Cycle
Computer Corporation

Cycle

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Inc

Cycle 5-IP: Upgrade Board
Owners Manual

CONTENTS

**This manual is available from our Cycle Internet Home Page at
http://www.cyclecc.com**

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 you 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:

SunOS 5.3   **or**   **Solaris 2.3**
SunOS 5.4   **or**   **Solaris 2.4**
SunOS 4.1.3 _U1 Ver B   or   **Solaris 1.1.1 Ver B**
SunOS 4.1.4   **or**   **Solaris 1.1.2**

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.*

Determine Your Current Release

SunOS Release	Solaris Equivalent
SunOS 4.1	Solaris 1.0
SunOS 4.1.2	Solaris 1.0.1
SunOS 4.1.3	Solaris 1.1
SunOS 4.1.3_U1 Rev A	Solaris 1.1.1 Rev A
SunOS 4.1.3_U1 Rev B	***Solaris 1.1.1 Rev B***
SunOS 4.1.4	***Solaris 1.1.2***
SunOS 5.0	Solaris 2.0
SunOS 5.1	Solaris 2.1
SunOS 5.2	Solaris 2.2
SunOS 5.3	***Solaris 2.3***
SunOS 5.4	***Solaris 2.4***

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.

Description	SunSoft Order Number	Price US List
Solaris 1.x to Solaris 1.1.2 Binary Upgrade (Includes RTU license, CD and End User Documentation)	SSOS-112-CDB-UPG	$149.00
Solaris 1.x to Solaris 1.1.2 RTU Upgrade	SSOS-112-RTU-UPG	$100.00
Solaris·1.x or 2.x to 2.3 Upgrade (Includes RTU license, CD and End User Documentation)	SSOS-230-CDB-UP1	$295.00
Solaris 1.x or 2.x to 2.3 RTU Upgrade	SSOS-230-RTU-UP1	$195.00
Solaris 1.x or 2.x to 2.4 Upgrade (Includes RTU license, CD and End User Documentation)	SSOS-240-CDB-UP1	$295.00
Solaris 1.x or 2.x to 2.4 RTU Upgrade	SSOS-240-RTU-UP1	$195.00

Upgrades are Inexpensive

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**.

Kernel Architecture is different

System	Application Architecture a-arch	Kernel Architecture k-arch
SPARCstation IPC	sun4	sun4c
SPARCstation IPX	sun4	sun4c
SPARCstation 5	sun4	sun4m
Cycle 5-IP Products	**sun4**	**sun4m**

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.

INSTALLATION STAGES & STEPS

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:f1:0:xx::yy and a new Host ID number of
the form 8000xxyy, 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 re-
licensing 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.

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.

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**

Press   **Press**
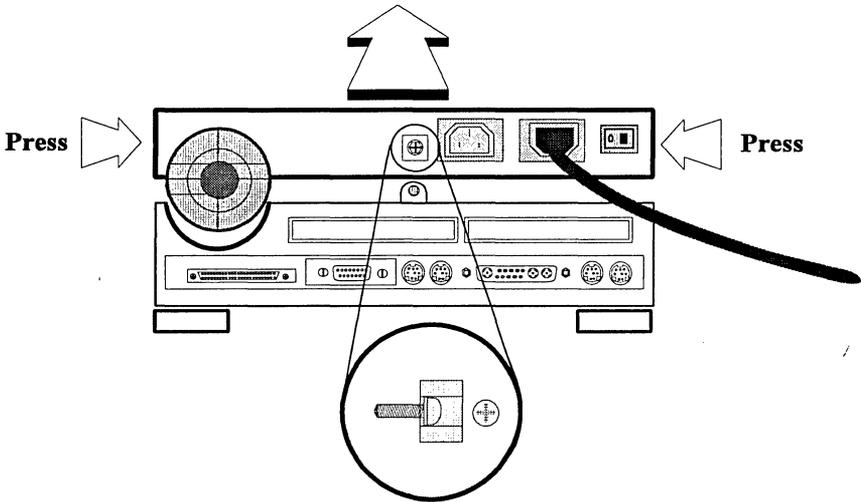
**Remove lock block by removing single
screw securing top cover**

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.

Adjust around wrist
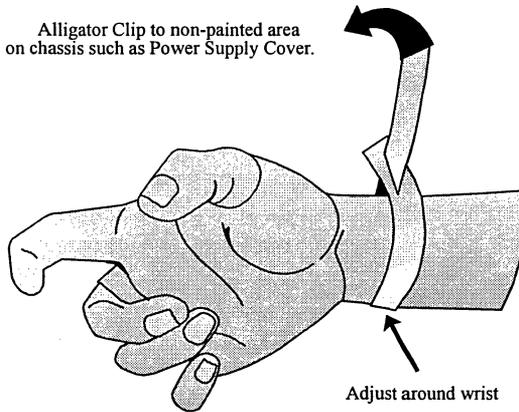
Wrist Strap Fitting

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.

Backpanel

Bottom Unit

IPC
Motherboard
to be Removed

Layout of cabinet
interior
with cover removed

Cables connecting
units

SCSI
Disk

Floppy
Disk

Top Unit
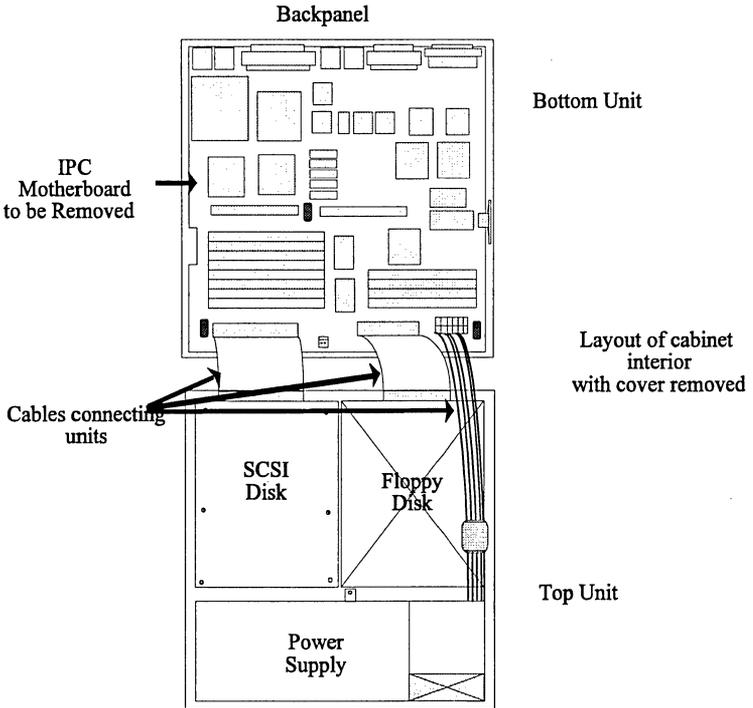
Power
Supply

IPC Motherboard Shown-Plan View

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).

Bottom Unit
IPC Motherboard

(7) S Bus Slot
Connector

(1) Speaker

(2) Main Power
Supply Connector

(6) SCSI Disk
Cable Connector

(5) Speaker
Connector

(4) Light
Pipe

(3) Floppy
Cable Connector
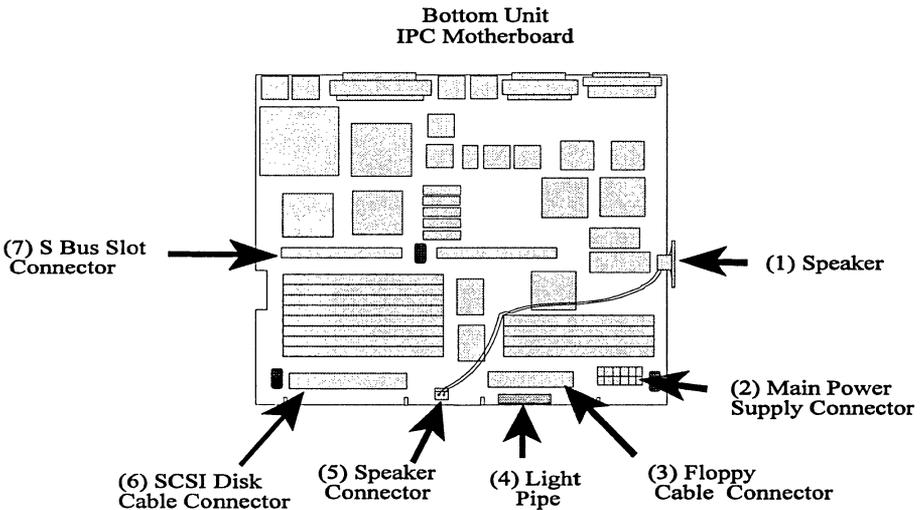
IPC Motherboard Shown - Plan View

Showing Cable Connector Removal Sequence

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:
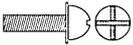
Phillips #1 Screw. Secures 50 pin external SCSI connector to backpanel (2 screws to remove).
[Refer to step 3.1]
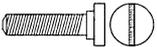
Flat Head #1 Screw. the 15 pin AUI Ethernet connector to the backpanel (2 screws to remove).
[Refer to step 3.1]
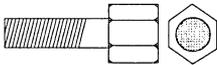
3/16" Socket Hexagonal Screw secures the 13W3 video cable to the backpanel (2 screws to remove).
[Refer to step 3.1]

Remove six screws securing Motherboard
to Backpanel of Bottom Unit

Flathead #1 AUI Ethernet

Philips #1 External SCSI

3/16" Socket Hexagonal 13W3 video
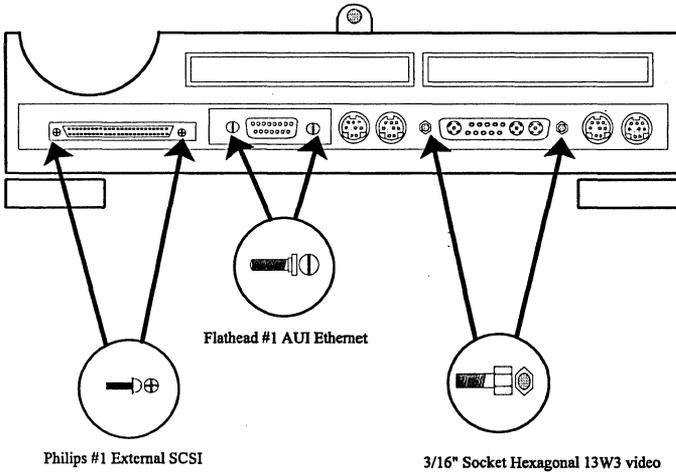
View of Backpanel showing screw types
to remove

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
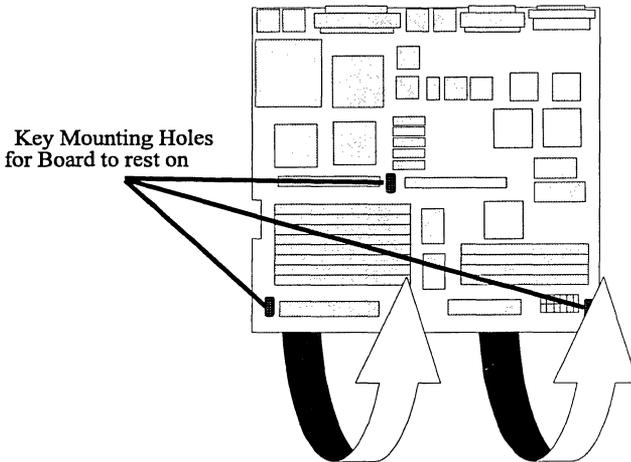
Stage 3: Set-up of Cycle 5-IP Motherboard

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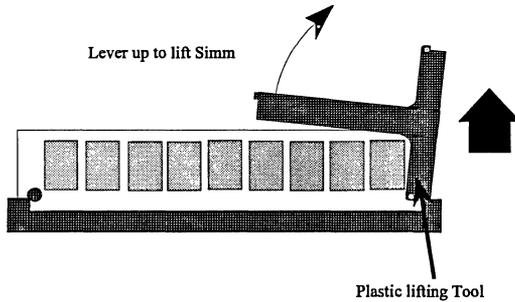
Removal of memory: Showing use
of plastic memory lifting tool provided

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 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.

IPC style 30 pin memory banks to be
loaded with 1MB or 4MB simm
modules numbered M1 to M8

IPX style 72 pin memory banks to
be loaded with 4MB, 8MB, 16 MB,
32MB simm modules numbered
S0 to S5
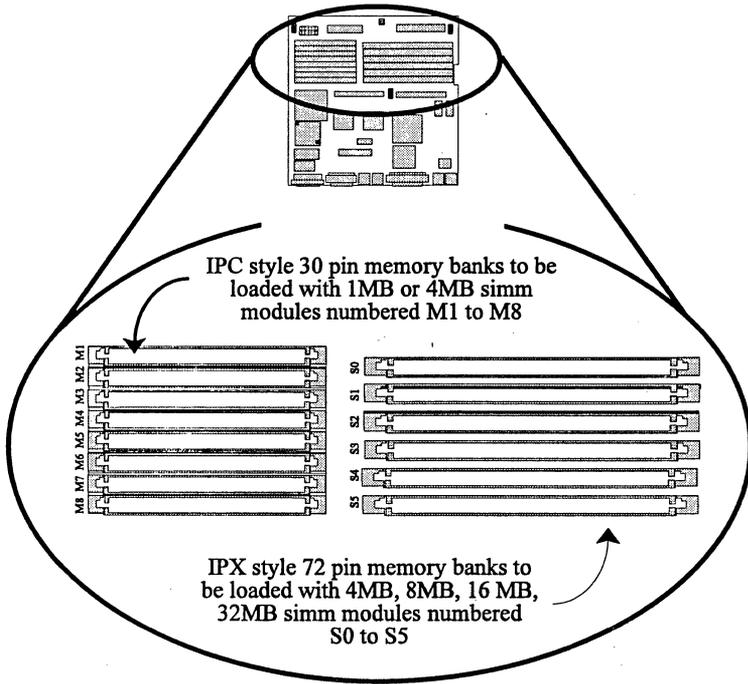
Stage 6: Setting Bank 0 memory switch for IPC or IPX memory

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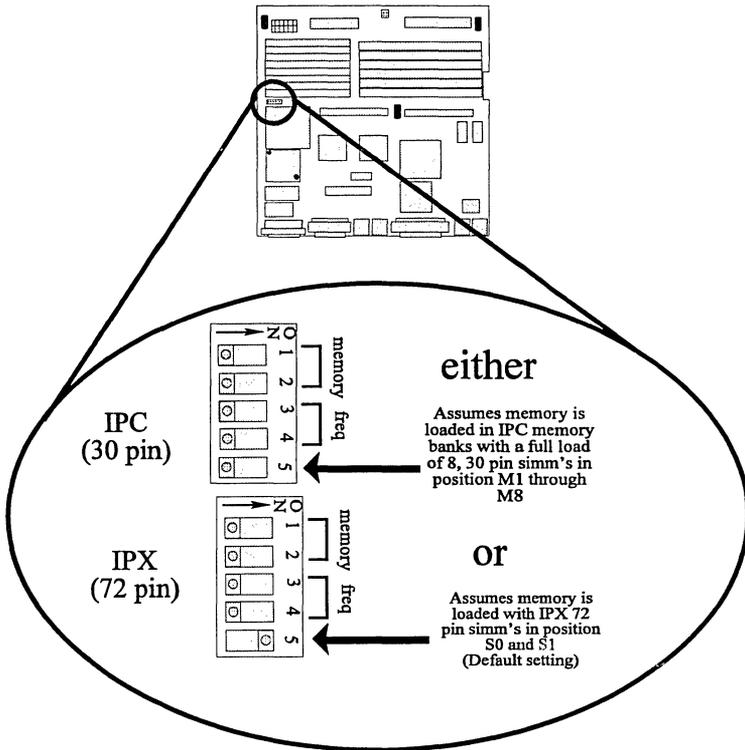
Step 6.2   If either memory type is set as bank 0 you can still load both IPX
and IPC banks with maximum memory capacity as per the following
table:

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

Maximum Memory: Possible Configurations				
Standard Sun IPX Type:	SIMM		SIMM	
	IPC 4MB	IPX 4MB	IPC 4MB	IPX 16MB
Number SIMM's	8	6	8	6
Memory Capacity	56MBytes		128Mbytes	
Double Density IPX Type:	SIMM		SIMM	
	IPC 4MB	IPX 8MB	IPC 4MB	IPX 32MB
Number SIMM's	8	6	8	6
Memory Capacity	80MBytes		224Mbytes	

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.
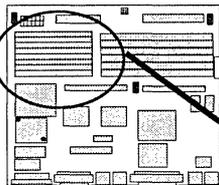
IPC style 30 pin memory banks to be loaded with 1MB or 4MB simm modules numbered M1 to M8
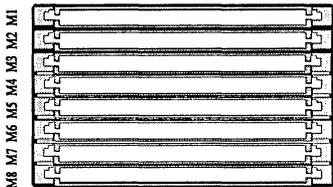
Step 7.2: However because of the new Cycle 5-IP Processor, requirements only certain memory configurations are supported:

Recycled Existing 30 pin IPC Memory: Possible Configurations		
	1MB SIMM	4MB SIMM
Number SIMM's	8	0
Mem Capacity 8MB	**8MB**	
Number SIMM's	0	8
Mem Capacity 32MB		**32MB**

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.

Step 7.3   The following chart shows **VALID** and **INVALID** memory configurations.
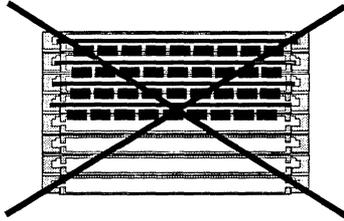
INVALID: 4 banks only filled,
all 8 banks must be filled.
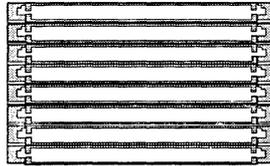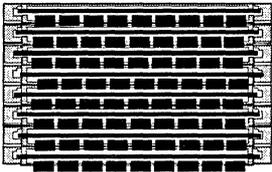
VALID: all 8 banks filled or left empty
Memory Capacity: 8MB using 1MB SIMM's
or 32MB using 4MB SIMM's

Memory configurations for 30 pin memory

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.

Press down   Press down

Locking Peg   Locking Peg
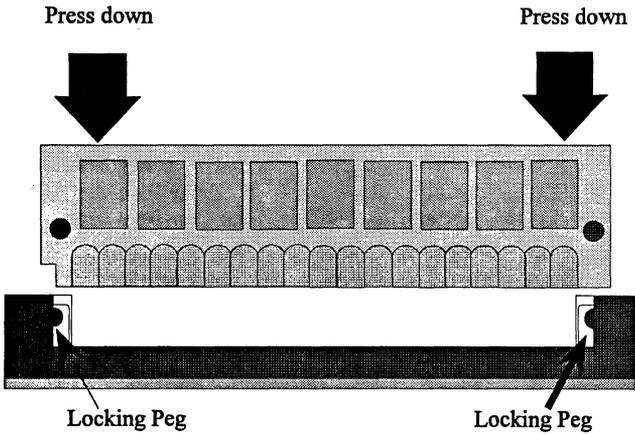
Correct Firm Seating of SIMM's
is essentail to valid operation

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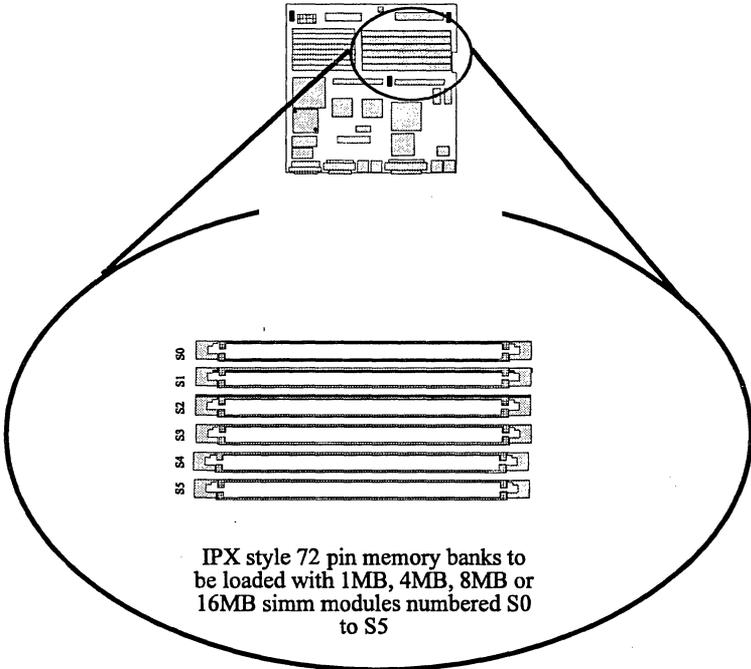
IPX style 72 pin memory banks to be loaded with 1MB, 4MB, 8MB or 16MB simm modules numbered S0 to S5

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.
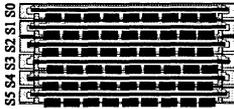
S0 to S5 all filled

S0 and S1 fill, S2, S3. S4, S5 empty
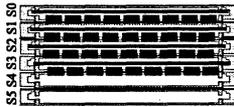
S0 to S3 filled and S4 and S5 empty
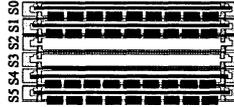
S0 and S1 filled, S2 and S3 empty, with S4 and S5 filled

VALID Configurations with IPX set as bank 0 on SW1 #5 using IPX memory
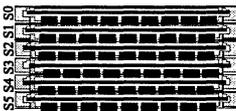
S0 to S5 all filled
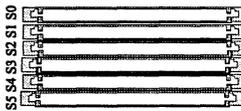
S0 to S5 all empty
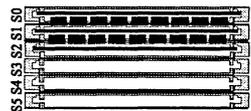
S0 and S1 fill, S2, S3. S4, S5 empty
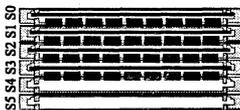
S0 to S3 filled and S4 and S5 empty

S0, S1, S4, S5 empty and S2, S3 filled
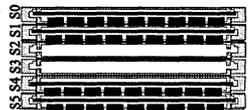
S0, S1 filled, S2, S3 empty, with S4, S5 filled

S0 to S1 empty and S2 to S5 filled

VALID Configuartions using IPX memory with IPC selected as bank 0 on SW1#5

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
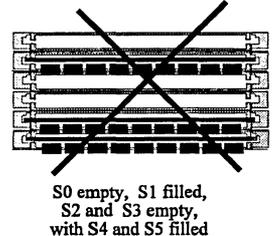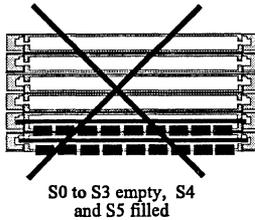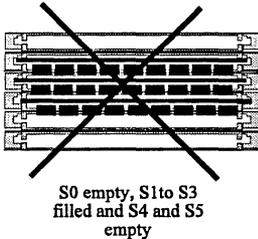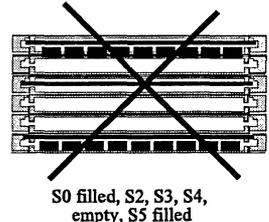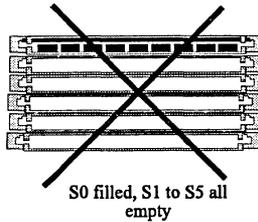
INVALID Sample Configuartions using IPX memory banks S0 through S5: Other INVALID configurations are possible.

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).

This Jumper
Block is for
memory speed
select (shown
factory default)

This Jumper Block
is for frequency
adjustment (shown
factory default)

This Jumper Block
is IPX, IPC memory
select
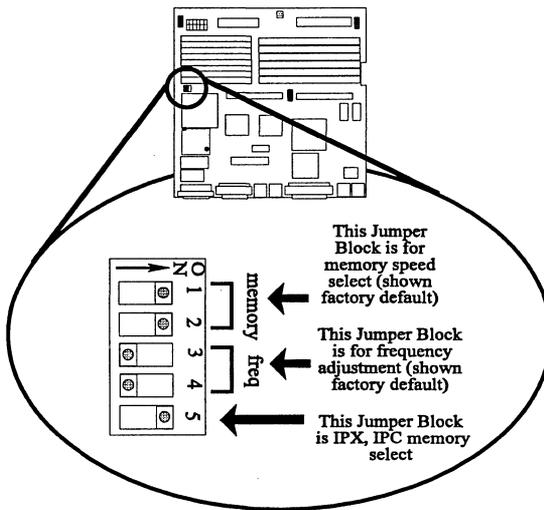
Memory and Frequency
Speed Jumper Locations

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 5 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)

These two
switches control
memory speed
select
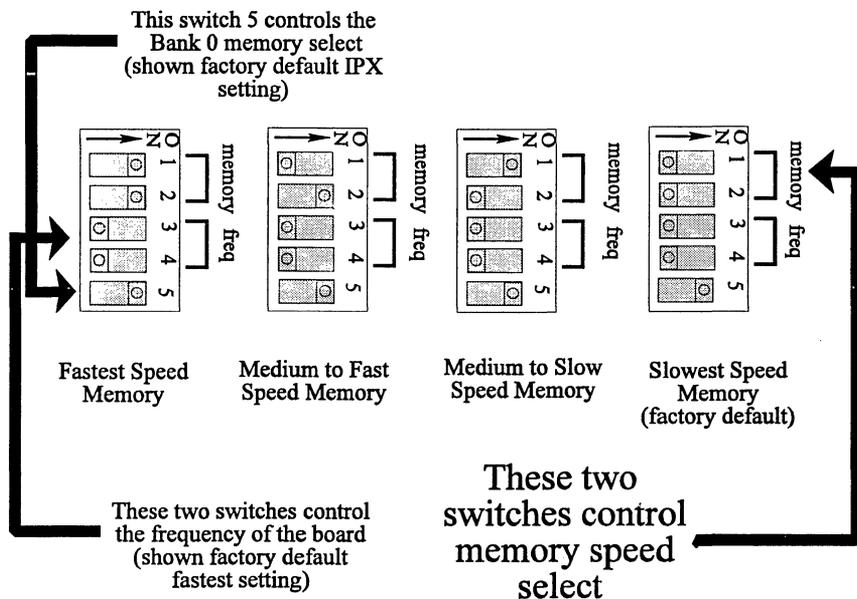
Before altering the memory switch settings from factory default first
run the board for several days at the default setting to get some
experience with the default setting performance before
experimenting with faster settings, which may cause MEMORY
errors or other system RESETS due to memory timing 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.

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)

Slowest Frequency (say 70MHz)   Medium to Slow Frequency (say 85MHz)   Medium to Fast Frequency (say 90MHz)   Fastest Frequency (say 90MHz) (factory default)

These two switches control the frequency of the board

These two switches control memory speed select
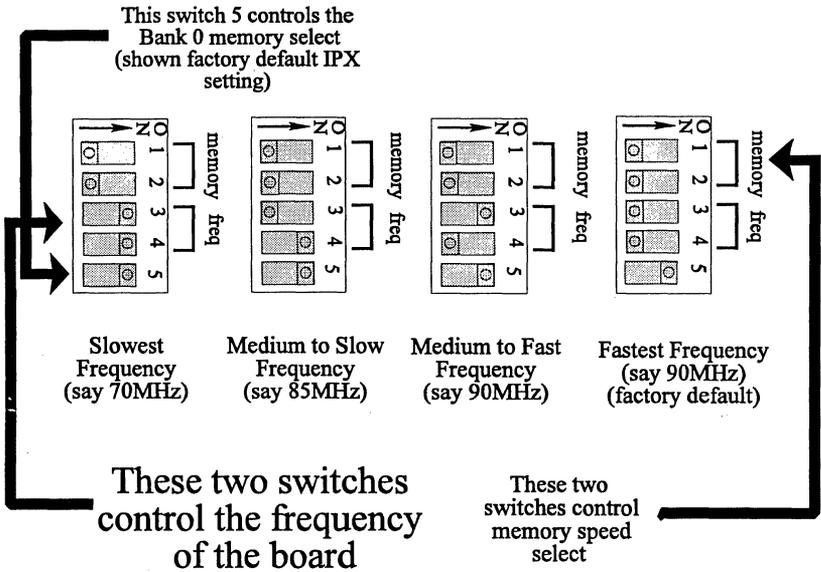
Example Shown for
Cycle 5-IP-90 Model

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.

Cycle 5-IP frequency settings for switch 3 and 4							
Switch settings		Cycle 5 IP-70	Cycle 5 IP-85	Cycle 5 IP-90	Cycle 5 IP-100	Cycle 5 IP-110	Cycle 5 IP-125
SW3	off	70 Default	85 Default	90 Default	100 Default	110 Default	125 Default
SW4	off						
SW3	off	70	85	90	90	100	110
SW4	on						
SW3	on	70	85	85	85	90	100
SW4	off			.			
SW3	on	70	70	70	70	85	90
SW4	on						

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

Backpanel fitted first and then
Motherboard eased down

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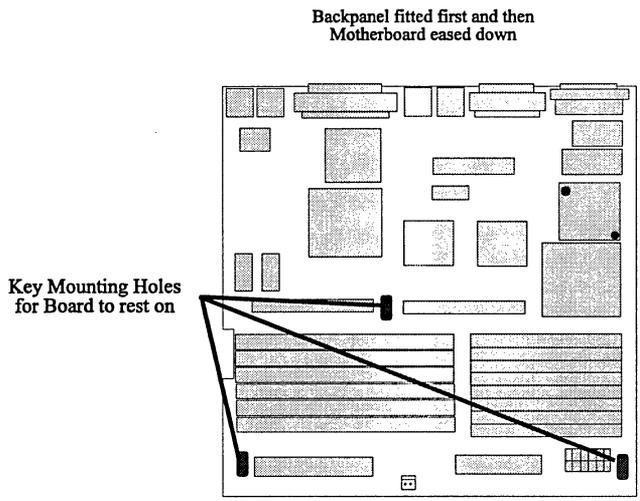
Step 10.2:   The new Cycle 5-IP Motherboard can be Re-Inserted back into the Bottom Unit now the memory has been fitted and the various memory jumpers set correctly. Insertion is the reverse of step 2.4 where the Motherboard is fitted Backpanel first carefully into the cabinet and seated on the three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

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.

Bottom Unit-Motherboard

(5) S Bus Slot Connector

(1) Main Power Supply Connector

(4) SCSI Disk Cable Connector

(3) Speaker Connector

(2) Floppy Cable Connector
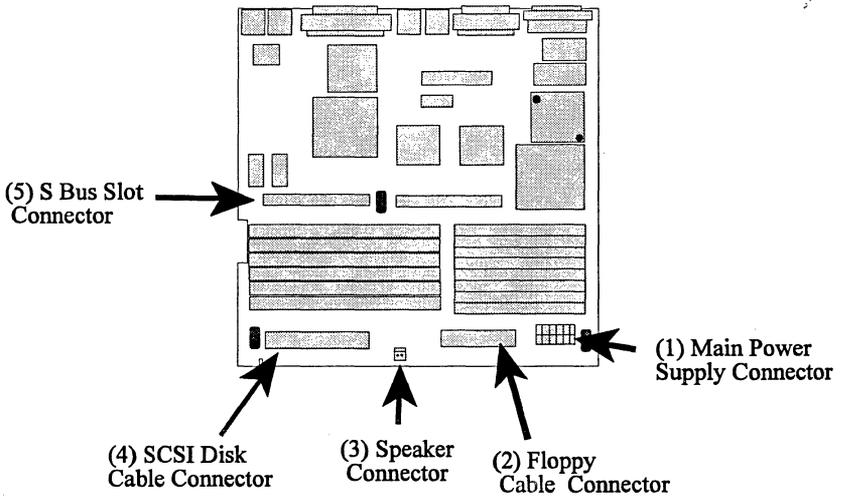
Step 10.3:   Re-connection of the various cables to the Cycle 5 Motherboard is
the reverse of the sequence performed in **Step 2.4** earlier.

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

Flathead #1 AUI Ethernet

Philips #1 External SCSI

3/16" Socket Hexagonal 13W3 video

View of Backpanel showing screw types to re-attach

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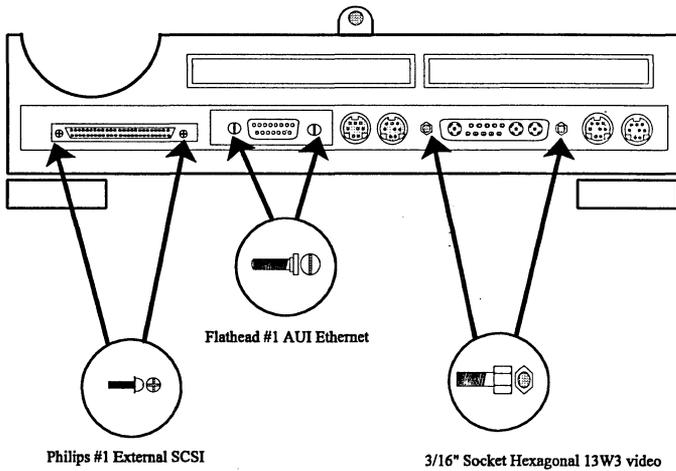
A speaker assembly bracket is included in the Cycle 5-IP kit consisting of an aluminum plate and a set of two screws with nuts and washer. This assembly should be used to mount the speaker onto the floppy diskette drive mounting bracket.

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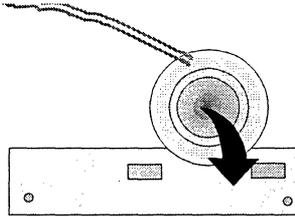
Pushing speaker firmly into mounting lugs
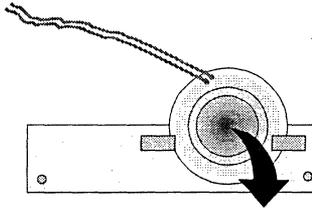
Speaker is now ready to be mounted onto floppy mounting bracket assembly using the screws and nuts (if necessary)
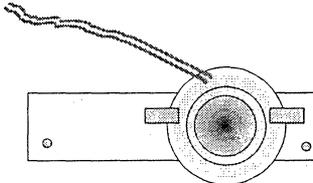
Step 10.5:   Now mount the speaker assembly bracket with the speaker fitted onto the top of the floppy mounting bracket in the top unit as shown below using #3 Screws provided in speaker assembly kit.

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.

Backpanel

Bottom
Unit

Speaker
assembly
before fitting

Old speaker
position

SCSI
Disk

Screws into old
floppy screw
holes

Top
Unit

Speaker assembly shown
fitted under floppy
drive and power
cables

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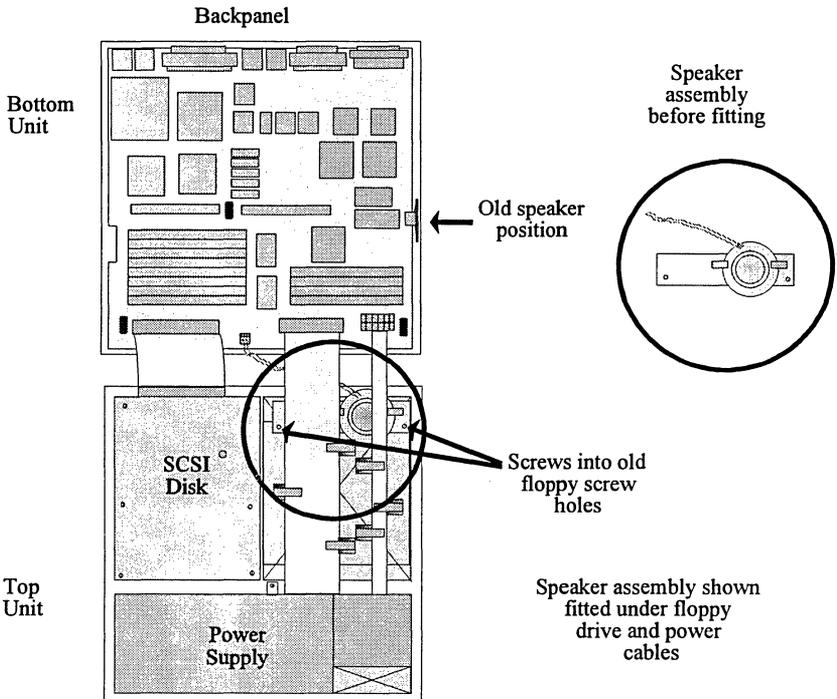
Step 10.6:   Re-Assemble the cabinet using the #3 Phillips Screws as shown
                   below in reverse process to that of **Step 1.3**.

Replace Cover
while pressing the two latch buttons

Press   **Press**

Replace lock block by inserting single
screw securing top cover
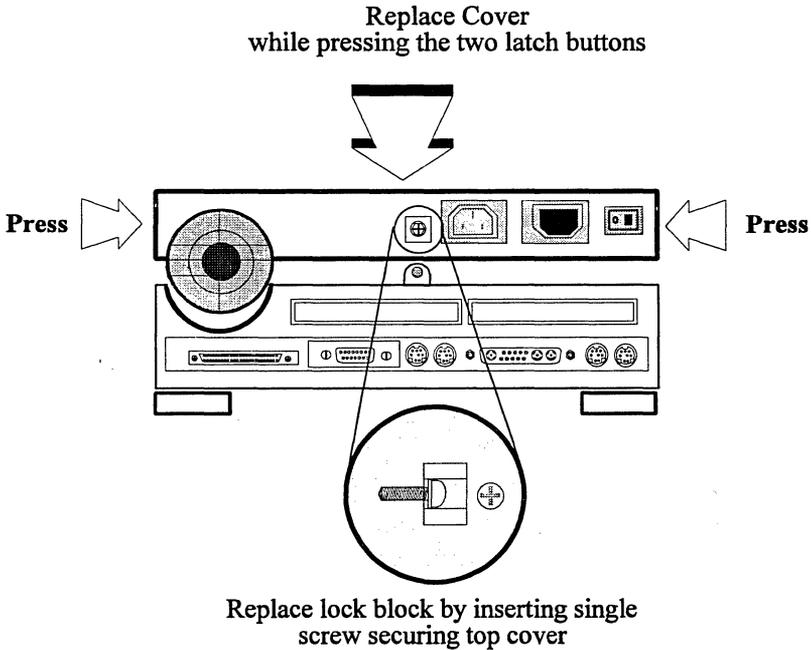
Stage 11:   **External Cable connection with new Cycle 5-IP Motherboard**

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

External SCSI   Serial B   Audio

Ethernet AUI   Serial A   Video   Keyboard/Mouse

New Cycle 5-IP Connectors

External SCSI   Serial B   Audio

Ethernet AUI or Twisted Pair   Serial A   Keyboard/Mouse

Optional Parrallel   Video (not available in Cycle 5-IP-NL

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.

	Old SPARCstation Connectors	New Cycle 5- IP Connectors	Comments
External SCSI	same	same	No Change
Ethernet	AUI only	AUI OR Twisted Pair (RJ45)	AUI standard, optional Cycle 5- CBL[1] available for RJ45.
Serial A	yes	same	No Change
Serial B	yes	same	No Change
Parallel	no	yes, via optional cable	Optional Cycle 5-PPCBL
Keyboard/ Mouse	same	same	No Change
Audio	same	same	No Change
Graphics (Video)	Black & White or CG3 on IPC GX on IPX	GX, GX+, TGX, TGX+ or No Load Graphics options	A variety of graphics options are offered on the Cycle 5-IP Motherboard see the following section for clarification.

Note[1]: To order connector for Twisted Pair (using RJ45 Connector) order following Cycle 5 part number: **Part Number: Cycle 5-CBL**.

Note[2]: 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.

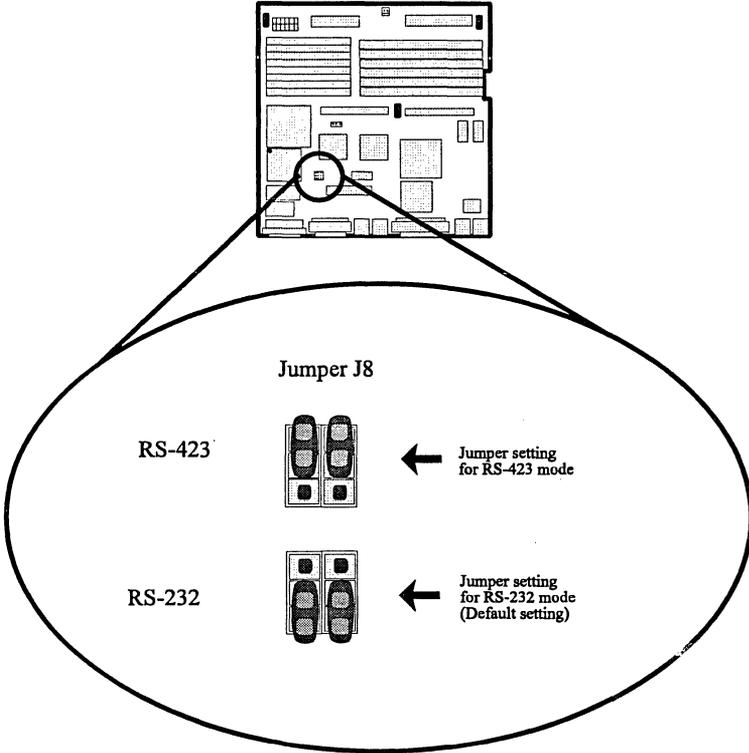### Summary Of Cycle 5 Part numbers for Ordering various Graphics Options

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

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

Description	Sun GX	Sun GX+	Sun TGX	Sun TGX+
Resolution Supported	1152x900@66Hz 1152x900@76Hz	1280x1024@ 67Hz 1152x900@ 66Hz 1152x900@ 76Hz	1024x768@ 60Hz 1024x768@77Hz 1152x900@66Hz 1152x900@76Hz	1024x768@ 60Hz 1024x768@77Hz 1152x900@66Hz 1152x900@76Hz 1280x1024@67Hz 1280x1024@76Hz 1600x1280@76Hz
VRAM	1MB	4MB	1MB	4MB
Buffering	Single	Single or Double	Single	Single or Double
Description	Cycle 5-IP-GX	Cycle 5-IP-GX+	Cycle 5-IP-TGX	Cycle 5-IP-TGX+
Resolution Supported	1024x768@ 60Hz 1024x768@77Hz 1152x900@66Hz 1152x900@76Hz 1280x1024@ 67Hz	1024x768@ 60Hz 1024x768@77Hz 1152x900@66Hz 1152x900@76Hz 1280x1024@ 67Hz	1024x768@ 60Hz 1024x768@77Hz 1152x900@66Hz 1152x900@76Hz 1280x1024@ 67Hz	1024x768@ 60Hz 1024x768@77Hz 1152x900@66Hz 1152x900@76Hz 1280x1024@67Hz 1280x1024@76Hz 1600x1280@76Hz
VRAM	2MB	4MB	2MB	4MB
Buffering	Single	Single or Double	Single	Single or Double

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.

Jumper J8

RS-423 — Jumper setting for RS-423 mode

RS-232 — Jumper setting for RS-232 mode (Default setting)

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