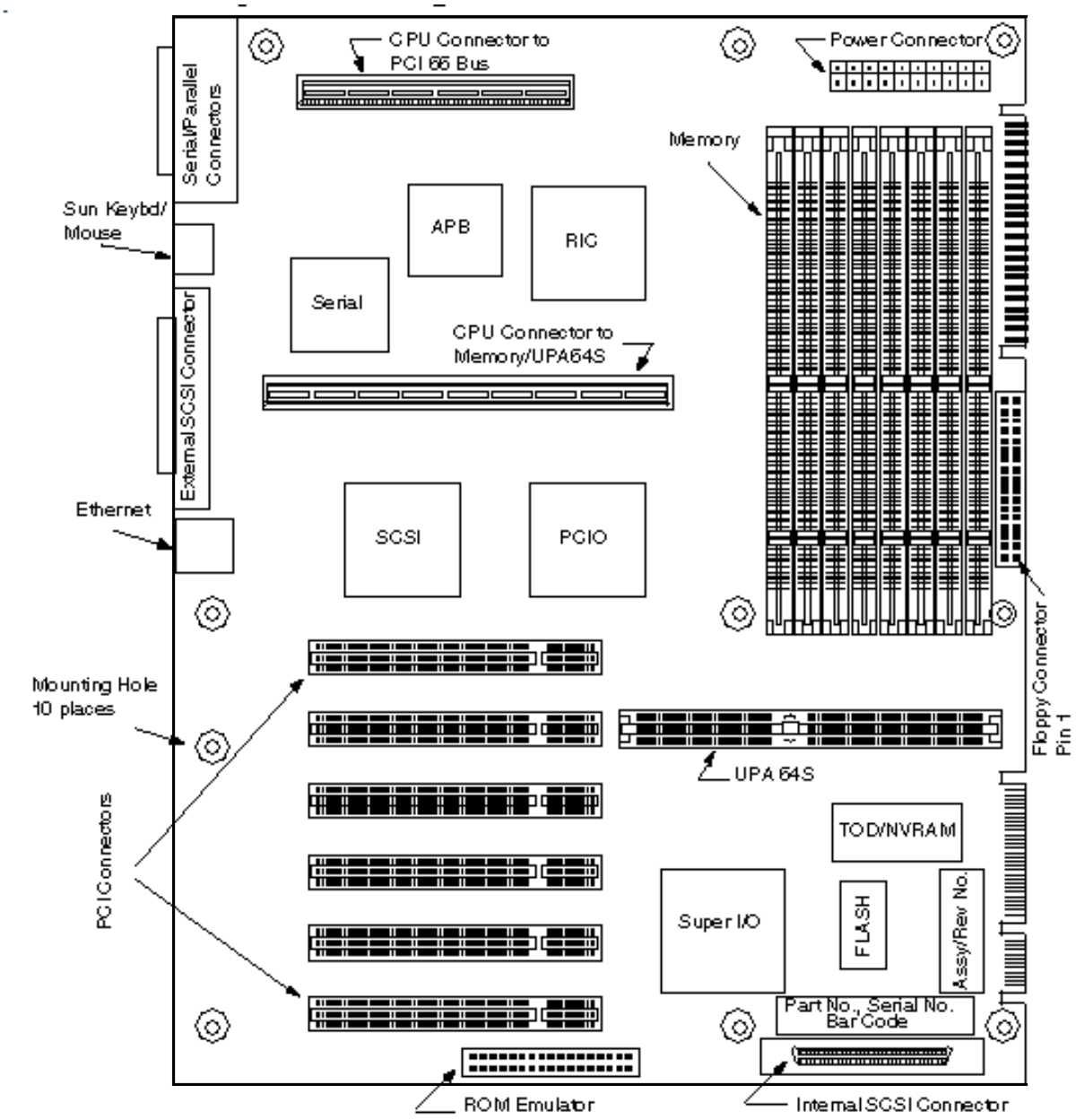
SPARCengine Ultra

SPARCengine Ultra AXi

595-4704
32MB to 1GB FRU
270MHz 300MHz 333MHz



Note –

1. Operates using Solaris 2.6 and later
2. Ethernet 10/100 BASE-T Interface uses RJ-45, 8-pin connector.
3. Uses UltraSPARC II/*i* processors.
4. Main memory modules require 32MB minimum.

SPARCengine Ultra AXi

595-4704
32MB to 1GB FRU
270MHz 300MHz 333MHz

Note – Continued

5. Internal devices use Ultra-wide SCSI interface, J1001, connector.
6. Serial number, version number, and date code are found on stickers located next to the internal SCSI connector (J1001).
7. Six 32-bit PCI slots are available, three in Bus A and three in Bus B. All slots are 33MHz, 32-bit, 5V only.
8. If the FFB2 board is used, it blocks one PCI slot, making it unusable.

SPARCengine Ultra AXi

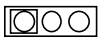
595-4704

Headers and Jumpers
Headers

Header	Function
J1501	Reset Switch (front panel)
J1990	System Power On LED (front panel)
J2500	PS/2 Mouse (rear bracket)
J2501	PS/2 Keyboard (rear bracket)
J3201	Speaker (front panel)
J3301	Power ON-OFF Switch (front panel)
J3302	Reserved (No Jumper)
J3602	Optional Fan
J3603	Optional Fan

SPARCengine Ultra AXi

595-4704
Headers and Jumpers
Headers (cont'd)

Header Name	Header	Setting	Pin #	Description
Reset Switch	J1501		1	For factory use only.
			2	Ground from reset switch
			3	Signalside from reset switch.
Power On LED	J1990		1	+LED (Vcc through resister).
			2	-LED (GND through logic).
PS/2 Mouse	J2500		1	Data
			2	Gnd
			3	Vcc
			4	Clk
PS/2 Keyboard	J2501		1	Data
			2	Gnd
			3	Vcc
			4	Clk
Speaker	J3201		1	Speaker
			2	N/C
			3	N/C
			4	Speaker
Power ON-OFF Switch	J3301		1	+LED (Vcc through resistor)
			2	-LED (GND through logic)
12V Optional Fan	J3602		1	Back fan fail
			2	Power
			3	GND
12V Optional Fan	J3603		1	Front fan fail
			2	Power
			3	GND

SPARCengine Ultra AXi

595-4704
Jumpers and Headers
Jumpers

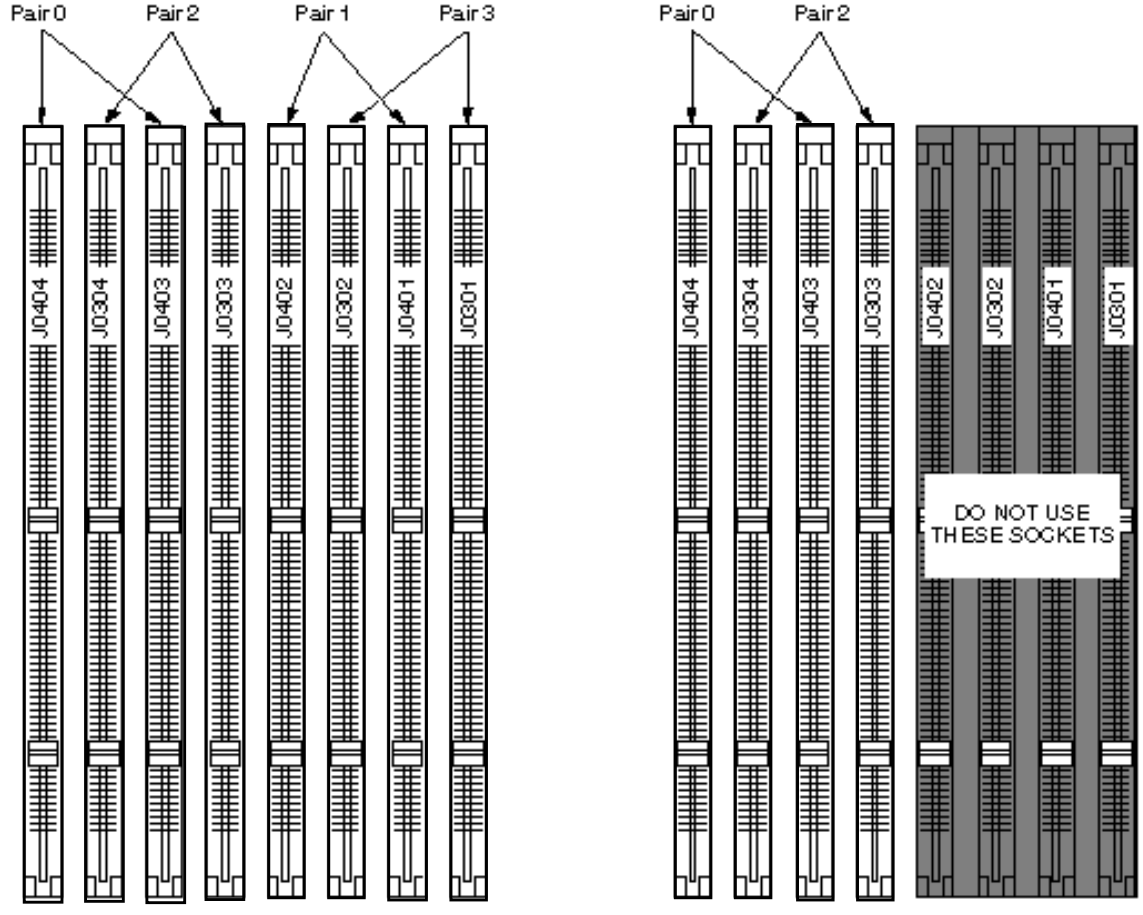
Jumper	Settings and Results
J1401	1-2 Flash Memory Write disabled 2-3 Flash Memory Write enabled (default)
J1402	1-2 Flash Memory selected (default) 2-3 ROM Emulator selected (used for system debug only)
J1804 J1806	1-2 RS232 (default) 2-3 RS423 1-2 RS232 (default) 2-3 RS423
J1805	1-2 FAST Serial 2-3 Normal RS232 (default)

Note –

1. Most types of PS/2 keyboards (J2501) and PS/2 (J2500) mouse devices are supported.
2. Two 3-pin connectors, J3602 and J3603, power two optional fans from the motherboard. Fans must have variable power conditions for speed control and must have TTL level signal to indicate rotation or not.
3. Only assert the push button reset, J1501, at the “OK” prompt or if maintaining the state of the disks is not critical.

SPARCengine Ultra AXi

595-4704
DIMM Configuration

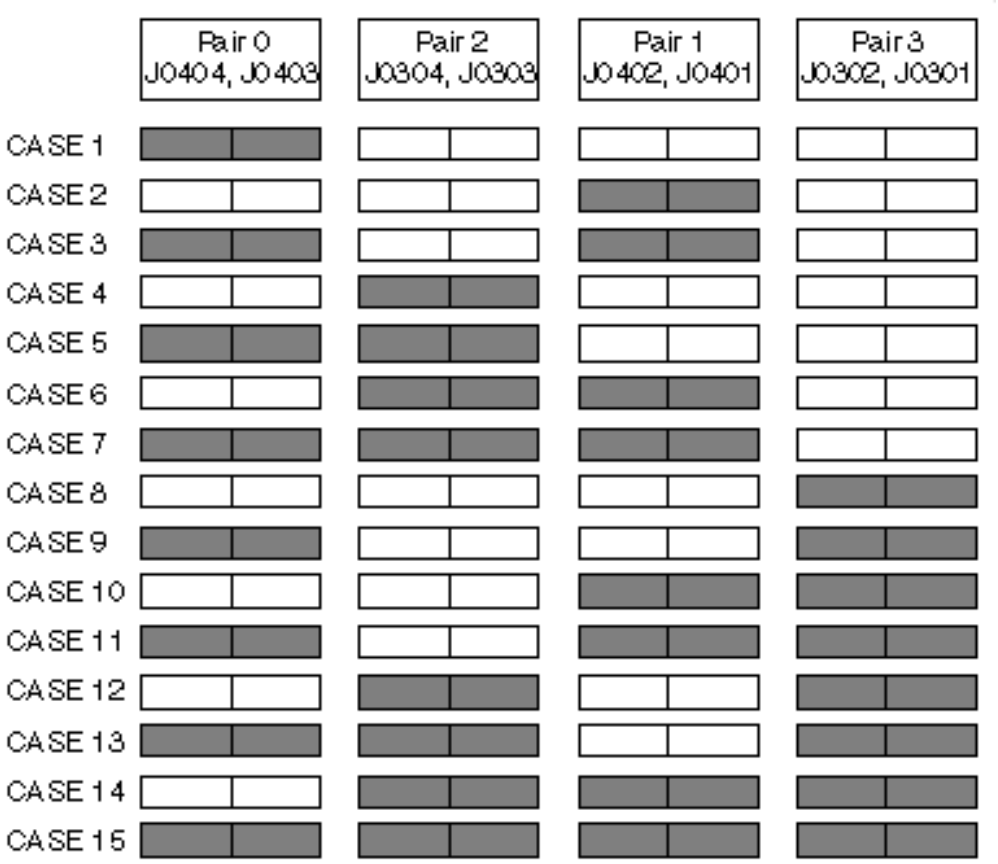


Note –

1. Memory modules are installed in pairs (two DIMMs at a time).
2. Uses DRAM, EDO, Buffered, 10 or 11-bit Column Address, 3.3V, 60ns, 72-bit, 168-pin DIMMs.
3. Both DIMMs in a pair must be of the same size.
4. Each DIMM Pair of 2 sockets must have identical DIMMs installed.
5. It is possible to have from 32MB to 1GB populated (32MB, 48MB, 64MB, 80MB 96MB, 112MB 128MB...up to 1GB in 16MB increments.)
6. Memory organization of 10-bit column address is supported in all DIMM Pairs.
7. Memory organization of 11-bit column is supported in DIMM Pairs 0 and 2 only.
8. Memory DIMMS (J0301-J0304, J0401-J0404)

SPARCengine Ultra AXi

595-4704
Acceptable DIMM Locations
10-bit Column Address Mode

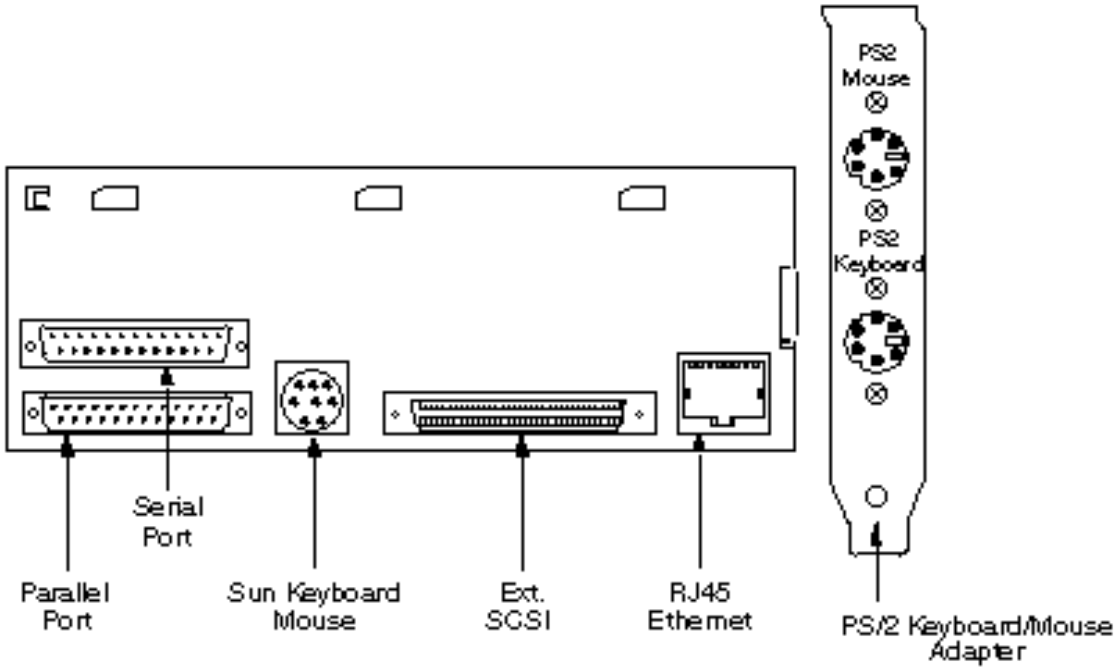


11-bit Column Address Mode

SPARCengine Ultra AXi

595-4704

Back Panel Connections

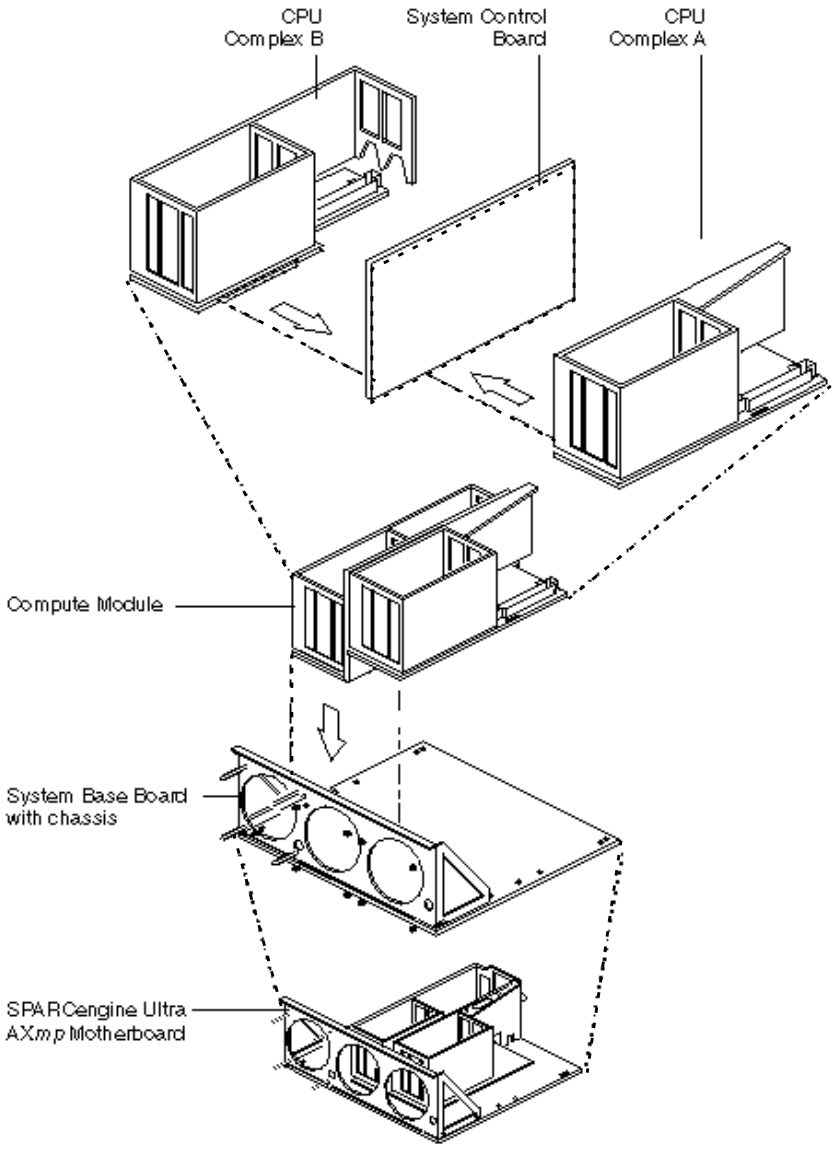


Note –

1. Uses Ultra-wide SCSI interface with 68-pin UW connector rear panel for external devices.
2. Parallel port uses DB25S female connector and is IEEE 1284 compatible.
3. Serial port uses DB25P male connector wired for TTY-A and TTY-B. Need “Y” splitter cable to use TTY-B.
4. Standard Ultra AXi motherboard supports the Sun type 5 keyboard and mouse.
5. Keyboard/Mouse Adapter brings signals to rear panel for PS/2 keyboard and mouse.
6. Interface connectors on the motherboard are J2500 for the PS/2 mouse header and J2501 for the keyboard header.
7. Ehternet uses twisted pair type with RJ45 connector at the rear panel.

SPARCengine Ultra AXmp

595-4943
Up to 2GB FRU
167MHz 200MHz 248MHz 296MHz



Note –

1. SPARCengine Ultra AXmp motherboard assembly is comprised of Complex A & B boards, System Control board, Compute Module, and System Base Board.
2. Four-way multiplexing.
3. Uses up to four UltraSPARC I or II 167 MHz to 300 MHz processors.
4. Operates under Solaris 2.6 HW:3 (5/98) and later.

SPARCengine Ultra AXmp

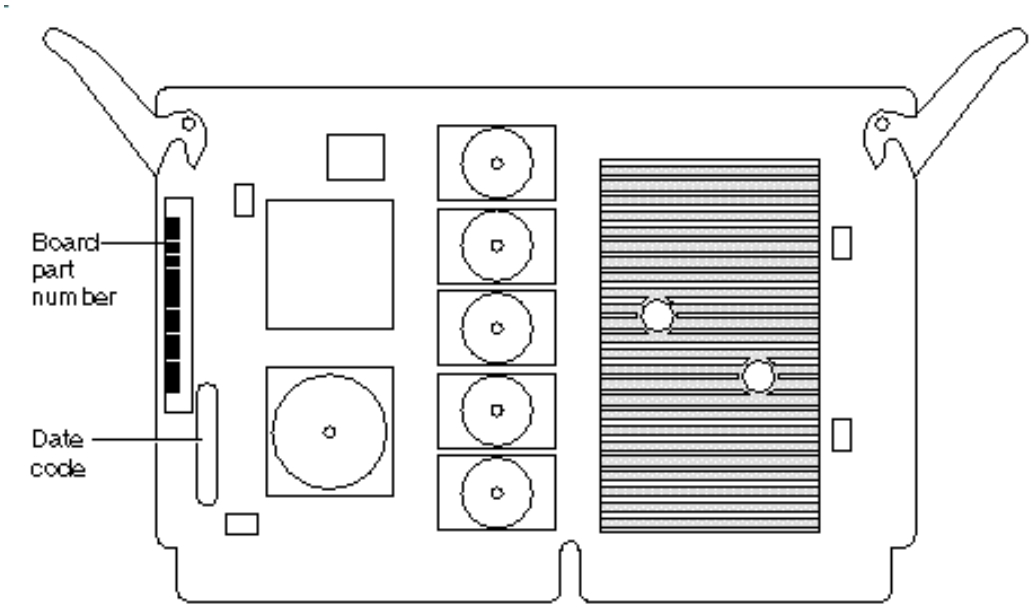
595-4943
Up to 2GB FRU
167MHz 200MHz 248MHz 296MHz

Note – Continued

5. Support up to 2 GB memory on-board (64MB minimum).
6. Six PCI slots.
7. Autosend 10BASE-T or 100BASE-T Ethernet.
8. Ultra AXmp motherboard assembly part number, serial number, revision number (last two digits of part number), and date code (assembly period: week, year: 0798) are located on stickers on the top of the CPU Complex A Board.

SPARCengine Ultra AXmp

595-4943
CPU Module



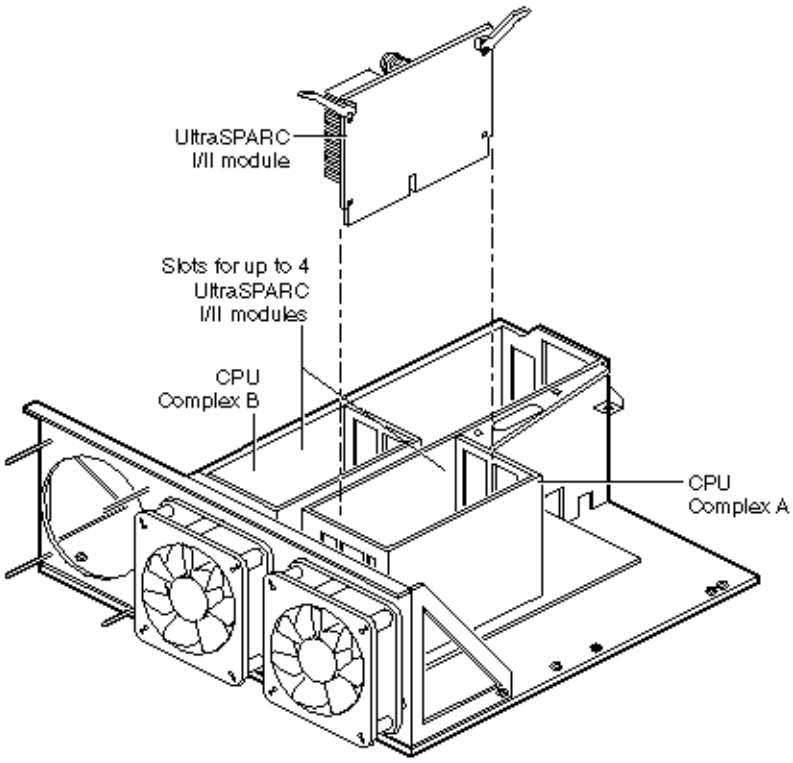
Note –

1. UltraSPARC I or II module part number and serial number are located on stickers on the side of the CPU module.
2. 1, 2, 3, or 4 CPU modules can be installed.
3. CPU modules used in a particular configuration must be the same type and have identical speed, external cache, and power.
4. CPU modules available for use with the Ultra AXmp: .

CPU Type	CPU Speed	On-Module Cache	Power Requirements	Part Number
UltraSPARC-I	167 MHx	512KB	30 watts max (+3.3V at 10A typ)	STP5110AUPA-167
	200 MHz	1MB	30 watts max (+3.3V at 12A typ)	STP5111AUPA-200
UltraSPARC-II	248 MHz	1M B	59 watts max (+3.3V at 7A typ, +2.6V at 8A typ)	STP5211UPA-250
	296 MHz	2MB	58 watts max (+3.3V at 5A typ, +2.6V at 9A typ)	STP5212UPA-300

SPARCengine Ultra AXmp

595-4943
Installing CPU Modules

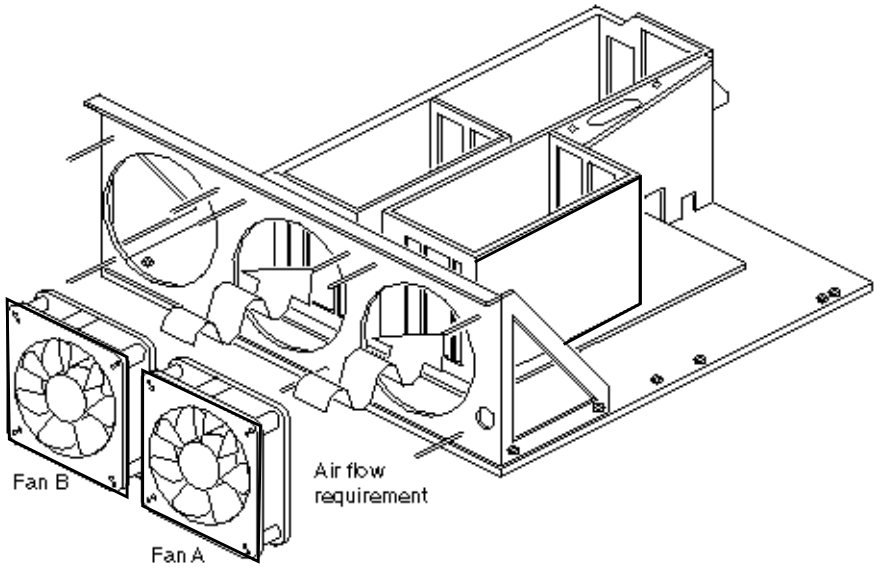


Note –

1. With multiple CPUs, first CPU to respond to OBP probe during boot process becomes master processor for system.
2. Fewer than four CPU modules in system, modules can be inserted into any of the four slots — there is no required slot assignment.
3. Two CPUs in system gives better performance by installing one module into slot in CPU Complex A and the other CPU module into one of the slots in CPU Complex B.

SPARCengine Ultra AXmp

595-4943
Cooling Fans



Note –

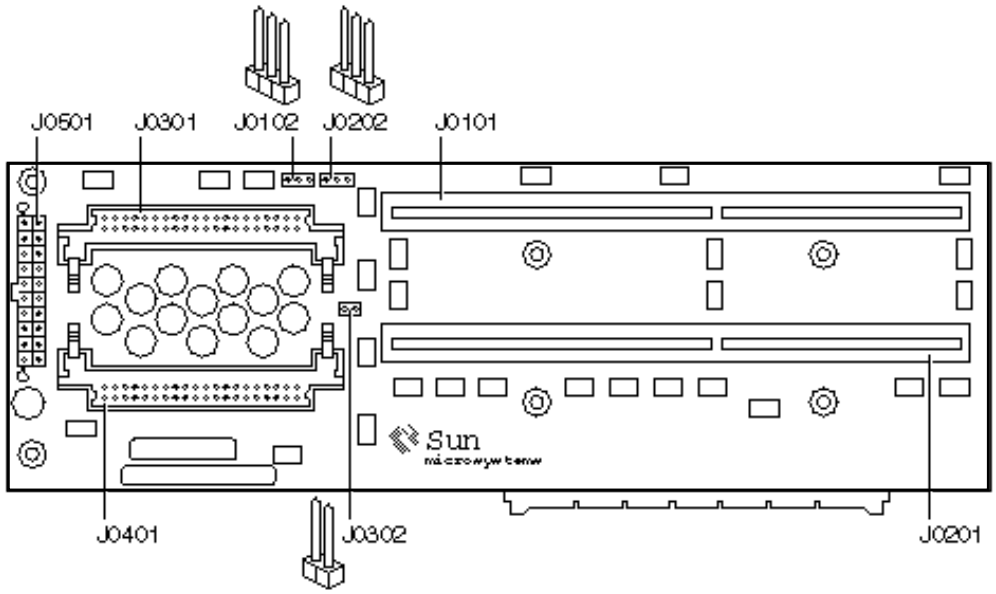
1. Fans should always be on a full speed (+12V).
2. Fans must be 12 VDC, variable speed with sensor feedback to detect a failed fan.fs
3. Recommended fan is NMB: Model 4710NL-04W-B59 Rib type.
4. Sun recommends fans to be mounted directly to Ultra AXmp motherboard assembly chassis for best cooling action.

   Caution – Fans are not included with the motherboard assembly and must be supplied by the OEM. Failure to provide adequate cooling to the CPU modules will cause damage to these CPU modules.
5. Required fans use jumpers J1003 and J1004.
6. Optional fans use jumpers J1005 for PCI slots and J1006 for disk drives and power supply.

SPARCengine Ultra AXmp

595-4943

CPU Complex A Board



Note –

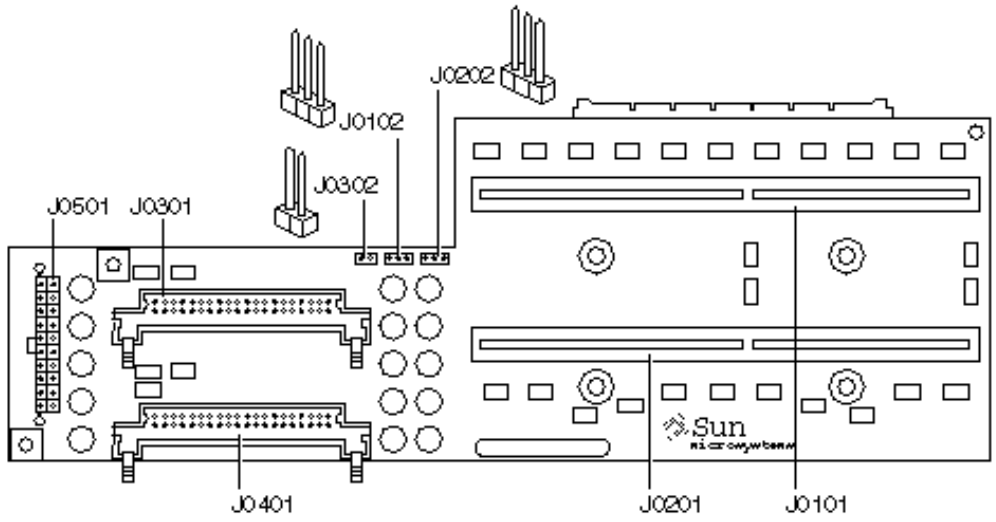
1. CPU Complex A Board is part of Compute Modules.
2. Holds up to two CPU modules and has jumper (J0302) related to CPU type.
3. Architecture complies with SPARC V9 instruction set.
4. All processors must operate at same clock frequency.
5. Each processor slot is supported by a DC-to-DC converter module, located on the CPU Complex Board.
6. CPU Complex A Board Jumper Settings:

Jumper	Setting	Result
J0102	2-3	Factory use only (do not change)
J0202	2-3	Factory use only (do not change)
J0302 [1]	no connection 1-2	UltraSPARC II processor (factory default) UltraSPARC I processor

1. See System Control Board table for related required settings of J2301 and J2302.

SPARCengine Ultra AXmp

595-4943
CPU Complex B Board



Note –

1. CPU Complex B Board is part of Compute Module.
2. Holds up to two CPU modules and has jumper (J0302) related to CPU type.
3. CPU Complex B Board Jumper Settings:

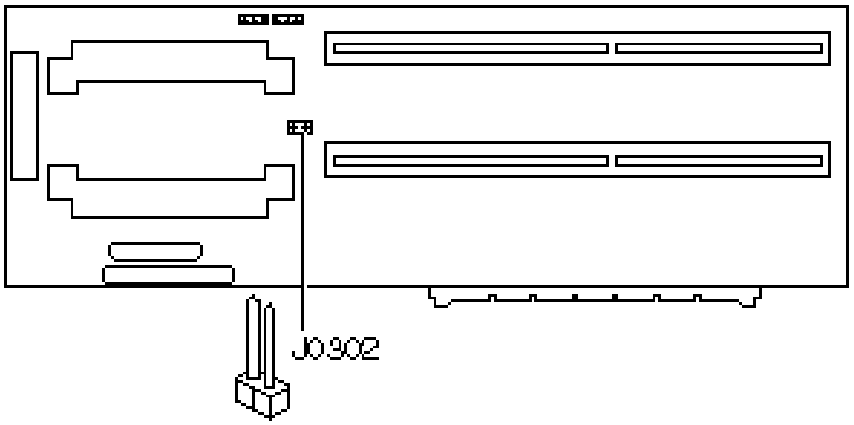
Jumper	Setting	Result
J0102	2-3	Factory use only (do not change)
J0202	2-3	Factory use only (do not change)
J0302 [1]	no connection 1-2	UltraSPARC II processor (factory default) UltraSPARC I processor

1. See System Control Board table for related required settings of J2301 and J2302.

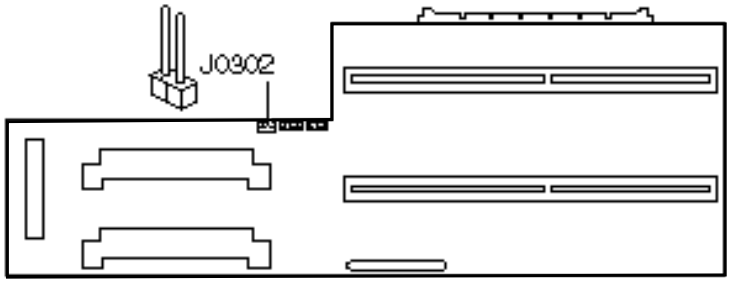
SPARCengine Ultra AXmp

595-4943

Complex A Board Jumpers



Complex B Board Jumpers

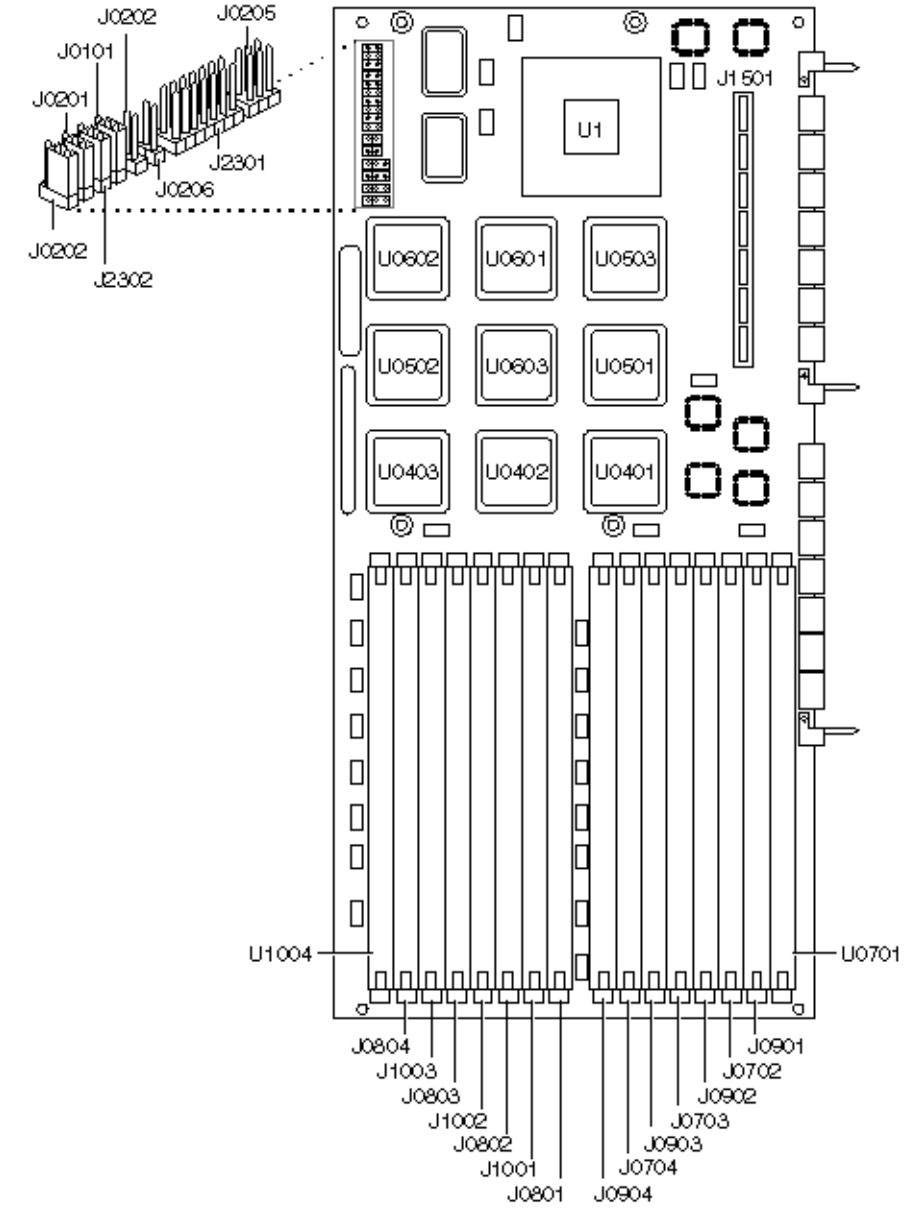


Note –

1. Complex A/B Board Jumper, J0302, determines whether UltraSPARC I or UltraSPARC II processor is to be used.

SPARCengine Ultra AXmp

595-4943
System Control Board



Note –

1. System Control Board holds up to 16 DRAM DIMMs organized as two banks.
2. Contains memory control logic and bus crossbar control logic.

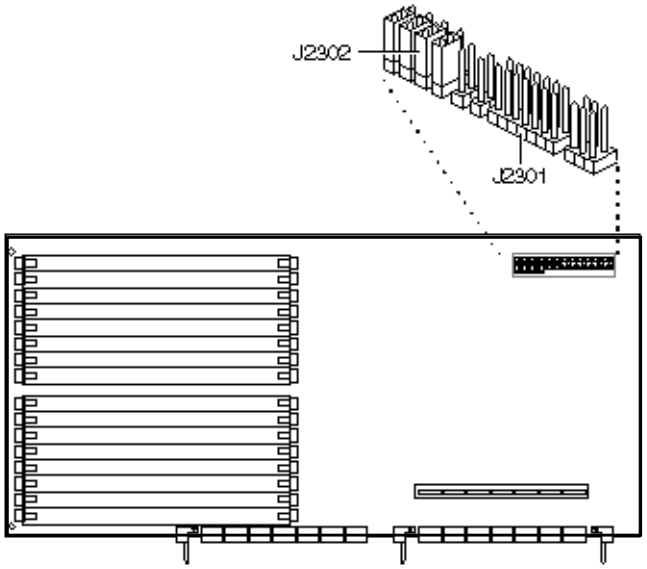
SPARCengine Ultra AXmp

595-4943
System Control Board Jumper Settings

Jumper	Setting	Result
J0101	2-3	Factory use only (do not change)
J0102	1-2	Factory use only (do not change)
J0201	2-3	Factory use only (do not change)
J0202	2-3	Factory use only (do not change)
J0205	no connection	Factory use only (do not change)
J0206	no connection	Factory use only (do not change)
J2301	See CPU Speed Jumper Settings	CPU speed jumper (factory default = UltraSPARC II at 296 MHz)
J2302	1-2 2-3 See CPU Speed Jumper Settings	3:1 UPA clock ratio (factory default) 2:1 (UltraSPARC I) or 4:1 (UltraSPARC II) UPA clock ratio

SPARCengine Ultra AXmp

595-4943
System Control Board CPU Speed Jumpers



Note –

1. System Control board has two jumpers (J2301 and J2301) related to the CPU speed.
2. System Control Board Speed Jumper Settings:

CPU	Part No. (Speed)	J2301 Setting							J2302 Setting
		1-2	3-4	5-6	7-8	9-10	11-12	13-14	
UltraSPARC I [1]	STP5110AUPA-167 (167 MHz)	Jumper	n/c	Jumper	n/c	Jumper	n/c	Jumper	2-3
	STP5111AUPA-200 (200 MHz)	Jumper	n/c	n/c	Jumper	Jumper	n/c	Jumper	2-3
UltraSPARC II [1]	STP5211UPA-250 (248 MHz)	n/c	Jumper	n/c	n/c	n/c	n/c	n/c	1-2
	STP5212UPA-300 (296 MHz)[2]	n/c	n/c	Jumper	Jumper	n/c	Jumper	n/c	1-2
	test reference (304 MHz)	n/c	n/c	Jumper	Jumper	n/c	n/c	Jumper	1-2
	future (360 MHz)	Jumper	n/c	Jumper	n/c	n/c	Jumper	n/c	2-3
	future (400 MHz)	Jumper	n/c	n/c	Jumper	Jumper	n/c	Jumper	2-3

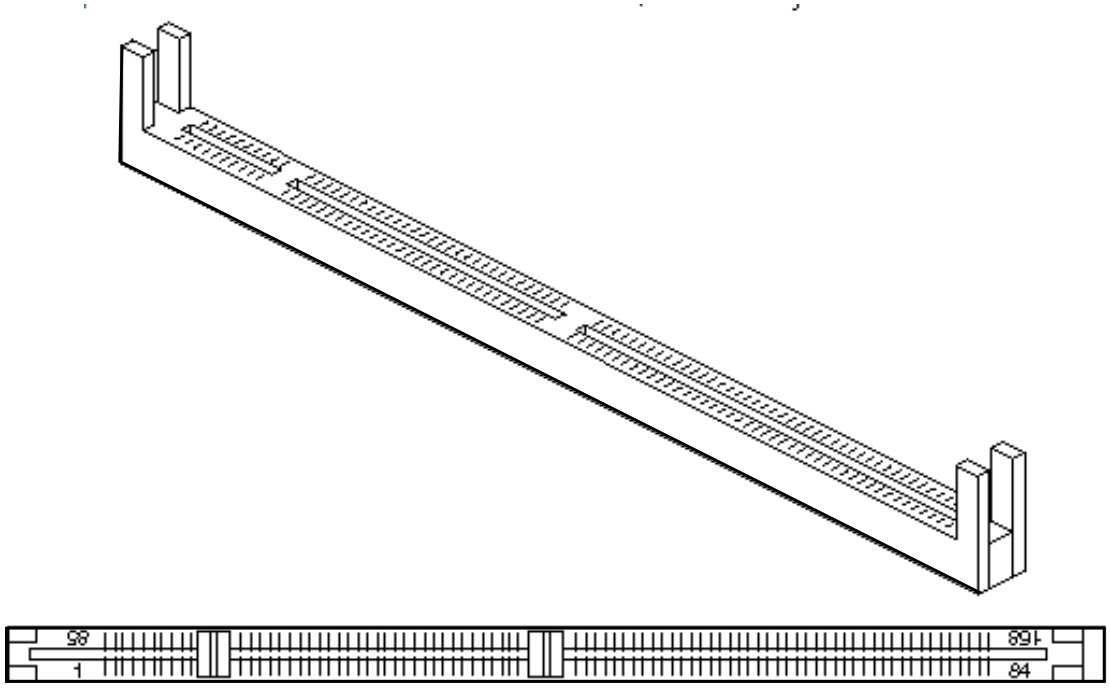
1. J0302 on CPU Complex Boards A and B must also be set (See table under CPU Complex Boards).

2. Factory default.

SPARCengine Ultra AXmp

595-4943

Main Memory Modules



Note –

1. Compute Module contains the System Control Board which holds 8 or 16 system memory DIMMs.
2. Eight memory DIMMs in a bank; two DIMM banks for total of 16 sockets.
3. Minimum memory required 64MB; maximum memory supported 2GB.
4. 16 sockets, 2 banks, 8 DIMMs per bank.
5. DIMMs in same bank must be of same size, configuration, and speed.
6. Can mix one bank of 10-bit column address DIMMs with one bank of 11-bit column address DIMMs.
7. Sun recommends all DIMMs in a bank be from same manufacturer.
8. Uses DRAM, EDO, Buffered, 10 or 11 bit Column Address, 3.3V, 60ns or less, 72bits, 168 Pins, DIMMs.
9. Memory must be installed 8 DIMMs at a time.

SPARCengine Ultra AXmp

595-4943

DIMM usage

Single and Dual Bank DIMM Usage (128MB DIMMs)

DIMM Type	Bank 0	Bank 1	Memory Size
Single bank	8 128MB DIMMs	empty	1 GB
	empty	8 128MB DIMMs	1 GB
	8 128MB DIMMs	8 128MB DIMMs	2 GB
Dual bank	8 128MB DIMMs	empty	1 GB
	empty	8 128MB DIMMs	1 GB
	8 128MB DIMMs	8 128MB DIMMs	ILLEGAL

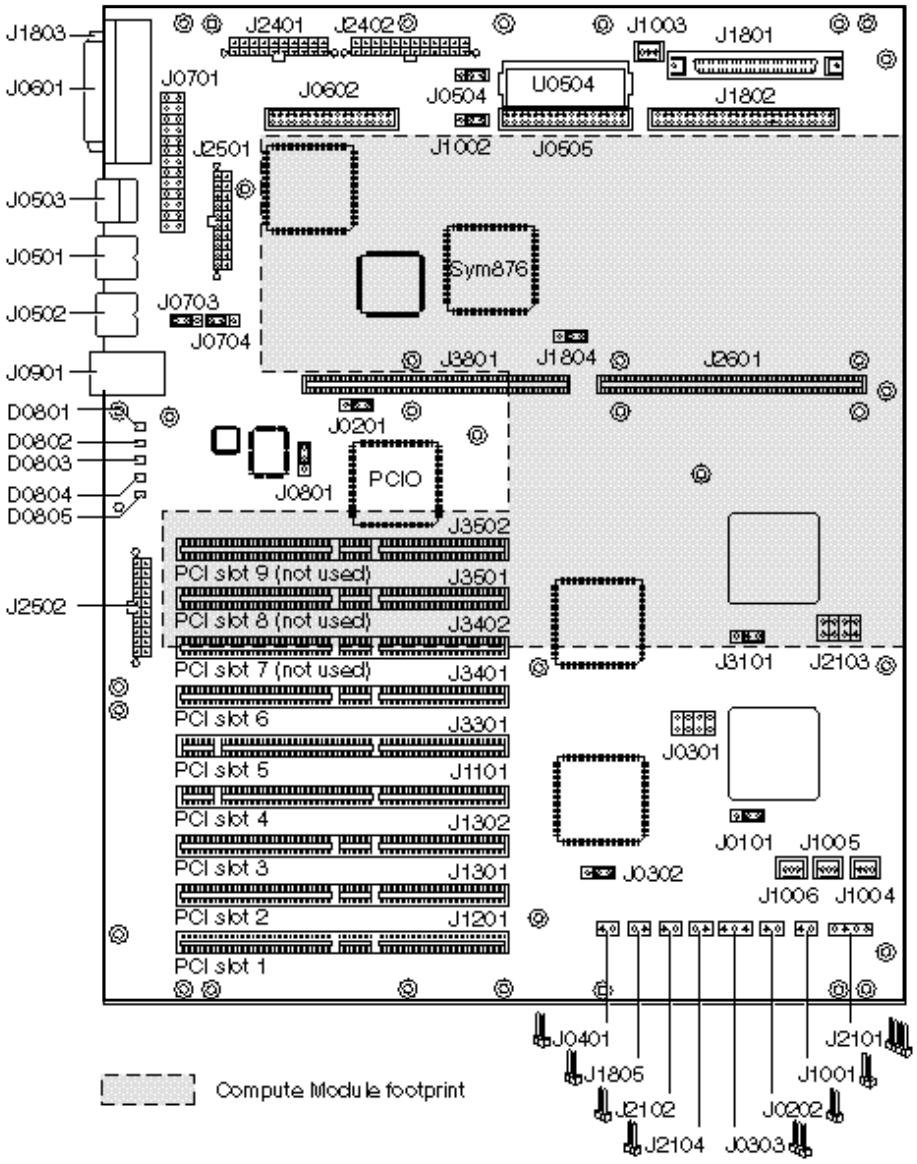
Single and Dual Bank DIMM Usage (256MB DIMMs)

DIMM Type	Bank 0	Bank 1	Memory Size
Single bank	8 256MB DIMMs	empty	2 GB
	empty	8 256MB DIMMs	2 GB
	8 256MB DIMMs	8 256MB DIMMs	ILLEGAL
Dual bank	8 256MB DIMMs	empty	2 GB
	empty	8 256MB DIMMs	2 GB
	8 256MB DIMMs	8 256MB DIMMs	ILLEGAL

SPARCengine Ultra AXmp

595-4943

System Base Board



Note –

1. Uses up to two 66 MHz 64-bit PCI cards and up to four 33 MHz 64-bit PCI cards.
2. Has connectors and headers for connecting Ultra AXmp motherboard assembly.
3. Jumpers J0703, J0704, and J1002 control serial port and power on/off operation.
4. Contains Ultra Port Architecture (UPA) chips and all of input/output controllers and interfaces.

SPARCengine Ultra AXmp

595-4943

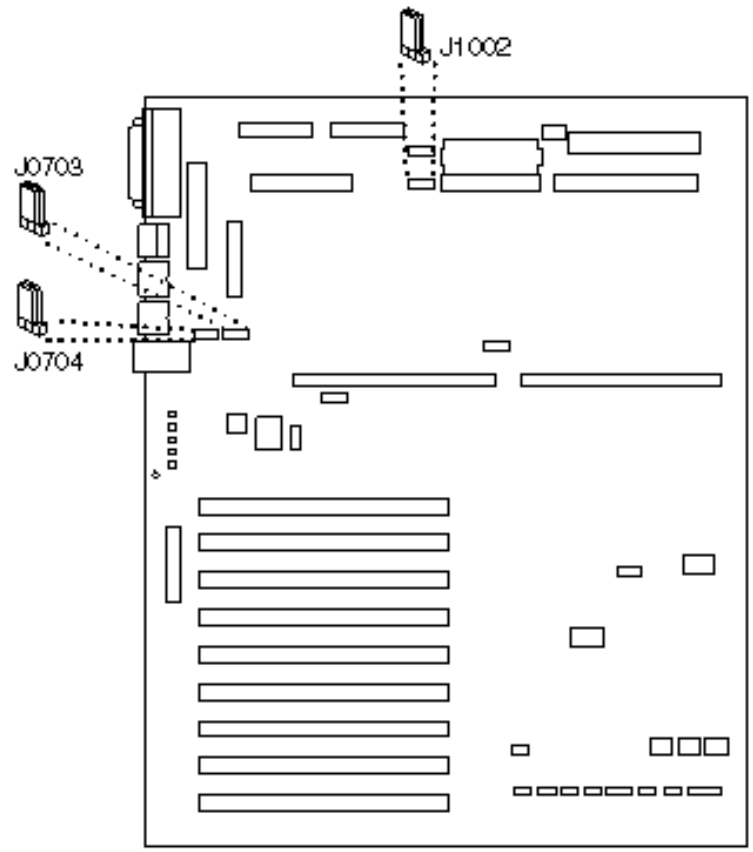
System Base Board Jumper Settings

Jumper	Setting	Result
J0101	2-3	Factory use only (do not change)
J0201	2-3	Factory use only (do not change)
J0302	2-3	Factory use only (do not change)
J0401	1-2 (OFF) 1-2 (ON)	For future use Factory use only (do not change)
J0504	1-2 2-3	Boot from Flash memory (factory default) Boot from S_ROMBO (for factory use only)
J0703	1-2 2-3	Serial port A set to RS232 (factory default) Serial port A set to RS423
J0704	1-2 2-3	Serial port B set to RS232 (factory default) Serial port B set to RS423
J0801	2-3	Factory use only (do not change)
J1002	1-2 2-3	With rear panel switch ON: ● Front panel switch: push ON, push OFF ● Keyboard switch: push ON ● (factory default) Rear panel switch: toggle ON/OFF ● Front panel switch: not operational ● Keyboard switch: not operational
J1804	2-3	Factory use only (do not change)
J3101	2-3	Factory use only (do not change)

SPARCengine Ultra AXmp

595-4943

System Base Board Jumpers



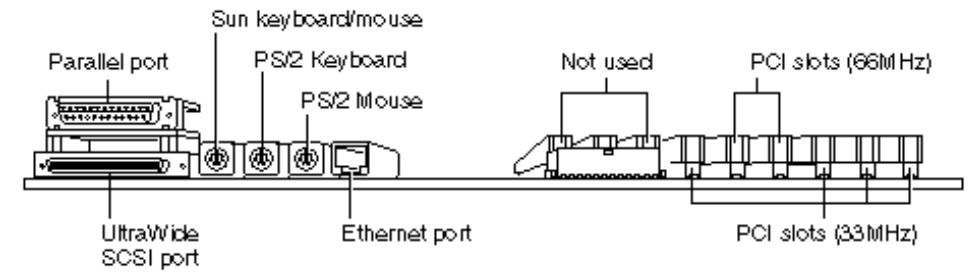
Note –

1. Header Summary for SPARCengine Ultra AXmp

Header	Function
J0202	System Power On LED (front panel)
J0303	Reset Switch (front panel)
J0701	Male Serial Port Connector Header
J1001	Power ON-OFF Switch (front panel)
J1003	Complex A Fan
J1004	Complex B Fan
J1005	Optional Fan C
J1006	Optional Fan D
J1805	Reserved for future use
J2101	Speaker (front panel)
J2102	Temperature Sensor #1
J2104	Temperature Sensor #2

SPARCengine Ultra AXmp

595-4943
Rear Panel Connections



Note –

1. Ultra-wide SCSI interface (SYM53C876) provides:

   - 68-pin UW connector on rear panel for external devices; up to 15 devices
   - 68-pin UW connector J1801 for internal devices; up to 15 devices
   - 50-pin narrow connector J1802 for internal devices; up to 7 devices

2. Ethernet 10/100 BASE-T uses RJ-45, 8-pin connector.
3. PCI Connectors provide 94-pin PCB edge connectors; accepts long or short card; supports up to 25W per slot.
4. Two UPA-to-PCI bridge chips provide four PCI buses (6 PCI slots).

   - six 64-bit PCI slots (two 66MHz, four 33MHz).

5. PCI slots 7, 8, and 9 are not used because they are covered by the Compute Module.
6. Sun keyboard/mouse interface uses:

   - Type 5 keyboard (UNIX) 320-1234, mouse X494A
   - 8-pin DIN type, J0503 connector
   - Sun Type 5 Keyboard-Mouse must be used for full functionality

7. PS/2 Keyboard interface is 6-pin DIN type connector, J0501
8. When both the Sun and PS/2 keyboards are present, the system chooses the PS/2 keyboard as system input device unless the factory default has been overridden.
9. PS/2 Mouse interface is 6-pin DIN type connector, J0502
10. Parallel port interface uses DB25S female connector on rear panel, J0601, and is IEEE compatible.
11. Serial port interface uses DB25P male, wired for TTY-A and TTY-B.

    - Need “Y” splitter cable to use TTY-B.