP-TGX</td>
<td>2MB</td>
<td>Bt467-170MHz</td>
<td>TGX</td>
<td>TGX (but with 2MB VRAM not 1MB and Bt170)</td>
</tr>
<tr>
<td>Cycle 5-IP-TGX+</td>
<td>4MB</td>
<td>Bt467-220MHz</td>
<td>TGX</td>
<td>TGX+</td>
</tr>
</tbody>
</table>

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# Performance Summary of GX, GX+ TGX and TGX+ Graphics Accelerator Boards

<table>
<thead>
<tr>
<th>Description</th>
<th>Sun GX</th>
<th>Sun GX+</th>
<th>Sun TGX</th>
<th>Sun TGX+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution Supported</td>
<td>1152x900@66Hz</td>
<td>1280x1024@67Hz</td>
<td>1024x768@60Hz</td>
<td>1024x768@60Hz</td>
</tr>
<tr>
<td>VRAM</td>
<td>1MB</td>
<td>4MB</td>
<td>1MB</td>
<td>4MB</td>
</tr>
<tr>
<td>Buffering</td>
<td>Single</td>
<td>Single or Double</td>
<td>Single</td>
<td>Single or Double</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Cycle 5-IP-GX</th>
<th>Cycle 5-IP-GX+</th>
<th>Cycle 5-IP-TGX</th>
<th>Cycle 5-IP-TGX+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution Supported</td>
<td>1024x768@60Hz</td>
<td>1024x768@60Hz</td>
<td>1024x768@60Hz</td>
<td>1024x768@60Hz</td>
</tr>
<tr>
<td>VRAM</td>
<td>2MB</td>
<td>4MB</td>
<td>2MB</td>
<td>4MB</td>
</tr>
<tr>
<td>Buffering</td>
<td>Single</td>
<td>Single or Double</td>
<td>Single</td>
<td>Single or Double</td>
</tr>
</tbody>
</table>

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Stage 13: RS-232 and RS-423 mode settings

Step 13.1: Jumper J8 can be used to set the serial mode for RS-232 or RS-423 mode. If an S-Bus card is fitted this should be removed to access the J8 position shown in the following diagram.
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