Inhalt des Dokuments:

Ok, let's see. I don't have any canned description here, but I'll give it a go. Any more questions, let me know.

-Dave Haynie

BASIC SYSTEMS

The A3000 is a 68030 based personal computer. There are 3 standard base configurations:

A3000-16/50 16MHz 68030/68881, 50 Meg SCSI Hard Disk, 1 Meg of Chip memory, 1 Meg of Fast memory.
A3000-25/50 25MHz 68030/68881, 50 Meg SCSI Hard Disk, 1 Meg of Chip memory, 1 Meg of Fast memory
A3000-25/100 25MHz 68030/68881, 105 Meg SCSI Hard Disk, 1 Meg of Chip memory, 4 Megs of Fast memory

MEMORY

For those unfamiliar with the Amiga architecture, Amiga memory is divided into 2 groups, Chip memory and Fast memory, both of which are 32 bits wide. The Chip memory is accessible by the Amiga System Chips, which are custom LSI devices dedicated to video display, Bit Image Manipulator ("The Blitter"), Video Coprocessor ("The Copper"), floppy control, serial port, and 4 channel digital audio. This memory, being shared between the CPU and the Amiga chip system, runs slower than the Fast memory from the CPU's point of view, and is generally used only for display, sound, floppy, and serial buffers. The Amiga 3000 supports 1 or 2 Megabytes of Chip memory.

The Fast memory system is a 32 bit system dedicated to the 68030 and hard disk DMA controller. This memory supports 68030 cache burst as well as a special "page detect mode", which allows asynchronous 0 wait state performance during contiguous memory accesses. The Amiga 3000 supports up to 4 Megabytes on-board using 256K x 4 Static Column "ZIP" memory devices, or up to 16 Megabytes on-board using 1M x 4 Static Column "ZIP" memory devices. Software support makes it possible to use Page Mode memories instead by disabling the burst and page detect modes.

HARD DISK

The A3000 system uses the SCSI bus for hard disk access, in conjunction with a custom 32 bit DMA controller. The current SCSI controller chip is designed for SCSI-1, though a pin-compatible SCSI-2 replacement is available. The system is capable of asynchronous or synchronous operation with the SCSI bus at full SCSI speeds. The actual DMA controller buffers incoming SCSI data in a FIFO, mastering the A3000 bus when the FIFO fills to effect 32 bit DMA transfers at full 68030 speed. What this all means, in practical terms, is that an asynchronous SCSI drive going at its full speed of around 1.5 megabytes/second only uses about 3.5% of the CPU time available to the system -- very important for support of multitasking under AmigaOS or UNIX.

VIDEO

The Amiga 3000 has two video ports, an Amiga standard 23 pin port and a VGA compatible 15 pin port. The Amiga port supplies the full range of Amiga type video, including NTSC (60Hz)/PAL (50Hz) compatible 15kHz modes and VGA compatible modes:

Horizontal	Vertical Normal	Vertical Interlaced	Maximum Colors	Horizontal Frequency	Pixel Speed
320	200/256	400/512	64/4096	15kHz	70ns
640	200/256	400/512	16/4096	15kHz	70ns
1280	200/256	400/512	4/64	15kHz	35ns
640	480	960	4/64	31kHz	35ns

And with a special monitor

1008	800/1024	N/A	2/greyscale	~50kHz	~22ns

All of the color modes have the provision for display into the "overscan" region, which allows something up to 740x480 pixels for a normal 640x400 display mode, with the loss of some hardware sprites (there are 8 total hardware sprites, the last you lose it the pointer sprite). All of the 15kHz modes are translated to 31kHz modes for VGA compatibility at the 15 pin video port. 15kHz modes with 35ns pixels are translated with alternate pixels lost, all others are translated perfectly.

There is a single video expansion port inside the Amiga 3000, which permits internal installation of Genlocks and other devices that require access to analog or digital video signals.

EXPANSION

There are two forms of card-based expansion for the Amiga 3000, Coprocessor and I/O. There is a single 200 pin Coprocessor slot, which is specific to the Amiga 3000, which allows the installation of faster CPUs as they become available. This was designed with the MC68040 in mind, but could be

used effectively by alternate processors. Such a Coprocessor card can run in parallel with the A3000's 68030, or it can safely shut down the 68030 and run the entire system itself. Coprocessor cards can share the A3000's system clocks, or they can run asynchronously at their own, faster clock rates. The
A3000 system reserves 128 MegaBytes of memory space for use by a Coprocessor board.

I/O device expansion, which is usually just called expansion, is standard among all Amiga computers. The original Amiga expansion bus, called the Zorro II bus, is supported, so that all correctly designed expansion cards for the A2000 work in the A3000. The Zorro II bus is a 24/16 bit bus clocked at between 7.09MHz and 7.16MHz. It supports multiple bus masters, shared interrupts, and automatic card configuration (AUTOCONFIG(R)). The Zorro II bus rate is about 3.5 MegaBytes/Second.

The Amiga 3000 also supports a new, 32 bit expansion protocol called Zorro III. Zorro II and Zorro III cards may coexist in the same backplane. Zorro III cards support full 32 bit address and data, and the bus is asynchronously clocked -- bus speed depends upon the driving bus master. Zorro III supports multiple bus masters, shared interrupts, vectored interrupts, AUTOCONFIG(R), "burst/block" transfers, and bus locking for multiprocessor support. The theoretical maximum rate on bus is 50 MegaBytes/Second, without bursting; the 25MHz Amiga 3000 drives the bus at approximately 20 MegaBytes/Second. The A3000 implementation reserves 1.75 GigaBytes of address space for Zorro III expansion.

SOFTWARE

The Amiga 3000 comes with AmigaOS System 1.3 and AmigaOS System 2.0 on disk at the moment. Eventually they plan to freeze the AmigaOS System 2.0 kernel into the A3000's 512K ROM. The AmigaOS provides support for both shell and GUI based user interfaces, lightweight multitasking, shared libraries, interprocess communication, interapplication communication, multiple file systems, and a wide range of other things.

Commodore's UNIX system, which currently has no official release date but is well into beta testing, is based on AT&T System V Release 4.0. That includes all the goodies like NFS, X, OpenLook, 680x0 ABI, etc.

A3000 PCB REV LEVELS V0.0 (first draft)

A variety of A3000 motherboards and daughtercards have been produced. This note outlines the changes made on the various prodution versions of the A3000. Boards are identitified by a numeric rev level. Increasing the ones digit denotes new artwork, while increasing the tenths digit denotes levels of rework.

Note that there are TWO types of boards bearing rev 6.1 markings. The first is a board marked with the silkscreen as rev 6 which has been reworked to the rev 6.1 level. The second is a board that was actually silkscreened as a rev 6.1 board. These boards are identical to boards marked rev 7.0, only the silkscreen was corrected.

Many intermediate revs which never left the factory are seen in this list. They are listed here because many internal commodore machines may be of that type. Units shipped to end customers are marked.

Motherboard:

Rev 9.0 **** Shipped to end customers. ****
Current production rev.

No rework required.

Rev 8.9 **** Shipped to end customers. ****
This rev is just like the rev 9.0 artwork, only some small changes were made.
This rev is actually the rev 8 inner layers combined with the rev 9 outer layers. This allowed rom towers to be phased out sooner than otherwise possible.

No rework required.

Rev 8.0
No boards of this type were produced. This was intended to be a cosmetic change.

No rework required.

Rev 7.3 **** Shipped to end customers. ****
Indicates that the ROM tower is fastened with wire ties.

No rework required.

Rev 7.2
indicates that this board has had a rom tower as opposed to EPROMs.

No rework required.

Rev 7.1
These boards had a pull-up wired to the SCSI select line. Without this pullup, the system might not boot if no SCSI devices were connected. All A3000s are shipped with a SCSI device built-in (providing termination). The only reason to add this jumper was to facilitate production processes that did not want a hard drive attached.

No rework required.

Rev 7.0 (and boards with rev 6.1 silkscreened on them).

These boards corrected all known problems with the rev 6 boards.

The SCSI terminators were changed to the defacto standard
of 3 8-pin resistor packs. Only sockets were installed
in the PCB, SCSI termination was not installed on the board.

Important User Note:

These boards will not boot without at least one SCSI device attached (such as the internal hard drive). If desired, this can be alleviated by jumpering U800 pin 6 to RP350 pin 4. Adding such a jumper would make this board a rev 7.1.
Note that the this level works great provided that a terminated SCSI hard drive is attached.

No rework required.

Rev 6.1 **** Shipped to end customers. ****

(Silkscreen says rev 6.0 in middle of board, label says rev 6.1 .
Note that some rev 7 boards were produced that had 6.1 silkscreened on them.
These are really rev 7 boards.)

First production boards.

These can be easily identitfied by a rework wire running to the FPU from near the fastram section.

Important User Note:

On these units, SCSI termination is mounted directly on the motherboard. Therefore no termination should be attached to the internal drive. All other revs of A3000 have no termination on the motherboard and require one and only one internal SCSI device to be terminated.

No rework required.

Rev 6.0 First production candidate. Included obselete gate arrays, bogus system software in EPROMS, illegal sockets for 84 pin PLCCs, etc. etc....

The rework required to make these boards functional can only be performed at the factory. (See ECR/ECO WC0101 for details).

Daughter Card

Rev 7.1 **** Shipped to End Customers ****
Current production rev. Soon to be replaced with rev 8 pcb which will, alledgedly, require no rework.

Rev 7.0
Rev 7 boards where created to eliminate the need for +12V jumper to the XT slots. A mistake was made in the PCB creation process causeing an inner layer short between the +12V & -5V power lines. All of these boards were reworked at the factory.

Rev 6.1 **** Shipped to end customers. ****
No rework required. These are reworked rev 6.0 pcbas.

Rev 6.0 **** Shipped to end customers. ****

This version was created to add components to support an alternate product.
It was noticed while these boards were being manufactured that on this and all previous revs of the daughter card, +12V was errantly not connected to the XT expansion slots.

Required rework:

+ 12 volts is missing from the XT slots.
Pin b9 of the XT slot should be connected to a source of +12 on the daughter card.

Mark board rev 6.1

Rev 5.1 **** Shipped to end customers. ****

This is a fully corrected rev 5 pcba.

No rework required.

Rev 5.0 **** Shipped to end customers. ****

This rev is functionaly identical to rev 4.1.

Required rework:

+ 12 volts is missing from the XT slots.
Pin b9 of the XT slot should be connected to a source of +12 on the daughter card.

Mark board rev 5.1

Rev 4.2 **** Shipped to end customers. ****

This is a fully corrected rev 4 or rev 3 pcba.

No rework required.

Rev 4.1 **** Shipped to end customers. ****
This is a correct rev 3 or rev 4 pcb.

Required rework:

Jumper +12V (on the daughter card) to pin B9 on a XT slot.

Mark the board 4.2

Rev 4.0 & rev 3.0
**** Shipped to end customers. ****

The only difference between rev 3 & 4 daughter cards is the silkscreen.
There are no functional differences.

Required rework:
Jumper RP603 pin 5 to CN603 pin 51.

Jumper RP608 pin 2 to CN602 pin 86.

+ 12 volts is missing from the XT slots.
Pin b9 of the XT slot should be connected to a source of +12 on the daughter card.

Mark board rev 4.2

Note that no end-user A3000 motherboards require rework. The daughter card may require up to 3 jumpers, depending on the vintage. There are also some user issues, things the owner should be aware of, if he or she owns a rev 6.x or 7.0 motherboard.