ALPHA MICROSYSTEMS
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# AM-7000 Computer Owner's Manual

DSM-00220-00

**FIRST EDITION:** May 2000

To re-order this document, request part number DSO-00220-00

### FCC Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

### Canadian Department of Communications Compliance Statement

This equipment does not exceed Class A limits per radio noise emissions for digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications. Operation in a residential area may cause unacceptable interference to radio and TV reception requiring the owner or operator to take whatever steps are necessary to correct the interference.

### Avis de Conformité aux Normes du Ministère des Communications du Canada

Cet équipment ne deapsse pas les limits de Classe A d'émission de bruits radioélectriques pour les appareils numeriques tels que prescrites par le Règlement sur le brouillage radioélectrique établi par le ministère des Communications du Canada. L'exploitation faite en milleu résidential peut entrainer le brouillage des réceptions radio et tele, ce qui obligerait le propriétaire ou l'opératour à pendre les dispositions nécessaires pour en éliminer les causes.

### Battery Warning

CAUTION: Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

ATTENTION: Il y a danger d'explosion s'il y a replacement incorrect de la batterie. Remplacer uniquement avec une batterie du même type ou d'un type recommandé par le constructeur. Mettre au rébut les batteries usagées conformément aux instructions du fabricant.

For AM-3500-E100, -E200, -E300, -E400, -E500 and AM-990-01 systems replace battery with Panasonic or Ray-O-Vac BR2325 only. For AM-3500-E550, AM-3500-6000, AM-3500-7000, and AM-990-04 systems, replace batteries with Panasonic or Ray-O-Vac BR1225 only. Use of other batteries may present a risk of fire or explosion. Replacement batteries may be ordered from your authorized Alpha Micro reseller.

### Safety Warning

This computer contains no user-configurable components that require opening the computer case. Because the power supply in this computer is capable of outputting high current levels hazardous to your safety, the computer case should only be opened by an authorized service technician.

Cet ordinateur ne contient aucune pièce configurable par l'utilisateur qui nécessite l'ouverture du boitier. L'alimentation de cet ordinateur peut preduire des nivaeux de tensions dangereux, le boitier ne devrait donc être ouvert que par un tecnnıcıan autoriaé.

### SOFTWARE SECURITY DEVICE IDENTIFICATION NUMBER: _____

The Alpha Micro Software Security Device (SSD) is a customized integrated circuit that personalizes the computer, providing identity verification for it. Certain Alpha Micro and non-Alpha Micro software may require that your computer contain an SSD in order to run software that has been customized to run only on your computer.

Please enter the identification of your SSD above. The SSD identification number should be on your computer ID label under "SSD Serial No." (Another way of finding the number is to look at the SSD itself. The SSD is located in an integrated circuit location on the CPU board; its identification number is printed on the SSD itself.) Software vendors may ask you for the SSD number if they are customizing software to run only on your computer.

This document may contain references to products covered under the following U.S. Patent Number(s): 4,530,048

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# Chapter 1 - Introducing the AM-7000 Computer

The Alpha Microsystems AM-7000 is a high-performance computer designed for a wide range of applications in business headquarters, departmental facilities, and professional offices. With power to support many users simultaneously, in local or networked configurations, the AM-7000 lends itself to virtually any business data processing environment.

The AM-7000 is constructed in modular fashion. Your organization can start with just the features and capacity needed, then expand the system as processing demands increase. The system can be field upgraded to provide more disk storage, memory, and tape backup capacity; to add more local cable-connected terminals and printers; to exchange data over a local area network with personal computers and other data processing systems; and to communicate through modems with remote data centers.

The AM-7000, shown in Figure 1-1 below, is housed in a compact enclosure that fits neatly next to a desk.

***Figure 1-1: AM-7000 in Deskside Chassis***

For configurations requiring more peripheral devices and /or more serial input/output connections, the AM-3501 is available as an expansion unit to the AM-7000, providing expansion capability in a matching deskside enclosure.

## ABOUT THIS BOOK

The purpose of this book is to get you started with your computer. After you've followed the instructions in this book, your computer will be set up and running. And, you will have a good idea of where to go next for information on the software you want to use.

- This chapter contains a software and hardware overview of your system. It also discusses the configurations available, as well as warranty and service information.
- Chapter 2 tells you how to unpack and set up your computer. It also contains information on choosing an installation site.
- Chapter 3 discusses turning on and resetting the computer, using the terminal keyboard, diskettes, streamer tape, DAT tape, and turning the computer off.
- Chapter 4 is an overview of the various software available for your computer, and lists the Alpha Micro documentation you can order to learn more about each subject.
- Chapter 5 discusses the use of some computer maintenance utility programs. It shows how to allocate system resources by entering the system initialization file commands to set up terminals and jobs for multi-user operation.
- Chapter 6 contains information on the caring for your computer.
- Chapter 7 is a handbook of troubleshooting procedures you can follow to isolate a problem should something go wrong with your computer.
- Chapter 8 lists the computer status codes you may see on the front panel display.
- Several appendices contain technical information, including instructions for cable construction and installation.

The *AM-7000 Service Manual* contains additional information on opening and configuring your computer. The service manual is intended for authorized technical personnel only.

### Graphics Conventions

Like other documents in the Alpha Micro documentation library, this book contains a number of standard symbols to make our text easier to read and understand.

| Symbol | Description |
|---|---|
|  | This symbol means **STOP!**, and signals an important warning or restriction you must know about before continuing. |
|  | This symbol marks a hint, and identifies a shortcut or an easier way to do something. |
|  | This symbol says "Don't forget!" and signals information to remember. |
| `Text` | Text that looks like this in our examples shows the characters the computer displays on your terminal screen, such as prompts and information messages. |
| **TEXT** | Text that looks like this in our examples shows the characters you type on the computer keyboard. |
| KEY | This symbol tells you when to press the indicated key on your terminal keyboard. For example: **DIR** RETURN tells you to press the RETURN key at the end of the DIR command. |
| CTRL/C | This combination of symbols tells you to hold down the first key and press the second key. For example, to type a CTRL/C (Control-C), press the CTRL key and, while holding it down, press the C key. |

***Table 1-1: Graphics Conventions***

## SYSTEM FEATURES

The AM-7000 uses a two-board combination, the AM-176-10 and the AM-319-20 boards, to provide new levels of performance and added versatility. There are a number of physical components that go into the construction of your AM-7000 computer which provide the ability to process, input, display, and store data. The following sections highlight some of these components. For technical information on these devices, refer to the specification sheet supplied with your computer.

## AM-319-20 System Board

The AM-319-20 system board provides the AM-7000 with:

- Four on-board serial I/O ports (with modem control)
- Supporting logic for four parallel high-performance FIFO ports
- SSD (Software Security Device) chip
- Ethernet port, with AUI (DB-15) and 10BaseT connectors
- UPS monitoring port for switch-contact type functions, such as power failure and low battery
- Two paddle card buses for connecting up to 32 serial I/O cards

- Battery backed CMOS containing several boot routines that enable you to change the I/O device the computer boots from

## AM-176-10 Board

The AM-176-10 board provides the AM-7000 with:

- 4GB of direct memory addressability
- 128KB external level two cache memory
- 8KB on-chip processor instruction cache memory and 8KB of data cache
- On-board 100BaseT Ethernet controller with 32-bit DMA transfer capability
- Four on-board single inline memory module (SIMM) expansion slots, which support 60ns EDO RAMs for up to 512MB of memory
- UltraSCSI controller with Wide SCSI interface
- Up to 8MB flash memory

## Processor

The heart of your computer is its powerful CPU (Central Processing Unit), a high speed 32-bit microprocessor. AM-7000 computers have an MC68060 processor running at 75MHz.

## Memory

The AM-176-10 board in the AM-7000 has four sockets in which main memory SIMMs (Single Inline Memory Modules) are installed. You must always install SIMMs in pairs of equal capacity. The AM-7000 supports a minimum of 32MB and a maximum of 512MB. Always use PFB-00713-xx 60ns SIMMs.

See the specification sheet included with your computer for more detailed information on memory capacity, and the *AM-7000 Computer Service Manual* for instructions on installing it.

## Cache Memory

To streamline the use of repetitive instructions within a program and to decrease retrieval time, the AM-176-10 board contains an external combined instruction and data cache. This cache improves the overall system performance by reducing the number of clock cycles required by the processor to fetch information from memory. In addition, the CPU has an 8KB instruction cache and an 8KB data cache.

## CMOS Menu Setup

The CMOS setup procedure gives you many boot options, including:

- Selection of any hard disk ID number as the primary boot disk (unit #0 - 6). In the case of the Wide SCSI interface coupled with Wide SCSI peripherals, you can also select unit #8 - 15*.

- Selection of any tape device as an alternate boot device (unit #1 - 6). In the case of the Wide SCSI interface coupled with Wide SCSI peripherals, you can also select unit #8 - 15*.
- Operator entry to boot the system with any valid monitor and/or initialization file name, located in [1,4] of the first logical of the selected physical boot device
- Selection between the AM-319-20 AUI or TPI port for Ethernet connection

* SCSI ID 7 is reserved for the host.

## SCSI Configuration

The AM-7000 contains a Wide SCSI-2 bus. The Wide SCSI bus offers higher performance when used with wide SCSI-2 or Ultra SCSI drives. Using the proper adapters, you can attach both wide and narrow devices—disk drives, tape drives, and SCSI diskette drives—to the Wide bus. However, using narrow devices on the Wide bus may affect the performance of wide drives on the bus.

The number of devices you can attach to the SCSI bus can be limited by three factors: the legal number of SCSI IDs, cabling limitations—total length and device spacing—and the number of drive bays available in the chassis. After a discussion of the type of SCSI devices you can use, the following sections describe configuration rules for the SCSI bus, including mixing device types and termination issues.

***Never*** plug a SCSI device into the SCSI cable, or remove one from the cable, while system power is on. Doing so could seriously damage the device and/or the CPU board. The AM-7000 uses tolerant active negation on the SCSI bus, which makes the bus more sensitive in these situations than on previous Alpha Micro computers.

### SCSI Device Types

You can attach any supported SCSI device to the Wide SCSI bus, using the appropriate adapter if necessary, as described below. Supported devices include:

- Narrow, wide and UltraSCSI disk drives
- ¼” streaming tape drives with capacities up to 26GB
- 4mm DAT (Digital Audio Tape) drives
- The AM-446 RAID subsystem for the safety of redundant data storage
- The AM-642 StoP (SCSI to Pertec) converter to use ½” magnetic tape as a SCSI device
- CD-ROM drives
- 3.5” SCSI diskette drives.

### Wide SCSI Configuration Rules

The Wide SCSI bus allows up to 15 SCSI IDs, so the limiting factors are the number of device bays in the chassis and, especially, cabling considerations. ***Because of the high performance of the Wide bus, it is critical to follow the cabling specification strictly, or performance and reliability will suffer.***

The two cabling specifications which affect the total number of devices are:

- The total length of the cable cannot exceed three meters (approximately 10 feet).
- Each device must be separated on the SCSI cable by at least one foot (approximately).

The standard internal wide SCSI cable for the AM-7000 ensures adequate space between internal devices. It allows up to five internal SCSI devices, plus the external connector. While this connector is normally used for an active terminator, you can attach an external cable to another SCSI device. To remain within the specification, the maximum length of the external cable is three feet. In practice, this normally means only one external device is possible. If you need a longer external cable, use a repeater, as described below.

To summarize, unless you use a repeater, the AM-7000's Wide SCSI bus supports up to five internal devices and one external device.

If you are attaching an external device, especially if it is a narrow device, be sure to read the section on Wide Bus Termination, below.

### The Wide SCSI Repeater

As mentioned above, the total allowable bus length for the Wide SCSI bus is 10 feet. This can be very limiting, especially in configurations which require more than one external device. The AM-441 Wide SCSI Bus Repeater attaches to the end of the AM-7000's internal SCSI cable. In effect, it starts a new physical bus: from the repeater, you can have up to ten additional feet of bus cable.

Allowing for the internal cable from the repeater to the external SCSI port, the AM-441 lets you have up to eight feet of external wide SCSI cabling, with as many devices as you can physically attach, obeying the specification of at least one foot between each two devices.

The AM-441 occupies an internal 5.25" drive bay. Since there are six available bays (three of them 5.25") and only five available connectors on the internal SCSI cable, this does not reduce the number of internal SCSI devices you can use (the AM-441 attaches to the connector which is normally used for the external port, so it does not take up an internal drive connector).

### Narrow Devices on the Wide Bus

You can attach any narrow SCSI device to the Wide bus by using a 50-pin to 68-pin adapter, PDB-00440-91, between the device and the cable connector. However, if you use both a narrow and a wide disk drive, the narrow drive's lower transfer rate slows down the entire bus, causing the wide drive to lose its performance advantage. For best results, we recommend using only wide disk drives on the Wide bus.

On the internal cable, the order of wide and narrow devices does not matter. If you use both wide and narrow external devices, the narrow device(s) must be the last device(s) on the external cable. See the next section on how to properly terminate the bus if you have narrow external devices.

### Wide Bus Termination

When terminating the Wide SCSI bus, keep two things in mind:

- All 16 lines of the bus must be terminated.
- Termination must be active.

If you have only internal SCSI devices, termination is simple: just make sure the external active terminator supplied with the AM-7000 is installed properly. Similarly, if you have only wide external devices, simply remove the terminator from the external port on the chassis and place it in the unused connector on the last device on the external cable.

When you have a narrow external SCSI device, such as a CD-ROM drive, termination becomes slightly more complicated. As stated above, any narrow external device must be the last device on the cable, beyond any wide external devices. You must terminate the "high" nine lines of the Wide bus before the first external narrow device, and the rest of the bus signals at the last device. To do this:

1. Between the last wide device and the first narrow device (if you have only narrow external devices, between the external wide connector and the first narrow device), you must use a wide-to-narrow cable which actively terminates the high nine lines. Alpha Micro offers two such cables: PDB-00440-80 (3 ft.) and PDB-00440-81 (6 ft.). You cannot use the six-foot cable unless you are using the AM-441Wide SCSI Bus Repeater.
2. Plug an active narrow terminator into the unused SCSI connector on the last narrow device. One is available from Alpha Micro, part number PRA-00222-21.

In this configuration, the external wide terminator included with the AM-7000 is not used.

## SCSI Dispatcher Software

The AM-7000 includes new SCSI dispatcher software, which controls all SCSI devices in the system. The SCSI dispatcher is set up in the system initialization command file. The following AM-7000 specific commands are added to the INI file **after** the JOBALC statements, but **before** the first DEVTBL statement:

```
PCI7K.LIT
SCZDSP SCZ7K.SYS/EW:0/ET/EU
```

For example:

```
:T
JOBS 1
JOBALC JOB1
;
TRMDEF TERM1,A31810=0:19200,AM62A,100,100,100,EDITOR=15
VER
PCI7K.LIT
SCZDSP SCZ7K.SYS/EW:0/ET/EU
;
DEVTBL DSK1,DSK2
```

The SCZ7K dispatcher supports several option switches, as shown in the following table:

| Switch | Description |
|---|---|
| /ET | Enable tolerant active negation of host CPU SCSI port |
| /EU | Enable ultra SCSI mode for maximum wide SCSI performance. Use this switch only when using the /ET switch. |
| /EW<br>/EW:{id#} | Enable Wide SCSI negotiation for all devices<br>Enable Wide SCSI negotiation for SCSI device ***ID#*** |
| /NQ<br>/NQ:{id#} | Disable Command Queuing for all devices<br>Disable Command Queuing for SCSI device ***ID#*** |
| /NS<br>/NS:{id#} | Disable Synchronous Negotiation for all devices<br>Disable Synchronous Negotiation for SCSI device ***ID#*** |
| /NP | Disable Parity Checking (Parity still generated) on all devices |

***Table 1-2: Dispatcher Switch Table***

The most common of these switches is /EW, to enable Wide SCSI operation when using the optional Wide SCSI bus. For example, if you have the Wide SCSI cabling option installed and a Wide SCSI disk drive at ID 0 of the wide bus, and non-wide devices at other IDs, enter this statement to enable Wide SCSI operation for just that drive:

```
SCZDSP SCZ7K/EW:0/ET/EU
```

If you have both Wide and narrow SCSI devices attached to the wide bus, enable Wide SCSI operation only for the wide devices. Use /EW without a device ID (to enable wide operation for the entire bus) only if all devices on the bus, both disk and tape drives, are Wide SCSI devices.

Do not use the /EW switch with the narrow SCSI bus, even if you have Wide SCSI devices attached to the bus using the appropriate adapters. Also, when using the /ET switch, make sure you do NOT attach or remove SCSI peripherals to the SCSI bus with power on - this can damage the SCSI bus circuitry.

## Serial I/O Capability

The AM-319-20 board provides four serial ports, implemented as RJ-45 connectors. These serial ports provide standard RS-232 serial I/O communication. The RJ-45 ports are pin-for-pin compatible with the AM-359 serial I/O paddle card ports, so the same type cabling can be used for both. These on-board ports must use the A31810.IDV interface driver, and are assigned port numbers 0-3. Refer to Appendix A for Serial I/O cabling information.

## Four High-Speed Parallel Printer Ports

AM-7000 computers have four on-board, high-speed, parallel printer ports that use the SEP.DVR interface driver. The ports are Centronics compatible and use 25-pin shielded connectors. See Appendix A for the 25-pin parallel connector signal pinouts.

To insure the reliability and performance of your parallel ports, avoid using parallel printer cables longer than ***six feet***.

## Network Hardware

Both the AM-176-10 and the AM-319-20 boards have Ethernet interfaces:

- The AM-176-10 board has one high-performance 10 / 100 Base T Ethernet port which uses a shielded RJ-45 connector. You do not need to indicate this preference on the CMOS menu. However, to use this port, you'll need Alpha Micro's networking software, AlphaTCP, which is included with AMOS 2.3A and later. The driver for this port is only TCP compatible; but ITC tunneling is supported. If AlphaTCP has not been included on your AM-7000, you can obtain it from your dealer via the Alpha Micro software bulletin board (http://tabbs.alphamicro.com), or from ACD8: on the latest AlphaCD.

- The AM-319-20 board has two connectors: a DB-15 AUI interface and a 10BaseT connector. To use the Ethernet ports on the AM-319-20, indicate your preference in the CMOS Menu.

We recommend you use the Ethernet port on the AM-176-10 board. It is more efficient than the AM-319-20 ports because it consumes less CPU overhead, and provides 100BaseT capability. The two ports on the AM-319-20 provide you with built-in back-up Ethernet connections.

The following SYSTEM statements are incorporated into the system initialization command file to configure your Ethernet hardware described above:

If you are using the 10/100 Base T Ethernet port on the AM-7000 CPU board, as recommended above, use this statement:

```
SYSTEM DVR:PCILSI.LDV/N/H/T:100/R:100     ;100BaseT

or

SYSTEM DVR:PCILSI.LDV/N/T:100/R:100       ;10BaseT
```

If you are using the AUI or TPI port on the AM-319-20, use this statement:

```
SYSTEM DVR:AM319S.LDV/N
```

## UPS Monitoring

The AM-319-20 board has an on-board dedicated DB-9 UPS port. This port is a switch contact status port, used by the Toshiba UPS products sold by Alpha Micro. This port connects to the UPS and can control (turn off) the disk write cache during a low battery and AC power fail condition. This function flushes all pending writes to disk, thereby reducing the chances of large-scale data loss when power is finally lost. When the power is restored, the UPS flags the system and the disk write caching is automatically re-enabled. A separate connection from the UPS to an RS-232 serial port is required for monitoring functions, such as load, voltage, and fault status.

## Front Panel Status Display

The two hexadecimal digit status display on the front panel lets you know what is going on inside the computer even when no messages appear on your terminal. Some normal functions of the machine (e.g., clearing memory when the computer boots) cause codes to appear on the display, as do certain system errors.

In addition, the self test uses the status display to let you know how it is progressing, and if any errors have occurred. The self test checks the major hardware components in the computer for proper operation, including memory, disk controllers and drives, the interval timer, and the serial I/O ports.

For information on all meaningful codes that can appear on the front panel display, see Chapter 8, "Status Display Codes." For information on using the self test, see the *Self Test User's Guide*, DSO-00157-00, that came with your computer.

## Real Time Clock

The system has a Real Time Clock chip which is part of the CMOS system setup. Both the CMOS boot settings and the time and date are battery backed-up. The Real Time Clock’s battery-backup provides a high level of time, date, and CMOS protection against corruption by a malfunctioning program.

## Rear I/O Panel

The AM-7000 rear panel supports a minimum of four DB-25 parallel printer ports and seven paddle board SIO expansion slots. The main system board provides four on-board RJ-45 serial ports, a 9-pin UPS port, and Ethernet connectors. The optional AM-3501 and AM-905 expansion chasses provide space for additional peripheral devices or serial I/O connections.

## Add-On Equipment

The only thing you need to add is a terminal. It allows you to input and display the data processed and stored by the components discussed above. You will probably want to also add a printer to provide printed copies of your data. Your Value Added Reseller (VAR) may have provided these items as part of your computer purchase.

If you want to expand your computer in the future by adding additional storage and backup devices, see the *AM-7000 Service Manual* for a diagram of where additional peripherals should be located in your cabinet.

## SOFTWARE FEATURES

Computer hardware is all potential and no action until the software programs instruct it to do something. Some of the features of the standard system software are listed below. Your VAR can provide software packages specifically suited to your needs, such as accounting software, programming languages, mathematical packages, and so on. Those packages are not included in this list. See your VAR for information on service and support for such packages.

- The operating system, AMOS, performs many functions, one of which is to manage the computer's resources so multiple users can run on the computer at the same time. The operating system also includes all support software for the hardware devices mentioned above.
- AlphaTCP allows your Alpha Micro computer to communicate using the increasingly popular TCP/IP protocol. This software allows you to connect to the Internet, send and receive mail, and transfer files.
- Programs called "print spoolers" let you use one or more printers at the same time without tying up a user terminal.
- The Task Manager lets you schedule multiple background tasks to run without operator control at preset times and dates.
- A sophisticated command language allows you to invoke a stream of commands and program input (predefined by you) by entering a single command.
- The business-oriented AlphaBASIC and AlphaBASIC PLUS programming languages are uniquely suited to the programming of business applications software packages.
- ISAM (Indexed Sequential Access Method) Plus, a machine language file management system callable from AlphaBASIC or assembly language programs, provides a method for quick information organization and retrieval.
- A screen-oriented text editor provides an easy-to-use tool for creating documents.
- A text formatting program aids in document preparation.
- A simple system initialization procedure allows you to quickly change the types of peripheral devices connected to the computer, change user memory allocations, and customize the computer to your exact needs.
- Support for many different kinds of printers and terminals gives you the ability to define your own type of terminal or printer to the computer.

For an introduction to AMOS software, refer to Chapter 4, "Where Do I Go from Here?" Chapter 4 also provides a list of additional documentation available from Alpha Micro to assist you with specific information in your area of interest.

## SERVICE INFORMATION

Alpha Micro provides a comprehensive post-sales service and support program for its entire product line. Our VAR network is structured to provide you with immediate access to support assistance and information.

Our customer commitment is maintained through the expertise and skills of our competent, professional staff whose dedication assures all Alpha Micro customers the maximum benefits of quality support.

Alpha Micro warrants its products through our VAR network. Alpha Micro will repair or replace a defective product under warranty without cost to the purchaser. Should you wish to arrange for factory warranty service for your equipment, you should obtain a Return Authorization Number from the Alpha Micro Technical Assistance Center. To arrange for on-site warranty service at your location, contact your Alpha Micro VAR or AMSO service organization.

In addition to the warranty service provided, support is available through Alpha Microsystems Service Operations (AMSO), our nationwide field service organization. AMSO provides direct repair services to Alpha Micro computer owners. Alpha Micro Field Engineers are factory trained to ensure continuity of product servicing. Should you select hardware service from your servicing Alpha Micro VAR, you can be assured he or she is backed by, and in close touch with, Alpha Micro for full factory support.

## For Further Assistance

If you are unable to contact your VAR, Alpha Micro will be glad to refer you to one. If you relocate and want to learn the name and address of an Alpha Micro dealer near you, please write or call Alpha Micro.

For information and the location of the Alpha Micro service location nearest you, call our toll free service number (800) 548-4848.

# Chapter 2 - Installation

This chapter gives general installation information for your computer. It discusses the following topics:

- Unpacking the computer
- Instructions for re-shipping the computer
- Recording the SSD identification number
- Preparing the site for your computer
- Verifying AC power requirements
- Turning on the computer
- Installing the operator terminal
- Initially testing the computer
- Booting under AMOS
- Installing Alpha Micro software
- Turning off the computer
- Expanding your computer

Your Alpha Micro VAR can assist you with setting up, expanding, or servicing your computer.

## UNPACKING GUIDELINES

Unpack the computer and ***save all packing material and cartons*** in case you ever need to transport the computer. The shipping material was carefully designed to provide optimum cushioning and protection. When re-shipping or otherwise transporting your computer, you must use the original packaging to ensure safe shipment.

When moving your computer, handle it gently. The hard disk in the main unit has moving parts and delicate read/write heads. Rough handling could damage the drive and prevent your system from operating properly.

Unpack the terminal which will serve as the operator terminal and set it aside for now.

### What You Will Need

When you unpack your computer you should find the following items:

- This manual and warranty cards.
- Release Notes.
- The main enclosure.

- One AC power cord.

In addition to the equipment Alpha Micro has provided and the operator terminal, you may need the following:

1. Properly configured cables for connecting your terminal to the computer.

   If you want to construct your own terminal cables, you need various tools and connectors as well as the actual cable material. See Appendix A for information on constructing terminal cables.
2. The manufacturer's operator manuals for your terminals and printers.
3. If your computer is set for 230 Volt AC operation, you need a 230 Volt AC power cord with the correct plug for your geographical area. Your local VAR may already have included this power cord with your computer; if not, contact your VAR for information on where to get it.
4. If the operating system has not already been installed on your hard disk, you will need a warm boot tape and a tape containing the operating system. This may be supplied by your VAR.

## Reporting Shipping Damage

If there is any damage to the shipping container or the main enclosure, or if you are missing any items on the unpacking checklist, please call your VAR immediately.

## Instructions for Reshipping the Computer

If shipping damage has occurred or the self test indicates a problem with the computer, your VAR may recommend that you ship it back.

If for some reason you cannot contact the VAR you bought your computer from, please call the Alpha Micro Sales Department; they will give you the name and address of an Alpha Micro VAR near you who can help you. See "Service Information" in Chapter 1.

When reshipping or otherwise transporting your computer, you must use the original packaging to ensure safe shipment.

Please include a note to the person who will receive the computer containing the following information: your name, address, phone number, the date you shipped the computer back, and the reason for return.

Be as specific as possible about the problem you experienced—the more information you provide the easier it will be for the service technician to determine the reasons for any problems. If you performed any troubleshooting procedures, let the person receiving the computer know exactly what procedures you have done and what the results were.

## RECORDING THE SSD IDENTIFICATION NUMBER

The Software Security Device (SSD)is a customized integrated circuit located on the main electronics board inside your AM-7000 computer. The SSD uniquely identifies your computer to customized

software that has been configured to run only on your computer. If you purchase customized software from your VAR or other software vendors, you need to give them your SSD identification number (printed on the SSD chip itself) before they can "key" the software to your computer.

The SSD identification number is written on the system ID label on the back of the computer in the section titled "SSD Serial No." Please note the identification number of your SSD at this time and enter the number at the front of this book.

## OVERVIEW OF INSTALLATION PROCEDURES

Now that you've unpacked your computer and have everything you need to hook it up, you can begin to physically install it. Installing your computer is a matter of:

1. Choosing and preparing a location for it.
2. Making sure it is configured correctly for your local electrical requirements.
3. Running an initial diagnostic test to make sure the computer is working correctly.
4. Connecting the operator terminal.
5. Installing the Alpha Micro software.
6. Creating a warm boot tape.
7. Connecting additional terminals and printers.
8. Getting assistance.

Some of the sections in this chapter refer to various locations on the front and back panels of the computer. The next two sections describe the front and rear panel connectors, controls, and indicators.

## Front Panel Controls and Indicators

.Figure 2-1, on the next page, shows the front panel on the AM-7000 deskside chassis. The panel has the following controls and indicators:

- The Power Indicator light is always lit when power is supplied to the computer.
- The CPU Activity light will remain lit whenever the CPU is active. During periods of inactivity, the light will be off.
- The Disk Indicator light is lit whenever there is hard disk activity.
- The Turbo button is not functional.
- The Reset button allows you to reset the computer from the control panel. Once the Reset button is pressed, the hardware will be reset and the computer will reboot. To avoid losing any data, make sure there are no applications running before you press the Reset button.

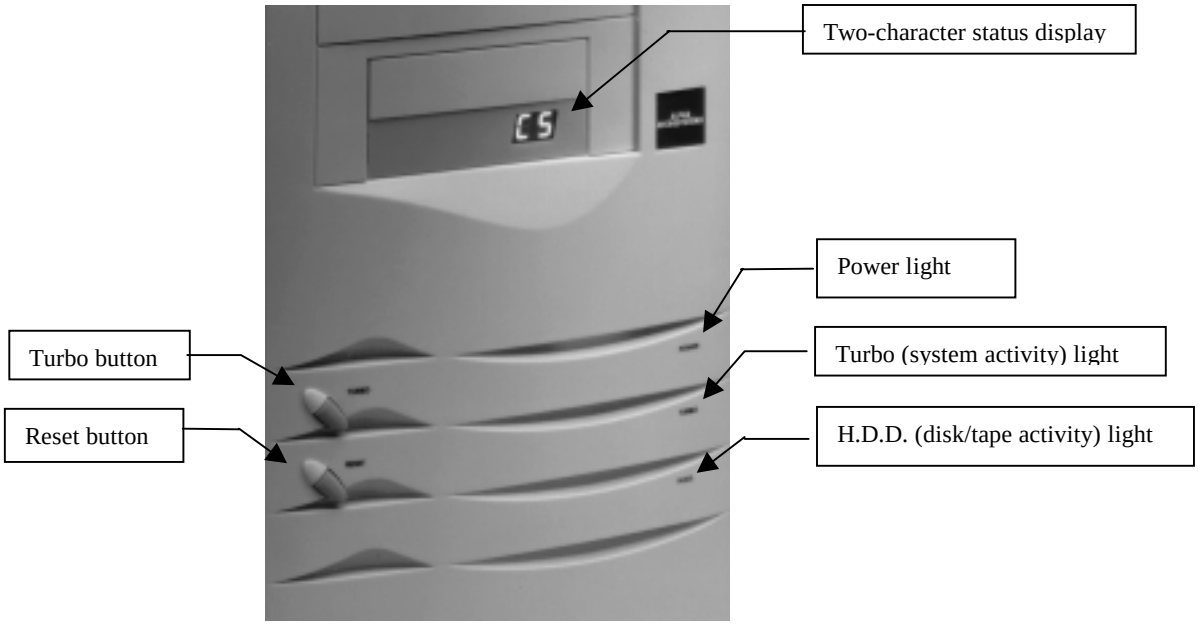


***Figure 2-1: Front Panel Controls and Indicators (deskside chassis)***

For information on various display codes that might appear on the AM-7000's front panel digital status display, see Chapter 8, "Status Display Codes."

## AM-7000 Rear I/O Panel Configurations

The types and number of connectors on the rear panel of your AM-7000 computer will vary depending on the equipment included with your order. The illustration below shows the standard AM-7000 rear panel configuration:

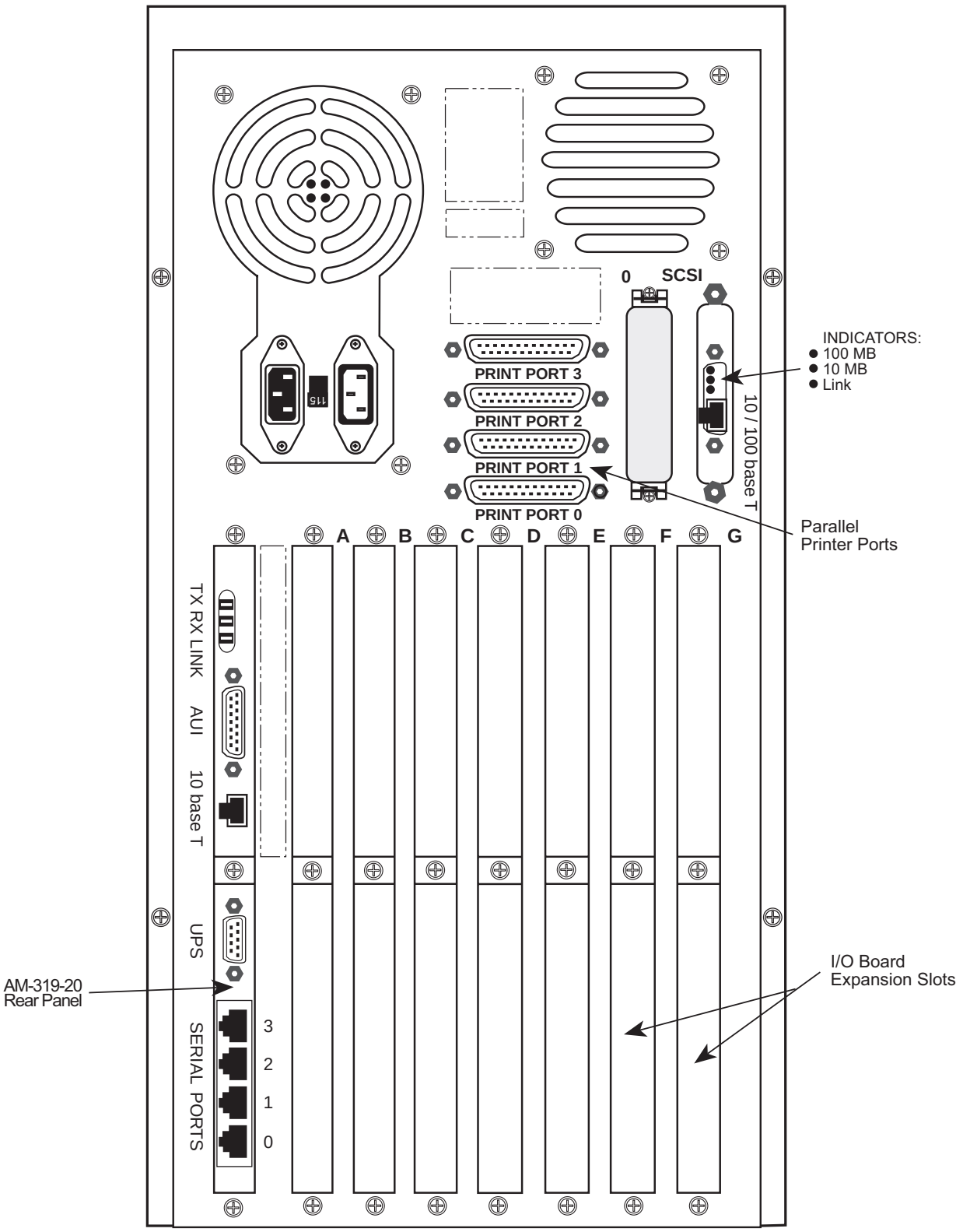


***Figure 2-3: AM-7000 Rear Panel Configuration (Deskside Chassis)***

# PREPARING THE SITE

For your computer to do its best job for you, you must place it in an environment it is comfortable in. Extreme temperature or humidity can cause computer failure. But, it is not very demanding—its environmental needs are similar to your own.

## Physical Requirements

The first step is to make sure the place you want to put your computer is large enough and sturdy enough for it. Also, leave enough room for any terminals and printers you want to use.

Make sure the AC power cord will reach from the back panel to an electrical outlet, and that there are enough electrical outlets for all terminals and printers. You should also make sure you have enough terminal cabling to reach from the back panel of your computer to the terminals and printers. See the following section on "Power and Cable Connections" for more tips and suggestions.

## Environmental Requirements

It is important to remember that the cleaner the environment, the more efficiently the computer performs. Treat your computer with respect. For example, do not place coffee cups or soda cans on top of the main enclosure where they can spill. If spilled liquid happens to reach the circuit boards inside the computer, it could cause computer failure.

In general, you should install your computer in an area where people do not eat, drink, or smoke, since all of these activities can cause contamination problems. Try not to place the computer in a high traffic area. This typically creates more dirt and dust which can clog the air intakes of the computer chassis. This will cause cooling problems because of the dirt accumulation. A side effect of a high traffic area is static electrical discharge which can cause system resets. This can be avoided by installing the computer in a better environment. For information on cleaning your computer and taking care of its components, refer to Chapter 6, "Preventive Maintenance."

When you select a location for your computer, remember that it operates within certain temperature and humidity ranges. Air circulation around the system is something that should be considered. Do not put a computer in a closed closet where there is no cooling. See the separate specification sheet for detailed requirements.

It is very important for the health of your computer that you do not obstruct its cooling system. The computer takes air in from the front and bottom and exhausts air at the rear. Allow **at least** six inches at the rear of the unit for ventilation. The mounting feet give it adequate ventilation space below. Do not place the computer on a carpet which can block the air intakes on the bottom of the system.

## Environmental Specifications

| | |
|---|---|
| **Computer external operating temperature** | 60 to 90 degrees F (16 to 32.2 degrees C) |
| **Humidity** | 10% to 90% (non-condensing) |

***Table 2-1: Environmental Specifications***

## Static Electricity and Grounding

One of the greatest enemies of computers, terminals, and printers is static electricity. The chief villain is climate: dry winds and dry seasons. If you have problems on dry and windy days when humidity is low, static electricity could be your problem. You should also be aware that both carpets and the plastic mats often used under desks are a prime source of static electricity.

If possible, you should place your computer in an uncarpeted area. If you must place it in a carpeted area where static electricity could be a problem, you should treat the area with anti-static spray on a regular basis.

If problems occur when equipment near the computer is turned on—for example, if your computer stops functioning when someone uses the photocopier—improper grounding could be your problem. We recommend a low impedance power conditioner be used to filter out these power problems. Alpha Microsystems can provide the approved power conditioner type. Ask your VAR for further details.

Several anti-static sprays on the market can be of considerable help during days when static electricity is a problem. Also, using an air conditioner that controls humidity can greatly reduce a static electricity problem.

# POWER AND CABLE CONNECTIONS

Before selecting a site for your computer, you should determine if the area where you want to place the computer has adequately regulated AC power. If you request it, many power companies will install test equipment to determine if there is a need for additional line regulation. You can also test line voltages using a high speed line transient recorder. If, over several days of testing, the line voltage varies more than 10 percent from the rated line voltage, you may need to install a power conditioner and a new dedicated AC power circuit. Alpha Micro computers require a properly grounded power outlet for the system to run correctly.

A "transient free," or smooth and consistent power source and a properly installed earth ground can significantly improve the reliability of your computer. While the computer is in use, it is important to maintain a constant line voltage free of power surges, fluctuations and impulses. Ideally, a separate power circuit should be available for use only by the computer. However, if this is not possible, you may need a line conditioner capable of suppressing transients or spikes to eliminate power surges and noise.

Be sure the power rating for the power lines the computer will be connected to is adequate for your computer or any future systems you may be planning to install. In North America, a standard 15 Amp,

115 Volt grounded connector-type outlet is required for the CPU chassis. In some other countries, the requirement is a 230 Volt AC power source.

The maximum power requirements for the computer are:

- 115 Volt AC at 5 Amps, or
- 230 Volt AC at 3 Amps

Additional outlets are required for each I/O chassis and/or peripheral connected to the computer. Alpha Micro computers come with a standard six-foot power cord. If this is not long enough, be sure any extension cords used are rated for the full 15 Amps—otherwise, the full voltage will not reach your computer. This can affect the efficient operation of your computer.

A point to remember is that the closer you get to either end of the AC voltage power range, the less efficient the computer will be.

To avoid electrical interference, sources of electrical noise such as air conditioners, copiers, electric typewriters or cleaning equipment should not be connected to the same power circuit as the computer. All outlets providing power to the computer should have a common grounding point restricted to only those connections coming from the computer installation.

Data cables should not be located near high voltage power lines, power transformer telephone cables, or in elevator shafts. They should not cross walkways. If you must cross walkways, cover the cables with a cable bridge.

You must also take cable lengths into consideration. Single-ended circuits are susceptible to all forms of electromagnetic interference. As line length increases beyond fifty feet, the reliability of the RS-232C cable connected to the terminal and printer decreases rapidly. If local terminals are to be located further than fifty feet from the computer, we recommend you use low capacitance twisted-paired overall shielded cables. If this cable does not solve your problem, then signal conditioning equipment (such as a Speedway Repeater) will be needed to improve the signal.

## Power Supply AC Voltage and Receptacle

The voltage select switch in the rear panel is factory set to 115 Volts. By simply sliding the switch to the opposite position, you can convert the power supply for 230 Volt operation.

The power supply has one standard AC power receptacle. One standard AC power cord is packaged with your computer.

## Verifying Voltage Compatibility

Different parts of the world use different standards for electricity. For example, most areas of the United States use 115 Volt electricity. Many other areas of the world use 220—240 Volt electricity.

Verify the input voltage before plugging in your computer. The illustration of the back panel earlier in this chapter shows the location of the input voltage switch.

If your computer is not set to the voltage you require, **do not** change the switch setting without checking with your VAR first. Your VAR will insure that you have the proper input voltage switch setting and power cord for your installation.

## Turning the Computer On

Once you turn on your computer, you must be very careful never to move it while power is still on; doing so could damage the disk drives inside the unit. "Turning the Computer Off," at the end of this chapter, gives information on how to correctly turn the computer off before moving it.

1. Verify once again that your computer has been configured correctly for the AC power service in your region.
2. Place the computer in the site you have chosen for it. Insert the socket end of the AC power cord firmly over the three prongs in the power cord receptacle in the back panel. Then plug the pronged end of the cord into an electrical outlet.
3. Remove the packing material from any diskette drives. (Remember to put this packing material back into the drives if you should have to move the computer.)
4. Turn on the computer by pushing the power button located on the front panel.
5. Now, check to make sure power is on:
    - Are the Power and Run (or Disk Activity) indicator lights on the front panel lit? (See Figures 2-1 and 2-2.)
    - Is the cooling fan running? To check the fan, place your hand behind the fan opening in the back panel; you should feel air blowing out.

If the power light and the fan are not on, you have a problem. Refer to Chapter 7 for troubleshooting help.

If the fan and the power light are on, you can proceed with installing the operator terminal. ***But first, turn the computer off!***

## INSTALLING THE OPERATOR TERMINAL

The terminal you use when installing software and running diagnostic programs is called the operator terminal.

There are two basic things you must do to install the operator terminal: set its operating parameters, and connect a cable between it and serial Port #0 on the back panel. You connect the operator terminal cable in the boot port. Figure 2-6 shows the location of the boot port within the AM-319-20 board adapter on the rear panel of your computer.

Although you can set the operator terminal at any port, we strongly recommend that you use Port #0, as you can edit the CMOS settings only at this terminal.

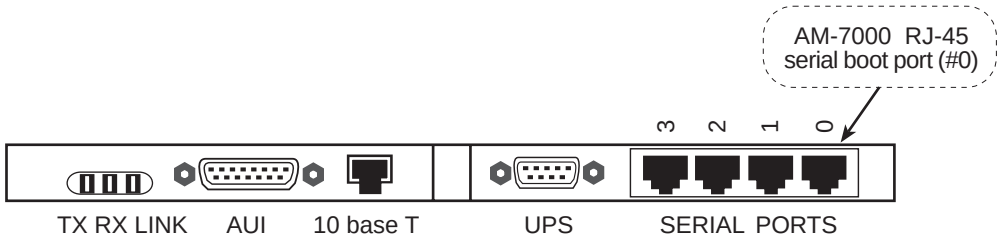


***Figure 2-5: AM-7000 Boot Port Location***

## Setting the Terminal's Baud Rate and Parameters

AMOS initially assumes the operator terminal is an Alpha Micro or compatible terminal using RS-232 signals. It also assumes the terminal is working at 19200 baud. (The "baud rate" is the rate at which the terminal and computer transfer information between themselves; if the terminal is not set at the baud rate the operating system thinks it should be using, the text displayed on the terminal is not legible.) AMOS also assumes the following terminal parameters:

| | |
|---|---|
| Data Word Length: | Eight data bits |
| Parity: | No parity |
| Stop Bit (110 baud): | Two stop bits |
| Stop Bit (other than 110 baud): | One stop bit |

Refer to the documentation accompanying your terminal for information on setting its baud rate and the parameters listed above.

Once the computer is booted with a compatible terminal, you can define your own type of terminal and tell the computer to use that terminal from now on, as long as it stays at 19,200 baud for CMOS configuration use. For more information on defining your own terminal, refer to the *System Operator's Guide*.

## Connecting the Cable

Refer to the FCC warning concerning electromagnetic interference at the front of this manual. The terminal cables you use must be shielded to minimize such interference. Also, see the section "Power and Cable Connections" earlier in this chapter.

Make sure you have appropriate cables for connecting the terminal to the computer. See Appendix A in this manual for cable guidelines. If you do not have the proper cables, please contact your VAR.

Plug one end of the finished cable into the proper connector on the back of the terminal and the other end into the appropriate connector on the back of the CPU chassis. Alpha Micro cables are labeled at each end to indicate which end plugs into the CPU and which end goes to the terminal.

## INITIAL TESTING

Before you boot the computer under AMOS, or hook up any printers and additional terminals, you should use the self test feature to verify that the hardware is working correctly. For full information on the self test, refer to *The* S*elf Test User's Guide* shipped with this owner's manual. Perform the self test now before proceeding to the next section.

## BOOTING UP UNDER AMOS

Normally, the AMOS system software is installed by Alpha Micro before the computer leaves the factory. If this is the case, all you need to do to bring the computer up under AMOS is turn the computer on. Follow these steps:

1. Turn on your terminal and any other peripheral devices such as a printer.
2. Press the AC power button on the front panel.

If the system software is already on your hard disk, within a few seconds you will see a succession of boot codes on the front panel status display, then system initialization file commands appear in rapid succession on the operator terminal screen as they are executed.

If nothing appears on the status display or the terminal screen after a minute's wait, contact your Alpha Micro VAR. You may need to follow the instructions below to install the operating system onto your System Disk.

When the computer is up and running, the front panel LED will display a zero.

## INSTALLING ALPHA MICRO SOFTWARE

If the AMOS software is not already installed on your hard disk, you should have received a system software tape or CD from your VAR along with the computer. If you did not, contact your VAR for help.

If you do have the system software tape or CD, you need both it and a "warm boot" tape supplied by your VAR in order to install your system software. Installing the software on your computer involves copying the latest system software from the tape or CD to your hard disk. Additionally, other software packages can be installed from a CD. AlphaCD contains all released software which can be copied from a logical disk on the CD to your system disk drive.

The tapes or CDs are accompanied by the *Release Notes* for the particular software release shipped with your computer. This document describes the most recent features incorporated into the software, and contains current instructions for transferring the files to your hard disk. The installation instructions in the *Release Notes* give you all the details for getting your computer up and running.

To install the system software from a streaming tape to a new computer, you need to:

1. Make sure power to the computer is turned on. Check that the boot device unit number is set correctly. See "AM-7000 CMOS Setup Procedure," in Chapter 3.

2. Insert the warm boot tape into the tape drive.
3. Press the Reset button on the front panel of the computer.
4. When the following message and cursor appear on the screen about a half minute later, it means the computer booted successfully from the warm boot tape.

```
AMOS       Version xx.x
```

5. Remove the warm boot tape. Insert the system software release tape. Transfer data from the tape onto the disk with this command:

**`MTURES DSK0:=ALL:[]`** RETURN

When the installation finishes, verify that a valid initialization file and monitor file are present, then push the reset button on the front of the computer. The computer should boot, and you should see the system initialization file commands on the operator terminal screen, as described above.

## THE WARM BOOT MONITOR

The warm boot monitor is used in case of an emergency, when the computer cannot find the system software files it needs to boot from on the hard disk.

As you become more familiar with your computer, we strongly recommend you create several warm boot tapes. In addition, if you ever change the configuration of your computer, you will almost certainly want to re-generate all new warm boot tapes.

Use the WRMGEN program to generate a warm boot monitor, and the appropriate backup command to place the monitor onto a tape or a diskette. See the *AMOS User's Guide* and the *System Commands Reference Manual* for details on these procedures.

See Chapter 3 for additional details on getting started with your computer system.

## TURNING THE COMPUTER OFF

You need to turn off the computer whenever:

- You add to, or modify, the circuit board configuration.
- You move the computer or servicing is required.
- Add to, or remove, external SCSI devices.

To turn off the computer always follow these steps:

1. Make sure all users have exited all programs and are logged off the computer.
2. Remove any backup media (such as diskettes) from the computer.
3. Turn off all external devices such as printers and terminals.
4. Press the AC power button on the front panel.

## EXPANDING YOUR COMPUTER

Your Alpha Micro VAR can assist you with setting up, expanding, or servicing your computer.

Once your computer is configured with the basic components, you may want to install any additional subsystems purchased with your basic computer. Or, you may want to change your basic configuration to add more users, change memory allocations, etc.

Part of adding new hardware to the computer involves changing the system initialization command file to define the new hardware to it. Changing the allocation of system resources also requires changing the system initialization file. For information on modifying this file, refer to the *System Operator's Guide to the System Initialization Command File*.

Please read that document carefully; modifying the system initialization command file without understanding its elements is very dangerous—a serious mistake could damage the file and leave your computer unable to boot from your System Disk. Instead of modifying the file directly, alter and test a copy, then replace original file with the validated copy.

## GETTING ASSISTANCE

If you have followed all of the instructions in this chapter, but for some reason your computer is not working, you probably want help. First, please turn to Chapter 7, "Troubleshooting," and see if one of the problems listed in "The Symptoms" is one you are experiencing. If the solution in that chapter does not cure your problem, or if your problem is not listed, it's time to get some outside help—call your VAR or the Alpha Micro Technical Assistance Center at 800/548-4848.

# Chapter 3 - Getting Started

This chapter contains two types of information: basic concepts about the way your computer is set up and operates, and general procedures for working with it. Specific topics include:

- Booting the computer.
- Flash memory booting option.
- The CMOS setup procedure.
- Device names and the System Disk.
- Disk accounts and user names.
- Logging on to the computer and transferring between disk accounts.
- Your terminal keyboard.
- Working with diskettes and streamer tapes.

## BOOTING THE COMPUTER

Booting is the process the computer goes through whenever you turn the power on or press the reset button. When you boot, a pre-programmed circuit built into the computer, called a PROM (Programmable Read-Only Memory), tells the CPU where to look on the disk for the software necessary to get the computer up and running. The CPU reads this software from the disk, loads it into the computer's internal storage area, its "memory," and executes its instructions.

Among the files transferred into system memory when you boot is the system initialization command file. The system initialization file is a special command file containing commands that define to the operating system (AMOS) all the hardware connected to your system. As the computer boots, it reads these commands and "builds" the operating system in memory correctly for your hardware configuration. You can change the system initialization file whenever you want to add more hardware to your system.

If you want to learn more about the system initialization file and how to modify it, read Chapter 5 of this book. Read the *System Operator's Guide to the System Initialization Command File* for more details.

As the computer processes the commands in the system initialization file, each line of the file displays on the operator terminal. When all of the commands in the initialization file have been processed successfully, the computer is up and running. The last command in any system initialization file is `MEMORY 0`. When you see `MEMORY 0` on the operator terminal, and the front panel status display changes to blank or 0, the computer has finished booting.

## AM-7000 FLASH MEMORY BOOTING OPTION

The AM7000 may be equipped with 4MB of flash memory on the main CPU board. All AM7000s with flash memory that are shipped from the factory contain a bootable version of AMOS in the flash memory. If, for some reason, the computer cannot be booted from disk, it may still be bootable using the version of AMOS stored in flash memory. This may then be used to access and restore the disk to a bootable status.

For details of flash memory operation, see Appendix G.

## AM-7000 CMOS SETUP PROCEDURE

When booting, the AM-7000 uses data stored in its CMOS parameters to find the primary and alternate boot devices, the system monitor and initialization files to use, and other system options. The CMOS RAM is provided on the AM-319-20 board; it is battery backed up and write-protected for data integrity.

You can change the CMOS configuration even if you can't boot the computer under AMOS. This can be very useful in case of certain system problems. To change the CMOS configuration, you must have a terminal configured for 19,200 baud attached to port 0 on the AM-319-20 system board. This terminal is referred to as the "boot terminal."

### AM-7000 Initialization Routine

Before relying on the CMOS parameters, the AM-176-10 boot code checks the validity of the CMOS contents by verifying the parameter checksum. If the checksum verifies, the system front panel displays "CS" while it verifies CMOS, and boots using the current CMOS parameters. If you want to change the CMOS parameters, press ESC when the "CS" displays (you have approximately three seconds). This displays the CMOS configuration menu, as described below.

If the CMOS checksum test fails, the front panel will blink "CE" for several seconds, then switch to "CC" while the boot code tests CMOS RAM to ensure that it is working. If the RAM test fails, the boot code displays "CF" on the front panel and the system halts. If this is the case, contact Alpha Micro's Technical Assistance Center.

### CMOS Menu Options

To enter CMOS Setup, first make sure no one else is using the computer. Then, press the system reset button. When the code "CS" appears on the front display panel, press ESC on the boot terminal to interrupt the boot process and access the CMOS Configuration menu. You have approximately three seconds to press ESC. The CMOS menu looks like this:

```
                ALPHA MICROSYSTEMS
             CMOS Configuration Menu


Primary boot device type....... SCSI Disk
Primary boot device unit #..... 00

Alternate boot device type..... Streamer
Alternate boot device unit #... 03

Boot monitor file name......... AMOS32.MON
Boot initialization file name.. AMOS32.INI

Network interface type......... TPI
Serial port 0 speed............ 19200
Display console boot messages.. Yes
Memory in bank 0/1............. Auto /Auto

Use [UP], [DOWN], or [TAB] keys to select an item.
Use [LEFT] and [RIGHT] keys to change item.
         Press [ESCAPE] when done.
```

The above shows the default CMOS settings used when initializing the CMOS. As indicated on the screen, you use the ↑, ↓, and [TAB] keys to select a parameter. To change a parameter, use the ← and → keys to cycle through its possible settings. The only exceptions are file names, which you type.

The CMOS menu fields are:

### Primary Boot Device Type

This parameter selects the type of device to boot from in the event that the attempt to boot from the alternate device fails or no alternate device is selected. Currently, SCSI and flash (on the AM-176-10 board) can be selected.

### Primary Boot Device Unit #

This parameter selects which primary drive number to boot from. Valid unit numbers for SCSI drives are 0-15. The setup routine will not allow you to select an invalid unit number.

### Alternate Boot Device Type

This parameter selects the type of device to attempt to boot from first, before defaulting to the primary boot device. Currently supported alternate boot devices are SCSI Disk, Streamer, XMODEM, or None (boot from primary device only).

### Alternate Boot Device Unit #

This parameter selects which alternate device number to boot from. Valid unit numbers are 0-15. The setup routine will not allow you to select an invalid unit number. You should know how many devices

you currently have on the system before you enter this number. If you select a number and the device is not found, it will go to the primary boot selection.

### Boot Monitor File Name

This parameter lets you change the name of the monitor file to be loaded during boot. Any valid file name, with an .MON extension, can be used (other extensions, such as .BAK, are also acceptable). The monitor file must exist, and reside in account [1,4] of the first logical disk of the selected boot device. This parameter is not used when booting from a tape device. You can use the backspace and the arrow keys to edit this field.

### Boot Initialization File Name

This parameter lets you change the name of the system initialization (INI) file to be used during boot. Any valid file name, with an .INI extension, can be used (other extensions, such as .BAK, are also acceptable). The INI file must exist, and reside in account [1,4] of the first logical disk of the selected boot device. You can use the backspace and the arrow keys to edit this field.

### Network Interface Type

This parameter specifies which Ethernet interface connector to use for the Ethernet port on the AM-319-20 board. There are two possible selections: AUI (DB-15), or TPI (RJ-45) 10BaseT. If you are using the high speed 100BaseT Ethernet port on the AM-176-10 board, it is not necessary to indicate it on the CMOS menu.

### Serial Port 0 Speed

By default, CMOS requires a port 0 terminal set to 19200 baud. You can change this to 1200, 9600, or 38400. The speed you set here should match the port 0 definition in the system initialization file. If the terminal's baud rate does not match this setting, you won't be able to re-enter the CMOS menu, since CMOS will not recognize it when you press ESC. You can, however, go into Self Test mode to match the port 0 terminal baud rate to the CMOS setting. Use the following procedure to set the port 0 baud rate to a known value:

1. Insure that your terminal is connected to port 0 of your system and set for one of the four supported baud rates -- 1200, 9600, 19200, or 38400.
2. Enter self-test by holding down the RESET button while turning AC power on the computer and then releasing the RESET button.
3. Observe the front panel two-digit status display. When **5b** is shown, tap the **<SPACE BAR>** repeatedly on the terminal connected to port 0 until the self-test header appears on your terminal. The port 0 baud rate in CMOS is now set to the same baud rate as your terminal.

### Display Console Boot Messages

When set to Yes, this option displays status messages on the operator terminal during booting. These messages are equivalent to each of the front panel status codes normally displayed during booting, and

are normally only needed if you cannot see the status display. See Appendix F for a list of these messages.

### Memory in Bank 0/1

These parameters allow the memory size in both banks 0 and 1 to be reduced for troubleshooting purposes. The settings for these memory banks are as follows:

| **Bank 0** | / | **Bank 1** |
|---|---|---|
| Auto | | Auto |
| 32MB | | |
| 64MB | | |
| 128MB | | |
| 256MB | | |
| | | None |
| | | 32MB |
| | | 64MB |
| | | 128MB |
| | | 256MB |

Note that Bank 1 memory size cannot be greater than Bank 0 memory size.

## Saving the CMOS Settings

When you are finished making changes press ESC. A message will appear at the bottom of the screen asking if you wish to save any changes made. Enter "Y" to save the changes in the CMOS RAM, or "N" to abandon any changes made. After entering your response, the system will boot using whatever parameters are then in the CMOS setup.

## Important Note

If you want to boot from a physical disk device other than device ID 0, you should create a disk driver for the selected drive ID and MONGEN it into the monitor. ***You must do this if you want to be able to MONTST using your boot monitor***. While a hardware reset will work if the monitor contains the generic SCZ7K.DVR, because it reads the drive ID from CMOS, MONTST does not look at the CMOS settings, and so will not know which drive to boot from unless the drive ID is embedded in the driver.

## DEVICE NAMES

Device names are how AMOS identifies the different pieces of equipment that make up your computer. Each disk drive and other storage device has its own device name (terminals and printers are defined somewhat differently). These device names are defined in the system initialization file.

Alpha Micro device names conform to a specific format to make it easy for you and the computer to refer to the same piece of equipment. All device names contain three letters and a number, and end with a colon (:). For example, DSK#:, where # is a decimal number, DSK is usually the name for a hard disk device and STR0: is the name of a streaming tape drive.

Having names for each device lets you specify which device you want to use for a specific command. For example, you can see a list of files from just one of your disk drives, or copy data from your hard disk to a diskette.

You can set up your computer to use each hard disk drive as if it were two or more separate devices. In this case, the actual disk drive is called the "physical device" and each portion of it is a "logical device." This is an important distinction, since in most cases with AMOS you refer to the logical device name. For example, a single 540MB hard disk drive could contain logical devices named DSK0:, DSK1:, DSK2:, DSK3:, and so on.

The disk device containing your system initialization command file and other system software, the device AMOS "boots from," is always called DSK0:. Normally this is the first logical device on the hard disk, but if for some reason you boot from your diskette drive, the diskette drive becomes DSK0:. When you change the device you boot from, it may also change the names of other devices on your computer—since you are using a different system initialization command file the devices may be defined differently.

For example, if your computer contains one hard disk drive, split into three logical devices, and one diskette drive:

- When your computer boots from the hard drive (the usual state of affairs), the hard drive would be referenced as three disk devices named DSK0:, DSK1:, and DSK2:. The diskette drive is named FLP0:.
- If you modify your computer to boot from the diskette drive, the hard drive might be referenced as three disk devices named WIN0:, WIN1:, and WIN2:, and the diskette drive is named DSK0:.

Remember, this is only an example. Your computer may be set up to reference the hard disk as more or less than three logical devices. If you want to see a list of the hard and diskette disk devices on your computer, type SYSTAT and press RETURN; the end of the display lists the available disks. DEVTBL can show you the relationship between physical devices and logical drives.

At some time in the future you might decide to change the number of logical devices on your hard disk. This is a sophisticated procedure, so for detailed instructions, see the document "Configuring Winchester Disk Drivers" in the *System Operator's Guide,* and follow the FIXLOG reference sheet in the *System Commands Reference Manual*.

## The System Disk

The System disk, DSK0:, is where the system software is stored, and where the computer looks for it when the computer boots. Usually, DSK0: is on your hard disk, but you can also set up your system to boot from a diskette, in which case the diskette drive would be DSK0:.

If you have a magnetic tape drive included with your computer., you also have the option of booting from this device if you are unable to boot from your hard drive. Booting from a tape medium is known as a "warm boot," and is usually reserved for special circumstances when it's not possible to boot from your normal System Disk on the hard drive. In such a case, the streamer device is not called DSK0: after the warm boot. Instead, the warm boot will transfer that name to a disk device you specified when you created the special warm boot monitor on the tape.

## DISK ACCOUNTS

Disk accounts are an organizational feature your Alpha Micro computer uses to help you keep track of your data. Instead of making you search through one enormous list of files for the specific one you're looking for, the AMOS operating system is designed to group files into "accounts."

Accounts are identified by a two part account number. The two numbers are separated by a comma and enclosed in brackets. The first number is called the project number, the second part the programmer number. [1,2], [200,0], and [34,11] are examples of account numbers. Since they are actually octal numbers, the digits 8 and 9 aren't used, and the highest possible number is [377,376] and the lowest is [0,1].

The two part structure of the account number allows you another level of organization. Besides grouping files into accounts, you can group related accounts in the same project. For example, all accounts containing files dealing with payroll may be in project 50 ([50,0], [50,1], etc.).

Accounts are called "disk accounts" because each account is specific to a particular device—usually a disk. For example, you may have the account [63,1] on both DSK0: and DSK1:. Though these accounts have the same account number, since they are on different devices they are different accounts, and contain different files.

You can also assign a password to each account on each disk if you wish, as a security measure. Anyone who doesn't know the password cannot log into the account. See Chapter 5 for how to assign passwords.

You can see a list of all the accounts on any device on your computer using the PPN command. Type **PPN** and the name of the device you want the list for, and press RETURN. For example, to see all the accounts on DSK0:, type:

```
PPN DSK0: RETURN
```

You can also see a list of all the files in any account, using the DIR (short for *directory*) command. To see a list of the files in the account you are currently in, type:

```
DIR/W RETURN
```

While you can use DIR to list the files from any account, to access the files in an account, you must usually log into it, as described later in this chapter.

Now that you have a general idea of what disk accounts are and how to use them, you can decide how you want to organize your own files into accounts. If you want to create more accounts on a diskette or your hard disk, see Chapter 5.

You can find more information on the PPN and DIR commands in the *System Commands Reference Manual*.

## LOGGING ON

The LOG command serves two purposes: it identifies you to the computer and lets you choose what disk account you want to access. When you first log on to the computer—either after logging off or after booting the system—you must tell the computer who you are and what account you want to use. You can do this by entering the disk account you want. For example:

```
LOG [25,1] RETURN
```

LOG now asks for your user name. Type it and press RETURN.

You can also enter your user name instead of an account number in the LOG command. This logs you into the root account defined when your user name was set up. For example:

```
LOG CARRIE SMITH RETURN
```

This logs you into Carrie Smith's root account.

You can assign passwords to disk accounts and user names. If the account or user name you enter has a password, AMOS asks you for the password before logging you in.

Once you're logged on to the system, you can use LOG to switch to a different account. You don't need to enter your user name again, just the account you want. For example:

```
LOG [36,14] RETURN
```

If the account has a password assigned, you are asked for the password before you transfer to the account.

The account number list for each device on your system is separate, so you may have duplicate account numbers on different disks. Therefore, to completely specify what account you want, you may need to enter both the device and account number. For example:

```
LOG DSK0:[7,12] RETURN
```

You only have to enter the device name if the same account exists on more than one device. If the account you enter does not exist, you see a message on your screen indicating you've typed an invalid account number.

For more details about the LOG command, see the *System Commands Reference Manual*. For information about user names, see the *System Operator's Guide*.

## THE TERMINAL KEYBOARD

The first step in communicating with AMOS is to be able to type your instructions on the terminal keyboard. The keyboard is very similar to a standard typewriter's, but it has a few extra keys with special functions.

Take a moment to look at your keyboard so you can easily locate these keys later:

| KEY | DESCRIPTION |
|---|---|
| RETURN | RETURN (sometimes labeled ENTER or with an arrow that curves to the left) is the carriage return key. Just as you press the carriage return on a typewriter to begin a new line on the page, a RETURN tells the computer you are ending a line of input and you want to begin a new line.<br><br>The computer does not normally process an instruction from you until you press RETURN to let it know you are finished with that line. |
| RUBOUT | RUBOUT is the deletion key; it backspaces AND deletes. It may be labeled RUB or DEL.<br><br>If you make a mistake while typing an instruction to AMOS, you can erase it using the RUBOUT key. |
| SHIFT | The SHIFT key on most keyboards acts much like the shift key on a typewriter. By holding down SHIFT, you can type upper case letters and the symbols on the upper half of the keys with two symbols. |
| CAPS LOCK | While the CAPS LOCK key is enabled, letters you type appear in upper case. Keys other than letters are not affected by the CAPS LOCK key on most keyboards. |
| ESC | This key may be labeled ESCAPE or ALT MODE. It is used with several application programs (such as AlphaVUE) to signal the end of input, or to switch between command modes; however, you do not use ESC at AMOS command level. |
| CTRL | Use the CTRL (or CONTROL) key with other keys to enter a different kind of character—a "control character." AMOS and much of the software on the computer interpret control characters as special instructions.<br><br>To type a control character, hold down the CTRL key and press the other key. For example, to type a Control-C, hold down the CTRL key and type the letter C. In this book, we indicate control characters this way: CTRL/C. Appendix B lists some of the control characters AMOS recognizes. |

***Table 3-1: Special Function Keys on the Terminal Keyboard***

## Correcting Typing Mistakes

You can correct any mistakes you may make while typing a command line as long as you have not yet pressed the RETURN key. You can:

- Press RUBOUT to erase single characters.
- Type CTRL/U to move the cursor to the beginning of the line.
- Type CTRL/C to tell AMOS to ignore the line.

See the table above for explanations of RUBOUT and control characters.

If you press the RETURN key before correcting your mistake, and the command you entered was not a valid AMOS command, AMOS lets you know it did not understand the command. For example:

```
PRIMT RETURN
?PRIMT?
```

(You meant to say PRINT.) After letting you know it does not understand the command, AMOS displays its prompt symbol. You can now try again.

If the AMOS line editor is enabled for the terminal you are using, you can recall a previous line to the screen by typing CTRL/R. In the sample conversation above, press CTRL/R at the AMOS prompt to recall the line `PRIMT` to the screen. Use the ← key to move back to the "M" without erasing characters, then type an "N" to overwrite the "M." Press the RETURN key to enter the command again.

Your particular terminal undoubtedly has many features we haven't covered in this section. For complete information on using your terminal, refer to the owner's manual that accompanied it.

## A WORD ABOUT DISKETTES

If your computer contains a diskette drive, that drive uses 3.5" diskettes. You will want to purchase blank, quad-density, 1.44MB 3.5" diskettes.

A diskette consists of a hard plastic jacket or case enclosing a thin disk of magnetically treated mylar on which your data is recorded. Never try to remove this plastic jacket—doing so will ruin the diskette, but it can still read the diskette..

Your VAR has ready-to-use diskettes available, containing software designed for Alpha Micro computers.

If you want to use empty, brand new diskettes to hold your own data, you need to perform a couple of simple steps before using an empty diskette for the first time. Please see "Formatting and Initializing a Diskette" in Chapter 5 for more information.

Diskettes have a finite lifetime, so be sure to make backup copies of your diskettes from time to time. The *System Operator's Guide* for your operating system version explains the procedures and commands for backing up data onto diskettes.

### Using Diskettes

If you haven't used diskettes before, take a few minutes to look at one before you insert it in the drive. The figure below illustrates the type of diskettes supported by the AM-7000 system.

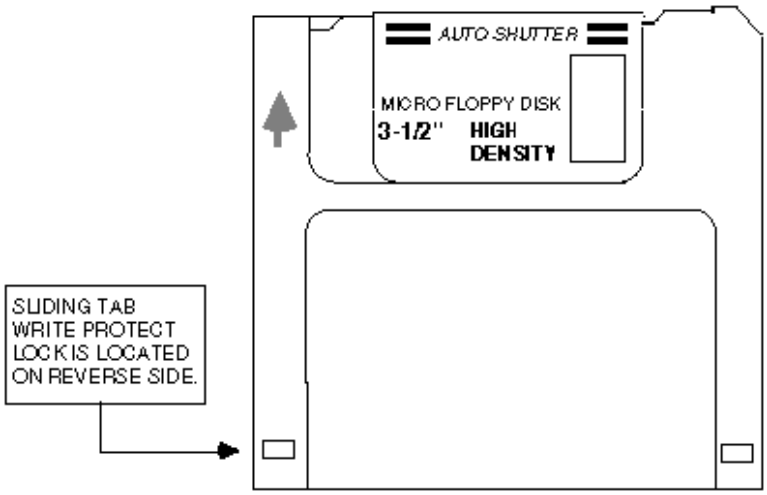


***Figure 3-1: 3.5" Diskette***

Look at the figure above and notice the sliding metal door in the hard plastic case surrounding the diskette. The cutout or door is the window through which the disk drive reads the data on the more fragile diskette as the inner disk rotates within the jacket or case.

When using these 3.5" diskettes, note the small, sliding tab that opens or closes a small square hole in the diskette case—this is the disk lock. By sliding the tab so it uncovers the hole, you write protect the disk so it can be read but not changed. By sliding the tab so it covers the hole, you allow the disk to be written on.

Remember to write protect any disks that contain valuable data—such as a bootable diskette—so they are guarded against accidental erasure. If you want the disk drive to write on a diskette, make sure the diskette is not write protected.

Always remember to label your diskettes by placing a self-adhesive label on them. We recommend you write on the label first, before you place it on the diskette.

When using diskettes, be sure to follow these precautions:

- Only insert a diskette into the drive when the computer is turned on—likewise, do not leave a diskette in the drive when you turn off the computer. Turning the computer on and off can cause power spikes that can damage the data on your diskette.
- Whenever you insert a diskette, be sure to use the MOUNT command (discussed below) to tell your computer a new diskette is in the drive.
- Never change diskettes if the drive is busy; doing so could damage the data on the diskettes. There is a small light on the front of the disk drive that is lit if the drive is busy.

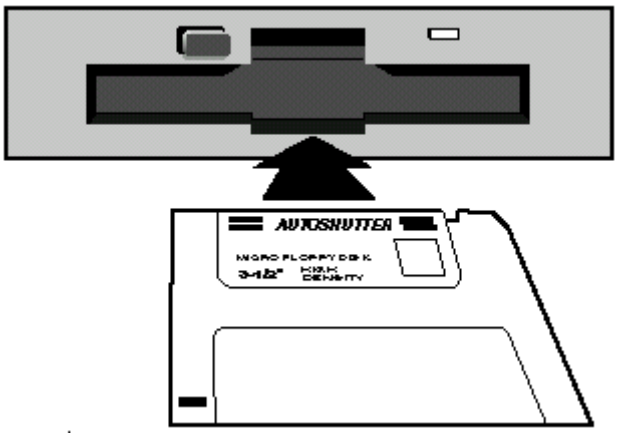


***Figure 3-2: Inserting a 3.5" Diskette***

To insert a diskette, hold it so the side with the label is up and the cutout or door is pointing away from you.

For a 3.5" diskette, push the diskette into the door until it is seated in the drive. To remove the diskette, push the eject button on the front of the drive.

## Mounting Diskettes

Whenever you insert a diskette into the disk drive, you need to tell the computer you did so by using the MOUNT command. This is true even when re-inserting the same diskette you just took out. If you forget to use the MOUNT command, AMOS won't know which diskette is in the drive and when you want to write on the diskette, the data may get scrambled!

When you boot the computer, the boot process automatically mounts your boot device, DSK0:. You must mount any other disk devices in order to use them. For example, if your computer contains your boot device, DSK0:, and a diskette drive called FLP0:, you need to type the following MOUNT command at AMOS command level to access a diskette in the diskette drive:

**`MOUNT FLP0:`** RETURN

Whenever you change the diskette in the drive, you must use the MOUNT command again. To remove the disk, type:

**`MOUNT FLP0:/U`** RETURN

## ABOUT STREAMING TAPE

There are five different ¼" streaming tape drives available for your computer: the AM-626, AM-627, AM-628, AM-629,and AM-650. For information on transferring data to and from streaming tape, see the *System Commands Reference Manual*. For information on cleaning tape drive heads, see Chapter 6.

## Tape Capacity

The storage capacity of your tapes depends both on the drive you have and the type of tape cartridge you are using. The following table shows the different types of tape cartridges available and the corresponding capacity for the AM-626, AM-627, AM-628, AM-629 and AM-650 drives.

The cartridge tapes shown in the table below are the ones specified for use by the tape drive manufacturer. Using tapes other than those recommended may result in excessive head wear.

| Device | Data Cartridge | Maximum Capacity |
|---|---|---|
| AM-626 | DC6037 | 40Mb |
| | DC6150 | 150Mb |
| | DC6250 | 250Mb |
| | DC6320 | 320Mb |
| | DC6525 | 525Mb |
| AM-627 | DC6037 | 40Mb |
| | DC6150 | 150Mb |
| | DC6250 | 250Mb |
| | DC6320 | 320Mb |
| | DC6525 | 525Mb |
| | MAGNUS 1.0 | 1000Mb |
| AM-628 | DC6037 | 40Mb |
| | DC6150 | 150Mb |
| | DC6250 | 250Mb |
| | DC6320 | 320Mb |
| | DC6525 | 525Mb |
| | MAGNUS 1.0 | 1000Mb |
| | DC9200 (MAGNUS 2.0) | 2000Mb |
| | DC9250 | 2000Mb |
| AM-629 | DC9634 | 4000Mb |
| AM-650 | QIC-139 | 13Gb |

***Table 3-2: Supported ¼" Streamer Data Cartridges***

## ¼" Tape Drive Read/Write Compatibility

Streaming tape drives use many different data formats. The tape drives for your computer can use the following formats:

- AM-626: Reads and writes in QIC-525 26-track and QIC-150 18-track format. Can also read QIC-120 15 track and QIC-24 9-track formats.
- AM-627: Reads and writes in QIC-1000 30-track, QIC-525 26-track, and QIC-150 18-track format. Can also read QIC-120 15 track, and QIC-24 9-track formats.
- AM-628: Reads and writes in QIC-2GB 42 track, QIC-1000 30-track, QIC-525 26-track, and QIC-150 18-track format. Can also read QIC-120 15-track and QIC-24 9-track formats.

- AM-629: Reads and writes in QIC-9634 and QIC-9634C track formats. Can also read QIC-2GB 42 track, QIC-1000 30-track and QIC-525 26-track formats.
- AM-650: Reads and writes in QIC-139 and QIC-139C track formats. Can read QIC-9634 and QIC-9634C and QIC-2GB track formats.

This information is based on hardware capabilities. Some software may have further restrictions on tape format.

## Loading and Unloading Tape Cartridges

To avoid static discharge, always ground yourself by touching the metal chassis before loading or unloading a tape cartridge.

1. Press the button on the drive's front panel to open the tape drive door.
2. Hold the cartridge with the metal side down. The end of the tape cartridge with the write-protect switch will enter the drive first.
3. Insert the cartridge into the drive. Keep pushing until the cartridge stops, and then close the door. After the door closes, the drive positions the tape, after which it is ready for use.

Before unloading the tape cartridge, be sure the tape activity light is out. To unload, press the tape door release button and remove the tape from the drive.

## USING A DAT DRIVE

The DAT drive is very simple to use:

1. In order to save data to the tape, the window on the tape cartridge must be in the write-enable position. The figure below shows the tape window in both "write-enable" and "write-protected" positions.
2. The tape inserts as shown below. As you insert the tape through the tape door, the DAT drive takes over the load operation by mechanically pulling the tape cartridge into the load position, just like your home VCR.

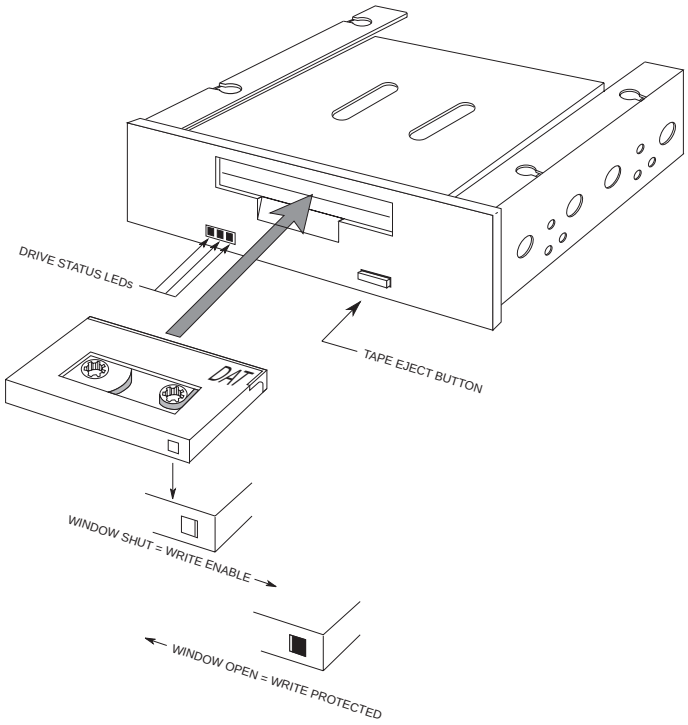


***Figure 3-3: DAT Tape Drive.***

3. Once the tape is loaded, the status lights on the drive will indicate the status of both the drive and the cartridge. See the manual that came with your tape drive for information on interpreting the status lights.
4. To unload the tape cartridge from the DAT drive, press the tape eject button, which is shown above. The drive will automatically eject the tape.

For information on maintaining the DAT drive, see Chapter 6.

# Chapter 4 - Where Do I Go From Here?

Your Alpha Micro computer is extremely versatile—it can do so many different things that, at this point, you might be somewhat undecided as to where to start.

Your next step is to learn something about the software you can run on your computer. This chapter deals with some of the questions you may be asking:

- What software is available for Alpha Micro computers?
- What Alpha Micro documents should I read next?

## INTRODUCTION TO AMOS SOFTWARE

This section will give you an idea of some of the software available for your computer.

### The Operating System, AMOS

AMOS, the Alpha Micro Operating System, supervises all of the programs that run on your computer. Regular updates to the AMOS operating system and its accompanying system software are available from your VAR. There are different revision levels of AMOS; to use AM-7000 you need AMOS 2.3A (patch release 6/00) or later.

### Programming Languages

The AlphaBASIC programming language is a standard part of the software for your computer. AlphaBASIC contains many business oriented features. AlphaBASIC also provides an ISAM (Indexed Sequential Access Method) interface. AlphaBASIC PLUS, also provided as standard, contains advanced features such as sophisticated data structures and program control constructs.

Please see your VAR for information on other programming and assembly languages available for your computer, such as AcuCOBOL-85, AlphaFORTRAN 77, and AlphaC.

### Networking

The networking software is included with AMOS. There are two different networking software packages:

- AlphaTCP allows your system to transfer files, exchange information, and share resources between different computers on the Internet. This package also provides TELNET services and network printer services.
- AlphaNET is a low-cost way to transfer files, exchange information, and share resources between different Alpha Micro computers.

## Text Preparation

If you are going to be creating documents on your computer, you will be interested in the word processing programs available. AlphaVUE, a screen-oriented text editor, allows you to use your terminal to create and change documents. You see the text of your letter or report on the terminal screen as you enter it on the keyboard. With AlphaVUE, you can move quickly through the document, correcting and adding words, inserting or deleting lines, moving paragraphs, and so on.

The TXTFMT program processes the documents you create using AlphaVUE, and automatically formats them according to your commands. TXTFMT provides features such as right margin justification, page numbering and titling, automatic list creation, and automatic index and table of contents creation.

Also, see the section on "Office Information Products" below for information on the AlphaWRITE word processing package.

## Utility Programs

The standard AMOS release contains over 200 utility programs and device drivers. In addition, because of the unique way AMOS handles commands, you can easily create your own utility programs.

Some of the standard utility programs allow you to do such functions as: copy, rename, and erase files; sort the data inside files; use a task management system to schedule and perform background tasks that run without operator control; print files while you perform other tasks at the same time; use the ISAM system to organize and retrieve information quickly; and back up data automatically at a convenient time when nobody is using the computer (in the middle of the night, for example).

## Application Programs

Your local Alpha Micro VAR has a variety of programs available for your computer, many of which are aimed at specific business needs such as: general accounting, dental office, legal office, real estate management, manufacturing inventory control, educational learning systems, restaurant management, medical office billing, laboratory analysis, and many others. Please see your VAR for details.

## Office Information Products

Several office information products are available separately from your local Alpha Micro VAR. The office information products series includes:

- AlphaCALC, an electronic spreadsheet program that prepares "what if" financial models quickly and easily.
- AlphaWRITE, a sophisticated word processing package that provides spelling checking, hyphenation, form letter preparation, automatic outlining and much more.
- AlphaMAIL is an electronic mail system for sending and receiving messages and reminders among multiple users and, combined with AlphaTCP, over the Internet.

- MULTI is a window-based environment manager, letting you use multiple programs on one terminal at the same time, and providing a number of desk accessory features, including a phone list, alarm clock, notepad, and others.
- VersiCOMM is a versatile, general purpose communications system, capable of performing a broad range of communication services.
- VP Search allows you to search for files containing a key word or series of words. If you can't remember the name assigned to a file or its location, all you need to know is one key word and VP Search will find it.

See your VAR for more information on these and other Alpha Micro office information products.

## ADDITIONAL DOCUMENTATION

Now that your computer is up and running, you are ready to start exploring the world of Alpha Micro. Your guide to the new territory is the Alpha Micro software documentation. This section gives you an idea of which documentation to consult for directions depending on the path you want to take.

Your computer is a member of the AMOS family of Alpha Micro computers, and the software documentation that applies to other AMOS based computers applies to yours, too.

You may purchase any book mentioned in this chapter separately; in addition, a multi-volume software documentation library is available containing all the AMOS software books listed below. You can order any of these books by calling your VAR.

Here's an idea of what to look at next:

### "I Want To Start At The Beginning"

If you have never used a computer before, we recommend you read the *AMOS User's Guide*. This book is a practical introduction to the Alpha Micro computer, containing instructions for many of the procedures you'll use every day. It expands on many of the topics discussed in Chapter 3.

### "I Want To Learn How To Maintain My Computer"

If you are going to be responsible for making data backups, adding new terminals or printers to the computer, running disk diagnostics, and otherwise managing and maintaining the computer, we highly recommend you read the *System Operator's Guide*, and obtain a copy of the *System Commands Reference Manual* and the *System Operator's Guide to the System Initialization Command File*.

The first book explains how to perform the maintenance and diagnostic procedures required by the Alpha Micro system software. The second book will prove an invaluable reference tool—it contains short reference sheets on over 200 AMOS programs. The third book describes how to change your system configuration by editing the file AMOS reads the configuration from when it boots.

## "I Want To Do Text Processing"

If you want to use your computer to prepare documents, there are several books you should look at:

The *AlphaVUE User's Manual* for information on the AlphaVUE screen-oriented text editor; the *TXTFMT User's Manual* for information on the TXTFMT text formatting program; and the *AlphaVUE/TXTFMT Training Guide*, a tutorial on document preparation for the computer novice.

Although AlphaVUE and TXTFMT are the text processing programs included with the standard AMOS software, you may want to investigate the other word processing packages your VAR has available for your computer, such as AlphaWRITE.

## "I Want To Write Computer Programs"

If you have programmed in BASIC before, and want to learn how to use the AlphaBASIC programming language, refer to the *AlphaBASIC User's Manual*. You may also want to see the *AlphaBASIC PLUS User's Manual* for information on the enhanced AlphaBASIC PLUS programming language.

If you are an experienced assembly language programmer who wants to write machine language programs for your Alpha Micro computer, we recommend you read these books:

- *Alpha Micro Instruction Set*, which contains information on the assembly language instruction set used by the Alpha Micro computers.
- *AMOS Assembly Language Programmer's Manual* which contains information on the assembler, linkage editor, object file librarian, and global cross reference program used by the assembly language programmer.
- *AMOS Monitor Calls* which contains information on the interfaces to the AMOS operating system available to the assembly language programmer.
- *AlphaFIX User's Manual* which contains information on the screen oriented debugger program, AlphaFIX.

# Chapter 5 - System Administration

"System Operator" is the title we give the person whose job it is to make sure the computer runs efficiently, and who has access to the files and programs that comprise the system software.

AMOS provides many program tools to support system administration functions. This chapter covers many of these procedures, including:

- Backing up your data.
- Allocating disk accounts.
- Modifying the system initialization file to add jobs and terminals, change memory allocations, and define parallel ports.
- Defining logical devices.
- Disk diagnostic procedures.
- Formatting and initializing diskettes.

## BACKING UP YOUR DATA

Once you begin using the computer, you will soon find yourself operating it with confidence and ease. However, no matter how smoothly everything goes, please remember one important thing—you must keep current copies of the data you are working on! This copy is your "backup."

Computers and data storage devices are very reliable, but nobody can guard against an unforeseen occurrence like a power outage, spilled cup of coffee, fire, or hardware malfunction. Such disaster can happen to anyone.

Your data is probably one of your most valuable possessions. How long would it take to re-enter the entire company payroll, all of your accounts receivable invoices, or your research journal article, if they were lost? And, what if you could not reconstruct the information no matter how much time you had?

All Alpha Micro computers come with some type of data backup device. Whether your backup device is a streaming tape or DAT drive, learn to use it! ***Develop regular backup procedures and follow them!*** If disaster strikes, you'll be glad you had a little foresight.

You should back up some or all of the data on your computer at regular intervals. How often you need to back up depends on how often you add or change data. If you add important data every day, you should back up your computer each night. If the data changes only once a week, back up once a week, etc.

Also, as mentioned in Chapter 2, you should be especially sure to make at least one copy of your System Disk onto a medium that will let you boot your computer if, for some reason, you cannot boot from your hard disk. Keep this warm boot media in a safe place in case you need it.

You can use the WRMGEN program to create a warm boot tape. For more information on warm boot monitors, see the *System Operator's Guide*.

Because both backup and diagnostic procedures usually must be done when only one job is accessing the disks, it is wise to run them when other users are off the computer (for example, at night or on weekends). By using the Task Manager, or the SLEEPR command within a command file, you can run backups and tests in the middle of the night when they won't interfere with other users. See the *Task Manager User's Manual* for details on how to do this.

## DISK ACCOUNTS

Theoretically, you could store your files on the disk without any type of organization. A list of all the files—the system software, your special application programs, memos, everything—might be several pages long and would be a nightmare to decipher.

As discussed in Chapter 3, a better technique to organize your files is to create "accounts" in which to store as many files as you want. An account is just an arbitrary designation for a group of files. Your system software is already organized into various accounts, and you can add as many or as few additional ones as you need. The following paragraphs describe how to add accounts to your computer.

### Passwords

You can assign a password to any account, if you wish. If the same account exists on multiple disks, each disk can have its own separate password for the account. The password acts as a mild security measure to prevent a casual user from accidentally logging into the wrong account. Passwords do not prevent files from being copied into or out of an account, and can be easily changed or erased using the SYSACT command described below.

### Organizing the Disk

Because there is the danger of logging into the wrong account if you have accounts with the same account numbers on different disks, you may want to establish a numbering scheme to prevent duplicates. You may want to reserve accounts [1,*] through [77,*] for DSK0:, accounts [101,*] through [200,*] for DSK1:, and so on.

If you find assigning and remembering account numbers cumbersome, you can substitute a predefined "ersatz" name for the account number. One of the files in your system software is called ERSATZ.INI. It's located on DSK0: in account [1,4], and contains several predefined ersatz names, but you can add more of your own, if you wish. For example, one of the predefined ersatz account names is OPR: for DSK0:[1,2]. So, whenever you need to log in the account DSK0:[1,2], you can type **`LOG OPR:`** RETURN instead. The *AMOS User's Guide* contains more information on ersatz names and how you can use them.

## Adding New Accounts

There is no specific number of accounts you must have; you can add as many as you wish, as long as there is room on the disk. When your computer is brand new, the only accounts are the ones the system software is stored in. You'll want to add more accounts from time to time as your business grows. To do so, use the SYSACT command, following these steps:

1. If you want to see a list of the disk devices on your computer, type:

   **SYSTAT** RETURN

   The end of the display lists the available disk devices. Decide what device you want to add the accounts to.

2. Log into account [1,2] on any disk device (for example, DSK0:). Type:

   **LOG DSK0:[1,2]** RETURN

   If you weren't already logged into another account, you'll need to enter your user name after the LOG command. If there's a password for this account, you'll be asked for it, too.

3. Type **SYSACT** followed by the name of the device you want to add the accounts to, and press RETURN. For example:

   **SYSACT DSK1:** RETURN

4. SYSACT responds with its prompt symbol, an asterisk. If you'd like to see a list of all the things SYSACT can do, type:

   ***H** RETURN

5. From the list you see next, you can select different functions to perform. You want to add a new account, so type **A** and the account number you want to add and press RETURN. For example:

   ***A 100,5** RETURN

6. SYSACT responds:

   ```
   Password:
   ```

   SYSACT asks if you want to protect the new account with a password. You can enter a password of up to six characters (A - Z, 0-9, $), or you can just press the RETURN key if you don't want to assign a password. If you do enter a password, whenever other users try to log into that account, they have to type the password. If they don't know the password, they aren't allowed to log in.

7. You can see a list of all the account numbers on the disk device and their passwords by selecting the L (List) function:

   ***L** RETURN

8. When you are finished using the SYSACT command and are ready to return to AMOS command level, select the E (end) option:

   ***E** RETURN

   SYSACT returns you to AMOS command level and the AMOS prompt symbol appears on your screen.

For complete information on using the SYSACT command, see the SYSACT reference sheet in the *System Commands Reference Manual*.

## MODIFYING THE SYSTEM INITIALIZATION FILE

The name of the system initialization file for your computer is usually AMOS32.INI. This special file in account DSK0:[1,4] defines to the AMOS operating system all of the devices connected to your computer, the jobs that will run on the computer, and special programs which need to be loaded into memory. As requirements change or as devices are added on to your computer, you must modify the system initialization file.

***NEVER change the system initialization file directly!*** Always make a copy of it and modify the copy, as described below.

To make a copy of the system initialization file to be modified and tested:

1. Log into DSK0:[1,4] by typing:

   **LOG DSK0:[1,4]** RETURN

2. Then, type:

   **COPY TEST.INI=AMOS32.INI** RETURN

3. Use AlphaVUE or another text editor to edit the contents of the test file:

   **VUE TEST.INI** RETURN

   If you are unfamiliar with AlphaVUE, refer to the *AlphaVUE User's Manual*.

4. Make all the necessary changes to TEST.INI. Save the file when exiting AlphaVUE by pressing the ESC key and typing **F**. Some of the common changes you may want to make are discussed below.

5. Use MONTST to insure TEST.INI is working as expected by typing:

   **MONTST TEST.INI**

6. After you have successfully tested TEST.INI and you are satisfied with the results, copy it back to AMOS32.INI.

Be careful not to rename your TEST.INI file too soon. You might want to let the computer run awhile to test out the new configuration before you rename it. Then, if you decide you don't want to keep the new configuration, you can always press the reset button to reboot with your former system initialization file.

***Follow this procedure any time you modify the system initialization file.***

Do not change any lines in the system initialization file other than those discussed here until you're familiar with the documentation on the file in the *System Operator's Guide*.

```
:T
;
JOBS 5
;
JOBALC JOB1
;
QUEUE 2000
;
TRMDEF TERM1,A31810=0:19200,ALPHA,200,200,200,EDITOR=15
;
PARITY                              ; Clear memory
VER                                 ; Unlock keyboard
;
PCI7K.LIT
SCZDSP SCZ7K.SYS/EW:0/ET/EU                 ; SCSI dispatcher
;
DEVTBL DSK
DEVTBL TRM,RES,MEM
DEVTBL /STR0                        ; Streaming tape device
;
BITMAP DSK                          ; Paged bitmaps for AMOS 2.X
;
ERSATZ ERSATZ.NEW
MSGINI 20K
;
SYSTEM SYSMSG.USA
SYSTEM DCACHE.SYS/N/M 1M            ; Enable disk read-caching
SYSTEM DVR:DSK/N 100K 60            ; Enable disk write-caching
SYSTEM CMDLIN.SYS
SYSTEM SCNWLD.SYS
SYSTEM QFLOCK.SYS
SYSTEM PCILSI.LDV[1,6]/N/H/T:100/R:100     ;Enable 100BaseT
SYSTEM TRM.DVR[1,6]
SYSTEM STR.DVR[1,6]
SYSTEM EPP.DVR[1,6]
SYSTEM
;
SET DSKERR
;
MOUNT DSK:
;
MEMORY 0
```

***Simple Initialization File***

## Defining the AM-7000 Parallel Ports

AM-7000 computers contain four high speed parallel ports, which are not automatically defined for you. If you want to use the parallel ports:

1. Type the following statement following the last DEVTBL statement in your TEST.INI file:

   **`DEVTBL /SEP0,SEP1,SEP2,SEP3`**

2. Load the parallel printer driver into system memory using a SYSTEM statement:

   **`SYSTEM SEP.DVR[1,6]`**

3. To connect a printer to the parallel port, change the DEVICE statement in the printer initialization file to reference parallel port 0 (SEP0:). For example:

```
DEVICE=SEP0:
```

For information on printer initialization files and printer spoolers, see the *System Operator's Guide* for your version of AMOS. For information on constructing cables to connect a printer to a parallel port, see Appendix A.

## Adding Jobs

When you increase the number of terminals connected to your computer, you also need to modify the system initialization file so the system software knows what ports they are connected to and what jobs they are attached to.

The steps below are necessary when you add an additional terminal to your computer. However, one terminal and job are already defined and set up for you, and these steps are not necessary for that first terminal.

Before adding jobs to your system, check the number of jobs that remain on your AMOS license. To increase your AMOS user license, contact your VAR.

1. To add jobs to your system, make a copy of the initialization file, as discussed previously.
2. At the beginning of the TEST.INI file is a JOBS statement. The number following the JOBS statement represents the total number of jobs on your computer.

   If your computer has five jobs now and you want to add two more jobs, change the number in the JOBS statement to 7 or more. For example:

```
JOBS 7
```

3. On the lines following the JOBS statement, there are one or more JOBALC statements. You can define each job in a separate JOBALC statement, or you can define several jobs in the same JOBALC statement by separating the job names with commas. For example:

```
JOBALC JOB4,JOB5
```

   Each jobname—which can have up to six characters (A - Z, 0 - 9, $)—defines a job on your computer. The total number of jobs defined in the JOBALC statements must be equal to or less than the number in the JOBS statement above.

4. You also need to define the terminals you're going to attach to these jobs. The TRMDEF statement defines the terminal characteristics and tells the computer which port on the back panel it's connected to. Add any new TRMDEF statements after the last TRMDEF statement in the file.

   Here is a sample TRMDEF statement:

```
TRMDEF TERM2,A31810=1:19200,ALPHA,200,200,200,EDITOR=10
```

   Using the sample, here's the information you must tell AMOS about a terminal:

   - TERM2 is the terminal name. You may use any name containing six or fewer letters and/or numbers. Each terminal must have a different name.

- A31810 is the name of the interface driver for the circuit board the terminal is connected to. There is a corresponding software driver file in the DVR: account called A31810.IDV.
- 1 is the octal number of the port the terminal is attached to. Each terminal must be connected to a unique port.
- 19200 is the baud rate of the terminal.
- ALPHA is the name of the terminal driver. ALPHA can be used for most Alpha Micro terminals, but you may want to see if a more specific driver is available for your terminal.
- 200,200,200 are buffer sizes, expressed in number of characters. Different situations may require other buffer sizes, but for now just use 200,200,200.
- EDITOR=15 enables the line editor for this terminal. See the *AMOS User's Guide* for more information on the line editor.

For a more extensive explanation of what each of these items represents, see the *System Operator's Guide to the System Initialization Command File*.

5. Use the SETJOB statement to link the terminal you defined in the TRMDEF statement with the job defined in the JOBALC statement. You can include parameters in the SETJOB statement to:
   - Define how much memory to allocate to a specific job.
   - Define the specific disk and account you want the specific job to log into each time the computer boots.
   - Unlock the terminal's keyboard (with the VER command).

   SETJOB statements must be entered after the last system statements in the .INI file. Here is a sample:

   ```
   SETJOB JOB4,TERM2,256K,LOG DEMO,VER
   ```

   See the *System Operator's Guide to the System Initialization Command File* for information on SETJOB.

7. Add a WAIT command to give the computer time for the new job to process the above commands before proceeding with the rest of the instructions in this TEST.INI file.

   ```
   WAIT JOB4
   ```

8. When you have added SETJOB and WAIT statements for each job you're adding to the computer, you're ready to perform a test reboot, using the procedure described earlier in this chapter.

## Changing User Memory

How much of the computer's total supply of memory is assigned to each job is determined by the memory parameters in the SETJOB statement (or the MEMORY command). If you decide to add jobs or alter memory allocations, you should first refer to the *System Operator's Guide*.

To see a display of the current memory allocations on your computer, use the SYSTAT command:

**SYSTAT/N** RETURN

In addition to many other pieces of information about the status of the computer, SYSTAT shows how much memory is assigned to each job. The SYSTAT command is explained in detail in the *System Commands Reference Manual*.

If you decide to permanently change the amount of memory allocated to a job, you can modify the system initialization file following the instructions below.

1. Make a copy of the initialization file and edit it, as discussed previously.
2. Scan through the file until you come to the SETJOB statement that attaches the terminal to the specific job whose memory you want to change. The amount of memory you allocated to that job is one of the parameters in the SETJOB statement, immediately following the terminal name.

   

   The number reflected in the SETJOB statement, following the terminal name, is the amount of memory currently allocated to the job. You can increase this number or decrease it as long as you keep in mind how much total memory your computer has, and how much memory the other jobs need.

3. The last statement in the system initialization file is MEMORY 0. This statement allocates to the System Operator's job all the memory not specifically assigned to other jobs.

   If you want to increase the amount of memory assigned to the job attached to the operator terminal—the terminal the computer boots on, connected to Port #0—all you need to do is subtract memory from some other job.

4. Save the TEST.INI file and exit AlphaVUE. Then, perform a test reboot by running MONTST as described earlier in this chapter. You can then use the STAT or SYSTAT command to see how much memory is assigned to each job.

## ANALYZING THE DISK

A disk diagnostic program reads data from a disk. If it cannot read an area of the disk, it reports the problem to you. Checking your disk frequently with disk diagnostic programs helps prevent data loss—the sooner you catch a malfunction, the less data is likely to be affected.

The type of problem found by disk diagnostics is known as a "hard error," because it means data is lost. A "soft error" means the computer had trouble reading the data, but data was not lost. Disk diagnostics do not report soft errors.

If a diagnostic program indicates problems, you may need to restore data from a backup copy or reconstruct the data on a damaged disk. If you have this type of problem, consult the section "Recovering From Disk Errors" in the *System Operator's Guide*.

Before running any of the disk diagnostic tests, especially if you suspect a problem, it is a good idea to use the SET DSKERR command:

**SET DSKERR** RETURN

SET DSKERR causes the computer to report the location of any hard errors the diagnostic program finds. If you don't use SET DSKERR, the diagnostic tells you only that an error occurred, not where on the disk it happened. You must run the diagnostic program from the same job where you used SET DSKERR.

The next two sections discuss two very useful diagnostic programs, REDALL and DSKANA. You can find more information on disk diagnostic programs in the *System Operator's Guide* and the *AMOS User's Guide*.

## The REDALL Command

REDALL reads every block of data—or the number of blocks you choose—on the disk you specify, and reports any hard errors. It does not alter the data on your disk.

REDALL works on both hard disks and diskettes. It is a good idea to run REDALL for each disk on your computer occasionally, possibly once a week. That way, if any disk problems develop, you can be sure of detecting them quickly.

To use REDALL, perform these steps:

1. To read all the blocks on a disk, enter REDALL followed by the device name of the disk you want to read. For example:

   ```
   REDALL DSK2: RETURN
   ```

2. If you don't want REDALL to read all blocks on the disk, follow the disk specification with the decimal number of blocks you want read:

   ```
   REDALL DSK2:100 RETURN
   ```

   The command above tells REDALL to read the first 100 blocks on DSK2:.

3. REDALL now tells you the number of blocks it is reading. For example:

   ```
   REDALL DSK2: RETURN
   Reading 13800 blocks
   EXIT
   ```

4. REDALL ends when it finishes reading the blocks. If any errors occur, REDALL displays the appropriate error message on your screen.

## The DSKANA Command

The DSKANA command is an important part of your disk maintenance routine. DSKANA analyzes the data on a specified disk and reports lost and mis-linked disk blocks, inconsistent block counts, and other file errors.

Each file on the disk is stored in one or more disk blocks. AMOS keeps track of which disk blocks are currently used in files and which are not, by means of a special structure called a "bitmap." Each disk has its own bitmap.

DSKANA compares the information in the bitmap with the actual data on the disk to make sure the bitmap is accurate. For example, if DSKANA finds a disk block that is part of a file, but the bitmap shows the block not in use, DSKANA reports an error. When DSKANA finishes analyzing the disk, it rewrites the bitmap unless you tell it not to.

Use DSKANA frequently on all of your disks. It is a good practice to use DSKANA on every disk just before you back up the files on that disk.

For more information on DSKANA, see the *System Commands Reference Manual*.

***NEVER*** use DSKANA (unless you are using the /C option described below) while other users are accessing the specified disk; doing so may damage the bitmap and the files on the disk.

To use DSKANA, follow these steps:

1. Log into OPR: by typing:

   **`LOG OPR:`** RETURN

2. Type **DSKANA** followed by the device name of the disk you want to analyze and press RETURN. For example, to analyze DSK1:, type:

   **`DSKANA DSK1:`** RETURN

   You now see:

   ```
   [Begin analysis of DSK1:]
   ```

   As DSKANA checks the disk, it displays the disk account numbers. When it finishes, it displays the results of its analysis. For example:

   ```
   DSKANA DSK1: RETURN
   [Begin analysis of DSK1:]
   [1,2]
     .
   [100,20]
   [The following blocks were marked in use but not in a
   file]
    1767   1772   2562   3456   6265

   [The following blocks were in a file but not marked in
   use]

   [Rewriting BITMAP]

   No file errors
   ```

If you see the "No file errors" message, the file structure on the disk is intact. If DSKANA lists a number of file errors, there is a problem with the disk's file structure. Your next step is to run DSKANA again, using either the /L or /E option—discussed below—to see where the errors are on the disk.

For the complete procedure to follow if DSKANA finds any file errors, see "Recovering From Disk Errors" in the *System Operator's Guide*.

## DSKANA Options

Following are the most common DSKANA options. Please see the DSKANA reference sheet in the *System Commands Reference Manual* for a complete listing of options.

| OPTION | FUNCTION |
|---|---|
| None | Displays account numbers on disk and summary only. |
| /C | Same information as default, but does not rewrite bitmap. |
| /E | Lists files and blocks in which any errors occurred. |
| /L | Lists all files and blocks on the disk. |

To use one of these options, place it after the DSKANA command like this:

**`DSKANA DSK1:/C`** RETURN

As mentioned above, you need to use the /L or /E option to find the location of any file errors DSKANA detects. The /C option is discussed in the next section.

To see the list of DSKANA options, type **`DSKANA`** RETURN without specifying a device name.

## The CHECK Option and Automatic Backups

At times, you may want to have DSKANA examine a disk without re-writing the bitmap, especially when using an "automatic" backup method such as a command file or the Task Manager to perform the backup.

The reason for this is simple: assume you run DSKANA at night as part of an automatic backup procedure. If anyone on your computer leaves a file—such as an AlphaVUE or AlphaWRITE document—open on the device DSKANA is checking, DSKANA doesn't take the open file into account when it rewrites the bitmap for the device. When the person returns in the morning and writes the file to the disk, it causes a bitmap error, because the computer didn't know the file was open. This could corrupt the disk, causing you to lose data.

To run DSKANA without rewriting the bitmap, use the /C option switch. You see DSKANA's normal display when you use the /C option, except for the [`Rewriting BITMAP`] message.

## FORMATTING AND INITIALIZING THE HARD DRIVE

When installing a new hard drive, you must format it using the FMTS2 command. Please refer to the *System Commands Reference Manual* for instructions on formatting a hard drive.

Be extremely careful when using the FMTS2 command. ***Formatting a hard drive will delete all data and system files!*** It is important that only a certified technician perform these tasks.

## FORMATTING AND INITIALIZING A DISKETTE

Before you use a new diskette for the first time, you must format it. Formatting configures the diskette so it is ready to receive and hold data in the pattern your computer uses. Then you must initialize the diskette, which sets up its initial account structure.

The following information pertains to standard floppy drives interfaced to the system using an AM-219 floppy controller. If your system contains an AM-212-20 SCSI floppy drive, consult the instructions the accompanied the floppy drive.

Follow the steps below to format and initialize a diskette.

These steps erase any data already on a diskette! Make sure the diskette is empty or does not contain files you need before you format it.

To see if there are files on the diskette, type **`DIR Devn:[]`** RETURN, where **`Devn:`** is the device name of the diskette drive.

1. Use the LOG command to log into the System Operator account [1,2] on DSK0:. Type:

   ```
   LOG OPR: RETURN
   Logged into OPR:
   ```

   If you weren't already logged in, enter your user name when the prompt for it displays.

2. Insert the diskette into the drive as described in Chapter 3. Don't use the MOUNT command. Instead, enter:

   **`FMTFLP Devn:`** RETURN

   where Devn: is the name of your diskette drive—probably FLP0: or MIN0:. (Chapter 3 discusses device naming conventions.) You now see the message:

   ```
   BEGIN FORMATTING
   ```

   When it is finished, FMTFLP displays:

   ```
   EXIT
   ```

   The diskette is now formatted. Before you can use the diskette, you need to initialize it.

3. Use the SYSACT command to initialize the diskette. Type:

   **`SYSACT Devn:`** RETURN

4. SYSACT displays its prompt symbol, an asterisk. Type **`I`** RETURN (the SYSACT Initialize command):

   **`*I`** RETURN

   SYSACT now asks you to confirm this command:

   ```
   Initializing the disk clears all files -
   enter Y to confirm:
   ```

   

   Initializing the diskette erases any data on it, so be sure the correct diskette is in the drive and *you entered the correct device name* before you answer.

Type **Y** RETURN. Now SYSACT asks you:

You'll now see this prompt:

```
Create extended directory structure? [NO]
```

This option is normally used with hard disk drives where the standard logical size can be increased beyond the 32MB limit. The default response is NO. Press the RETURN key to accept the default response.

5. The diskette is now ready to use. To log into the diskette and write data to it, you need to add accounts to the diskette. Use the SYSACT A (Add) option as described earlier. For example, to add accounts [100,2] and [120,0] on the diskette, type the following commands:

```
*A 100,2 RETURN
Password: RETURN
*A 120,0 RETURN
Password: MINE RETURN
```

In this example, one of the new accounts, [100,2], is not protected by a password, and the other, [120,0], is protected by the password MINE.

6. Now, use the E command to leave SYSACT:

```
*E RETURN
```

You have now left SYSACT and are at AMOS command level.

For more information on FMTFLP, LOG, and SYSACT, refer to the *System Commands Reference Manual*. For more information on disk accounts, see the *AMOS User's Guide*.

## NETWORK STATISTICS

Along with the LDVSTS.LIT program, you can use the ESLSI.LIT program to get additional network statistics. Entering ESLSI will display the usage of the program and what switches are available.

# Chapter 6 - Preventive Maintenance

Your computer requires little care. However, preventive maintenance is an integral part of keeping any computer running at peak efficiency. To safeguard your investment, we recommend you establish a regular maintenance schedule for your equipment.

This chapter contains some recommended maintenance procedures for:

- Diskettes, DAT cartridge, and streamer tape cartridges.
- The diskette drive, as well as DAT and streaming tape drives.
- The main enclosure.

## DISKETTES

In order to protect your data, diskettes must be handled and cared for properly.

Here are some important hints to remember:

- The recording surface on diskettes is contained within a protective enclosure—never try to remove this enclosure or touch the recording media within.
- Treat diskettes gently. Fingerprints, scratches, spills, and dirt can ruin them.
- Keep your diskettes in a dust-free environment. This helps them stay clean.
- Never expose diskettes to an electromagnetic field—doing so could cause your data to disappear! For example, do not leave diskettes on top of the computer or terminal since various items within the enclosure emit a strong magnetic field.
- Keep magnets away from your diskettes. Even weak magnets such as those in paper clip holders can erase data on a diskette.
- Avoid temperature extremes. Do not expose diskettes to temperatures below 50 degrees Fahrenheit (10 degrees Celsius) or above 125 degrees Fahrenheit (52 degrees Celsius). Do not leave your diskettes next to a window where radiant heat from direct sunlight can cook them.

  Diskettes should be at about the same temperature as your computer or spurious device errors could result. If the place you store the media has a very different temperature than the area where your computer lives, place the diskette near the computer and give it a few minutes to adjust to the new temperature before use.

## CARE OF STREAMING TAPE AND DAT CARTRIDGES

A cartridge tape can store data from an entire disk, so it is worth taking care of properly. In addition to the tips for diskettes, above, remember the following:

- Store cartridges with the write-protect switch in the SAFE position.
- Keep magnets away from your tapes. Even weak magnets such as those in paper clip holders can erase data on a cartridge tape.
- Don't expose tapes to very high or low humidity (more than 80% or less than 20%).
- Cartridge tapes should be acclimated to computer-room temperature and humidity conditions before use. If the tape has been stored away from the computer, it should be returned to the computer environment at least eight hours before use. If it has been in a different environment for less than eight hours, it should be kept in the computer location for at least as many hours as it was away from it.

## DISKETTE DRIVE

The diskette drive requires periodic cleaning of its read/write heads. A regular cleaning schedule can prevent problems, such as data loss, which can result from dirty heads. If you do start noticing data loss, cleaning the heads will probably take care of it.

You can clean diskette drives using a special head-cleaning kit available from vendors of computer supplies.

## ¼" STREAMING TAPE DRIVE CLEANING

It is very important to clean the read/write head of your tape drive periodically. If you use your cartridge tape drive to do one or more backups per day, you should clean the head at least once a week. For more frequent use, keep in mind:

- When you use new tapes exclusively or often, clean the head after every two hours of tape drive running time.
- If you reuse tapes most of the time, clean the head after every eight hours of running time.

For the AM-626, AM-627, AM-628, and AM-629 streaming tape drives, follow these cleaning procedures:

- Dip a lint-free cotton swab in isopropyl alcohol (at least 91% strength)
- The head is a brass-colored metal square that can be seen in the tape slot. Rub the surface of the head with the moist cotton swab.
- Rub the head with a dry swab to prevent residue buildup.

When cleaning tape drive heads, never use 70% rubbing alcohol. Make sure you use isopropyl alcohol of at least 91% strength.

## DAT DRIVE CLEANING

If excessive magnetic dust and debris collects on one or more of the heads, magnetic media may become unreadable and unwriteable. This situation may occur infrequently, or not at all, depending on the media used.

Whenever the tape cartridge status light flashes, you should clean the drive heads with a cleaning cartridge.

As routine maintenance, the drive heads should be cleaned after every 50 hours of operation.

To clean the heads on the DAT drive, use a DAT cleaning cartridge designed for your drive. The cleaning cartridge contains the correct recognition holes to allow the DAT drive to identify it as a cleaning cartridge.

Follow these general guidelines to use the cleaning cartridge:

1. Insert the cleaning cartridge into the DAT drive. The drive will immediately detect that this is a cleaning cartridge.
2. The drive will load and run the cartridge in about 10 seconds, then it will be ejected.

## MAIN ENCLOSURE

The computer main enclosure is sturdy painted sheet metal and plastic. Clean it as you would any other painted surface, using a gentle detergent. Remember, however, that if any liquid makes its way inside the enclosure, severe damage to the computer could result. So, a light dusting is the safest cleaning procedure, and probably all the main enclosure will require.

# Chapter 7 - Troubleshooting Procedures

We are sure you will find your Alpha Micro computer easy to install and use, and be pleased with its exceptional reliability. However, if a problem should occur, look at the list of symptoms below to find practical information on diagnosing and correcting the problem. Some of the problems below are the result of improper installation, while others can occur through user error.

To make troubleshooting your computer as simple as possible, we have defined several procedures to use in tracking down problems. These procedures should either guide you to finding and fixing the problem, or take you to a point where you can verify a major hardware failure or software problem has occurred.

A hardware failure should be handled by your VAR.

A software problem, on the other hand, might be something you can handle yourself. However, we do not give software checkout procedures in the sections below. This is because such procedures require you to be a fairly experienced user of the computer. With experience, you should have no problem in tracking down and fixing such problems. For information on software procedures, refer to the *System Operator's Guide*. For now, we recommend you contact your VAR if you have a software problem you cannot fix easily.

## THE SYMPTOMS

### Symptom #1: No Display on the Operator Terminal Screen

If you see no characters on the screen at all when you boot the computer, perform the following troubleshooting procedures in the order given:

| | |
|---|---|
| [ ] Check Power/Run/Memory Lights | (Procedure #1) |
| [ ] Check the System Status Codes | (Procedure #2) |
| [ ] Powerup/Reset | (Procedure #3) |
| [ ] Check Terminal/Printer | (Procedure #4) |
| [ ] Self Test | (Procedure #5) |
| [ ] Alternate Boot | (Procedure #6) |

### Symptom #2: Scrambled Characters on the Terminal Screen

If the characters you see on the screen after you boot are not legible text, perform the procedures listed below in the order given:

| | |
|---|---|
| [ ] Check Power/Run/Memory Lights | (Procedure #1) |
| [ ] Check the System Status Codes | (Procedure #2) |
| [ ] Check Terminal/Printer | (Procedure #4) |
| [ ] Powerup/Reset | (Procedure #3) |
| [ ] Self Test | (Procedure #5) |
| [ ] Alternate Boot | (Procedure #6) |

### Symptom #3: Computer Does Not Finish Booting

The operator terminal displays the system initialization command file as the computer boots. The last command in the .INI file is MEMORY 0. If the terminal display stops before reaching MEMORY 0, and more than a minute or so goes by, the computer did not finish booting. Perform these procedures in the order given:

| | |
|---|---|
| [ ] Check Power/Run/Memory Lights | (Procedure #1) |
| [ ] Check the System Status Codes | (Procedure #2) |
| [ ] Powerup/Reset | (Procedure #3) |
| [ ] Self Test | (Procedure #5) |
| [ ] Alternate Boot | (Procedure #6) |

### Symptom #4: Job on Computer Locks Up After Bootup

If, after the system has finished booting, the computer does not respond to your commands, we say it has "locked up" or "crashed." Perform these procedures in the order given:

| | |
|---|---|
| [ ] Check Power/Run/Memory Lights | (Procedure #1) |
| [ ] Check the System Status Codes | (Procedure #2) |
| [ ] Powerup/Reset | (Procedure #3) |
| [ ] Self Test | (Procedure #5) |
| [ ] Check Terminal/Printer | (Procedure #4) |
| [ ] Alternate Boot | (Procedure #6) |

## THE TROUBLESHOOTING PROCEDURES

The following pages define the various troubleshooting procedures listed in the previous section. We assume you are familiar with the placements of various buttons and switches on the computer—such as the reset and power buttons; if not, refer to the illustrations in Chapter 2.

## Procedure #1: Check Power/Run/Memory Lights

A. Are the power light and fan on? If yes, go to Step B. If the fan is on but the power light isn't, your power light may be burnt out. Go to Step B.

1. Press the power button to turn the computer off.

   Make sure the power cord is not damaged and is the correct type for your geographical area. Make sure it is plugged in firmly on both ends. If there is a problem with the cord, correct it and go to "Procedure #3: Powerup/Reset." If the computer comes up correctly, your problem is fixed.

2. Check the electrical source by plugging something else into the outlet, such as a lamp. If there is a problem with the outlet, correct it and go to "Procedure #3: Powerup/Reset." If the computer comes up correctly, your problem is fixed.

3. Check to make sure your computer is configured for the proper input voltage by checking to see the voltage setting is correct on the voltage switch on the back panel of your computer.

   

   ***Caution: If you have operated the computer with the improper input voltage, you may have damaged the computer.***

   If your computer is configured incorrectly, change the voltage switch to the proper setting, and perform "Procedure #3: Powerup/Reset" only ONCE. If the computer does not come up correctly, shut off the power and contact your VAR for help; stop. If it does, your problem is fixed.

   If your computer is configured correctly, proceed:

4. If the voltage configuration is correct, and the power cord is OK and in place correctly, but the power light is still not on, call your VAR for help. Stop.

B. OK, the power light is on. Is the run light on? If so, skip to Step C.

   1. If the run light is off, then perform "Procedure #2: Check the System Status Codes." If the procedure does not find and correct any problems, proceed.

   2. Perform "Procedure #3: Powerup/Reset," ONCE. If that procedure does not correct the problem, proceed.

   3. Perform "Procedure #5: Self Test." Call your VAR with the results of your self test and ask for help. Stop.

C. The power light and the run light are both on. Check the front panel display, after booting successfully the status LED will display a 0 and the run light should be on. If a status code appears on the front panel display and the computer does not boot, compare the status code with the status codes shown in Procedure #2.

   1. ***Note:*** If the memory light is on more than once in a great while, contact your VAR—you probably have memory problems.

      The memory light is actually a "1" in front of the two-digit status code on the front panel. When you see a 1 in this position, it indicates a parity error condition.

      If the memory light is on, perform "Procedure #3: Powerup/Reset" ONCE. If that procedure does not clear the memory light, proceed.

   2. Perform "Procedure #5: Self Test." Call your VAR with the results of the self test and ask for help. Stop.

D. No problem was found in this section. Please perform the next procedure on your checklist.

## Procedure #2: Check the Computer Status Codes

The section below assumes your computer is not running the self test. For information on the status codes you can see when running the self test, refer to "Procedure #5: Self Test." For more information on the status codes mentioned below, refer to Chapter 8.

Look at the front panel Status Display. As the computer boots itself, a series of status codes appears on the display in rapid succession. None of the codes should remain on the display longer than a second or two. Check for the following codes:

A. If the LED is displaying a 0, everything is normal. No problem was found in this procedure. Return to the current procedure or continue with the next procedure on your checklist.

B. If Status Code 4 remains on the display panel, this indicates that the computer ran out of QUEUE blocks. Additional QUEUE blocks can be allocated in the system initialization command file.

C. If Status Code 10, 11, or 12 remain on the display panel, this indicates that during the boot process, the computer was unable to find A31810.IDV in [1,6], or the terminal driver in [1,6], or the system initialization command file in [1,4].

D. If one of the Status Codes 20, 21, 22, or 2E remains on the display panel, the computer did not boot because of a problem with the boot PROM. Perform "Procedure #6: Alternate Boot." If the computer does not come up correctly, something serious may be wrong. Call your VAR for help. Stop.

E. If Status Code 25 or 35 remains on the display panel, this indicates that the computer was unable to locate the User File Directory (UFD) in account [1,2] on the boot device. This could indicate a problem with the format on your boot device, contact your VAR for assistance.

F. If Status Code 23, 2F, 33, or 3F remains on the display panel, you might have a problem with your boot device selection. Verify that the primary and alternate boot devices and corresponding unit numbers in the CMOS Menu are set correctly according to the instructions in Chapter 2. Perform "Procedure #3: Powerup/Reset." If the computer does not boot normally at this point, call your VAR. Stop.

G. If Status Code 24 through 28 or 34 through 39 remains on the display panel, your System Disk might be the source of the problem. Perform "Procedure #6: Alternate Boot." If the computer boots correctly, then you can suspect something is wrong with the System Disk. Your VAR can help you restore your System Disk. If the computer does not boot, something more serious may be wrong. In either case, call your VAR for help. Stop.

H. If you see Status Code 29 on the display panel, the computer is trying to warm boot from a tape device and is searching for a label on the tape. If this status code remains on the display panel for more than a minute or so, verify the correct tape is mounted in the drive. If you have a known good warm boot tape in the drive, and the computer will not boot from it, contact your VAR for help. Stop.

I. If Status Code 2A, 2b, 3A, or 3b remains on the display panel, your computer is having a problem loading or executing the system monitor program. Perform "Procedure #6: Alternate Boot." If the computer boots correctly, you might have a problem with the files on your System Disk. Your VAR can help you restore these files. If the computer does not boot from the alternate device either, something more serious may be wrong. Again, contact your VAR for help. Stop.

J. If Status Code 2d or 3d remains on the display panel, your computer has encountered an error, perhaps due to faulty memory or addressing. Perform "Procedure #5: Self Test." If your computer does not pass the self test, call your VAR with the information from the test. Stop.

K. If the status code is 80 through 8C, you are in the self test mode. Perform "Procedure #3: Powerup/Reset." If the computer boots normally, your problem is fixed; if it doesn't, call your VAR.

L. If the Status Code is a number not discussed above, your computer is probably a victim of random noise on the power lines or a software error.

Perform "Procedure #5: Self Test." If the computer does not pass the self test, call your VAR with the information from the test.

If the computer passes the self test, perform "Procedure #3: Powerup/Reset"; if the computer comes up normally, your problem is probably fixed. If it does not come up normally, call your VAR.

## Procedure #3: Powerup/Reset

A. If the computer is already turned on, skip to Step B. To turn on the computer, follow the instructions in Chapter 2. Remember—DO NOT hold in the reset button while you turn on the computer or you will enable the self test.

The computer should now boot. Skip down to C, below, for instructions on how to tell if the computer is up.

B. To reset the computer:

1. Before you reset the computer, make sure everybody is at AMOS command level—which is when they see the AMOS prompt, usually a dot. If you reset while people are working on the computer, they will lose whatever they were in the middle of. If any files are being written or transferred to the disks, wait until that process is finished—if you reset while data is being written to the disk, you might damage the data.

If anyone has files open, and cannot exit the program because his or her terminal is locked up, go ahead and reset the computer. Then, after you are up and running, run DSKANA on the disk where the file resides to check for disk errors. See Chapter 5 for instructions on using DSKANA.

2. Push the reset button.

C. Check to see if the computer is up. If you see the system initialization command file displayed on the operator terminal, and the last command is MEMORY 0, the computer has booted.

To make sure, type the following command:

**SYSTAT** RETURN

Your terminal should display system status information.

If MEMORY 0 was the last command in the system initialization command file and the SYSTAT command works, the computer booted successfully, and you can return to the procedure you are performing or to the next procedure on your checklist.

D. If the computer did not boot successfully, try turn the computer off and back on again, following these steps:

1. If your computer has a diskette drive, remove any diskette in the drive.
2. Turn off the power to any terminals, printers, and other peripheral devices connected to the computer.
3. Turn off the computer and wait a few seconds.
4. Turn on all of the terminals, printers, and peripheral devices connected to the computer.
5. Turn on the computer. Do not hold in the reset button while you do so.
6. Return to Step C, above, to see if the computer is up and running.

Return to the current procedure or go to the next procedure on your checklist whether or not the computer is up and running.

## Procedure #4: Check Terminal/Printer

Various steps in the procedure below tell you to reset the computer. If you are not familiar with this procedure, refer to Step B in "Procedure #3: Powerup/Reset."

A. Make sure each terminal is turned on:

1. For video display terminals, do you see anything on the screen? If so, the power is on—skip to B, below.

   For printers, is the power light on? If so, the power is on—skip to B, below.
2. See the terminal manufacturer's manual to find out how to troubleshoot power or fuse problems for the device.

   Correct the problem and reset the computer. If it comes up normally and your terminals seem to work all right, your problem is fixed.

B. If you do not see anything on the screen, type CTRL/Q, then CTRL/C. If you see ^C on the screen, your computer is communicating with the terminal. Type:

**SYSTAT** RETURN

If you see a system status display, your computer is probably up and running fine and your problem is fixed.

C. Checking terminal cables:

1. Make sure the terminal cables are firmly connected to the correct ports. The terminal the computer boots on is usually connected to Port #0.
2. Make sure the cables are firmly connected to the terminals. If a terminal has two ports, make sure the cable is plugged into the correct one—usually labeled MAIN—not the AUX or PRINTER port.
3. For printers, make sure the correct ends of the cable are attached to the computer and the printer—cable ends are usually not interchangeable for printers.

4. If there is a problem with the terminal cables, correct the problem and reset the computer. If it comes up normally and the terminals seem to work all right, your problem is fixed.

D. Disconnect all terminals except the terminal you are testing.

E. Reset the computer. If it comes up normally, and there is no problem with the terminal, you know one of the other terminals may be the problem.

F. Connect another terminal and go to Step D again. Repeat until you find the problem terminal.

G. Check the terminal option settings against the terminal manufacturer's manual. Check for:

1. Correct baud rate.

Your computer as shipped from Alpha Micro assumes the terminal it boots on is set for 19200 baud.

2. Set for full duplex (not half duplex) operation.
3. Set for remote (not local) operation.
4. Set for a data word length of 8 data bits.
5. Set for no parity.
6. Set for 2 stop bits if the terminal works at 110 baud; 1 stop bit if it works at any other baud rate.
7. Set for conversational (not block) mode.
8. For a printer, make sure it is on-line.

If the option settings are wrong, correct them and reset the computer. If it is up and running and the terminal works all right, your problem is fixed.

H. If you have a known good terminal similar enough to the problem terminal to work in its place, substitute it for the questionable one and reset the computer.

If the computer is up and running and the terminal works all right, you know the problem lies with the terminal, not the terminal cable. Put the original terminal back on and proceed to Step J.

If the problem is still there with the new terminal, put the original terminal back on and reset the computer. Continue with Step I.

I. Check the terminal cable. If you suspect it might be damaged, try substituting another cable and resetting the computer. If it comes up normally and the terminal works, you can assume the original cable is bad.

Remove the cable hoods from both ends of the bad cable and look for broken wires. If you feel comfortable doing so, review the cable constructions in Appendix A to see if there are any errors in cable construction.

If there is a problem with the cable, repair it or call your VAR for help. If you have repaired the cable, try hooking the terminal up again and performing "Procedure #3: Powerup/Reset." If the computer comes up normally and the terminal works all right, you have fixed the problem.

J. If the terminal has a self test mode, use it to determine the problem with the terminal. Use the manual provided by the terminal manufacturer for instructions on interpreting the terminal self test.

If the test mode tells you what the problem is, correct the problem and reset the computer. If it comes up normally and the terminal works all right, you have fixed the problem.

K. You were not able to find a specific problem with the terminal. Call your VAR if you still suspect a problem with your terminal.

L. Return to the current procedure or go on to the next procedure on your checklist.

## Procedure #5: Self Test

A. Read the introduction in *The Self Test User's Guide* that came with your computer.

Get an overall idea of the test, the terminal display, and the front panel Status Display.

B. Now look over the table Self Test Checker below.

These codes are taken from the full list of normal and error codes given in *The Self Test User's Guide.*

The error codes to watch for on the front panel Status Display are listed in the Blinking column. If an error occurs, the self test blinks the code for it. The code for the beginning of each subtest is given in the Steady column. Steady means normal condition.

The special symbols used in the Self Test Checker have these meanings:

- The slash character (/) means the codes blink alternately, showing the type of error and its location.
- The letter X in the items with an asterisk (*) means a digit (1-9) will display. Record the digit you see on the screen.
- The ranges 1-16 and 1-2 in the items with an asterisk (*) mean a number in the given range will display on the screen. Record the number that appears.

C. Turn the computer off. Perform Section C. of "Procedure #3: Powerup/Reset".

D. Start the self test: hold down the reset button on the front panel while you turn on the power by pressing the power button on. This enables the self test. Release the reset button.

E. Let the self test know your terminal's baud rate.

The terminal you use for the self test must be plugged into one of the four serial I/O ports on the CPU board. It cannot be attached to either of the two parallel ports.

The numbers 80 and 82 mark the beginning of the test and they only appear on the display for fraction of a second, followed by a steady 5b. When you see a steady 5b, press your keyboard's space bar several times. This tells the self test your terminal's baud rate so it can display messages at the correct baud rate.

F. Note which of the tests apply to your computer.

On the screen, the self test displays an inventory of your computer's configuration to let you know it will test only the components it has detected. You may want to check these off on the Self Test Checker, shown in the table below.

G. Observe the front panel Status Display and the screen.

If a blinking error code appears on the front panel Status Display, check it off on the Self Test Checker.

As each test finishes, note whether the component being tested passed or failed.

If an error occurs during the Memory Test, the addresses of the errors display on the screen. Jot them down on the Self Test Checker.

H. Stop the self test at an appropriate time.

**After the self test finishes testing all the devices**, wait until it's performing the system configuration inventory again and press the reset button to end the test.

There is a slight chance you might damage the data on the disks if you interrupt the test while it is testing one of the storage devices.

**If the test loops on the configuration test** and stays on error code 80 or 8F and won't go further, press the reset button to stop the test.

**If the test loops on the memory test**, and stays on a memory error code and won't go further, press the reset button.

I. If errors were found, call your VAR for help.

To find out what the blinking number you circled or recorded means, refer to your *Self Test User's Guide*.

Be sure to keep your Self Test Checker, since that information will be of help to your VAR.

J. If the self test didn't find a problem, return to the current troubleshooting procedure or perform the next procedure on your checklist.

| Configuration Test | | Memory Test | | Interval Timer Test | |
|---|---|---|---|---|---|
| Steady | Blinking | Steady | Blinking | Steady | Blinking |
| 80 | | 90 | | 98 | |
| | 80 | | 9X/1/16* | | 98 |
| | 5b | | 8F/1-16* | | |
| | 8F | | 8F | | |

***Table 7-1: Self Test Checker (1)***

| Serial Port Test | | Hard Disk Test | | PCI Test | |
|---|---|---|---|---|---|
| Steady | Blinking | Steady | Blinking | Steady | Blinking |
| A0 | | d0 | | d6 | |
| | A0/1-2* | | d0 | | d6 |
| | | | d1 | | |
| | | | d2 | | |
| | | | d3 | | |
| | | | d4 | | |
| | | | d5 | | |

***Table 7-2: Self Test Checker (2)***

A / indicates two codes blink alternately. An * indicates the code is in the range shown. X stands for any single digit.

## Procedure #6: Alternate Boot

You perform this procedure when previous procedures indicate something may be wrong with the software on your System Disk. The object of this procedure is to see if the computer can boot off some other device—whether or not you are successful in booting tells your VAR quite a bit about what might be wrong with your computer.

First, verify the device and unit number settings on the AM-7000 CMOS menu, for the correct alternate device. Refer to Chapter 2 for details on boot ID switch settings and the CMOS configuration menu. When you are sure the setup is correct for the device you are attempting to boot from, proceed.

A. If your computer does not contain a diskette drive, skip to Step B.

   If your computer contains a diskette drive, and you usually boot from a hard drive, place a diskette containing the system software—usually labeled "System Disk"—in the drive. Push the reset button.

   If the computer boots, there is probably some scrambled data on your hard disk preventing the computer from booting from it. Although once you are familiar with the computer you can easily restore the System Disk yourself, we recommend that as a new user you contact your VAR for help. Stop.

   If the computer does not boot, you may have a more serious problem. Contact your VAR for help.

B. If your computer does not contain a diskette drive, you can create a warm boot tape using a streaming tape drive:

   To warm boot from a streaming tape:

1. Load your warm boot tape into your streaming tape drive.
2. Push your computer's reset button. In about 30 seconds you should see a message giving the version number of the operating system. Then, the AMOS prompt symbol, a dot, displays.

   If you do see the operating system message and a dot, you have successfully warm booted. Because this is a warm boot you do not see the system initialization command file on the operator terminal. Go to the next step.

   If you do not see the operating system message and a dot, try performing the warm boot once more. If you still do not see the message, call your VAR for help. Stop.
3. Enter the following command:

   **DIR SYS:AMOS*** RETURN

   If your terminal displays a list of files including two with .INI and .MON extensions, you know at least some of your System Disk is intact.

   Although once you are familiar with the computer you can easily restore the System Disk yourself, we recommend that as a new user you contact your VAR for help at this point. Stop.

# Chapter 8 - Status Display Codes

Your computer provides various tools for you to use to assure yourself your computer is healthy and operating as it should. For instance, your computer is capable of testing itself and checking most of its own internal components for proper operation.

Besides letting you know when things are working correctly, if a problem should occur, these tools help you find the cause. This chapter describes these diagnostic tools:

- Status codes: normal and error status codes that appear on the front panel display when you boot your computer system or run the self test.
- The self test feature: a powerup diagnostic test that checks all major hardware components in the main chassis. (The self test is discussed in detail in the *System Self Test User's Guide*, DSO-00157-00, Rev. 01, that came with your computer.)

## FRONT PANEL STATUS DISPLAY CODES

During normal operation, when you are not using the self test, the front panel status displays a zero. When you boot your computer, a series of codes appears in rapid succession on the display as the AMOS operating system gets itself up and running. If an error occurs during booting, one of these codes may remain on the status display. This can tell you what was happening when the error occurred.

Some of these codes may also occur any time the computer is running. If you have a problem with your computer, check the front panel; if there is a code displayed, look it up in this table to help diagnose the problem.

| Front Panel Status Code | Description |
|---|---|
| 0 | Computer is functioning normally. |
| 1 | Control has been passed from the Boot PROM to AMOS and AMOS is starting its initialization process. |
| 4 | System has gone under 100 queue blocks remaining. This code displays until replaced by another, even if the system now has over 100 queue blocks. At a convenient time, allocate more system queue blocks in the system initialization file. |
| 7 | LEVEL7 debugger is active. Will occur only when the LEVEL7 software is loaded in system memory. Refer to the LEVEL7 documentation for details. |
| Steady 8 | The computer's internal DC power supply has detected an internal power failure. Contact your VAR. |
| Flashing 8 | UPS low battery condition has existed for more than two minutes. The system has executed a shutdown procedure. Write-caching is deactivated on any disk drives which had it enabled. The system is now in a HALT condition until the batteries in the UPS are completely dead. Turn off system power! To reset this condition, you must get the UPS primary power back on line. Check the UPS input power breaker and be sure it's ON! The system must be rebooted with a hardware reset. |
| 9 | Memory parity error was encountered. |
| F | During booting, memory is being cleared and sized. |
| 10 | An interface driver (.IDV) defined in a TRMDEF statement in the system initialization file was not found in account [1,6] on first logical of the boot device. |
| 11 | A terminal driver (.TDV) defined in a TRMDEF statement in the system initialization file was not found in account [1,6] on the boot device. |
| 12 | AMOS system initialization (.INI) file not found in account [1,4] on the first logical of the boot device. |
| 1E | During booting, system was halted due to a bus time-out error. |
| 20 | The computer is beginning to execute the boot PROM. An error at this point indicates your computer has a faulty PROM or other hardware problem. Contact your VAR. |
| 21 | The computer is transferring the instructions from the PROM into its Random Access Memory (RAM). If an error occurs here, your computer might have a bad PROM or bad memory. Contact your VAR. |

***Table 8-1: Front Panel Status Codes***

| Front Panel Status Code | Description |
|---|---|
| 22 | The computer is generating a checksum of the instructions in Random Access Memory. If this calculated checksum does not match the checksum coded into the instructions themselves, you see a 2E error code. If an error occurs here, your computer might have a bad PROM or bad memory. Contact your VAR. |
| 24 | Reading the Master File Directory (MFD) from disk. An error at this point indicates disk problems in the alternate boot device. |
| 25 | Searching for the User File Directory (UFD) account [1,2] on the first logical of the alternate boot device. |
| 26 | Searching for a BADBLK.SYS file in account [1,2] on the first logical of the alternate boot device. Valid only on disk drives that use a BADBLK.SYS file. |
| 27 | Loading BADBLK.SYS on the alternate boot device. Valid only on disk drives that use a BADBLK.SYS file |
| 28 | Searching for account [1,4] on the first logical of the alternate boot device. An error at this point may indicate disk problems. Try reloading the latest version of the system software. |
| 29 | If you are ***booting from a tape device***, the computer is searching for a label block on the tape, as the alternate boot device. |
| 2A | Loading the AMOS monitor from the alternate boot device. If an error occurs at this point, try reloading the latest version of the system software. |
| 2b | Beginning to execute the AMOS monitor program from the alternate boot device. If an error occurs at this point, try reloading the latest version of the system software. |
| 2d | Bootup from the alternate boot device failed because of a time-out error. This may indicate a faulty memory or an addressing problem. |
| 2E | Bootup from the alternate boot device failed because of a bootstrap loader program checksum error. This may indicate a bad PROM or bad memory. |
| 2F | Bootup from the alternate boot device failed because of an invalid boot device selection. Access the CMOS setup routine by pressing Reset, then pressing the ESC key when the code "CS" appears on the front panel. Verify the device and unit number settings on the CMOS menu. |
| 33 | ***While booting:*** initializing the primary boot device. If the boot stops at this point, it may indicate a hardware problem with the primary boot device. When you are booting from a disk, this code may remain on the display for a short time after you've turned the power on, while the disk drive spins up to operating speed. |

***Front Panel Status Codes (continued)***

| Front Panel Status Code | Description |
|---|---|
| 34 | ***While booting:*** reading the Master File Directory (MFD) from the primary boot device. An error at this point indicates disk problems.<br><br>***During normal operation:*** unimplemented Integer instruction encountered. |
| 35 | Searching for the User File Directory (UFD) account [1,2] on first logical of the primary boot device. |
| 36 | Searching for a BADBLK.SYS file on the first logical of the primary boot device. Valid only on disk drives that use a BADBLK.SYS file. |
| 37 | Loading BADBLK.SYS on the first logical of the primary boot device. Valid only on disk drives that use a BADBLK.SYS file |
| 38 | Searching for account [1,4] on the first logical of the primary boot device. An error at this point may indicate disk problems. Try reloading the latest version of the system software. |
| 39 | If you are ***booting from the hard drive (DSK0)***, this code indicates the computer is looking for the system monitor file in [1,4] as the primary boot device. If this file is missing, reload the latest version of the system software. |
| 3A | Loading the AMOS monitor from the primary boot device. If an error occurs at this point, try reloading the latest version of the system software. |
| 3b | Beginning to execute the AMOS monitor from the primary boot device. If an error occurs at this point, try reloading the latest version of the system software. |
| 3F | Bootup failed because of an invalid primary boot device selection. Access the CMOS setup routine by pressing Reset , then pressing the ESC key when the code "CS" appears on the front panel. Verify the device and unit number settings on the CMOS menu. |
| 40 | UPS inverter on. Normal operation recovering from an AC power failure. Only displays if the UPS status cable is installed on the UPS port. |
| 41 | UPS is bypassed. System running without UPS battery protection. Please turn on UPS run switch. |
| 42 | UPS inverter on, AC power failure detected, and the system is running off batteries. This status is updated every second that the AC power is off.. |
| 43 | Not valid, system inoperative. |
| 44 | UPS is on, and batteries are low. Batteries are recharging, please check. |
| 45 | UPS is bypassed and batteries are low. |

***Front Panel Status Codes (continued)***

| Front Panel Status Code | Description |
|---|---|
| 46 | UPS inverter is running and a low battery condition exists. Only **2 minutes of power remaining!** System shutdown is imminent. |
| 47 | Not valid, system dead. |
| 48 | An internal fault has been detected in the UPS. |
| 49 | An internal fault has occurred in the UPS and it is in bypass. |
| 4A - 4E | Not valid. |
| 4F | UPS cable has been unplugged from UPS port. |
| 62 | Detected an AC power failure |
| 66 | AMOS initialization is complete and DSK0 is being mounted. |
| 88 | Trying to execute an unimplemented SVCA (Monitor) call. |
| 89 | Floating Point emulation |
| 95 | Logger CREATE error. |
| 96 | Logger CLOSE error. |
| 97 | Logger FILOTX error. |
| 98 | Logger OPENA error. |
| 99 | Logger semaphore not available. |
| B0 | CMOS batteries need to be replaced. Data that was stored in CMOS RAM is not guaranteed. |
| B1 | The battery voltage dropped temporarily (i.e., after replacing the batteries). The initial CMOS parameters are not guaranteed. Access the CMOS setup routine by pressing Reset, then pressing the ESC key when the code "CS" appears on the front panel. Re-enter CMOS settings. |
| C0 | Unimplemented Integer Instruction |
| CC | The computer is testing the CMOS RAM for proper operation after detecting a CMOS checksum error. |
| CE | CMOS parameter checksum error. This code will flash on the front panel for several seconds. |
| CF | CMOS RAM failure. The system is going into a halt state. Contact your dealer or the Alpha Micro Technical Assistance Center. |
| CS | Do you want to enter CMOS setup? You have three seconds to press the ESC key on the boot terminal, which must be set at 19200 baud. |

***Front Panel Status Codes (continued)***

| Front Panel Status Code | Description |
|---|---|
| D0 | Tried deleting all three valid timer chips and all failed. |
| EF | System has detected an attempt to write outside of the supervisor stack area. |
| F | On boot-up, memory is being cleared and sized. |
| F0 | Bus error was encountered. |
| F1 | Address error was encountered. |
| F2 | Illegal instruction was encountered. |
| F4 | CHK instruction. |
| F5 | TRAPV instruction. |
| F6 | Privilege violation. |
| F7 | TRACE return. |
| F8 | Coprocessor protocol violation. |
| F9 | EM1111. |
| FA | FPCP branch or set on unordered condition, or FPCP inexact result, or FPCP divide by zero, or FPCP underflow, or FPCP operand error, or FPCP overflow, or FPCP signaling NAN, or FPCP unimplemented data type. |

***Front Panel Status Codes (continued)***

For more information on status display codes, and on how your own programs can send a number to the status display, please refer to the *System Operator's Guide*.

Other status codes can appear during Self Test; these codes are discussed in the *System Self Test User's Guide* that came with your computer.

## SELF TEST FEATURE

One of your computer's most helpful features is its ability to test itself and check its major hardware components for proper operation. The major purpose of this diagnostic test is to check all hardware whose failure might prevent your computer from operating properly, and to assure you all hardware components are working correctly.

If the diagnostic test reports a problem, you can contact your Alpha Micro VAR for help. Tell your VAR the information displayed by the diagnostic test; it will help the technicians give you quick service by narrowing the problem down to a specific piece of hardware within the computer.

Because the operation of the self test and the codes displayed by the self test differ depending on the version of the boot PROMs contained in your computer, the appropriate self test information for your computer can be found in the *System Self Test User's Guide* that was shipped with your computer.

# Appendix A - Connector Configurations

The types and number of connectors found on the rear panel of your AM-7000 will vary, depending on the hardware configuration you order.

## SERIAL I/O CONNECTORS

The AM-7000's I/O interface board, the AM-319-20, includes four on-board RS-232 serial ports. All four serial ports have standard RJ-45 connectors and use the A31810.IDV interface driver for octal port numbers 0 through 3.

The AM-7000 system chassis has seven (or more, depending on chassis) rear panel slots designed for serial I/O expansion. These slots can be used for standard Alpha Micro I/O paddle cards, such as the AM-359, which connect to the A channel expansion bus on the AM-319-20 board.

For even more flexibility, the first six slots can be used to house I/O paddle cards, and the seventh slot can be used for connection to an AM-3501 I/O expansion chassis. The expansion chassis can accommodate an additional seven serial I/O paddle cards which are connected back to the B channel expansion bus on the main AM-319-20 board.

AM-359 serial I/O expansion paddle cards connected to the A channel bus use the standard AM359.IDV interface driver. Paddle cards connected to the B channel bus use the AM359B.IDV interface driver.

Although several different types of I/O paddle cards are available, Alpha Micro highly recommends the use of AM-359 eight-port serial I/O cards for serial I/O expansion. The AM-359 paddle cards use the same standard RJ-45 connectors and cables as the AM-7000's on-board ports, they can be purchased with or without optical isolation protection, and they consume less I/O select addressing than any other I/O expansion card, which allows for more ports per I/O channel!

## WHAT IS RS-232?

All AM-7000 serial ports support RS-232. RS-232 is the name of a standard developed by the Electronic Industry Association (EIA) to encourage standardized interfacing of devices to computer systems. The letters RS stand for Recommended Standard. The RS-232 interface standard specifies electrical signal characteristics and names, and defines the functions of the signal and control lines that make up the interface.

Basically, implementing this standard involves assigning standardized signal definitions for the various pins of the RS-232 connector at either end of your terminal or printer cables. For example, the wire attached to Pin #2 carries the signal interpreted on the computer end as "Input Data from Terminal" and on the terminal end as "Transmit Data To Computer."

You enable these specific signals by attaching cable wires to certain connector pins.

If a terminal or printer manufacturer says their device is RS-232 or RS-232C compatible, it will probably be easy for you to connect it to your Alpha Micro computer system.

Before constructing the cable to connect a printer or terminal to your Alpha Micro computer system, you need to consult the manufacturer's manual accompanying the device. It will tell you how to wire the connector on the device end. Few devices use all of the defined signals. In most cases, you need to connect only three or four pins. Although printer cables are sometimes a little more complicated on the printer end, terminal cables are often the same on both computer and terminal ends.

Alpha Micro uses RJ-45 connectors for RS-232 device connection. The maximum length of RS-232 cables is ***50 feet*** between devices.

## IMPORTANT NOTE

The Federal Communications Commission (FCC) has established rules regarding allowable emission levels of Class A computing devices (ref: Subpart J of Part 15 of FCC Rules). The Alpha Micro systems to which this manual applies have been determined to be in compliance with the FCC rules. However, you should be aware that if other devices, such as terminals and printers, are attached to these systems, even if the devices are attached in accordance with the instructions contained in this manual, the resulting configuration may not be in compliance with the referenced FCC rules. Corrective measures, if any are required, are the responsibility of the user. Information on emission levels of peripheral devices should be obtained from the manufacturer of the device.

## CABLE CONSTRUCTION GUIDELINES

If you want to construct your own cables, there are a few things you should keep in mind before soldering the cable connectors:

### Cable Length

We strongly recommend that RS-232C cables be not more than fifty feet long. As you increase the cable length beyond fifty feet, the reliability of the data signal decreases. This applies when using an untwisted paired cable. These are some things you can do if the cables absolutely must be longer than fifty feet:

1. Alternatives to the RS-232 standard, namely RS-422, do allow communication over cables longer than fifty feet. Since RS-422 is supported only by the AM-358 board, you will need some special equipment to implement these standards.
2. Signal conditioning equipment (for example, a "short haul modem") can improve signal quality.

### Cable Type

We recommend you use a twisted paired shielded and jacketed cable. The cable should be rated at least CMP Level 3, but you can use CMP Level 5 cable for lines longer than 100 feet. Most cities require that any low voltage communication cable have a CMP, Communication cable Plenum rating. This type of cable should comply with your local fire codes for installation in your facility. Using a high quality twisted paired, overall shielded cable helps minimize electromagnetic interference. Reducing this

interference protects your system from signal noise. It also protects other devices around your Alpha Micro computer system (such as a TV or radio) from interference radiated by an improperly shielded system.

The following section, titled "Cable Shielding," provides instructions on creating an adequately shielded cable that should provide satisfactory protection from interference. Please see the "Important Note" above for information on your responsibilities concerning electromagnetic interference.

## Cable Shielding

There are different techniques for shielding a terminal or printer cable, but the method we recommend as best satisfying FCC shielding requirements is to use a metal connector hood that connects to the cable shield. Alpha Micro has pre-made cables available using this shielding technique.

The shielded cable consists of several layers. On the inside are the colored wires that carry the data signals. Surrounding these wires is a metal foil covering. On the outside of the foil covering are small, uncoated, "drain wires." Completely surrounding all of the above elements is the plastic coating that forms the outside of the cable.

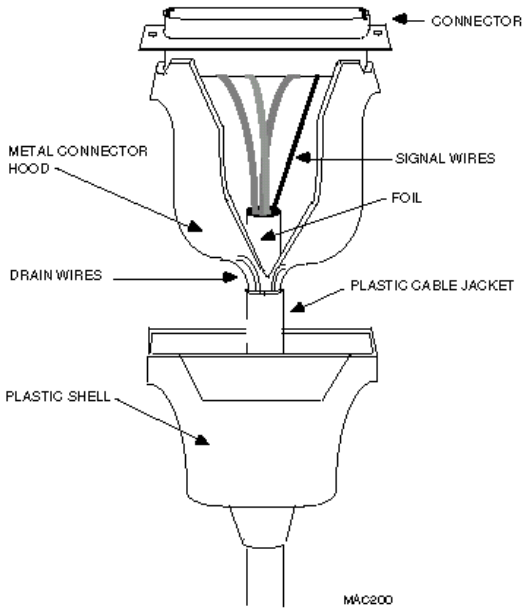


***Figure A-1: Shielding a Cable***

The technique for making an adequately shielded cable involves connecting the metal cable hood to the cable drain wires to ensure electrical continuity. Please refer to the figure above.

When you strip the end of the shielded cable to allow access to the signal wires, also strip a small amount of the plastic coating back from the interior foil layer of the cable. Trim the drain wires and bend them down over the plastic coating of the cable. Make the signal wire connections by soldering the proper signal wires to the appropriate connector pins as discussed in the preceding section.

Next, put the metal connector hood in place, enclosing the cable. Bend the drain wires back up over the outside of the connector hood neck, and solder them into place. Crimp the supplied strain relief ring over the connector hood/cable connection as shown in the figure above. If a plastic outer shell is provided for the metal connector hood, put it in place now.

The new RJ-45 serial ports have a shield ground connection at pin 1. All cables adapters and assemblies have the shield ground connection to pin 1. These pre-made cable assemblies are available from Alpha Micro and their part numbers and details are documented in the AM-359 product installation instructions. For pinout and cable construction information, refer to *AM-359 - 8-Port Serial I/O Installation Instructions*, PDI-00359-00

## RS-232 DB-9 CONNECTOR SIGNALS

For RJ-45 connectors, use the standard AM-359-50 cable set or straight RJ-45 patch cords. The RJ-45 connectors use the same pin-outs as DB-9 connectors.

The following table shows the signal-to-pin orientation applicable to each standard DB-9 serial I/O connector:

| PIN | Direction | RS-232 Signal Name |
|---|---|---|
| 1 | | N/C—No Connection |
| 2 | Input | RXD—Received Data |
| 3 | Output | TXD—Transmitted Data |
| 4 | Input | CTS—Clear to Send |
| 5 | Output | RTS—Request to Send |
| 6 | | N/C—No Connection |
| 7 | | GND—Signal Ground |
| 8 | Input | DCD—Data Carrier Detect |
| 9 | Output | DTR—Data Terminal Ready |

***Table A-1: Rear Panel DB-9 Connector Signals***

## RS-232 DB-9 to DB-25 Terminal Cables

This section tells you which pins to connect to construct cables for particular terminals supported by Alpha Micro. We have grouped the signals into pairs which will also allow longer and more reliable communication to the computer system.

The AM-60, AM-62, and AM-70 terminals are all RS-232 devices and use the same cabling. The AM-62A, AM-65, AM-72, and AM-75 terminals, when used as RS-232 devices, also use these pinouts.

For RJ-45 connectors, use the standard AM-359-50 cable set or straight RJ-45 patch cords. The RJ-45 connectors use the same pin-outs as DB-9 connectors.

The following table gives the pinouts required for RS-232 cables connecting a terminal to the computer:

| **Terminal End Male DB-25 Connector** | | | **Computer End Male DB-9 Connector** | |
|---|---|---|---|---|
| **SIGNAL** | **PIN#** | **DIRECTION** | **PIN#** | **SIGNAL** |
| TXD | 2 | ⟶ | 2 | RXD |
| GND | 7 | ⟷ | 7 | GND |
| RXD | 3 | ⟵ | 3 | TXD |
| DTR | 20 | ⟶ | 4 | CTS |

***Table A-2: Pinouts for RS-232 Terminal-to-Computer Cables***

The DTR connection (pin 20) to the computer (pin 4) can serve as 'READY/NOT BUSY' handshake line to prevent 'overrunning' the terminal with data. This protocol is also effective for several printers used by Alpha Micro.

**Caution:** While this cable configuration enhances the use of the Alpha Micro terminals, it may degrade system performance with other types of terminals and printers if they do not provide a compatible DTR on pin 20. In such cases, the connection to pin 4 at the computer end should be disconnected.

## Workstation Connection Cables

For RJ-45 connectors, use the standard AM-359-50 cable set or straight RJ-45 patch cords. The RJ-45 connectors use the same pin-outs as DB-9 connectors.

RS-232 pin assignments for connecting an IBM PC-compatible workstation to the Alpha Micro computer are listed in the tables below.

| **Workstation Serial I/O Port (Female DB-9)** | | | **Computer End Male DB-9 Connector** | |
|---|---|---|---|---|
| **SIGNAL** | **PIN#** | **DIRECTION** | **PIN#** | **SIGNAL** |
| TXD | 3 | ⟶ | 2 | RTX |
| CTS | 8 | ←\| | 5 | RTS |
| DSR | 6 | ←\| | | |
| DCD | 1 | ←\| | | |
| RXD | 2 | ⟵ | 3 | TXD |
| RTS | 7 | ⟶ | 4 | CTS |
| GND | 5 | ⟷ | 7 | GND |

Note: Pins 1, 6 and 8 on the workstation connector are jumpered together.

***Table A-3: Pinouts for Workstation to Computer Cable - IBM PC/AT and Compatibles***

| **Workstation Serial I/O Port (Male DB-25)** | | | **Computer End Male DB-9 Connector** | |
|---|---|---|---|---|
| **SIGNAL** | **PIN#** | **DIRECTION** | **PIN#** | **SIGNAL** |
| TXD | 2 | ⟶ | 2 | RTX |
| CTS | 5 | ⟵ | 5 | RTS |
| DSR | 6 | ←\| | | |
| DCD | 8 | ←\| | | |
| RXD | 3 | ⟵ | 3 | TXD |
| RTS | 4 | ⟶ | 4 | CTS |
| GND | 7 | ⟷ | 7 | GND |

Note: Pins 5, 6 and 8 on the workstation connector are jumpered together.

***Table A-4: Pinouts for Workstation to Computer Cable - IBM PC/XT and Compatibles***

## RS-232 RJ-45 TO DB-25 CABLES FOR TERMINALS AND PRINTERS

The following table shows the signal-to-pin orientation of each of the AM-7000's four on-board serial I/O connectors. Note that this particular cable uses an RJ-45 to RJ-45 patch cord, and a DB-25 connector adapter to interface to the terminal or printer. The AM-359 serial I/O paddle cards can use an identical cable when required.

| **Computer End** | | **RJ-45 Patch Cord** | | | **Terminal or Printer DB-25 Adapter** | |
|---|---|---|---|---|---|---|
| **SIGNAL** | **PIN#** | **DIRECTION** | **PIN#** | **DIRECTION** | **PIN#** | **SIGNAL** |
| RXD | 5 | ⟵ | 5 | ⟵ | 2 | TXD |
| RTS | 4 | ⟶ | 4 | ⟶ | 5 | CTS |
| TXD | 3 | ⟶ | 3 | ⟶ | 3 | RXD |
| DTR | 6 | ⟶ | 6 | ⟶ | 8 | DCD |
| CTS | 2 | ⟵ | 2 | ⟵ | 20 | DTR |
| GND | 7 | ⟵ | 7 | ⟵ | 7 | GND |
| DCD | 8 | ⟵ | 8 | ⟵ | 4 | RTS |
| Shld GND | 1 | ⟵ | 1 | ⟵ | 1 | Shld GND |

***Table A-5: RS-232 RJ-45 to DB-25 Connector Signals***

The patch cords should be internally twisted-pair cable with RJ-45 connectors on both ends. The pin assignments are straight through (pin-for-pin) with no swapped ends.

Alpha Micro also offers a pre-made cable featuring an RJ-45 connector on one end and a standard female DB-9 connector on the other end. For more information on RJ-45 cable adapters and types, refer to the AM-359 product installation instructions (PDI-00359-00). The AM-359 PDI has details on the cables and adapters available from Alpha Micro to interconnect just about any serial device to these ports.

## PARALLEL PRINTER PORTS

AM-7000 computers have four high-speed parallel ports. All the parallel ports on the AM-7000 support the industry standard Centronics interface. The signal pinouts for the parallel ports are as follows:

To insure the reliability and performance of your parallel ports, avoid using parallel printer cables longer than **six feet.**

| PIN # | SIGNAL NAME |
|---|---|
| 1 | Data strobe |
| 2 | Data 1 |
| 3 | Data 2 |
| 4 | Data 3 |
| 5 | Data 4 |
| 6 | Data 5 |
| 7 | Data 6 |
| 8 | Data 7 |
| 9 | Data 8 |
| 10 | Acknowledge |
| 11 | Busy |
| 12 | Paper error |
| 13 | Select |
| 14 | Auto line-feed (not used) |
| 15 | Error |
| 16 | Printer reset |
| 17 | Select in |
| 18 | Ground |
| 19 | Ground |
| 20 | Ground |
| 21 | Ground |
| 22 | Ground |
| 23 | Ground |
| 24 | Ground |
| 25 | Ground |

***Table A-6: Centronics Interface Cabling Signal Pinouts***

## AM-7000 UPS STATUS PORT

The UPS status port on the back panel of the AM-7000 is a male DB-9 connector. The UPS system also has a male DB-9 connector for its switch contact port. To connect the UPS to the computer you will need a cable with two female DB-9 connectors. The following table shows the pinout connections required to make this cable. You will need an 8-wire cable, and both grounds are necessary!

| CPU Signal Name | ←—— FDB-9 | cable | ——→ FDB-9 | UPS Signal Name |
|---|---|---|---|---|
| FAULT | 3 | ←—— | 1 | FAULT |
| GND | 2 | ←—— | 2 | GND |
| GND | 5 | ←—— | 5 | GND |
| ON BYPASS | 6 | ←—— | 6 | ON BYPASS |
| LOW BATTERY | 7 | ←—— | 7 | LOW BATTERY |
| INVERTER ON | 8 | ←—— | 8 | INVERTER ON |
| AC PWR FAIL | 9 | ←—— | 9 | AC PWR FAIL |

***Table A-7: AM-7000 UPS Status Port Signal Pinouts***

## ETHERNET RJ-45 10 AND 10 / 100 BASET CONNECTOR

The Ethernet RJ-45 ports (both 10BaseT and 10/100Base T) functions exactly like a DB-15 Ethernet AUI port. The following section explains some of the technical aspects of Ethernet networking, as well as the cable pinouts required when using the one of these RJ-45 interface connectors.

### 10/100BaseT Topology and Cabling

Ethernet networks were originally designed to be multi-point networks arranged as a bus topology. That meant that Ethernet would work over coaxial cable (either thick or thin) with 50 ohm termination at each end of the network, and each computer would attach directly to the same cable.

With the introduction of 10BaseT and later 100BaseT, Ethernet can be connected via inexpensive twisted pair (Level 5 compliant) cabling, with each computer having its own RJ-45 termination. As a result however, the network topology is changed so that a central repeater or "hub" is required to perform the task of re-broadcasting both data and Ethernet control signals to all other computers connected to the Ethernet. Such repeaters are commonly available from commercial sources.

10BaseT and 100BaseT connections use 100 ohm unshielded twisted pairs, with at least two pairs per cable (one set of pairs for transmitting data and another for receiving). These cables terminate in eight pin RJ-45 connectors with the following pin assignments:

| RJ-45 Pin Number | Signal Name |
|---|---|
| 1 | Transmit Data + |
| 2 | Transmit Data - |
| 3 | Receive Data + |
| 6 | Receive Data - |

***Table A-8: 10/100BaseT (RJ-45) Connector Signals***

You should consult the 10BaseT and 100BaseT cabling specifications for details on cable lengths, impedance, wiring guidelines and other details to insure that your network configuration is properly designed and configured.

# Appendix B - The Control Characters

Your terminal keyboard allows you to type control characters which perform special functions. A control character is the signal transmitted to the computer when you hold down the CTRL key and press another key at the same time. The following list contains the most important control characters. The *AMOS User's Guide* contains a complete list of control characters and their functions.

**Control-C**

Control-C is the system interrupt command. You use it to interrupt whatever program is in progress and return to AMOS command level. After pressing CTRL/C to interrupt a program, you cannot resume execution of that program; you must start it over from the beginning.

Some programs, such as AlphaVUE, do not recognize a Control-C as an exit command; instead you must use the exit command for that program if you want to return to AMOS command level.

Other programs do recognize a Control-C; however, if an exit command exists for a program, it is usually better to use that command than to press CTRL/C. Many programs perform various closing functions when you use their normal exit commands and would not have a chance to perform those procedures for an orderly exit if you bypass them by using a Control-C.

**Control-U**

At AMOS command level, you may move to the leftmost character of the command line you are typing by pressing CTRL/U.

**Control-S**

A program or command often displays more data on your terminal than fits on one screen. To stop the screen display, press CTRL/S.

You can now read the data on the screen at your leisure. Not only does the display freeze, but AMOS actually stops sending data to your terminal until you press CTRL/Q (see below); at that point, AMOS resumes sending information where it left off.

While a Control-S is in effect, AMOS stores, but does not act upon, anything you type except for CTRL/Q. There is, however, a limit to how much can be stored. The exact number of characters depends upon your initial system setup.

**Control-Q**

When you press CTRL/S (described above) to freeze the screen display, you must press CTRL/Q to resume the screen display. If you have typed anything while the Control-S was in effect, a Control-Q tells AMOS it can now go ahead and act upon that input.

Try this: Press CTRL/S, then type DIRRETURN, and then PRINTRETURN. The commands aren't displayed on the screen and it appears that nothing happened. Now press CTRL/Q to release the display, and you see first a list of the files in your account printed on the screen, then a display of the files waiting to print.

**Control-R**

The command buffer is an area of memory where the computer stores commands that have been entered. Pressing CTRL/R shows you what commands are in your command buffer.

If the line editor is installed on your computer, you can use CTRL/R to call up previous command lines, make changes to them, and then submit them again. This is a great convenience if you want to enter a series of similar commands; you can just keep making minor changes to one command, and reusing it.

# Appendix C - Super I/O

Super I/O is designed to significantly increase character output for all serial ports using the A31810.IDV or AM359B.IDV drivers. This includes all AM-359 board serial I/O ports, as well as the AM-7000's four on-board serial ports. The more terminals you have on your system performing character output, the more you will benefit from Super I/O.

Super I/O handles character output in a much more efficient manner than any other previously released AMOS serial port driver, which greatly reduces the load on the CPU and makes more CPU cycles available for other tasks.

In earlier versions of AMOS, Super I/O was a separate, optional feature. In all versions of AMOS supported on the AM-7000, Super I/O is included in the operating system.

## DISABLING SUPER I/O

For most Super I/O compatible serial ports, you will always want to have Super I/O enabled. However, if you have an application program that does not run properly on a Super I/O enabled serial port, it is possible to disable Super I/O. You can disable Super I/O on one or more AM-359 boards, but you can't disable Super I/O on an individual serial port.

### Disabling Super I/O on All I/O Boards

If the application causing problems is one you run infrequently, you can temporarily disable Super I/O on all your AM-359 ports by using the following procedure:

1. Create a copy of your system initialization command file; type:

   ```
   LOG 1,4 RETURN
   COPY TEST.INI=AMOS32.INI RETURN
   ```

2. Use AlphaVUE to modify your TEST.INI file. Locate the first AM-359 TRMDEF statement. Disable Super I/O by adding **/O** (that's an "O", not a zero) to the first AM-359 TRMDEF statement. For example, change:

   ```
   TRMDEF TERM2,AM359=0:19200,AM65,100,100,100
   ```

   to

   ```
   TRMDEF TERM2,AM359/O=0:19200,AM65,100,100,100
   ```

3. Save the file and leave AlphaVUE. The use the MONTST command to boot with the test initialization file, as described in Chapter 5.

Once you have completed running the program that exhibits problems under Super I/O, you can reboot your computer using the standard system initialization command file, which will reactivate Super I/O.

## Disabling Super I/O on Individual AM-359 Boards

When your computer is processing your system initialization command file, it loads a copy of the AM359.IDV file when it encounters the first TRMDEF statement for an I/O board. This same copy of the .IDV file is used for all subsequent I/O boards. This being the case, if you use the **/O** switch in the first AM-359 TRMDEF statement, Super I/O is disabled on all I/O boards in your computer. In some cases, you may want to disable Super I/O on a particular AM-359 board, while leaving Super I/O enabled on your other I/O boards. The procedure for doing this is as follows:

1. First, make a copy of your AM359.IDV file; make sure the copy uses a name other than AM359.IDV. For example, while in the DVR: account, type:

   **`COPY AM359S.IDV=AM359.IDV`** RETURN

2. Create a copy of your system initialization command file; type:

   **`LOG 1,4`** RETURN
   **`COPY TEST.INI=AMOS32.INI`** RETURN

3. Use AlphaVUE to modify the TEST.INI file. Locate the AM-359 board or boards for which you want to disable Super I/O. For all of the TRMDEF statements for the ports on those boards, substitute **AM359S** in place of AM359. Do this only for the AM-359 boards for which you want to disable Super I/O.

4. Now, you must add the **/O** switch to the very first TRMDEF statement that uses the AM359S driver. For example:

   **`TRMDEF TERM17,AM359S/O=20:19200,AM65,100,100,100`**

3. Save the file and leave AlphaVUE. The use the MONTST command to boot with the test initialization file, as described in Chapter 5.

To disable Super I/O for the AM-319-20 serial ports, use this procedure for A31810.IDV instead of AM359.IDV.

# Appendix D - SCSI Termination

## SCSI TERMINATION USING EXTERNAL TERMINATOR OPTION

The preferred method of terminating the SCSI bus in an AMOS based computer is the installation of an external terminator. In April 1993, the external SCSI bus terminator became standard on all AMOS computers. Using an external terminator makes installing an add-on subsystem (like a portable CD-ROM drive) easier, eliminating the need to remove terminators from a SCSI device located in the host computer. In the AM-7000, the external terminator ***must be*** an “active” terminator. An active terminator is included with your AM-7000.

The AM-176-10 board is sensitive to incorrect SCSI bus termination. If you are using the external terminator and one of the SCSI devices inside the computer also has its terminators installed, you will experience problems.

The SCSI bus must be terminated at each end of the cable. The AM-176-10 terminates one end of the bus. The other end must be terminated by an active style external terminator. An active terminator for the wide SCSI bus (PRA-00222-20) is included with the AM-7000.

To use the external terminator, make sure none of the SCSI peripherals inside the computer are terminated. The termination power for the SCSI bus is provided by the AM-176-10 board.

The external terminator is shown in Figure A-1:

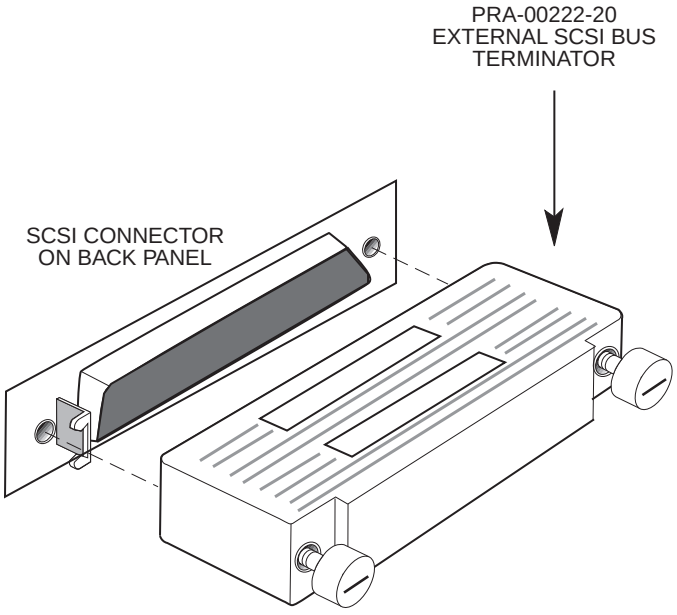


***Figure D-1: Active External Terminator Installation***

Figure A-1 shows an extended active external SCSI connector. This configuration is used on almost all of Alpha Micro's currently available product. The terminator is installed by sliding it over the connector and then screwing it into place.

## ATTACHING EXTERNAL DEVICES

To attach an external SCSI device, you must remove the terminator from the external SCSI port. However, you ***must*** make sure the SCSI bus is still terminated at both ends. To do so, install the external active terminator in the unused SCSI I/O port of the external SCSI device.

Attaching an external narrow SCSI device, such as a CD-ROM drive, to a system using the Wide SCSI bus is a special case. You must make sure all 16 lines of the Wide SCSI bus are properly terminated. To do so:

1. Use an external wide to narrow SCSI cable which actively terminates the “high” nine lines of the Wide SCSI bus. Alpha Micro offers this cable in both three foot and six foot lengths (PDB-00440-80 and PDB-00440-81).
2. Plug the narrow active external terminator (PRA-00222-21) into the unused SCSI I/O port of the external device. This terminates the “low” half of the SCSI bus.

Notice that, in this configuration, the Wide SCSI active external terminator (PRA-00222-20), which is normally plugged into the external SCSI port, is not used.

## TERMINATOR POWER

For information on how to configure terminator power, see the following documents:

- *SCSI Disk Drives Installation Instructions*, PDI-00436-20, revision A12 or later.
- *AM-626/627/628/629 SCSI 1/4" Streaming Tape Drive Installation Instructions*, PDI-00625-00, revision A05 or later.
- *AM-647 DAT Tape Drive Installation Instructions*, PDI-00647-00, revision A02 or later.
- The configuration document accompanying your disk drive.

# Appendix E - Read-Ahead and Write Buffering

## INTRODUCTION

Earlier AMOS systems achieved high levels of performance by using an intelligent disk controller (such as the AM-520) to offload a large portion of the CPU overhead associated with disk access. A benefit of this offloading is that extra cycles are available on the controller to perform functions such as read-ahead and write buffering. Both of these schemes are used by the current AM-520 firmware, but cannot be used on other non-intelligent interfaces such as the Alpha Micro SASI interface because the main processor running AMOS has to control the SASI interface, stealing CPU cycles away from other resources, such as the terminal service system and user jobs.

The AM-176-10 board uses a programmable RISC DMA controller for SCSI bus communications and for data transfer to and from the AM-176-10's SCSI bus. The 68060 CPU is only involved with setup before and cleanup after a SCSI command is sent to a device—the rest of the command, including data transfer, is handled by the RISC processor.

Having the RISC processor take care of these details allows both read-ahead and write buffering without the need for a separate controller. Also, fast SCSI-2 disk drives will give better performance than an AM-520 using ESDI drives for the following reasons:

- Physically, SCSI-2 drives are faster than all ESDI drives. They spin the platters twice as fast (reducing latency) and have significantly faster seek times.
- Data transfer rates are higher with fast SCSI-2 drives. ESDI drives have a maximum transfer rate of 2.25MB/s, whereas fast SCSI-2 drives transfer data at 10MB/s (or around 4 times faster). Wide SCSI has a maximum transfer rate of 20MB/s.
- The data transfer path is much faster with the RISC SCSI-2 controller. It is able to read from or write to system memory 32 bits at a time, taking 60ns per read or write. The AM-520 transfers data 16 bits at a time, taking 210ns per 16-bit transfer (or 420ns per 32-bit transfer).

## READ-AHEAD

The AM-176-10's SCSI disk driver, SCZ7K.DVR, is able to perform read-ahead directly into the AMOS (DCACHE) disk cache. When any program attempts to read a physical block from a disk, the SCZ7K driver will also read up to an additional seven sequential blocks from the disk drive and store these read-ahead blocks in the cache.

This read-ahead scheme works very well when jobs on the system are doing a large number of sequential reads. For example, data base searches and programs like REDALL may execute much faster because the data they require is already in memory and only has to be transferred from the cache into the user partition.

Programs that do significant random disk access (such as RNDRED) tend to slow down with this read-ahead scheme. Most of the slowdown is caused by "thrashing" of the disk cache, where cache entries that will be used again are removed from the cache due to the allocation requirements of the read-ahead blocks (which typically are never used). The actual data transfer overhead is very little, as most SCSI disk drives (especially fast SCSI-2 drives) have a track cache built into the drive allowing both the target and read-ahead blocks to be transferred over the SCSI cable without delay.

## Controlling Read-Ahead

For read-ahead to occur on the AM-176-10, both the AMOS disk cache (DCACHE.SYS) and the full SCSI dispatcher (SCZ7K.SYS) must be installed. The number of read-ahead blocks to be transferred into cache on every physical disk read is contained in the disk driver. This can be set when using the FIXLOG program to generate a disk driver with the appropriate read-ahead blocking factor.

When you use FIXLOG to create a driver for the AM-176-10 board, you are asked to specify the number of read-ahead blocks. For example, type:

```
FIXLOG RETURN
FIXLOG.LIT Version x.x(xxx)

1. Change the number of logicals.
2. Create a sub-system driver.

Enter choice: 2 RETURN

Enter name of generic driver to be used: SCZ7K RETURN
Enter number of logical units per physical unit: 10 RETURN
Enter SCSI id (0-6): 0 RETURN
Enter number of read-ahead blocks (0-7): 5 RETURN
Enter new driver name: DSK RETURN
New driver is now in memory.
```

To save the driver you have created, type:

```
SAVE DSK.DVR RETURN
```

If you wish to disable or change the number of read-ahead blocks, simply use FIXLOG to generate a new disk driver. If the disk driver is for the DSK: device, don't forget to use MONGEN and embed the new driver into the system monitor.

The generic AM-176-10 SCSI disk driver (SCZ7K.DVR) is set up for seven read-ahead blocks.

## WRITE BUFFERING

AMOS (and therefore every application written for AMOS) understands only 512-byte disk blocks. Therefore, when a disk write request is made by a program, a single block transfer is made to the disk drive. If the program then writes the next sequential block, the system must wait the latency time of the drive (i.e., the time it takes the drive to complete one revolution) before the next block can be written. Latency, even on fast SCSI-2 drives, is around 7ms.

Write buffering can speed up the write process. When write buffering is enabled, all writes to the SCSI disk are first transferred into a buffer. If the write buffer becomes at least half full, or around three quarters of a second passes with no reads, or if a preset "guaranteed flush" time-out occurs, the SCZ7K.DVR disk driver will begin scanning through the write buffer, finding blocks that need to be written out to the drive. The algorithm used to flush blocks out to the drive is able to find up to eight consecutive blocks and write them to the disk drive as a single write command, therefore dramatically improving system performance.

Another benefit of write buffering is it tends to eliminate duplicate disk writes, such as bitmap updates during operations such as copying files and tape restores, and prevents head thrashing when reading through random access data files and writing a sequential file out to the disk (as most report generation programs do).

## Potential Pitfalls

Obviously, there can be problems with write buffering, especially if the system either crashes or is powered off while writes are pending in the write buffer. If that happens, all pending writes are lost. Though this sounds like a major problem, it can also happen if write buffering is not enabled. However, write buffering increases the number of writes at risk. The primary write buffering risks are an errant software operation or a hardware failure that causes a system crash.

To help reduce the possibility of data loss, certain safeguards have been put in place. Writes are not buffered indefinitely; they are performed whenever the device is not performing reads. Even if the drive is busy with read requests, the buffer is still periodically flushed, based on a user definable "absolute flush time." In addition, if you have a UPS installed and connected to the AM-319-20's UPS status port, and you experience a power failure and the UPS status port senses a low battery condition, AMOS will flush and disable the write buffer in preparation for a system shutdown. Also, the MONTST command automatically flushes the write buffer.

Therefore, you must weigh the potential for data loss (which is always there) versus the dramatic performance increase seen when using write buffering. If you are worried about the reliability of write buffering, it may be worth keeping in mind that the AM-520 disk controller has always used write buffering on a track-by-track basis (however, not quite as efficiently as the AM-176-10 write buffering scheme). The SMARTDRV program that comes with MS-DOS does write buffering (you may have noticed the "Waiting for system shutdown" message when rebooting a PC with CTRL-ALT-DELETE) and UNIX-based computers have always done it.

## Setting Up Write Buffering

To enable write buffering, you must be using the full SCSI dispatcher (SCZ7K.SYS). Enable write buffering by adding parameters to the SYSTEM statement used to load the SCSI disk driver into system memory. Append "/N" followed by the buffer size and flush period enables write buffering for that device. The syntax is:

```
SYSTEM DVR:dev/N buffer-size flush-period
```

For example:

```
SYSTEM DVR:DSK/N 200K 60
```

The ***buffer-size*** is the size of the write buffer (you specify the size in Kilobytes). We advise a buffer size of 100K to 200K.

The ***flush-period*** is the maximum number of seconds data may be left in the write buffer without being written to the disk. For example, if you specify 30, you will know that after 30 seconds any pending writes will be written to the disk. This is true even if the disk is constantly busy servicing reads.

One SYSTEM command is required for each different SCSI disk driver present in the system. For example, if you have two 1.2GB SCSI-2 drives named DSK0-36 and DSK37-73 and one 540MB SCSI-2 drive named SUB0-17, you need one SYSTEM command for the DSK device (although it's really two physical drives) and one SYSTEM command for the SUB device.

When specifying write buffering for a device, two files are placed into system memory: .DVR (loaded from disk) and .WRC (directly created in system memory), which are the driver and cache buffer. This is true for all SCSI disk devices except the DSK device. For the DSK device, the file DSK.DVR does not need to be created because it is already loaded into the system monitor. Therefore, for the DSK device, only the file DSK.WRC will be created in system memory.

In the three-drive example mentioned earlier, the added SYSTEM commands would look like this:

```
SYSTEM DVR:DSK/N 100K 60  ;Driver in AMOS will create DSK.WRC
SYSTEM DVR:SUB/N 100K 60  ;Load SUB.DVR and create SUB.WRC
```

This would set up 100K of write buffering for the DSK devices and 100K of write buffering for the SUB device. All three drives would have their write buffers flushed every minute (or sooner if the drives are not busy with read requests).

## FINAL NOTES

Both read-ahead and write buffering schemes used on the AM-176-10 board dramatically improve system performance in our lab tests. Both schemes are fine-tuned for the 68060 processor and RISC SCSI controller and do not take cycles away from AMOS like other commercially available disk optimization software.

Although our lab tests attempt to simulate the "real world" of user applications, they probably use the resources of the AM-176-10 CPU and SCSI subsystem differently than your application does; therefore we highly recommend you experiment with cache and write buffer sizes, read-ahead blocks, and flush periods on an installed system to find the best possible combination for that system.

# Appendix F - BOOT Messages

The following messages may appear on the terminal connected to port 0 during the boot process:

**Welcome to the Alpha Micro Computer System.**
This is just a friendly greeting so you know your computer is starting.

**Press <ESC> to enter setup.**
This message occurs at the same time as CS on the status display. If you press the <ESC> key now, the computer will display the CMOS configuration menu. If you press CTRL-D now the computer will start the Diagnostic Self-Test routines.

**Initializing boot device**
The computer is setting up the device you are booting from.

**Initializing tape device**
The computer is setting up the tape drive to read the warm boot tape.

**Initializing from AM176-10 flash memory.**
The computer will use the disk image stored in the flash memory of the AM176-10 board for booting.

**Initializing from AM703 flash board.**
The computer will use the disk image stored in the flash memory of the AM703 board for booting.

**Initializing serial port transfer.**
The computer will receive a disk image file from serial port 0 on the AM176-10 board and use it for booting.

**Flash data transfer complete.**
The contents of flash memory have been copied to RAM.

**Looking for DSK0:[1,4]**
The computer is searching for the SYS: PPN on the boot disk.

**Looking for AMOS monitor**
The computer is searching for the AMOS monitor files specified in CMOS.

**Starting AMOS**
The computer boot process is finished and AMOS is starting to run.

**Monitor not found**
The computer could not find the AMOS monitor file that is specified in CMOS on the boot device.

**Initialization file not found**
The computer could not find the system initialization file that is specified in CMOS on the boot device.

**`Error transferring from flash.`**
The computer was unable to copy the contents of the flash memory to RAM.

**`Incorrect boot checksum -- halting`**
The checksum of the boot program is incorrect so the boot process cannot safely continue.

**`Fatal time-out error`**
An unexpected hardware bus error occurred.

**`Fatal error -- system halting.`**
The boot process cannot safely continue due to an error.

# Appendix G - Flash Memory Booting Option Details

The Flash Memory Booting Option contained in most AM-7000 and Roadrunner 75 based systems allows you to boot your system from flash memory if for some reason the booting software on the disk becomes inoperable.

## FLASH MEMORY ORGANIZATION

When booting from flash memory, the computer's memory is allocated as shown in figure G-1.

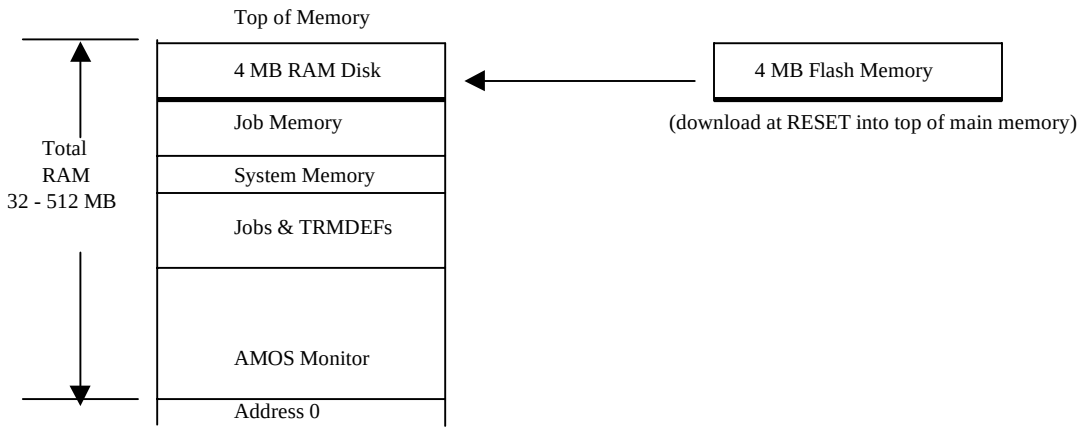


***Figure G-1: AM-7000 Flash Boot Memory Map***

## FLASH MEMORY OPERATION

When the AM-7000 is turned on or reset, the boot code sizes main memory. If FLASH is selected as the boot device, 4MB is subtracted from the total memory size and the adjusted size is made available for AMOS. The upper 4MB of memory is reserved and is referred to as a RAM disk.

Next, the contents of the flash memory is copied to the upper 4MB area of RAM thereby loading the RAM disk. There is a RAM disk driver (`ram.dvr`) imbedded in the AMOS monitor that emulates a disk drive. The AMOS monitor specified on the CMOS setup screen is then loaded from the RAM disk into low memory. The AMOS monitor then begins execution in a normal manner.

When AMOS is "up and running", all modifications to data on the RAM disk are only temporary and will be lost on reset or power failure. In order to save any changes made to the RAM disk to the flash memory, a special software utility must be used. This utility is described at the end of this Appendix.

## BOOTING FROM THE AM-7000 FLASH MEMORY.

The AM-7000 flash memory is configured during the manufacturing process to contain a minimal AMOS system. It includes an AMOS monitor, several versions of system initialization files, commonly used device drivers and programs. As configured, it should boot properly and run on most AM-7000 configurations. To boot from the AM-7000 flash memory do the following:

1. Turn power on or press the reset button on your computer.
2. When "Press <ESC> to enter setup" appears on the terminal or "CS" appears on the status display, press the <ESC> key to enter the CMOS Configuration Menu>
3. Using the arrow keys select Flash for the Primary boot device type.
4. Enter the name of the boot monitor and the boot initialization filenames. Normally these will be AMOS32.MON for the monitor name and AM7000.INI for the initialization filename.
5. Press <ESC> and then enter "Y" to save the changes.

The computer should then proceed to boot from the AM-7000 flash memory.

## STANDARD AM7000.INI CONTENTS

The AM7000.INI file includes support for the following:

| | |
|---|---|
| SUB: | SCSI disk drive with SCSI ID 0 |
| STR0: | 1/4 inch cartridge streaming tape drive |
| DAT0: | DAT cartridge tape drive |
| MTX0: | Exabyte cartridge tape drive |
| AM319S Ethernet controller on the AM310-20 board | |
| AM176-10 Ethernet controller at 10Mb per second | |
| TCP/IP with telnet and ftp capabilities | |
| CDROM reader using the ACD program and driver | |
| On-board serial ports at 19200 baud using AM62a terminal driver | |

Also included in the flash AMOS configuration is a very simple system initialization file, SINGLE.INI. This only activates the terminal on serial port 0 at 19200 baud using the AM62A terminal driver. It does not define any extra peripheral devices or communications capabilities. This initialization file can be used for troubleshooting if the more complete initialization in the flash fail during the boot process.

The AMOS system contained in the flash can provide enough capabilities to enable you to check the disk drive and copy files from tape or CD back to the disk drive. Of course if the disk drive has a physical hardware problem, it will need to be repaired or replaced.

## ENHANCING FLASH MEMORY CONTENTS

The original AMOS system contained in the flash memory is a single user system since it has not been PIC encoded to the SSD. As such, while it will work fine for accessing tapes and disk, networking is not supported. If network support is needed, the AMOS monitor must be PIC encoded by using the OSINST program. Additionally, for full network support, several configuration files in the TCP directory must be modified. Once these modifications are made to the copy of AMOS in the RAM disk, the system can be saved to flash memory using the FLUTIL program.

Changes needed in the AlphaTCP configuration files are as follows:

### File NETWRK.

Change the IP address to the assigned IP address for the computer. The first line corresponds to the AM-7000 CPU board Ethernet port. The second line corresponds to the AM319-20 Ethernet port. This is the same order as the definitions for the Ethernet ports in the CONFIG file.

### File RESOLV.

Set the NAMESERVER line's IP address to the address of your name server if you have one.

### File CONFIG. (optional)

If you have a default router you may specify its IP address in the "start route" statement on the last line of the CONFIG file. Remember to remove the # character at the beginning of the line.

## FLASH MEMORY CONTENTS

The following AMOS monitors and system initialization files are included in the flash memory system:

### Monitors

| | |
|---|---|
| AMOS32 MON<br>AM7000 MON<br>7KRAM MON | These are three identical monitors with the RAM disk driver embedded as the system disk driver |
| AMSS7K MON | This has the SCSI disk driver embedded as the system disk driver |

### INIs

| | |
|---|---|
| AM7000 INI<br>AMOS32 INI | supports 4 terminal, SCSI disk, tape, Ethernet tcp/ip |

SINGLE INI Minimal support. 1 terminal, no SCSI devices, no Ethernet

## Device drivers for the following:

1/4" cartridge streamer, Exabyte, and DAT tape drives
RAM disk, SCSI disk, CDROM, and VDK virtual disk
AM-7000 CPU board Ethernet and 319-20 Ethernet
Alpha, AM62, AM62A, AM65, AM65A, AM75, and VT100 terminals

## FLUTIL SOFTWARE UTILITY

Occasionally, modifications must be made to the AMOS configuration or other software stored in flash memory. FLUTIL helps maintain the contents of the AM-7000 flash memory. The flash memory can be erased and reprogrammed with the contents of the current RAM disk. The current contents of the flash memory can be saved to a data file which can then be used to recover in the event that the contents of the flash memory become unusable.

During modification of the AMOS configuration and updating of the flash memory, it is important that no other users are using the system.

Remember that any changes made to files on the RAM disk are not permanent, and will disappear if the computer is re-started. Changes must be saved using this program to become permanent.

## Flash memory Update

Before using this program to update the flash memory, any configuration changes should be thoroughly tested. This normally means that you must `MONTST` the new configuration from the RAM disk and verify that:

1. The system does boot properly
2. The system does work properly and all peripherals are working properly

Before running the FLUTIL program, log into OPR: and run a DSKANA on your RAM disk. Erase any old files like *.BAK, *.OLD, and *.LST which you don't want programmed into the Flash memory. Also, make sure that your JOB is NOT running MULTI.

In the unlikely event that the flash memory update fails catastrophically (i.e. a power failure occurs), insure that you have created and saved the flash memory recovery files for the current operating environment.

To update the flash memory, log into `OPR:` and type:

**`FLUTIL`** RETURN,

The following menu will be displayed.

```
Flash Memory Utility Program Version 1.0(106)
```

```
1.  UPDATE Flash Memory with current RAM disk
2.  Copy Flash Memory to Image File
3.  Copy Image File to Flash Memory
4.  Exit

    Enter choice:
```

Enter **1** RETURN to begin the flash memory update. You will see a warning message and then be asked if you want to continue. To continue with the update type **Y** return. Until the update is successfully completed, the system cannot be re-booted from the flash memory.

First the flash memory contents are erased. Next the contents of the RAM disk are programmed into the flash memory. Then the contents of the RAM disk and the flash memory are compared to verify successful flash memory update. During the program and verification phases, progress is indicated on the terminal screen, and all other jobs are suspended.

If the update is not successful, a warning message is displayed. Also if you try to exit the program while the flash memory contents are compromised, a warning message is displayed. After an unsuccessful update, the system will probably not re-boot properly from flash memory, but should still boot properly from disk.

# Appendix H - Standard Flash & Disk INIs

The following files are sample INI files for both hard disk and flash disk booting for your reference. Bold text indicates commands that are specific to the AM-7000 CPU.

## HARD DISK INI FILES

## AM7000.INI

```
; New AM176-10 -- AM7000.INI boot from Disk.
:T
JOBS 100
JOBALC JOB0,JOB1,JOB2,JOB3
JOBALC NETLOG,TCPEMU
;JOBALC NETSER
JOBALC LOGJOB
QUEUE 4000
load trmdef.lit
;
TRMDEF TRM0,A31810=0:19200,AM62A,100,100,100,editor=20
xy=24
TRMDEF TRM1,A31810=1:19200,AM62A,100,100,100,editor=20
TRMDEF TRM2,A31810=2:19200,AM62A,100,100,100,editor=20
TRMDEF TRM3,A31810=3:19200,AM62A,100,100,100,editor=20
;TRMDEF NETSER,PSEUDO,NULL,100,100,100
TRMDEF LOGTRM,PSEUDO,NULL,100,100,100
TRMDEF NETLOG,PSEUDO,NULL,100,100,100
TRMDEF TCPEMU,PSEUDO,NULL,100,100,100
TDVDEF *.TDV
;
del *
VER
PCI7K.LIT           ;INITIALIZE PCI BUS
SCZDSP SCZ7K.SYS/EW:0/EU/ET
;SCZDSP SIM7K.SYS
DEVTBL DSK
;DEVTBL NEW
DEVTBL RAM
DEVTBL TRM,RES,MEM,/STR0
;DEVTBL /DAT0,MTX0
BITMAP DSK
;BITMAP NEW
BITMAP ram,514,0

MSGINI 20K
ERSATZ ERSATZ.ERZ

system system.lit
SYSTEM SYSMSG.USA
SYSTEM CMDLIN.SYS
SYSTEM SCNWLD.SYS
;SYSTEM LEVEL7.SYS/N/E/P JCB DISASM MAP TCB IDENT DDB
SYSTEM DCACHE.SYS/N/M/U 2M
SYSTEM DVR:DSK/N 200K 50
;SYSTEM DVR:NEW/N 200K 50
SYSTEM DVR:TRM.DVR
```

```
SYSTEM ram.DVR[1,6]
SYSTEM STR.DVR[1,6]
;SYSTEM DAT.DVR[1,6]
;SYSTEM MTX.DVR[1,6]
;SYSTEM DVR:PCILSI.LDV/N/H/T:200/R:200 ;100MB
SYSTEM DVR:PCILSI.LDV/N/T:200/R:200    ;10MB
SYSTEM DVR:AM319S.LDV/N                ;10MB
SYSTEM RTI.LIT
SYSTEM TCP:IPCINI/N 100 100K
SYSTEM TCP:TFTPD.LIT
SYSTEM TCP:TFTPD.RTI
SYSTEM TCP:FTPD.LIT
SYSTEM TCP:FTPD.RTI
SYSTEM SYS:FTP.LIT
SYSTEM SYS:FTP.RTI
SYSTEM SYS:TELNET.LIT
SYSTEM SYS:TELNET.RTI
SYSTEM
SMEM 6M

LOG OPR:
SYSTEM SERVICE
LOG SYS:
load setjob
SETJOB JOB1,TRM1,500k,JOB.JIN
SETJOB JOB2,TRM2,500k,JOB.JIN
SETJOB JOB3,TRM3,500k,JOB.JIN
;SETJOB  NETSER,NETSER,100K,NETSER.LIT
SETJOB  LOGJOB,LOGTRM,100K,LOGJOB.NIN

SETJOB  NETLOG,NETLOG,50K
SETJOB  TCPEMU,TCPEMU,5000K,TCP:GOTCP.CMD
;
SLEEP 2
LOG OPR:
JOBPRI TCPEMU 254
SET DYN
LOG SYS:
SET HEX
MOUNT DSK:
si
MEMORY 0
```

## AMOS32.INI

```
; New am176-10 - AMOS32.INI boot from Disk
:T
JOBS 100
JOBALC JOB0,JOB1,JOB2,JOB3
JOBALC NETLOG,TCPEMU
;JOBALC NETSER
;JOBALC LOGJOB
QUEUE 4000
load trmdef.lit
;
TRMDEF TRM0,A31810=0:19200,AM62A,100,100,100,editor=20
xy=24
TRMDEF TRM1,A31810=1:19200,AM62A,100,100,100,editor=20
TRMDEF TRM2,A31810=2:19200,AM62A,100,100,100,editor=20
TRMDEF TRM3,A31810=3:19200,AM62A,100,100,100,editor=20
;TRMDEF NETSER,PSEUDO,NULL,100,100,100
;TRMDEF LOGTRM,PSEUDO,NULL,100,100,100
TRMDEF NETLOG,PSEUDO,NULL,100,100,100
TRMDEF TCPEMU,PSEUDO,NULL,100,100,100
;
del *
TDVDEF *.TDV
```

```
VER
PCI7K.LIT
SCZDSP SCZ7K.SYS/EW:0/EU/ET
;SCZDSP SIM7K.SYS
DEVTBL DSK
;devtbl new
DEVTBL RAM
DEVTBL TRM,RES,MEM,/STR0
;DEVTBL /DAT0,MTX0
BITMAP DSK
;BITMAP NEW
BITMAP ram,514,0

MSGINI 20K
ERSATZ ERSATZ.ERZ

system system.lit
SYSTEM SYSMSG.USA
SYSTEM CMDLIN.SYS
SYSTEM SCNWLD.SYS
SYSTEM DCACHE.SYS/N/M/U 2M
;;SYSTEM LEVEL7.SYS/N/E/P JCB DISASM MAP TCB IDENT DDB
SYSTEM DVR:TRM.DVR
SYSTEM ram.DVR[1,6]
SYSTEM STR.DVR[1,6]
;SYSTEM DAT.DVR[1,6]
;SYSTEM MTX.DVR[1,6]
SYSTEM DVR:DSK/N 200K 50
;SYSTEM DVR:NEW/N 200K 50
;SYSTEM DVR:PCILSI.LDV/N/H/T:200/R:200       ;100mb
SYSTEM DVR:PCILSI.LDV/N/T:200/R:200          ;10mb
SYSTEM DVR:AM319S.LDV/N                      ;10MB
;
SYSTEM RTI.LIT
SYSTEM TCP:IPCINI/N 100 100K
SYSTEM TCP:FTPD.LIT
SYSTEM TCP:FTPD.RTI
SYSTEM SYS:FTP.LIT
SYSTEM SYS:FTP.RTI
SYSTEM SYS:TELNET.LIT
SYSTEM SYS:TELNET.RTI
SYSTEM
SMEM 6M
LOG OPR:
SYSTEM SERVICE
LOG SYS:
load setjob
SETJOB JOB1,TRM1,500k,JOB.JIN
SETJOB JOB2,TRM2,500k,JOB.JIN
SETJOB JOB3,TRM3,500k,JOB.JIN
;SETJOB  NETSER,NETSER,100K,NETSER.LIT
;SETJOB  LOGJOB,LOGTRM,100K,LOGJOB.NIN

SETJOB  NETLOG,NETLOG,50K
SETJOB  TCPEMU,TCPEMU,5000K,TCP:GOTCP.CMD
;
SLEEP 2
LOG OPR:
JOBPRI TCPEMU 254
SET DYN
LOG SYS:
SET HEX
SET DSKERR
MOUNT DSK:
si
MEMORY 0
```

# FLASH DISK INI FILES

## SINGLE INI

```
:T
; am176-10 Single.INI boot from Flash Disk
JOBS 5
JOBALC JOB0
QUEUE 4000
;
TRMDEF TRM0,A31810=0:19200,AM62A,200,200,100,EDITOR=5
ver
XY=24                                          ; Turn Graphics Off
PCI7K.LIT
;SCZDSP SIM7K.SYS
;
DEVTBL TRM,RES,MEM;/str0
;DEVTBL SUB               ;HARD DISK
BITMAP DSK,514,0          ;RAM  DISK
BITMAP SUB
;
ERSATZ ERSATZ.ERZ
;
SYSTEM SYSMSG.USA
SYSTEM CMDLIN.SYS
SYSTEM SCNWLD.SYS
SYSTEM DVR:TRM.DVR
SYSTEM DVR:STR.DVR
SYSTEM
;
LOG OPR:
SYSTEM SERVICE
;
LOG SYS:
SET DSKERR
SET HEX
;
DEL *
MEMORY 0
```

## AM-7000 INI

```
; New am176-10 - AM7000.INI boot from Flash Disk
:T
JOBS 100
JOBALC JOB0,JOB1,JOB2,JOB3
JOBALC NETLOG,TCPEMU
;JOBALC NETSER
JOBALC LOGJOB
QUEUE 4000
;
TRMDEF TRM0,A31810=0:19200,AM62A,100,100,100,editor=20
xy=24
TRMDEF TRM1,A31810=1:19200,AM62A,100,100,100,editor=20
TRMDEF TRM2,A31810=2:19200,AM62A,100,100,100,editor=20
TRMDEF TRM3,A31810=3:19200,AM62A,100,100,100,editor=20
;TRMDEF NETSER,PSEUDO,NULL,100,100,100
TRMDEF LOGTRM,PSEUDO,NULL,100,100,100
TRMDEF NETLOG,PSEUDO,NULL,100,100,100
TRMDEF TCPEMU,PSEUDO,NULL,100,100,100
TDVDEF *.TDV
;
VER
```

```
PCI7K.LIT                 ;REQUIRED
SCZDSP SCZ7K.SYS/ew:0     ;/eu/et
DEVTBL SUB
DEVTBL TRM,RES,MEM,/STR0
;DEVTBL /DAT0,/MTX0
BITMAP DSK,514,0
BITMAP SUB
MSGINI 20K
ERSATZ ERSATZ.ERZ

SYSTEM SYSMSG.USA
SYSTEM CMDLIN.SYS
SYSTEM SCNWLD.SYS
SYSTEM DCACHE.SYS/N/M/U 2M
SYSTEM DVR:TRM.DVR
SYSTEM DVR:SUB.DVR/n 200k 50
SYSTEM DVR:STR.DVR
SYSTEM DVR:ACD.DVR
;SYSTEM DVR:DAT.DVR
;SYSTEM DVR:MTX.DVR
SYSTEM DVR:PCILSI.LDV/N/T:200/R:200    ;10mb
;SYSTEM DVR:PCILSI.LDV/N/H/T:200/R:200 ;100mb
SYSTEM DVR:AM319S.LDV/N                ;10MB
SYSTEM RTI.LIT
SYSTEM TCP:IPCINI/N 100 100K
SYSTEM TCP:FTPD.LIT
SYSTEM TCP:FTPD.RTI
SYSTEM SYS:FTP.LIT
SYSTEM SYS:FTP.RTI
SYSTEM SYS:TELNET.LIT
SYSTEM SYS:TELNET.RTI
SYSTEM
SMEM 8M

LOG SYSTEM SERVICE
;
SETJOB JOB1,TRM1,500k,START7.JIN
SETJOB JOB2,TRM2,500k,START7.JIN
SETJOB JOB3,TRM3,500k,START7.JIN
;SETJOB  NETSER,NETSER,100K,NETSER.LIT
SETJOB  LOGJOB,LOGTRM,100K,LOGJOB.NIN

SETJOB  NETLOG,NETLOG,50K
SETJOB  TCPEMU,TCPEMU,2000K,TCP:GOTCP.CMD
;
LOG OPR:
JOBPRI TCPEMU 254
SET DYN
LOG SYS:
SET HEX

MOUNT SUB:
SI
MEMORY 0
```

## AMOS32.INI

```
:T
; AMOS32.INI boot from Flash Disk...
JOBS 50
JOBALC JOB0,JOB1,JOB2,JOB3
JOBALC SPOOL,NETSER,NETLOG,TCPEMU
;
QUEUE 4000
;
LOAD LOAD.LIT
LOAD DEL.LIT
```

```
LOAD SYSMSG.USA
LOAD TRMDEF.LIT
LOAD DEVTBL.LIT
LOAD BITMAP.LIT
LOAD SYSTEM.LIT
LOAD MOUNT.LIT
;
TRMDEF TRM0,A31810=0:19200,AM62A,200,200,100,EDITOR=5
XY=24                                          ; Turn Graphics Off
TRMDEF TRM1,A31810=1:19200,AM62A,200,200,100,editor=5
TRMDEF TRM2,A31810=2:19200,AM62A,200,200,100,editor=5
TRMDEF TRM3,A31810=3:19200,AM62A,200,200,100,editor=5
TRMDEF DUMMY,PSEUDO,NULL,100,100,100
TRMDEF NETSER,PSEUDO,NULL,100,100,100
TRMDEF NETLOG,PSEUDO,NULL,100,100,100
TRMDEF TCPEMU,PSEUDO,NULL,100,100,100
TDVDEF *.TDV
;
VER
PCI7K.LIT
SCZDSP SCZ7K.SYS/ew:0     ;/eu/et
;
DEVTBL TRM,RES,MEM,TLP,/SEP0
DEVTBL SUB                ;HARD DISK
DEVTBL /STR0 ;/DAT0,/MTX0 ;TAPE DEVICES
BITMAP DSK,514,0          ;RAM  DISK
BITMAP SUB
MSGINI 20K
NETFAM
;
ERSATZ ERSATZ.ERZ
ERSATZ ETH101.ERZ
;
SYSTEM SYSMSG.USA
SYSTEM CMDLIN.SYS
SYSTEM SCNWLD.SYS
SYSTEM DVR:TRM.DVR
SYSTEM DVR:SEP.DVR
SYSTEM DVR:STR.DVR
;SYSTEM DVR:DAT.DVR
;SYSTEM DVR:MTX.DVR
SYSTEM DVR:ACD.DVR
SYSTEM DVR:TLP.DVR
;SYSTEM DVR:PCILSI/N/H/R:200/T:200     ;100mb
SYSTEM DVR:PCILSI/N/R:200/T:200        ;10mb
SYSTEM DVR:AM319S.LDV/N                ;10mb
SYSTEM DCACHE.SYS/N/M/U 2M
SYSTEM DVR:SUB/N 200K 50
SYSTEM RPC.SYS/N
SYSTEM RPCLOD.LIT
SYSTEM RTI.LIT
SYSTEM TCP:IPCINI/N 100 100K
SYSTEM TCP:TELNED.LIT
SYSTEM TCP:TELNED.RTI
SYSTEM TELNET.LIT
SYSTEM TELNET.RTI
SYSTEM TCP:FTPD.LIT
SYSTEM TCP:FTPD.RTI
SYSTEM SYS:FTP.LIT
SYSTEM SYS:FTP.RTI
SYSTEM TCP:LPD.LIT
SYSTEM TCP:LPD.RTI
SYSTEM TCP:LPR.LIT
SYSTEM TCP:LPR.RTI
SYSTEM
SMEM 8M
;
LOG OPR:
SYSTEM SERVICE
;
LOG SYS:
```

```
SET DSKERR
SET HEX
;
 MOUNT DSK:
DEL *
;
SETJOB SPOOL,DUMMY,10K,LPTINI SEP0.PIN
XFRSEL SEP0: RAW
;
SETJOB  NETSER,NETSER,100K,NETSER
WAIT NETSER
SETJOB  NETLOG,NETLOG,50K
SETJOB  TCPEMU,TCPEMU,2000K,TCP:GOTCP.CMD
SLEEP 5
LOG OPR:
DEMO
JOBPRI TCPEMU 254
SET DYN
;
SETJOB JOB1,TRM1,500k,START7.JIN
SETJOB JOB2,TRM2,500k,START7.JIN
SETJOB JOB3,TRM3,500K,START7.JIN
;
MEMORY 0
```

# Document History

| Revision | Date | Description |
|---|---|---|
| A00 | May 2000 | Initial release. |

# Index

## *D*



## *E*



## *F*



## *G*



## *H*



## *I*



## *J*

## *K*



## *L*



## *M*



## *N*



## *O*



## *P*



## *R*



## *S*

## *T*



## *U*



## *V*



## *W*