A4000HardwareGuide

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A4000HardwareGuide

1.1 main

Amiga 4000 Hardware Guide 2.0
compiled by Warren Block

1.2 introduction

Introduction

Copyright

Distribution

Disclaimer

Working on computer hardware can be dangerous, both to the computer and to yourself. If you are not a qualified technician, please do not attempt to perform any of these procedures yourself. Neither myself nor any of the people listed in the Credits make any claim that any of these tips actually work. In fact, they will probably destroy your computer or your self-confidence. Neither is any claim made that any of the information presented here is error-free, so if you do attempt any of these modifications or fixes and damage yourself or the computer, neither myself nor any of the persons listed in the Credits section will be held responsible.

Introduction

The Amiga 4000 Hardware Guide was compiled from online messages posted by many different folks, various hints and tips I've collected elsewhere, and from my own experiences with the 4000. So it is by no means complete. Corrections or additions are welcomed.

The purpose of the guide is to help make A4000 troubleshooting easier by gathering all kinds of Amiga 4000 hardware information into a single, easy-to-use guide file.

This guide is specifically for the Amiga 4000; however, at the prompting of several other individuals, I've compiled a short A1200 hardware FAQ to address those same old questions I see popping up in c.s.a.hardware all the time. Both are or will be available in the hard/misc directory of Aminet.

All of the people who have contributed are listed under Credits. I can't thank them enough! At this point in time, information of this type can be very valuable in keeping A4000 systems alive and running, and they have been gracious enough to freely share this information with everyone.

Comments on this document should be addressed to the Editor.

1.3 common problems

Common Problems

1.4 fan problems

Fan Problems

A4000 makes rattling noises, fan stalls on powerup, or fan does not turn. Solution: replace fan. Replacement fans: Radio Shack #273-243 or Panasonic FBK-08A12M, available from Digi-Key, Hosfelt, and others (see Sources).

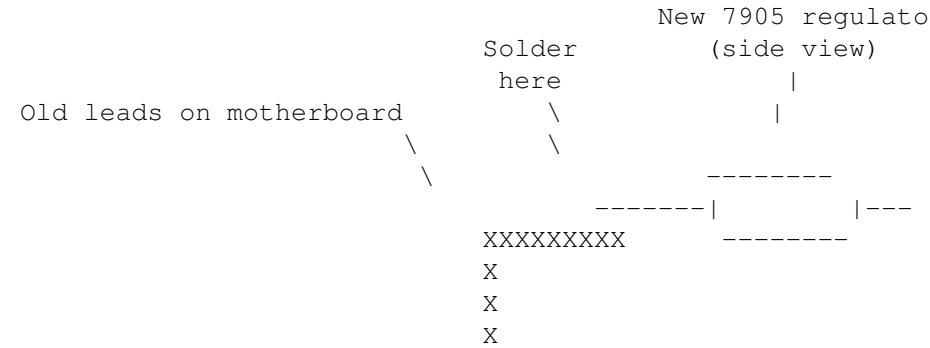
Please be aware that I've seen two styles of power supplies in the 4000; the fans may differ slightly. Some older 4000s had a power supply with a large hole for the fan, and a bolt-on grill protecting it. This power supply used an actual Panasonic FBM-08A12M. A newer power supply design has a built-in grill formed by holes in the side of the power supply; in this case, the fan is held in place by four odd-looking screws that tapped directly into the holes in the fan's plastic frame, and the fan itself is a "MAX FLOW" generic.

1.5 -5v power problems

-5V Power Problems

Problems with large hard disk transfers, discolored Toaster output (pink or magenta display of white areas), system crashes, or Emplant diagnostic failures. (See Emplant Reference.) Solution: U198 7905 -5V regulator is probably bad. Replace with new 7905 1-amp -5V regulator (see Sources).

The easiest way to replace this component may be to clip off the leads close to the body of the defective part, then trim the leads of the replacement and solder it to the old pins.



1.6 video banding problems

Video Banding Problems

Display on monitor has faint, darker vertical bands or stripes. See the Tips section for the Video Banding Modification.

1.7 green display problems

Green Display Problems

Video output from the A4000 has a greenish tint. This may be caused by the Sync On Green jumper (J500) being in the wrong position. Unless the monitor is set up to receive sync signals piggybacked on the Green video input, pins 1-2 of J500 should be jumpered. See Internals/Motherboard Jumpers.

1.8 backplane problems

Backplane Problems

After adding or removing expansion cards, system no longer boots, displays yellow screen. Solution: too-long resistor and capacitor leads on solder side of backplane daughterboard are bent and shorting together. Remove the backplane and trim leads.

1.9 cable routing problems

Cable Routing Problems

Make sure that signal and power cables aren’t blocking the power supply fan air intake. The floppy ribbon cable can be routed from the motherboard between the power supply connector and the power supply itself. If there is only one drive installed, excess ribbon can be pushed under it.

1.10 battery problems

Battery Problems

Battery (BT176) is "furry." Batteries can actually leak and destroy part of the motherboard, so replacement of corroded batteries is advised. Dalco's 3.6V 3-pin battery, part #46875, is an almost-identical part: the pins and size are identical, but it is rated for 60 mAh rather than the A4000 stock battery's 40 mAh.

1.11 zorro-iii dma problems

Zorro-III DMA Problems

Problems with transfers when using 4091 or Fastlane SCSI-2 controller boards. Check for revision of Super Buster; the revision 9 chip had problems with DMA transfers to or from Zorro-III boards (like the controllers mentioned above). Revision 11 of the Super Buster fixed this problem. (Note: it is unclear whether there is a problem with Zorro-II boards and the revision 9 Buster; Zorro-II or Zorro-III video boards that do not use DMA should not encounter this problem, which is not to say that there might not be others! Problems may also be encountered with the 2091 or GVP Series II SCSI controller boards. To isolate this problem, check disk transfers to Chip RAM with a program like Diskspeed 4.2.)

There can be a software component to this problem, also. Check that libs:68040.library is at least version 37.30. Note that due to the way the library version numbers are handled, version 37.4 is an earlier version. The later 37.30 library handles Zorro transfers better.

1.12 scsi reselect problems

SCSI Reselect Problems

System reports "SCSI Bus Phase Error." Check that all SCSI devices support Reselect; if not, disable Reselect mode for the entire bus (how to do this varies depending on the SCSI host adapter).

1.13 dead machine problems

Dead Machine Problems

A4000 does nothing on power-up; keyboard light, power light, and hard drive

spin-up show that power supply is working, but screen is gray or black, and disk drive doesn't click. Possible cause: the motherboard is not supported very well near the internal IDE connector. Solution: gently lift the motherboard near this connector. Installing an insulating support underneath the motherboard near here will be a more permanent solution.

1.14 slow 2091 problems

Slow 2091 Problems

2091 SCSI controller in A4000 performs very slowly. Solution: the 2091 controller has problems with the A4000 environment (see 2091 Reference in the Boards section). Several utilities are available in the "hard" directory of Aminet that can help speed up the 2091's performance in an A4000.

1.15 common questions

Common Questions

Memory Questions

Question: What type of memory does the A4000 use?
Answer: The A4000 comes with a single 2M SIMM installed for Chip RAM, and has four SIMM sockets for expansion memory (Fast RAM). These sockets hold 72-pin SIMMs, either 1M or 4M in capacity, 80 ns or faster. All Fast RAM SIMMs must be the same size. To fit properly, these SIMMs must be single-sided modules. (These specifications describe the motherboard memory; expansion boards may use other types of memory.)

Question: Can the A4000 use 36-bit SIMMs, instead of 32-bit?
Answer: Yes. The extra parity bits are ignored.

IDE Hard Drive Questions

Question: Can the A4000 support two IDE hard drives?
Answer: Yes, since IDE supports a master/slave drive setup. Make sure the drive jumpers are set properly for two drives.

Question: Can the A4000 use IDE hard drives larger than 512M?
Answer: Yes. The supposed "limit" of 512M is a limitation of the BIOS in MS-DOS machines, and the A4000 is not subject to this limit. The maximum supported size of a hard drive is 2G (~2000 megabytes).

Question: Can "EIDE" or "Fast ATA" hard drives be used in the A4000?

Answer: Yes. These are just revised versions of IDE, and should work fine with the A4000's on-board IDE controller.

SCSI Hard Drive Questions

Question: Does the A4000 come with a SCSI or SCSI-2 hard drive controller?
Answer: No. The A4000T (tower) model did come with a built-in SCSI-2 controller, though. The A4091 and FastLane expansion boards are common SCSI-2 controllers for the A4000, and the 2091 is a fairly common SCSI-1 controller.

Question: Why doesn't SCSI work on the A4000?
Answer: It does. But because of a bug in early versions of the Zorro-III DMA controller (the "Buster" chip), DMA SCSI controllers didn't work properly. This problem can be fixed (by replacing the early revision 9 Buster with a revision 11 version) or avoided altogether (by using a SCSI controller that doesn't use the Zorro-III bus, like the one built into the Warp Engine accelerator).

Question: What are SCSI terminators?
Answer: Terminators are resistor packs attached at both ends of the SCSI chain. The resistance reduces ringing and noise on the bus, and is necessary for reliable operation. Terminators that install directly on a drive are usually black or yellow SIPs (Single In-line Package), and there may be one, two, or three of them. An alternate method is to package the resistors into a connector which may be plugged into an external SCSI port. These terminators may be of several types: a Centronics 50-pin connector, a DB-25, or a high-density 50-pin "SCSI-2" connector. Finally, there are "passive" terminators like the SIP packs described above, and "active" terminators that incorporate a voltage regulator to do a more precise job. An active terminator may work when a passive one won't, but they tend to cost somewhat more than the passive variety.

Question: What is the proper setup for SCSI termination?
Answer: Both ends of the SCSI chain need to have terminators, and there should be none in the middle. If you have a controller and one hard drive, there should be terminators on each. For a larger chain, just make sure that the end devices are terminated, and those in the middle are not. Don't forget that the controller counts as a device on the chain. (Now, the catch: some SCSI devices are not very compliant with the SCSI specification, and require oddball setups. Devices made within the last couple of years are usually pretty compliant.)

Question: Can a SCSI-1 drive be used with a Fast SCSI-2 controller?
Answer: Yes, and vice versa. SCSI-1 and SCSI-2 (and Fast SCSI-2) are compatible. Of course, a SCSI-1 drive won't go any faster when plugged into a Fast SCSI-2 controller; neither will a Fast SCSI-2 drive connected to a SCSI-1 controller go any faster than SCSI-1.

Question: What is the pin-out for a DB25 SCSI connector? What about the standard 50-pin SCSI header?

Answer: See the Drives/SCSI Pin-Outs section for both.

Question: Will SCSI hard drives meant for the Mac work on an A4000?
Answer: Yes. The cable included with most external Mac hard drives is a DB25-to-Centronics 50 adapter, and this will work on a SCSI controller with DB25 external SCSI port. Software is available for accessing an existing Mac filesystem, so file interchange with a portable SCSI device is possible.

CD-ROM Questions

Question: Will an EIDE CD-ROM drive work with the A4000's IDE interface?
Answer: Not unless you can locate a replacement for the scsi.device driver, which isn't capable of dealing with CD-ROM drives. SCSI is usually simpler to set up. Beware of pseudo-IDE CD-ROM drives, like the older Mitsumi, Panasonic, and Sony drives which will not work unless you have a special interface board for them.

1.16 tips

Tips

1.17 connecting vga monitors

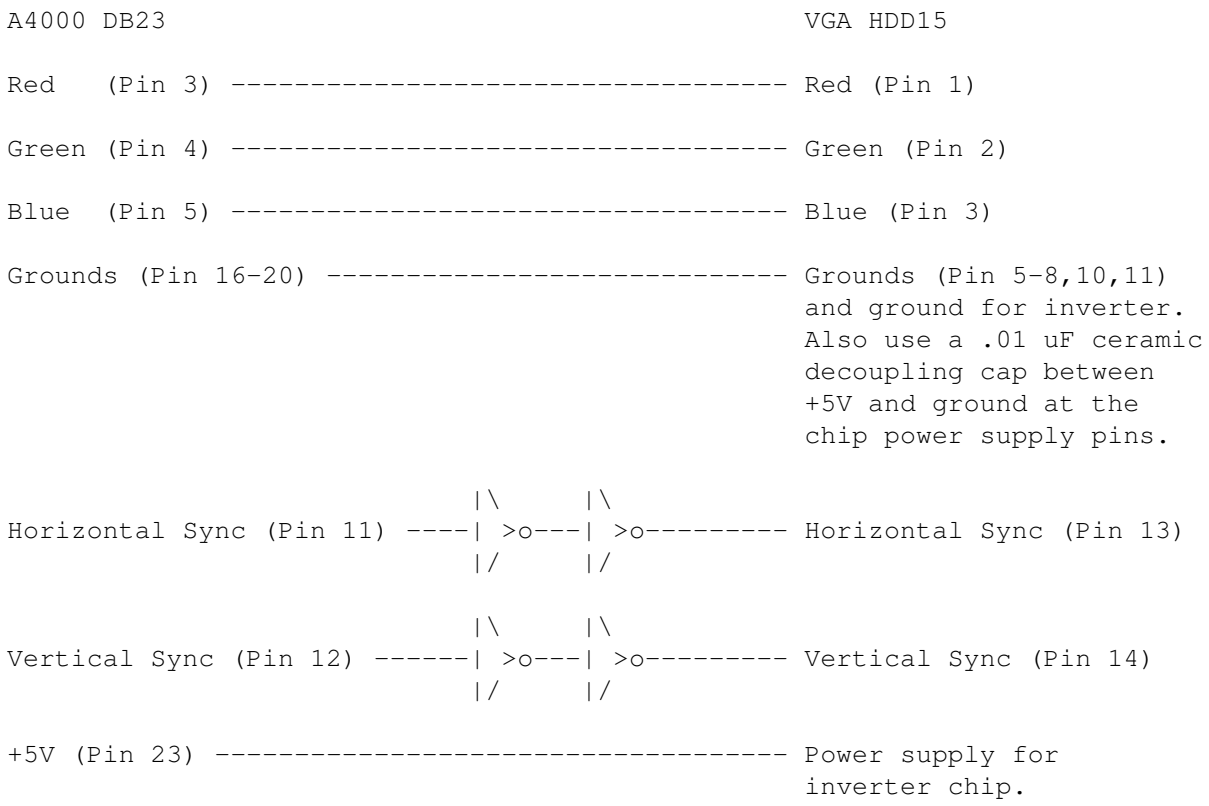
Connecting VGA Monitors

VGA monitors can be connected to the A4000; however, since the special circuitry in the Amiga video output can mistakenly identify a monitor as a genlock and thus cause problems, a special cable or adapter is the best way to hook them up. All this cable really does is buffer the horizontal and vertical sync signals by double-inverting them through a TTL gate. Commodore's DB23-to-HDD15 adapter (supplied with most A4000s) used a 74HCT08 for this, but you can use a 74LS04 or other low-power TTL-level inverters (or other gates wired as inverters, of course).

Remember that most VGA monitors won't sync at 15.75 kHz, so you'll have to set the A4000 to use the Double NTSC (or Double PAL) or Multiscan video modes. Even using these modes, the video output may not work with some VGA

monitors, since some of the modes use horizontal sync frequencies as low as 23 kHz, and normal VGA starts at 31.5 kHz. Using the VGAOnly monitor driver will bump these frequencies up a bit, perhaps enough to make them usable with picky monitors.

A4000 VGA Video Cable



1.18 video banding modification

Video Banding Modification

Video Banding Modification: Many (most?) A4000s show some faint vertical bands on the display. There is a modification to prevent this, but, like anything else, it has advantages and disadvantages.

Advantages:
- Removes vertical bands from display.
- Simple modification.
- Relatively easy to disable.

Disadvantages:
- Interferes with operation of attached genlocks and deinterlacer boards like the Amber A2320 board (see Boards/A2320 'Amber' Reference).

The modification involves connecting pin 15 of the video port connector through a 100 ohm, 1/4 watt resistor to ground. This can be done inside the

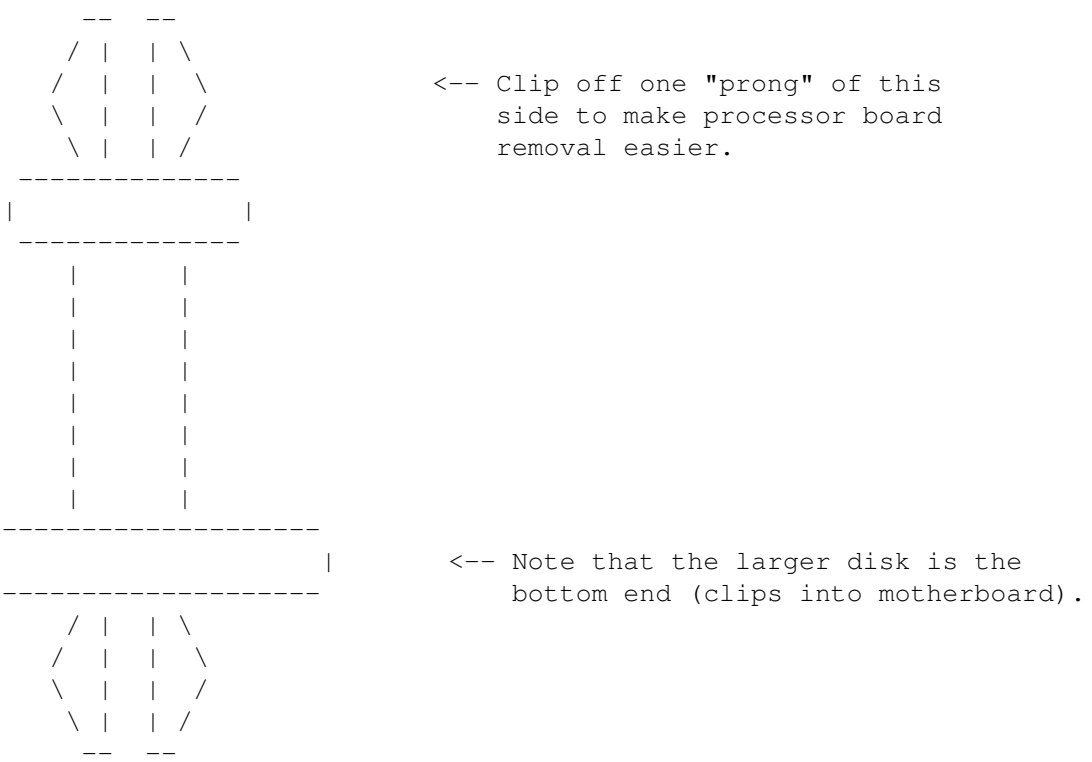
A4000, but it's safer and more versatile if the modification is performed on the DB23-to-HDD15 adapter that was included with the A4000. That way the adapter can be unplugged from the machine if a genlock or Amber board is to be used.

There are two grounds on the adapter PC board: shield ground and video ground (pins 16-20). Since all the other components on the board use the video ground, it seems reasonable to use it for this modification, rather than the more-easily-reached shield ground. The resistor fits nicely on the bottom of the adapter PC board, running from pin 15 to pin 18 of the connector's soldered pins.

1.19 processor board mounting

Processor Board Mounting

The nylon standoffs that hold the A3640 processor daughterboard in place grip the board very, very tightly, making removal difficult and prone to flexing this fragile board. Pushing the two halves of the standoff together with needle-nose pliers makes it somewhat easier to remove the processor board, but it may still be a fight, putting stress on the motherboard, the processor board, and the person removing it. After removing the board, you can clip off one "prong" of the side that plugs into the processor board. If you leave one of these prongs in place, the processor board will still be held firmly in place, but removal will be much easier, next time, anyway. If you are afraid that the processor board will not be held firmly enough, do this modification on only two of the standoffs.



1.20 processor cooling

Processor Cooling

A company called PC Power & Cooling makes a stick-on cooling fan for the 486 processor that just happens to fit the 68040 perfectly. The fan uses a stick-on backing to attach to the chip, so you don't have to mess with little clips or spring wires. It spins on ball bearings instead of a bushing, so life expectancy is claimed to be 50,000 hours instead of the ordinary bushing fan's 5000 hours. A disk-drive power connector powers the fan. Finally, it's only .6 inches high, no more than the heat sink that comes with the A3640 processor board. PC Power & Cooling calls it the "CPU-COOL," and they sell it for $24. In the United States, you can save a few dollars by ordering it from large mail-order companies like PC Connection.

PC Power & Cooling
5995 Avenida Encinas
Carlsbad CA 92008
(800) 722-6555
(619) 931-6988 Fax

1.21 internals

A4000 Internals

Motherboard Jumpers

Connector Pin-Outs

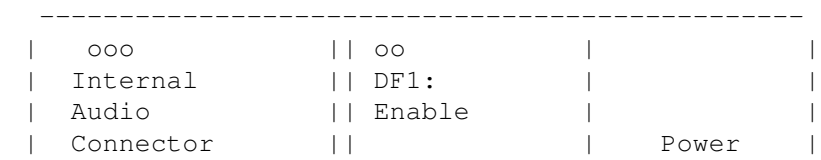
Power-Up Self-Test

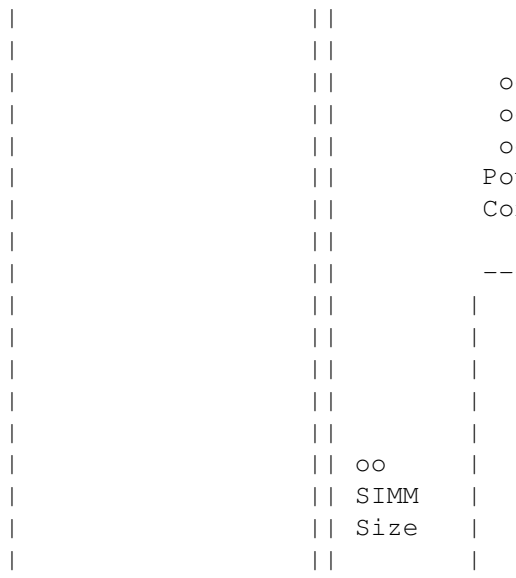
Keyboard Self-Test

1.22 motherboard jumpers

Motherboard Jumpers

A4000 Motherboard





Jumper Listing:

J351: DF1 Enable
Closed: Enable low-density (880K) floppy as DF1.
Open: No DF1 *OR* for high-density (1.76M) DF1.

J852: Fast RAM SIMM Size (Chip RAM is always 2M.)
256K: 1M SIMMs.
1M : 4M SIMMs.

CN404: Internal Audio Connector
Audio signals attached here will be mixed with the A4000 audio output. The A4000 audio is somewhat louder than the normal line level output from most CD-ROM drives, presumably to make sound effects audible over background music. Setting the software-controlled A4000 audio level lower (to 32 instead of 64) will help match the levels.

Pin 1: Audio In (Left)
Pin 2: Ground.
Pin 3: Audio In (Right)

Other Jumpers (Not Shown Above)

J100: CLK90 Clock Source
1-2 Closed: Internal (68020/68030)
2-3 Closed: External (68040)

J104: CPU Clock Source
1-2 Closed: Internal
2-3 Closed: External

J151: ROM Speed: 160 or 200 ns ROMs.
1-2 Closed: 200 ns ROMs (default).
2-3 Closed: 160 ns ROMs.

```
    J213: Chip RAM: 2M or 8M
          1-2 Closed: 2M Chip RAM (default).
          2-3 Closed: 8M Chip RAM. This option was apparently for use
                      with the never-released AAA chip set, and won't
                      work in a normal A4000.

    J500: Sync On Green
          1-2 Closed: Sync on green disabled (default?).
          2-3 Closed: Sync on green enabled (see the Common Problems section
                      for the Green Display Problems note on this jumper).

    J501: Lisa Sync (Wide input on the Lisa chip.)
          1-2 Closed: CSync from Agnus Pin 80.
          2-3 Closed: +5V (default).

    J502: Select DAC Sync
          1-2 Closed: DAC syncs on green.
          2-3 Closed: DAC uses standard signal (default).

    J850: Enable DSACK (Used with 68020)
          1-2 Closed: DSACK Enabled for 68020. U860 and U152 also required.
          2-3 Closed: No DSACK.

    J975: "Options" connector. Apparently for some type of expansion,
          perhaps for use with mouse or joystick-type peripherals.

  Power Supply Connector Wires:

    Yellow: +5V
    Orange: +12V
    Blue:   Ground
    Red:    -12V
    Brown:  Power Good (???)
```

1.23 connector pin-outs

```
                              Connector Pin-Outs

------------------------------------------------------------------------------

 Note: Signals shown with a star (*) in front of them are active-low. I
 recommend that you independently verify the pin-out information shown here
 with a logic probe, meter, or scope before using it.

------------------------------------------------------------------------------

                          Serial Port

                          Parallel Port

                          Video Port

                          Keyboard Port

                          Mouse/Joystick Ports
```

External Floppy Port

Internal Floppy Connector

Internal IDE Hard Disk Connector

1.24 serial port pin-outs

Serial Port (DB25 Male)

Pin 1: Shield Ground
Pin 2: Transmit Data
Pin 3: Receive Data
Pin 4: RTS
Pin 5: CTS
Pin 6: DSR
Pin 7: Data Ground (Do not connect to shield ground.)
Pin 8: CD
Pin 9: +12V (20 mA maximum.)
Pin 10: -12V (20 mA maximum.)
Pin 11: Amiga Audio Out (Left)
Pin 12: Unused
Pin 13: Unused
Pin 14: Unused
Pin 15: Unused
Pin 16: Unused
Pin 17: Unused
Pin 18: Amiga Audio In (Right)
Pin 19: Unused
Pin 20: DTR
Pin 21: Unused
Pin 22: RI
Pin 23: Unused
Pin 24: Unused
Pin 25: Unused

1.25 parallel port pin-outs

Parallel Port (DB25 Male)

Pin 1: *Strobe
Pin 2: Data 0
Pin 3: Data 1
Pin 4: Data 2
Pin 5: Data 3
Pin 6: Data 4
Pin 7: Data 5

```
  Pin 8: Data 6
  Pin 9: Data 7
 Pin 10: *Acknowledge
 Pin 11: Busy
 Pin 12: Paper Out
 Pin 13: Select
 Pin 14: +5V Pull Up (10 mA maximum.)
 Pin 15: Unused
 Pin 16: *Reset
 Pin 17: Ground (Do not connect any of these grounds to a shield.)
 Pin 18: Ground
 Pin 19: Ground
 Pin 20: Ground
 Pin 21: Ground
 Pin 22: Ground
 Pin 23: Ground
 Pin 24: Ground
 Pin 25: Ground
```

1.26 video port pin-outs

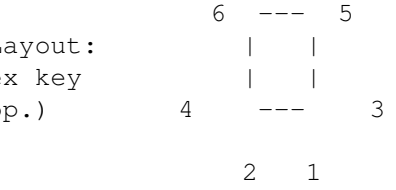
```
                          Video Port (DB23 Male)

------------------------------------------------------------------------------

  Pin 1: *External Clock
  Pin 2: *External Clock Enable (47 ohm)
  Pin 3: Red Video   (75 ohm)
  Pin 4: Green Video (75 ohm)
  Pin 5: Blue Video  (75 ohm)
  Pin 6: Digital Intensity (47 ohm)
  Pin 7: Digital Blue  (47 ohm)
  Pin 8: Digital Green (47 ohm)
  Pin 9: Digital Red   (47 ohm)
 Pin 10: *Composite Sync  (47 ohm)
 Pin 11: *Horizontal Sync (47 ohm)
 Pin 12: *Vertical Sync (47 ohm)
 Pin 13: Ground Return (Digital ground return for pin 2.)
 Pin 14: *Pixel Switch (Genlock overlay, 47 ohm)
 Pin 15: *Clock Out (47 ohm)
 Pin 16: Video Ground (Do not connect any of these grounds to pin 13.)
 Pin 17: Video Ground
 Pin 18: Video Ground
 Pin 19: Video Ground
 Pin 20: Video Ground
 Pin 21: -5V  (10 mA maximum.)
 Pin 22: +12V (100 mA maximum.)
 Pin 23: +5V  (100 mA maximum.)
```

1.27 keyboard port pin-outs

Keyboard Port (6-Pin Female Mini-DIN, PS/2 Type)

Pin 1: Data
Pin 2: Unused
Pin 3: Ground
Pin 4: +5V (100 mA maximum.)
Pin 5: Clock
Pin 6: Unused

Pin Layout: (Index key at top.)



Note: A PS/2 keyboard will not work with the A4000.

1.28 joystick port pin-outs

Mouse/Joystick Ports (DB9 Male)

Mouse:

Pin 1: Mouse Vertical
Pin 2: Mouse Horizontal
Pin 3: Mouse Vertical Quadrature
Pin 4: Mouse Horizontal Quadrature
Pin 5: Mouse Button 3 (Middle)
Pin 6: Mouse Button 1 (Left)
Pin 7: +5V (50 mA maximum.)
Pin 8: Ground
Pin 9: Mouse Button 2 (Right)

Light Pen:

Pin 1: Unused
Pin 2: Unused
Pin 3: Unused
Pin 4: Unused
Pin 5: Light Pen Press
Pin 6: *Light Pen (Capture Beam Pos)
Pin 7: +5V (50 mA maximum.)
Pin 8: Ground
Pin 9: Unused

Digital Joystick:

Pin 1: *Forward
Pin 2: *Back
Pin 3: *Left
Pin 4: *Right
Pin 5: Unused
Pin 6: *Fire
Pin 7: +5V (50 mA maximum.)
Pin 8: Ground
Pin 9: Fire Button 2

Analog (Proportional) Joystick:

Pin 1: Button 3
Pin 2: Unused
Pin 3: Button 1
Pin 4: Button 2
Pin 5: Pot X (Horizontal Control)
Pin 6: Unused
Pin 7: +5V (50 mA maximum.)
Pin 8: Ground
Pin 9: Pot Y (Vertical Control)

1.29 external floppy port pin-outs

External Floppy Port (DB23 Female)

Pin 1: *Disk Ready
Pin 2: *Disk Read Data

```
  Pin 3: Ground
  Pin 4: Ground
  Pin 5: Ground
  Pin 6: Ground
  Pin 7: Ground
  Pin 8: *Disk Motor Control
  Pin 9: *Select Drive 3
 Pin 10: *Disk Reset
 Pin 11: *Disk Change (Latched Low)
 Pin 12: +5V (250 mA maximum.)
 Pin 13: *Select Disk Side (0=Upper, 1=Lower)
 Pin 14: *Write Protect
 Pin 15: *Track Zero
 Pin 16: *Disk Write Enable
 Pin 17: *Disk Write Data
 Pin 18: *Step (Pulse: Low, then high.)
 Pin 19: Direction (0=Inner, 1=Outer)
 Pin 20: Unused
 Pin 21: *Select Drive 2
 Pin 22: *Disk Index Pulse
 Pin 23: +12V (160 mA maximum, 540 mA surge.)
```

1.30 internal floppy connector pin-outs

```
              Internal Floppy Connector (34-Pin Male Header)

-------------------------------------------------------------------------------

  Pin 1: Ground                 Pin 18: Direction
  Pin 2: *Change                Pin 19: Ground
  Pin 3: Unused                 Pin 20: *Step
  Pin 4: *In Use 1              Pin 21: Ground
  Pin 5: Ground                 Pin 22: *DKWD
  Pin 6: *In Use 0              Pin 23: Ground
  Pin 7: Ground                 Pin 24: DKWE (Write Enable?)
  Pin 8: *Index                 Pin 25: Ground
  Pin 9: Ground                 Pin 26: *TRKD
 Pin 10: *Select 0              Pin 27: Ground
 Pin 11: Ground                 Pin 28: *Write Protect
 Pin 12: *Select 1              Pin 29: Ground
 Pin 13: Ground                 Pin 30: *DKRD
 Pin 14: Unused                 Pin 31: Ground
 Pin 15: Ground                 Pin 32: *Side
 Pin 16: *MTRI                  Pin 33: Ground
 Pin 17: Ground                 Pin 34: *Ready
```

1.31 internal ide hard disk connector pin-outs

```
            Internal IDE Hard Disk Connector (40-Pin Male Header)

-------------------------------------------------------------------------------
```

```
   Pin 1: *Reset                 Pin 21: Unused
   Pin 2: Ground                 Pin 22: Ground
   Pin 3: Drive Data 7           Pin 23: *I/O Write
   Pin 4: Drive Data 8           Pin 24: Ground
   Pin 5: Drive Data 6           Pin 25: *I/O Read
   Pin 6: Drive Data 9           Pin 26: Ground
   Pin 7: Drive Data 5           Pin 27: I/O Channel Ready
   Pin 8: Drive Data 10          Pin 28: Unused
   Pin 9: Drive Data 4           Pin 29: Unused
  Pin 10: Drive Data 11          Pin 30: Ground
  Pin 11: Drive Data 3           Pin 31: Interrupt Request
  Pin 12: Drive Data 12          Pin 32: Unused
  Pin 13: Drive Data 2           Pin 33: Disk Address 1
  Pin 14: Drive Data 13          Pin 34: Unused
  Pin 15: Drive Data 1           Pin 35: Disk Address 0
  Pin 16: Drive Data 14          Pin 36: Disk Address 2
  Pin 17: Drive Data 0           Pin 37: *IDE_CS1
  Pin 18: Drive Data 15          Pin 38: *IDE_CS2
  Pin 19: Ground                 Pin 39: *Active (LED driver output.)
  Pin 20: Unused                 Pin 40: Ground
```

1.32 power-up self-test

Power-Up Self-Test

Test Status	Color Shown	Description Of Error
Passed	Light Gray	Initial hardware configuration tests passed. Initial software tests passed. Final initialization test passed.
Failed	Red	ROM Error: Make sure ROMs are seated properly.
	Green	Chip RAM Error: Make sure Agnus is seated, and check Chip RAM SIMMs for proper seating.
	Blue	Custom Chip or CIA error.
	Yellow	Processor detected error before software trapped it.

1.33 keyboard self-test

Keyboard Self-Test

Number Of Caps Lock Blinks	Description Of Error
One	Keyboard ROM failed.
Two	Keyboard RAM failed.

Three	Watchdog timer failed.
Four	Short detected in keyboard.

1.34 boards

A4000 Boards

A3640 Reference

68020/68030 Processor Board Reference

Warp Engine Reference

A2320 'Amber' Reference

Emplant Reference

2091 Reference

1.35 a3640 reference

A3640 Reference

The A3640 is the stock 68040 processor board that comes with most A4000s. It contains a 25 MHz 68040; some boards came with the 68LC040, which is a 68040 with no built-in math coprocessor functions. The A4000 User's Guide has instructions on upgrading from a 68EC040, which has no math coprocessor or memory management unit (if any A4000s were ever shipped with 68EC040 processors, there were very few of them). Some A3640 boards (notably, revision 3.1 boards with U209 marked as "-02" or "-03") can be used in A3000 or A3000 tower computers.

(See also Tips/Processor Board Mounting.)

Jumpers:

J100: Enable CDIS* MDIS* (???)
1-2 Closed and 3-4 Closed: Enable CDIS* MDIS* (default).

J400: Enable MAPROM: Enable remapping circuit for loading Kickstart into Fast RAM with a developer utility program.
1-2 Closed: MAPROM enabled (default).
3-4 Closed: MAPROM disabled.

1.36 68030 processor board reference

68020/68030 Processor Board Reference

This processor board is the board supplied with the A4000/030. It may contain a 68030, 68EC030 (functionally equivalent to the 68030 but without a memory management unit), or even a 68020 processor. The 68020 option was apparently for an extremely low-cost version of the A4000; it is unlikely that any boards using the 68020 were ever sold.

A possible cost-reduced variation of this processor board has no jumpers. This type of board has a PLCC socket for the math coprocessor, which runs at the same speed as the processor.

(See also Tips/Processor Board Mounting.)

Jumpers:

J100: FPU Select
1-2 Closed: Use FPU in the PLCC socket.
2-3 Closed: Use FPU in the PGA socket.

J101: FPU Clock
1-2 Closed: Use optional on-board oscillator at U103 for FPU clock.
2-3 Closed: Use CPU clock as FPU clock.

J103: MAPROM Enable
1-2 Closed: MAPROM disabled.
2-3 Closed: MAPROM enabled (requires U100).

J201: 68020 Select
1-2 Closed: 68020 not selected.
2-3 Closed: 68020 selected.

J202: 68030 Select
1-2 Closed: 68030 selected.
2-3 Closed: 68030 not selected.

J203: 68020/68030 Select
1-2 Closed: 68030 selected.
2-3 Closed: 68020 selected.

1.37 warp engine reference

Warp Engine Reference

The Warp Engine is a popular 68040 processor board that replaces the A3640. It includes four 72-pin SIMM sockets and a Fast SCSI-2 host adapter.

Memory: Any combination of 4M, 8M, 16M, or 32M 72-pin SIMMs, either 32-bit or 36-bit wide. Add them starting with SIMM4 and working down to SIMM1. It is advised that you put your largest SIMM in the SIMM4 socket.

SIMM Speed: For a 28 MHz Warp Engine, 80 ns SIMMs are adequate. A 33 MHz Warp Engine requires 70 ns SIMMs, while a 40 MHz board needs 60 ns.

SIMM Types: Single or double-sided SIMMs will work, although the double-sided 16M SIMM is not recommended due to high power consumption. (This probably also applies to double-sided 32M SIMMs; the Warp Engine manual doesn't say so, perhaps because they are rare at present.)

Upgrading: All that is required to convert a 28 MHz Warp Engine into a 33 MHz or 40 MHz Warp Engine is to replace the oscillator and processor.

(See also Tips/Processor Board Mounting.)

Jumpers:

JP1: SCSI Termination Power

JP2:

A: Mode Select (Off: 68040 enabled, On: 68040 disabled)
B: SIMM Type (Off: double-sided, On: single-sided)
C: SIMM Bank Size (Off: 16M, On: 4M)
D: Wait State (Off: no wait state, On: 1 wait state)
E: reserved
F: MMU Disable (Off: MMU enabled, On: MMU disabled)
G: Cache Disable (Off: caches enabled, On: caches disabled)
H: SCSI Config (see below)
J: SCSI Config (see below)
K: SCSI Config (see below)

JP3: reserved

JP4: used for A3000 version *only* (connects to pin 21 of U350)

SCSI Configuration Jumpers (H, J, K on JP2)

K	J	H	(0=Open, 1=Closed)
0	0	0	SCSI autoboot disabled
0	0	1	10-second delay, LUN scan, not synchronous
0	1	0	10-second delay, LUN scan, 200 ns synchronous
0	1	1	10-second delay, LUN scan, 100 ns synchronous
1	0	0	no delay, LUN scan, 200 ns synchronous
1	0	1	no delay, LUN scan, 100 ns synchronous
1	1	0	no delay, no LUN scan, 200 ns synchronous
1	1	1	(default) no delay, no LUN scan, 100 ns synchronous

1.38 a2320 reference

A2320 'Amber' Reference

The A2320 is a video deinterlacer board originally built for the A2000. It is essentially the motherboard deinterlacer circuitry from the A3000 on a board. Based on the Amber chip used in the A3000, the board is often referred to as the Amber board. Physically, the board is designed to fit into the video slot of an A2000. Electronically, it works fine in an A4000.

Why would you need a separate deinterlacer board when the A4000 already has AGA circuitry that can scan-double? If you have a VGA or multisync monitor, there are two main reasons:

A. Not all programs can be mode-promoted to "double" screens through software (games, for instance). The Amber board will scan-double all 15.75 kHz screens.

B. The AGA "double" modes are not truly double in frequency. A 640x200 "doubled" screen syncs at about 27.5 kHz, not the 31.5 kHz that you'd expect. Some multisync monitors can't sync this low. With an Amber board, the output is 31.5 kHz, the same as "stock" VGA.

Physical Mounting

A modified "slot cover" can be attached to the back panel of the Amber board to allow it to be attached securely to an A4000 slot. You'll also need to trim a bit off the "top" of the Amber's metal panel to allow clearance for the A4000 case (a nibbling tool is useful here). The board will only fill part of A4000 video slot; it looks funny this way, but it works.

Don't remove the enable/disable switch! The Amber gets confused by some of the "doubled" screen modes, and rather than passing them through, tries to double them to 55 kHz or above! On these modes, you'll need the disable switch to force the board to pass the video through. (Productivity mode is passed through correctly, since it was part of the ECS chip set that was around when the Amber board first came out.)

Disadvantages

The Amber board was designed before AGA came out, and doesn't really understand AGA. As noted above, some modes are not passed through properly unless the board is disabled with the switch. Also, I believe that AGA screens with more than 32 colors or HAM-6 will have the colors quantized to a certain degree, although I haven't really been able to prove this. It hasn't been a problem so far. Games that use the AGA color abilities but don't allow for promoting their screens to doubled modes are the only likely sources for this trouble.

1.39 emplant reference

Emplant Reference

The Emplant is a Zorro-II board that, in combination with the appropriate software, makes it possible to emulate other computers on the Amiga system.

The Emplant hardware performs several functions. Sockets are provided for both DIP- and SIMM-packaged ROMs (the ROMs of the "target" computer are installed on the board, then copied to image files, then removed). Also provided are two Macintosh-type serial ports and a basic, no-frills, non-autobooting SCSI-1 interface based on the 53C80 SCSI chip.

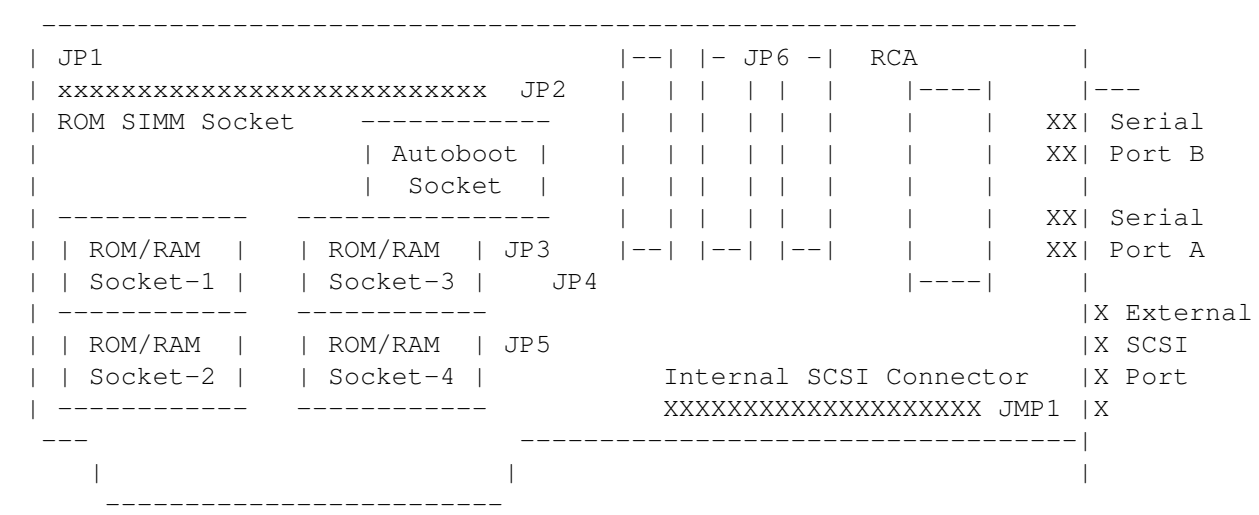
Dual serial ports and the SCSI controller are optional, and some models of the board come without one or both of these options.

Early versions of the board came with "ST" brand serial chips or "LOGIC" brand SCSI chips, both of which caused various problems with their respective ports. Utilities Unlimited has offered free replacements for these problem chips in the past. Contact them at:

```
    Utilities Unlimited International, Inc.
    790 N. Lake Havasu Avenue #16
    Lake Havasu City  AZ  86403
    (602) 680-9004 Sales
    (602) 453-6407 Fax
    (602) 680-9234 Tech Support
```

A commonly-defective -5V regulator on the A4000 motherboard can cause the Emplant board to fail diagnostic tests and not perform properly in other ways, including unreliable operation of AppleTalk devices. See the Common Problems section on -5V Power Problems for more information.

Jumpers:



JP1: ROM SIMM Address Line Selection
Right: Default.
Left: ???.

JP2: ROM SIMM Write Enable
Right: Default (gated write select).

```
        Left: Signal pulled up to +5V.

   JP3: Auto-Boot ROM/SRAM Socket Power/Address Select
        Upper: Supply power to 28-pin DIP.
        Lower: Supply address line for 32-pin DIP.

   JP4: ROM/RAM Socket 3/4 ROM/SRAM Socket Power/Address Select
        Upper: Supply power to 28-pin DIP.
        Lower: Supply address line for 32-pin DIP.

   JP5: ROM/RAM Socket 1/2 ROM/SRAM Socket Power/Address Select
        Upper: Supply power to 28-pin DIP.
        Lower: Supply address line for 32-pin DIP.

   JP6: Mac Emulation Audio Mode Select
        Upper: Mono.
        Lower: Stereo.

   JMP1: SCSI Terminator Power Enable
          On: Supply SCSI terminator power.
         Off: Do not supply SCSI terminator power.

   RCA: Input Connector For Audio Digitizing Circuitry
```

1.40 2091 reference

```
                                2091 Reference

------------------------------------------------------------------------------

  The 2091 is a Zorro-II DMA SCSI hard drive controller that was originally
  introduced with the A2000HD. Because of the 2091's high availability, it is
  often found in A4000s, even though it performs very slowly in them. The
  2091 apparently can't use DMA to transfer data to 32-bit Fast RAM, and so
  uses a very small buffer in Chip RAM, making for extremely slow disk
  transfers. There are utilities in the "hard" directory of Aminet that may
  help alleviate this problem.

  ROM revisions are a common problem with the 2091; 6.6 or later ROMs are
  recommended.

  Sixteen sockets allow for the addition of up to 2M of 16-bit Fast RAM,
  using CMOS 256K x 4 DRAMs (44C256) rated at 120 ns or faster. (This is not
  normally very useful on the A4000, since a SIMM added to the motherboard
  RAM sockets is simpler to obtain and install, and will operate *much* more
  quickly.)

  Usually looked on as a cheap (sometimes very cheap) way to access SCSI
  peripherals from the A4000, the 2091 is certainly better than no SCSI
  controller at all.

  Jumpers:

    JP1: Memory Size
           0K: Set for no memory.
```

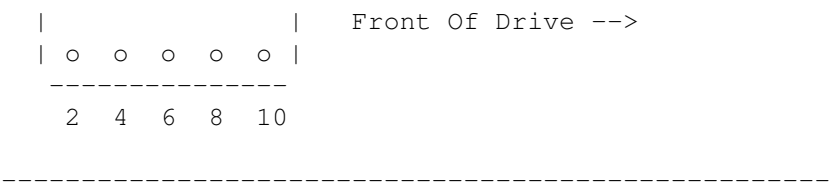
```
          512K: Set for 512K of RAM.
            1M: Set for 1M of RAM.
            2M: Set for 2M of RAM.

    JP2: Autoboot Enable
         AUTO: Set to enable autobooting from the 2091.
          DIS: Set to disable autobooting from the 2091.

    JP3: Interrupt Select
         INT6: Select interrupt 6.
         INT2: Select interrupt 2.

    JP5: Options
         Option 1: LUN Enable. When jumpered, enables scanning for Logical
                   Unit Numbers numbers at each physical SCSI address.
                   Default value: Off.
         Option 2: Time-Out Length. When jumpered, enables longer time-out
                   for slow-starting drives. Default: Off. (Note: When on,
                   this jumper disables parity during the message in phase.)
         Option 3: Reserved. Factory default: Off.

    JP201: Factory use only.

  For pin-out information on the internal 50-pin header and external DB25
  SCSI connectors, see Drives/SCSI Pin-Outs.
```

1.41 drives

```
                                    Drives

------------------------------------------------------------------------------

                            Seagate ST3096A/ST3144A Reference

                            External SCSI Connector

                            SCSI Pin-Outs
```

1.42 seagate st3144a reference

```
            Seagate ST3096A/ST3144A 120M IDE Hard Drive Reference

------------------------------------------------------------------------------

  The Seagate ST3096A (80M) and ST3144A (120M) are the stock drives included
  with most AA4000s.

                             Jumpers

                  |       1  3  5  7  9
                  |      ---------------
                  |     | o  o  o  o  o |
```




```
Single drive:     Pins 3-4 jumpered.
Two-drive master: Pins 3-4 jumpered and pins 5-6 jumpered.
Two-drive slave:  Pins 3-4 open and pins 5-6 open.
LED connected:    Pins 9-10 must be jumpered to connect to an activity LED
                  on the controller. Without this jumper, the drive will
                  work, but there will be no activity light (unless you
                  connect an LED to the connector on the front of the
                  drive itself).
```

1.43 external scsi connector

```
                    Building An External SCSI Connector

------------------------------------------------------------------------------

  Pin connections for external SCSI-2 half-pitch connector:

  NOTE: Connector is VIEWED     |\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/|
  FROM THE BACK, or inside      |  1                         49  |
  of the computer.  All odd-    |  --------------------------    |
  numbered wires go to the      |  \                          /  |
  top of the connector, and     |   ------------------------     |
  all even-numbered wires go    |  2                         50  |
  to the bottom.                |/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\|

  Procedure: obtain the connector from Redmond Cable. Split the 50-pin SCSI
  ribbon cable connectors back a couple of inches. Start with pin 1, lay it
  in the crimp-on pins at the upper left of the connector (again, viewed from
  the back of the connector). By placing the two sides of a small pair of
  needle-nose pliers on the wire on either side of the crimp pins, you can
  gently force the wire down into the V-shaped gap between them. Locate wire
  #2, then use the same procedure to connect it to the other side of the
  connector. Repeat for all 50 wires, then clip the plastic retaining clips
  onto the connector and give it a final squeeze to make sure all wires are
  making contact.

  You can cut a hole in the A4000's "Expansion" port cover on the back of the
  machine to hold this new connector (a "nibbling" tool works well for this).

  Don't forget proper SCSI termination: the devices at both ends of the chain
  should be terminated. If the internal SCSI cable leads from the controller
  to an internal drive, and then to this connector, the internal drive must
  be unterminated for this port to be functional. When used in this
  configuration, the external device plugged into this port needs to be
  terminated. Half-pitch terminators are available from Dalco; using one of
  these would allow you to operate the A4000 with or without an external SCSI
  device without having to open up the computer to change termination.
```

1.44 scsi pin-outs

```
                                SCSI Pin-Outs

------------------------------------------------------------------------------

  Internal 50-Pin SCSI Header Pin-Out

  All odd pins are grounds, except for pin 25, which is unused.

   Pin 2: *Data 0
   Pin 4: *Data 1
   Pin 6: *Data 2
   Pin 8: *Data 3
  Pin 10: *Data 4
  Pin 12: *Data 5
  Pin 14: *Data 6
  Pin 16: *Data 7
  Pin 18: *Parity
  Pin 20: Ground
  Pin 22: Ground
  Pin 24: Ground
  Pin 26: Terminator Power
  Pin 28: Ground
  Pin 30: Ground
  Pin 32: *ATN
  Pin 34: Ground (Unused?)
  Pin 36: *BSY
  Pin 38: *ACK
  Pin 40: *RST
  Pin 42: *MSG
  Pin 44: *SEL
  Pin 46: *C/D
  Pin 48: *REQ
  Pin 50: *I/O

  External DB25 SCSI Connector Pin-Out

   Pin 1: *REQ
   Pin 2: *MSG
   Pin 3: *I/O
   Pin 4: *RST
   Pin 5: *ACK
   Pin 6: *BSY
   Pin 7: Ground
   Pin 8: *Data 0
   Pin 9: Ground
  Pin 10: *Data 3
  Pin 11: *Data 5
  Pin 12: *Data 6
  Pin 13: *Data 7
  Pin 14: Ground
  Pin 15: *C/D
  Pin 16: Ground
  Pin 17: *ATN
  Pin 18: Ground
```

```
Pin 19: *SEL
Pin 20: *Parity
Pin 21: *Data 1
Pin 22: *Data 2
Pin 23: *Data 4
Pin 24: Ground
Pin 25: Terminator Power

External Centronics 50 Connector Pin-Out

Pins 1-12 and 14-25 are grounds.

Pin 26: *Data 0
Pin 27: *Data 1
Pin 28: *Data 2
Pin 29: *Data 3
Pin 30: *Data 4
Pin 31: *Data 5
Pin 32: *Data 6
Pin 33: *Data 7
Pin 34: *Parity
Pin 35: Ground
Pin 36: Ground
Pin 37: Ground
Pin 38: Terminator Power
Pin 39: Ground
Pin 40: Ground
Pin 41: *ATN
Pin 42: Ground (Unused?)
Pin 43: *BSY
Pin 44: *ACK
Pin 45: *RST
Pin 46: *MSG
Pin 47: *SEL
Pin 48: *C/D
Pin 49: *REQ
Pin 50: *I/O
```

1.45 monitors

```
                                  Monitors

------------------------------------------------------------------------------

               1081 Reference

               1084 Reference

               1085 Reference

               1940/1942 Reference

               1950 Reference

               1960 Reference
```

Idek Iiyama Vision Master 17 (MF-8617) Reference

Mitsubishi DiamondScan AUM-1381A Reference

1.46 1081 reference

1081 Reference

Information needed! Who made it? Common problems? Pinouts for connectors? Tips?

Similar to the 1084, with SCART and composite video connectors. Probably made by Philips. The 1081 may have only been distributed in Europe.

A common problem is for the monitor to "pop," then go dark. Hitting it may bring back the picture. This is often caused by cold or cracked solder joints on the flyback transformer, which resoldering should cure.

1.47 1084 reference

1084 Reference

Information needed! Who made it? Common problems? Pinouts for other connectors? Tips?

The 1084 and its variants (1084S, 1084S-P, 1084-P, 1084S-P2, 1084-D, and 2080) are all 15.75 kHz monitors. They do not handle AGA "double" screenmodes, nor will they display the deinterlaced output from the A2320 Amber board or the motherboard deinterlaced output on an A3000. However, they will show all normal 15.75 kHz displays, and many (most? all?) of the 1084 versions have a separate input for composite video.

Common problems:
* The door covering the front-panel controls is typically broken off.
* The attached cables or connectors on some models tended to fail, causing loss of color.
* Failed or insufficient insulation may cause arcing.

Only the six-pin DIN connectors are used for analog RGB. Some 1084 monitors also have digital RGB (PC clone CGA) inputs.

Other notes:

* The 2080 was a long-persistance phosphor variation.
* The 1084-D may have been made by Daewoo of South Korea.

Pinouts:

```
       Pin 1: Green
       Pin 2: Horizontal Sync
       Pin 3: Ground
       Pin 4: Red
       Pin 5: Blue
       Pin 6: Vertical Sync
```

1.48 1085 reference

```
                              1085 Reference

------------------------------------------------------------------------------

  The 1085(S) is a cost-reduced version of the 1084, with lower resolution
  (.52 mm dot pitch) and no non-glare screen treatment. Like the 1084, the
  1085 is a fixed-frequency 15.75 kHz monitor, and is not compatible with
  most AGA screen modes.

  Pinouts (DB9):

       Pin 1: Ground
       Pin 2: Ground
       Pin 3: Red
       Pin 4: Green
       Pin 5: Blue
       Pin 6: Unused
       Pin 7: Composite Sync
       Pin 8: Unused
       Pin 9: Unused
```

1.49 1940 reference

```
                           1940/1942 Reference

------------------------------------------------------------------------------

  This monitor is a 13-inch bisync (not true multisync) monitor built by
  Samsung for Commodore. It has two ranges of sync frequencies to match both
  normal (15.75 kHz) and doubled screen modes. The 1942 differs from the 1940
  only in that it has a smaller dot pitch. MonEd may be useful in getting the
  picture to fill the entire screen. Both variations feature stereo speakers.

  Specifications:

      Sync Frequency: 15.6-15.8 kHz and 27.3-31.5 kHz Horizontal
                      47 Hz to 75 Hz Vertical

          Dot Pitch: 0.39 mm (1940)
                     0.28 mm (1942)

        Sound Output: 1.0 W RMS/Channel at 5% max. THD
```

```
   Input Connectors: One permanently attached DB15 and Audio R/L


   Pinouts (DB15):

        Pin 1: Red
        Pin 2: Green
        Pin 3: Blue
        Pin 4: Unused
        Pin 5: Unused
        Pin 6: Red Ground
        Pin 7: Green Ground
        Pin 8: Blue Ground
        Pin 9: Unused
       Pin 10: Digital Ground
       Pin 11: Digital Ground
       Pin 12: Unused
       Pin 13: Horizontal Sync
       Pin 14: Vertical Sync
       Pin 15: Unused
```

1.50 1950 reference

```
                                1950 Reference

------------------------------------------------------------------------------

  Information needed! Connector pinouts, specifications?

  The 1950 monitor was actually produced by a company called AOC. Parts may
  still be available direct (although there have been conflicting reports).
  The AOC model of the monitor was known as the AOC CM314.

  AOC International
  311 Sinclair Frontage Road
  Milpitas  CA  95035
  (408) 956-1070

  A sync problem may be caused by the monitor detecting sync on the Green
  input and then disabling the horizontal and vertical sync inputs. Removing
  the 10K R854 resistor or the 10uf C812 capacitor on the small vertical
  board may fix this.

  The analog/TTL switch appears to be prone to failure. However, if switching
  the switch brings back the picture, it may actually be that the 74LS123
  (IC805) on the same board is failing. The suggested course of action is to
  first replace (or at least resolder) this chip first, since it's a commonly
  available part.

  Another common problem is the failure of a multifunction sync chip.
  Replacements should be available from Sony.
```

1.51 1960 reference

1960 Reference

Information needed! Connector pinouts, specifications?

The 1960 may have been made by Daewoo (Korea) or a Taiwan company.

A common problem involves a component that is insulated with eletrical tape (inadequately) from the factory, resulting in arcing. Replacing this insulation can cure the problem.

Typical failures also result from cold solder joints on the 1960 boards, which can be repaired by resoldering.

The screen size adjustment pots may be prone to failure, making adjustments difficult.

1.52 idek iiyama vision master 17 (mf-8617) reference

Idek Iiyama Vision Master 17 (MF-8617) Reference

This is a fairly popular monitor for use with the Amiga, since it is a high quality, relatively inexpensive 17-inch monitor that can sync down to about 23.5 kHz, and therefore works with most (all?) AGA "double" screenmodes. All presets and controls are digital, set through three front-panel buttons and an LCD display. The image can easily be expanded to fill the screen in all modes. (See Boards/A2320 'Amber' Reference for information on the A2320 'Amber' board that may be used with this monitor.)

Specifications:

```
    Sync Frequency: 23.5 kHz to 86.0 kHz Horizontal
                    50 Hz to 120 Hz Vertical

        Resolution: Maximum 1280 x 1024 at 80 Hz

  Input Connectors: Five BNC connectors and one DB15 (not high density)
                    (A cable is included to connect a HDD15 VGA-type
                    connector to the DB15 connector on the monitor.)
```

Pinouts:

DB15:

```
      Pin 1: Red
      Pin 2: Red Ground
      Pin 3: Green
      Pin 4: Green Ground
      Pin 5: Blue
```

```
 Pin 6: Blue Ground
 Pin 7: Ground
 Pin 8: NC
 Pin 9: NC
Pin 10: NC
Pin 11: NC
Pin 12: NC
Pin 13: NC
Pin 14: Horizontal or HV Sync
Pin 15: Vertical Sync
```

1.53 mitsubishi diamondscan aum-1381a reference

```
                Mitsubishi DiamondScan AUM-1381A Reference

------------------------------------------------------------------------------

  The DiamondScan is one of the few VGA-type multisync monitors that has a
  composite video input, and that made it relatively common for use on the
  Amiga (although I believe that Mitsubishi no longer makes this model). The
  official scan rates cover the range from 15.6 kHz to 36 kHz, so the
  DiamondScan should work with all normal Amiga video modes. User controls
  are standard knobs and buttons, and there are no digital memory features,
  so using it with the Amiga means that you have to juggle the monitor's
  picture location settings along with the Amiga overscan and screen position
  settings. The DiamondScan works fine with the Amber board (see Boards/
  A2320 'Amber' Reference).

  One feature of the DiamondScan is particularly applicable to the video
  production uses of the Amiga: the "Composite/RGB Select" (pin 22) on the
  DB25 input. Connect this pin through a switch to ground, and then a flip of
  the switch will select composite video or analog RGB display without
  reaching for the switches on the back of the monitor.

  Specifications:

      Sync Frequency: 15.6 kHz to 36 kHz Horizontal
                      45 Hz to 90 Hz Vertical

          Resolution: Maximum 800 x 560 (Rated...normally considered
                                         to be an 800x600 monitor.)


    Input Connectors: BNC (Composite Video)
                      DB9 (EGA/CGA/Mono TTL) (DB9-to-DB9 cable was included.)
                      DB25 (Analog RGB)

    Pinouts:

      DB9: (For TTL 16-Color CGA)

        Pin 1: Ground
        Pin 2: Unused
        Pin 3: Red Video
        Pin 4: Green Video
```

```
  Pin 5: Blue Video
  Pin 6: Intensity
  Pin 7: Unused
  Pin 8: Horizontal Sync
  Pin 9: Vertical Sync

DB9: (For TTL 64-Color EGA)

  Pin 1: Ground
  Pin 2: Secondary Red Video
  Pin 3: Primary Red Video
  Pin 4: Primary Green Video
  Pin 5: Primary Blue Video
  Pin 6: Secondary Green Video/Intensity
  Pin 7: Secondary Blue Video
  Pin 8: Horizontal Sync
  Pin 9: Vertical Sync

DB9: (For TTL Mono)

  Pin 1: Ground
  Pin 2: Unused
  Pin 3: Unused
  Pin 4: Unused
  Pin 5: Unused
  Pin 6: High Intensity
  Pin 7: Video
  Pin 8: Horizontal Sync
  Pin 9: Vertical Sync

DB25:

   Pin 1: Sync Ground
   Pin 2: Red Video
   Pin 3: Red Video Ground
   Pin 4: Green Video
   Pin 5: Green Video Ground
   Pin 6: Superimpose Control (YS)
   Pin 7: Superimpose Ground
   Pin 8: Video Input Select (AV)
   Pin 9: Composite Video Input
  Pin 10: Composite Video Ground
  Pin 11: Composite Video Out
  Pin 12: Composite Video Ground
  Pin 13: PGA Mode Control
  Pin 14: Blue Video
  Pin 15: Blue Video Ground
  Pin 16: Horizontal/Composite Sync
  Pin 17: Vertical Sync
  Pin 18: Unused
  Pin 19: Unused
  Pin 20: Unused
  Pin 21: INT (+5V ???)
  Pin 22: Composite/RGB Select (TTL level: Low for RGB, high
                                or open for composite.)
  Pin 23: Analog/TTL Select (TTL level: Low for TTL, high
                             or open for analog.)
```

```
        Pin 24: Remote (TTL level: Low to disable Mode Switch.)
        Pin 25: Shield Ground
```

1.54 sources

```
                                Sources For Components

------------------------------------------------------------------------------

  Opinions in this section are strictly those of the Editor.
  This list includes sources for suppliers of parts and accessories like
  cables and connectors. If you don't know where to start, I'd suggest that
  you contact the following:

  * For general or custom cables and connectors: Dalco or Redmond Cable.
  * For general board-level parts (not custom Amiga): Digi-Key and JDR.
  * For custom Amiga parts: Unknown at this point. Suggestions welcome!

------------------------------------------------------------------------------

                             Altex Electronics
                             Dalco Electronics
                             Digi-Key Corporation
                             Hosfelt Electronics
                             JameCo Electronic Components
                             JDR Microdevices
                             Marlin P. Jones & Associates
                             MCM Electronics
                             Memory World
                             Parts Express
                             Redmond Cable
```

1.55 altex electronics

```
  Altex Electronics
  11342 N IH 35
  San Antonio  TX  78233-9903
  (800) 531-5369
  (210) 637-3264 Fax

  I've not had a lot of experience with Altex, although they seem okay, and
  have a pretty good selection of connectors and components at good prices.
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1.56 dalco electronics

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  Dalco Electronics
  275 Pioneer Boulevard
  Springboro  OH  45066
  (800) 445-5342
  (513) 743-9251 Fax
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Extremely large selection of connectors, cables (including the relatively
rare SCSI-2 and 2.5-inch IDE hard disk varieties), and pretty much everything
in the way of computer assemblies. Oriented towards computer end-users.
They will custom-build cables. Service is good, prices are excellent, and
their catalog is filled with basically neat stuff.

1.57 digi-key corporation

Digi-Key Corporation
701 Brooks Ave. South
P.O. Box 677
Thief River Falls MN 56701-0677
(800) 344-4539
(218) 681-3380

Huge assortment of electronic components, including chips, heat sinks,
cables, connectors, fans, and every other electronic part you can think of
except DB23s. Prices tend to be a little higher, which is offset somewhat
by the fact that they have such a large selection. Their catalog can be
considered a reference work. Oriented towards electronics designers and
experimenters.

1.58 hosfelt electronics

Hosfelt Electronics
2700 Sunset Boulevard
Steubenville OH 43952-1158
(800) 524-6464
(800) 524-5414 Fax

Source for Panasonic replacement fans and other parts. Very low prices.
I've had no experience (yet) with this company.

1.59 jameco electronic components

JameCo Electronic Components
1355 Shoreway Road
Belmont CA 94002-4100
(800) 831-4242
(415) 592-2503 Fax

Large selection of chips, power supplies, and other electronic components,
including some that can be extremely difficult to find elsewhere.

1.60 jdr microdevices

JDR Microdevices
1850 South 10th Street
San Jose CA 95112-4108
(800) 538-5000 Orders (24-Hour)
(800) 538-5005 Fax
(800) 538-5002 Tech Support
(408) 494-1430 BBS

Chips, cables, hard drives, generic computer parts. Oriented towards the end-user, quick to deliver, inexpensive, and nice on the phone.

1.61 marlin p. jones & associates

Marlin P. Jones & Associates
PO Box 12685
Lake Park FL 33403-0685
(407) 848-8236
(407) 844-8764 Fax

Chips, connectors, electronics and computer parts, much of which is surplus. They sometimes have parts unavailable elsewhere, like blue LEDs. Oriented towards electronics experimenters and designers.

1.62 mcm electronics

MCM Electronics
650 Congress Park Drive
Centerville OH 45459-4072
(800) 543-4330
(513) 434-6959 Fax

Large assortment of parts. Oriented towards electronic repair shops.

1.63 memory world

Memory World
3392 Progress Drive, Suite B
Bensalem PA 19020-5899
(215) 244-7930
(215) 244-7932 Fax

Source for SIMMs, ZIPs, other memory, Motorola processors. And they even know what an Amiga is! Prices tend to be excellent.

1.64 parts express

```
Parts Express
340 E. First Street
Dayton  OH  45402-1257
(800) 338-0531
(513) 222-4644 Fax

Chips, cables, other parts. Oriented towards electronic repair shops.
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1.65 redmond cable

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Redmond Cable
(206) 882-2009
(206) 883-1430 Fax

Excellent source of very unusual cables and connectors. They will custom-
build cables or just sell the parts. They had SCSI-2 panel mount female
connectors, which I was unable to locate anywhere else.
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1.66 editor

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              Editor And Compiler Of The A4000 Hardware Guide

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Warren Block
602 St. James
Rapid City  SD  57701-3658
(605) 342-1632 (voice)
wblock@silver.sdsmt.edu

Music that may have contributed to the mood of this guide, and that has
definitely influenced me:

Pink Floyd: Wish You Were Here, Meddle, The Division Bell
Peter Gabriel: Us, Shaking The Tree
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1.67 credits

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                                   Credits

------------------------------------------------------------------------------

People who have contributed information to this document, either directly
or by posting public Usenet or BBS messages that have revealed information
that was incorporated into this document:

Chuck Baker                    Dr. Peter Kittel
Volker Barthelmann             Paul Kolenbrander
Gary Bates                     Jeff Koons
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Randy Kruszka
Erik Lindberg
Michael Martin
Gerry Murphy
John Palmer
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Finally, a special note of thanks to Urban Müller, the main administrator of Aminet, for the Aminet itself.

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