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January 1987 **AMSD Journal** Volume 9, Number 1

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Article Filing Instructions

We hope you find the *AMSD Journal* to be a valuable reference tool, and that you will want to refer to its articles frequently in the future. To make it easy and quick to find information, current articles are designed to be filed with articles from past issues. The entire set of *Journal* back issues forms three volumes: "General Information," "Software Information," and "Hardware Information." (The set of back issues is available for purchase. See "Subscription Information," above.)

The title of each feature article in this issue includes a reference number. Use the reference number to file the article in the back issue volume indicated at the top of each page of the article. For example, if the top of the first page of the article "6.5.5 One Hundred New Uses for MULTI," contains the words "Software Information," you know that article is to be filed in Section 6 of the "Software Information" back issue volume after article number 6.5.4.

The last pages of the *Journal* are new Tables of Contents for the back issue volumes, updated with entries for articles included in this month's issue.

Q&A Ask Alpha Micro: Questions and Answers

Q. While working with AlphaWRITE documents I often need to enter today's date or time. Since the computer already knows this, why do I have to type it in manually?

ANSWER: Actually, you don't have to type the date or time manually when you are working with AlphaWRITE.

AlphaWRITE's **GLOSSARY** feature has codes to automatically insert the date or time in your document. These permanently assigned codes are always available because they are built into AlphaWRITE.

The date entry comes in five different formats and the time entry in two formats. All you need do is press **GLOSSARY**, type the code for the format you want and AlphaWRITE does the rest. Here are the codes and the formats they represent:

CODE:	FORMAT:
D1	April 23, 1987
D2	23 April 1987
D3	23-Apr-87
D4	4/23/87
D5	23/4/87
T1	5:17 PM
T2	17:17

GLOSSARY also has a handy feature so you can review the list of codes and text you've assigned in a particular glossary document, along with the built-in date and time codes. This means you don't have to leave the document you are working with and **edit** your glossary document to see its contents, or memorize each and every glossary code you use.

The glossary help feature shows you the **AlphaWRITE Glossary Help Menu** listing the entries associated with this glossary document, including the list of permanent codes for time and date.

To see a list of your glossary's contents, from your document display:

Press **GLOSSARY** then press **HELP**

If your keyboard doesn't have either of these keys, you can substitute their universal key sequences: **ESC G** for **GLOSSARY** and **ESC ?** for **HELP.**

For more detailed information about the glossary feature, please see your AlphaWRITE Reference Guide.

Q It's my job to make archive tapes of company reports at regular intervals. And, these reports frequently have hundreds of files associated with them. I use VCRSAV to backup the files to tape, but it takes soooo long. Is there anything I can do to speed up the backup process?

ANSWER: Yes, you can shorten the time it takes to do a backup. One function of VCRSAV is to show you the name and location of each file it is selecting for the backup. And, when you are backing up hundreds or thousands of files, the time VCRSAV takes to paint the screen with the file specification of each file it selects can add up.

The file specification display is for your information and only confirms VCRSAV has already selected a file. You can instruct VCRSAV to withhold the display of this information, saving the time it takes to show each file specification it has already chosen. To do so, use the VCRSAV command's suppress option:

/SUPRESS (or /SUP)

For example, if you were backing up all files on DSK5: and wanted to suppress the

Ask Alpha Micro: Questions and Answers (Continued)

file specification display, from command level you'd type:

```
VCRSAV DSK5:[ ]*.*/SUPRESS
```

Using /SUPRESS with VCRSAV in a command file can speed up an automated backup too.

The amount of time /SUPRESS saves you depends on how many files you are selecting. Using it for backing up just a few files may not make much difference, but using it for a few hundred or thousand files will.

For more information on VCRSAV please see your AMOS/L VCR Backup User's Manual and on command files, see Command Files User's Manual.

1.3.8
AM-100/L CPU Interrupt Conflict

If your computer has an AM-100/L CPU, Revisions A or B, and uses multiple I/O controllers generating a large number of different-level interrupts (e.g., an AM-300 or AM-316 I/O Controller), you may encounter this error message:

ILLEGAL USER INTERRUPT ON LEVEL 0

Your computer system may also lock up once in a while.

Later versions of the AM-100/L CPU contain a correction that takes care of this problem. Figure A illustrates a modification to your AM-100/L CPU board designed to make the circuitry more closely resemble Revision C AM-100/L boards.

This modification changes the revision level of your AM-100/L board from A05 to A06 or from B03 to B04.

The parts for this modification are available from Alpha Micro's Spare Parts/Logistics Department as **Retrofit Kit RFK-00160-01.**

When you have received this kit, and have performed all the steps necessary to power down your computer and remove the CPU board, here's what to do:

1. Remove the IC (Integrated Circuit) at location U-71.

2. Remove the Capacitor at location C-48.

3. If Resistor modules are installed in locations RN-2 and RN-3 (next to U-71), remove them and jumper the pins together for each location as follows:

   pin 2 to pin 3
   pin 4 to pin 5
   pin 6 to pin 7
   pin 8 to pin 9

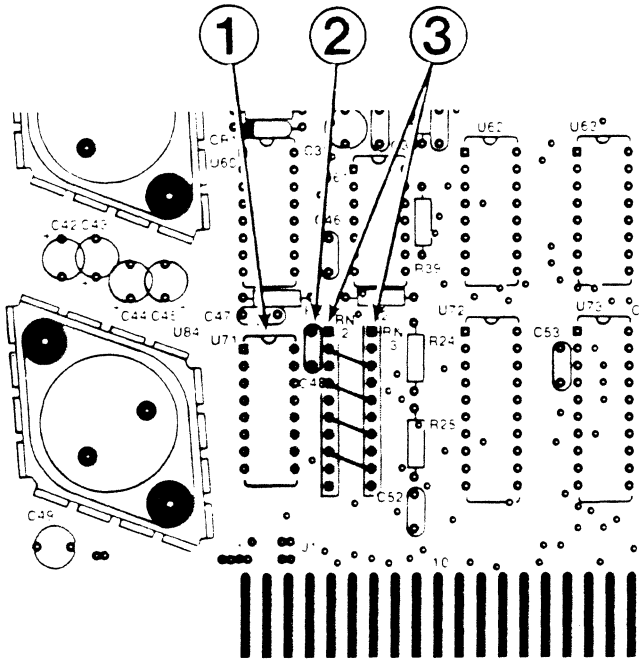


FIGURE A

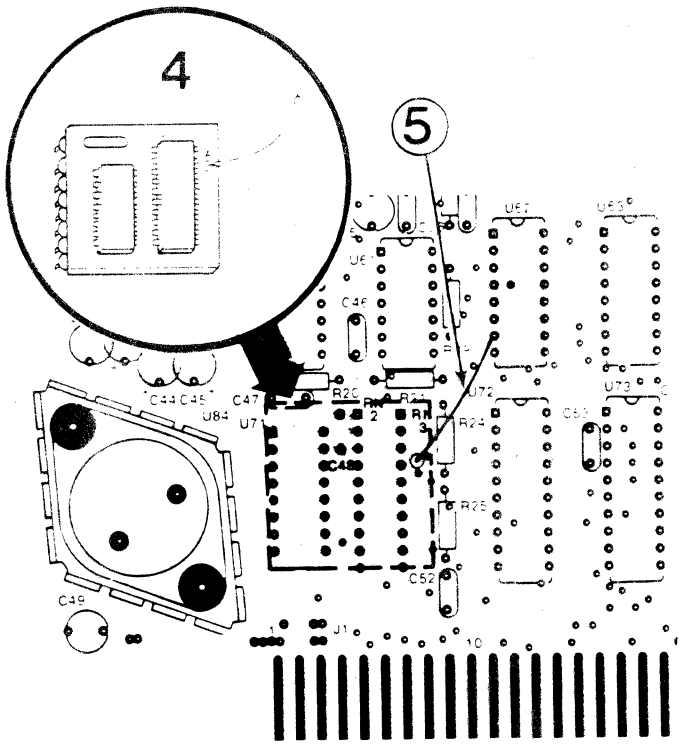
1.3.8 (Continued)
AM-100/L CPU Interrupt Conflict

4. Install module DWB-00159-00 from the Retrofit Kit at IC location U-71.

5. Add a jumper from pad A on the DWB-00159-00 to U-62 pin 7.

6. Mark the board with the correct revision level, A05 to A06, or B03 to B04, and install it in the CPU chassis.

7. Close up the system, apply power, and test for proper operation.



2.10.1
Introduction to the AM-520 Disk Controller

by R. J. Wilcox
Design Engineer, Advanced Systems Specialist
Advanced Product Division

What's an AM-520?

The AM-520 is a disk controller for the VME bus based AM-1500 and AM-2000 series systems. It can control up to eight high capacity, high speed disk drives with the industry standard SMD interface. Alpha Micro currently supports these drives on S-100 bus based systems with the AM-415 disk controller, and on VME bus based systems with the AM-415 connected to an AM-117 S-100 to VME Bus Adapter.

The AM-520 is another in the series of "genius" peripheral controllers using a proprietary technology we call "Herbie." This approach to peripheral controller design has resulted in a high degree of performance previously unavailable on the Alpha Micro line of computers.

What's "Herbie?"

Herbie refers to a technology developed at Alpha Micro to provide a highly flexible, high speed, intelligent approach to peripheral control.

At some point in the original design, someone dubbed this idea "Herbie" and the name stuck, since it was easier to refer to the entire concept with a single name rather than an explanation of what it was.

Herbie boards are entirely "soft." That is, all of the peripheral control and system communication functions are performed by software down loaded to the board by the controlling system. This microcode is fully compatible with the 68000 family of processors and the AMOS operating system. Using this approach, many of the maintenance functions normally performed by the main CPU are performed by an identical processor on the Herbie board.

Unlike previous controllers, the Herbies have no control or data ports. All data is passed between the host and peripheral through system memory. The Herbie is a bus master and is able to examine and/or modify all areas of system memory. Through this capability the new peripheral controllers can take advantage of the high speed and flexibility of the AMOS operating system.

How it Works

An example may help to clarify the communication process. Let us examine the steps performed by the system to read a single disk block, using a standard controller.

The application program, one of several tasks running on the system, requires a disk block. The program maintains a DDB (Data set Driver Block) which it uses to tell AMOS the details about the file and record required. A call is made to AMOS to retrieve the block. AMOS determines which device is to be accessed and calls the appropriate device driver. This driver translates the information contained in the DDB into the instructions necessary for the controller to read the disk block.

With the controller working away, the program is put into a suspended state to wait for the task to complete. AMOS uses this approach to allow other programs to run while waiting for the disk transfer to complete. When the disk data is ready, the controller interrupts the CPU to inform AMOS that the waiting job may now collect the data.

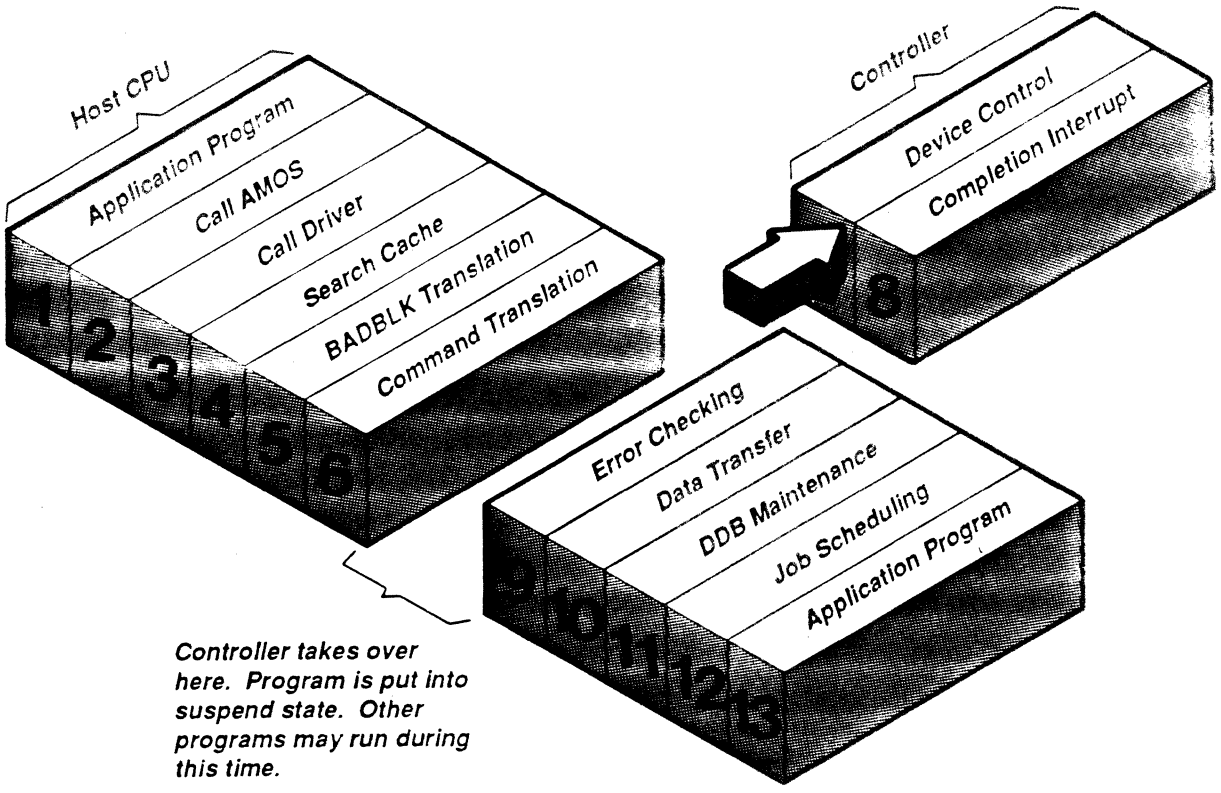
2.10.1 (Continued)
Introduction to the AM-520 Disk Controller

AMOS now executes the code necessary to re-activate the device driver so it can unload the block of data from the disk controller. The driver checks for errors, and if all is well, updates the DDB with the information required for the application to use the delivered data. AMOS then returns control to the application program.

This approach to peripheral control is highly efficient and is one of the major advantages of the AMOS operating system. It should be noted, however, that a single CPU is performing all of the required tasks. The time required to perform these maintenance functions might be better used in dealing with the application program.

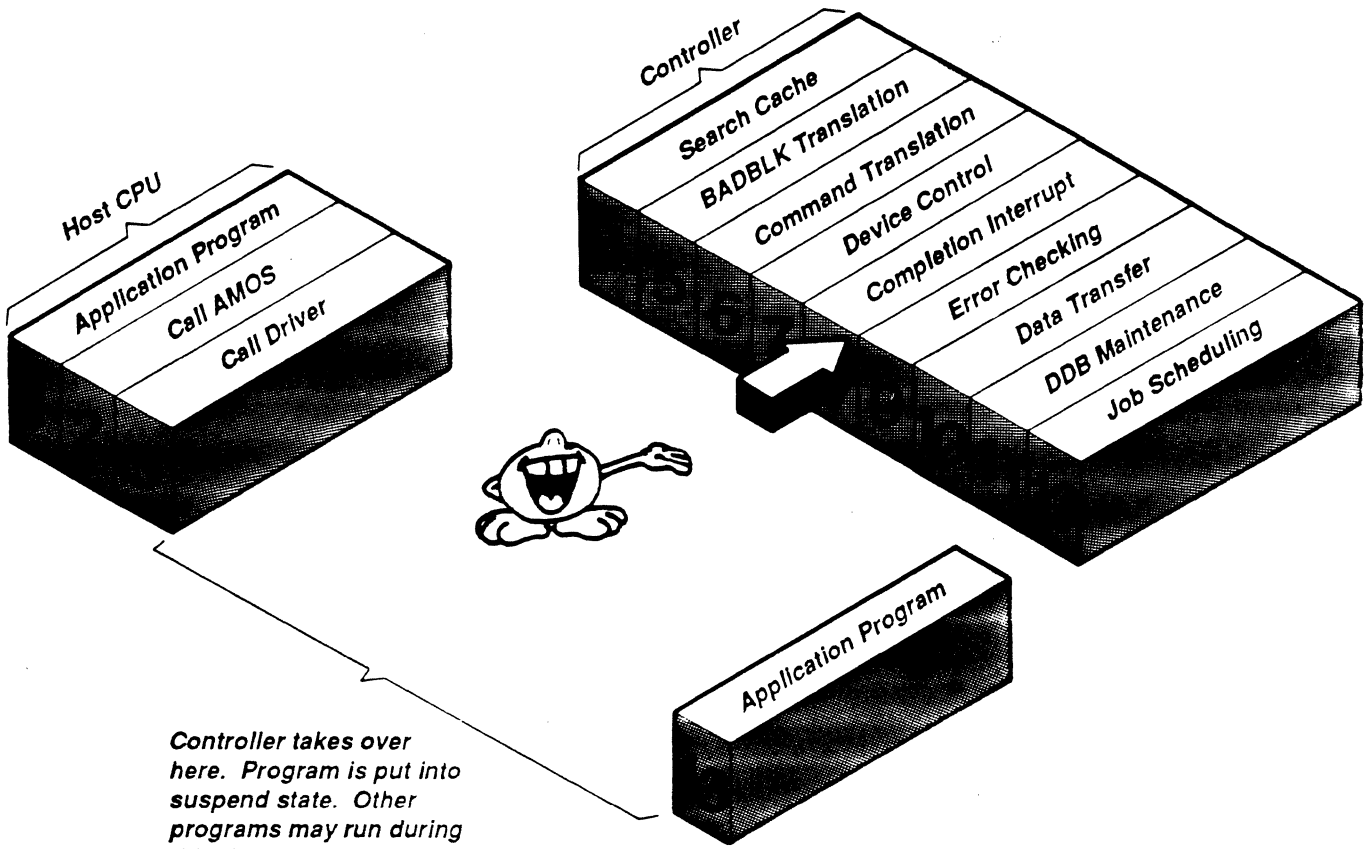
The same task performed by the AM-515 disk accelerator or AM-520 disk controller becomes much simpler. As in the normal case, the application program maintains a DDB and calls AMOS to perform the disk function. AMOS calls the Herbie device driver. This driver simply points to the DDB in memory and tells the Herbie controller to "do it." The task can now be suspended. When Herbie is finished, the job is awakened with no intervention from the main CPU.

The data is already in memory, ready for the application, and all error processing has been performed. No translation, no disk control, no data movement, and no extra job scheduling functions were needed by the CPU. Herbie did it all.



System without Herbie

2.10.1 (Continued) Introduction to the AM-520 Disk Controller



System with Herbie

Other "Intelligent" controllers can perform the translation and disk control functions, but they are not able to execute the job scheduling functions that make AMOS so efficient.

Herbie History

The first Herbie controller, the AM-515 disk accelerator, consists of a Motorola 68000 microprocessor, 512K bytes of dynamic local RAM memory, 4K bytes of local ROM memory, the unique Herbie interface, and a SASI port. The ROM is used only to assist in the down loading function and some diagnostic functions. All control software is down loaded from the main system. The SASI port allows connection to the ST-506 disk interface controller board (XEBEC 1410A) to control the 5-1/4" disks supplied with most Alpha Micro computers.

The second Herbie controller, the AM-350 I/O processor, has the same CPU, memory, and bus architecture as the AM-515. Instead of the SASI port, an interface to the unique AM-355 bus is included. Two of these "ports" allow connection of up to 10 AM-355 paddle cards for a total capacity of 60 RS-232/RS-422 ports.

2.10.1 (Continued) Introduction to the AM-520 Disk Controller

The goal of the Herbie development effort was, and continues to be, including multiple processors to improve the performance of the total multiuser system. It is not desired to provided a "quick fix" solution to higher speed peripheral processing at the expense of CPU dependent tasks. Therefore, most of the development effort has been devoted to the Herbie interface and communication system.

The performance of the AM-515 is a result of this effort alone. The same disk controller and disk supplied with the standard system are provided with the AM-515. The AM-515 does not make the disk spin faster or the heads move into position any faster than normal. It is still limited by the performance of the XEBEC controller. The increased performance is due to the efficiency of the Herbie architecture. So what happens when we improve the disk efficiency as well? Enter, the AM-520.

The Newest Herbie: AM-520

The AM-520 differs from its predecessors in its local RAM and peripheral interface circuitry. It contains 1 Mbyte of dynamic RAM in a unique triple port architecture. A high speed DMA controller is able to move data from disk to local RAM at disk rotational speed while the local CPU continues to execute local programs and communicate with main system memory.

This results in the ability to collect multiple disk blocks or "track buffer" while maintaining local caching and system communication tasks. While it does not make the Fujitsu Eagle spin faster or move the heads faster, it results in a performance level not seen before on the Alpha Micro computer.

Summary

The Herbie development effort has enlightened and dismayed the staff at Alpha Micro. As we more closely examine the details of the AMOS operating system in an attempt to "squeeze" more performance from it, we realize how fragile the balance is. The effort to improve performance is tempered by the realization of the number of different applications depending on its features.

There is no "typical" Alpha Micro system. Each has a different number of users, a different type of application, a different mix of CPU and peripheral related tasks.

We have published a series of benchmarks related to our current systems and peripherals, and will continue to do so. In these reports, we attempt to explain all of the details relating to these benchmarks and what we are trying to relate through them.

We understand our "typical system" is not like yours, and we invite you to run similar benchmarks. We learn a great deal from Alpha Micro dealers and users, and attempt to design solutions for "typical systems." We invite analysis of systems that depart from this norm to improve our products.

We expect to publish more details on the AM-520 as the information becomes available. [Editor's Note: We plan to include more information on the AM-520 in next month's issue.]

4.5.2
Improving VME System VCR Reliability Ratios

To increase the read and write reliability ratios on the VCR backup tapes created on AM-1500 and AM-2000 Series computer systems, we have incorporated decoupling capacitors into the shields of the video input and output cables. This change should already be incorporated into ALL systems shipped from the factory.

This change increments the revision level of your computer's video cable assembly from A00 to A01.

Since this modification should already be incorporated into your new VME bus computer system, there will be no RFK (Retro-Fit Kit) for its components.

The modification consists of a solder lug and capacitor, .1 uf 10% 50V, attached from solder lug to cable shield for both the video input and output cables.

If this modification is damaged, the reliability ratios of your VCR tapes might be adversely affected.

13.1.24
How Temperature Affects Disk Media

By David Reid, Systems Engineer
Alpha Micro North Central District Office

Winter is here and with it comes COLD weather. A gentle reminder: disk drives are sensitive to both temperature and temperature change. If you've ever had a system fail right after being unpacked-- fresh from the cold delivery truck-- the fact the drives underwent a quick temperature change could have been the problem. The rate of change is also called "temperature slew."

As a general rule, hard disk drives can tolerate a maximum rate of change of 10 degrees Centigrade per hour. This is because, in part, disks are really made up of two dissimilar materials. One is an aluminum disk and the other is an oxide or plated coating for the magnetic recording. These materials have different rates of expansion and if you change the temperature too quickly they can separate, causing a disk drive failure.

There is also a problem associated with exposing a cold metal disk drive to warm humid air and the resulting moisture condensation. The solution to this problem is very simple. When you receive a shipment that has had time to get very cold, let it set for several hours in the packing material. This gives the system time to warm up gradually. Don't forget this rule when you take a warm system back out into the cold for delivery or for a demo. Pack the system so it won't be exposed to excessive temperature change. Transport the system in a warm van or car to minimize the amount of time it will take to warm the system up again.

If you follow these simple rules you can save yourself a lot of time, aggravation and money.

16.1.1 Technical Information: AM-1200 Parallel Printer Port

by Randy Bird, Product Manager
Computer Systems Division

The parallel port connections on the new AM-1200 system are the same as those on the IBM PC parallel printer interface; these more or less match the Centronics interface standard except that a DB-25 connector is used in place of the standard 36-pin Amphenol-type connector. Most parallel printers use variations on this standard, with different sets of the "non-essential" signals implemented, and a menagerie of connectors used.

This can cause a multitude of problems with interfacing, since a pin used for one function on one printer may be used for another purpose altogether on a different manufacturer's machine. While an "elegant" interface uses all of the signals to define any possible problem, a minimum, fully functional interface uses:

DATA0 through DATA7
STROBE*
BUSY
GROUND

Troubleshooting

If you are having trouble connecting a particular printer to the AM-1200, try disconnecting all lines other than the ones listed above, and see if the printer then works properly.

Before connecting additional signals, check the printer's interface manual and try to compare signal names with those listed for the AM-1200 in the table at the end of this article; hook up only those which match. If it then ceases to function, troubleshoot by disconnecting one line at a time.

Another Complication: Cable Length

Another possible problem is cable length. The AM-304 printer manual recommends a cable of no more than six feet. Just between you and me, this is unrealistic; a somewhat longer cable might work if you use shielded cable and provide multiple ground lines, preferably twisted pair.

Connections for Typical Printers

To ease the interfacing process, we have included below a table listing the pin connections for the IBM Proprinter and the Alpha Micro AM-304/AM-306 parallel printers. Be sure to set the printer for parallel operation, and set up your system initialization command file as required for a parallel printer. For more information, see the AM-1200 Owner's Manual.

16.1.1 (Continued)
Technical Information: AM-1200 Parallel Printer Port

AM-1200 System Parallel Port Pin Signals

Signal Name	Signal Source	Req'd/ Optional	AM-1200 (DB-25S)	IBM Proprinter (Amphenol-36)	AM-304/306 (DB-25P)
STROBE*	System	Required	1	1	3
DATA0	System	Required	2	2	14
DATA1	System	Required	3	3	13
DATA2	System	Required	4	4	12
DATA3	System	Required	5	5	11
DATA4	System	Required	6	6	10
DATA5	System	Required	7	7	9
DATA6	System	Required	8	8	15
DATA7	System	Required	9	9	16
ACK*	Printer	Optional	10	10	22
BUSY	Printer	Required	11	11	19
PAPERERR	Printer	Optional	12	12	24
SELECT	Printer	Optional	13	13	4
AUTOFEED	System	Optional	14	N/U	N/U
ERROR*	Printer	Optional	15	32	N/U
RESET*	System	Optional	16	31	N/U
SELECT*	System	Optional	17	N/U	N/U
LOGIC GROUND	N/A	Required	18-25	19-30	7
CHASSIS GROUND	N/A	Optional	N/U	17	N/U

N/U = Signal not used
* = Active-low signal

1.1.20a Errata: "1/4" Streamers on VME Systems" [Dec. 1986]

[Please file this article after the Software Volume article "1.1.20 - 1/4" Streamers on VME Systems," published in the December 1986 issue of the AMSD Journal.]

The article "1/4" Streamers on VME Systems" stated:

> "The Streamer Support Update tape contains the same files that were released as part of the AM-515 Phase II Update along with updated STRSAV.LIT, XEBDVR.RTD, and 415DVR.RTD files."

It also stated:

> "Note that if you need both the AM-515 Phase II Update and streaming tape drive support, you need only get the Streamer Support Update since it contains the AM-515 Phase II Update files as well as the streaming tape drive support files."

We have since been informed that these statements are not true, and that the official AM-515 Phase II Support Tape contains several necessary files not included on the Streamer Support Update Tape.

Before the Streamer Update Tape can be installed, it is important for you first to install the AM-515 Phase II Update Tape, following the instructions shipped with that tape.

3.2.14
New Software Patches Available from AMSD

The following list gives a description of the new software patches now available from AMSD. The products affected by these patches are: Phase II AM-515 and AlphaWRITE.

Patches in the following list include SPNs 232 through 235, released as of 8 December 1986; beginning where the list appearing in the December Journal article left off (see Journal Vol. 8, #11 - Software Article 3.2.13).

The SPN description in the purpose column ends with the software version(s) this patch is intended for.

SPN #	Module	Purpose
232	---	Currently in test.
233	AM515.MIC	Mounting a drive which was the first logical of the first physical drive or of a subsystem, would result in a "Bitmap Kaput" error message returned from SYSTAT. This patch is to be applied to the Phase II AM515 update software when installed on AMOS/L 1.3B and AMOS/32 1.0 operating systems.
234	---	Used internally.
235	WRITE	Corrects problem where **search** or **replace** failed to find some matches in small partitions where memory paging was necessary. This patch applies to AlphaWRITE version 1.2(196)-2.

6.3.3
Workaround: AlphaWRITE 1.2 Sort Problem

THE PROBLEM: If you are sorting and have marked the minimum number of characters needed to perform the sort, you may find your data is not ordered correctly. For example, suppose you want to sort the articles below based on their year of publication:

1986:The Truth About DB-9 Connectors
1984:Text for Fun and Profit
1971:Teletypes: Wave of the Future?
1985:Telltale Symptoms of I/O Clogging

The most efficient course would be to mark the unique characters on which you need to base the sort, the third and fourth characters, expecting the **sort** command to place the lines in proper order by date. AlphaWRITE 1.2 does not perform this task correctly. After sorting, you see:

1971:Teletypes: Wave of the Future?
1986:The Truth About DB-9 Connectors
1984:Text for Fun and Profit
1985:Telltale Symptoms of I/O Clogging

THE WORKAROUND: Simply mark **one more** character than you really need to base the sort on. For example, in the case above, mark the **third through fifth** characters, even though you don't need to sort on the fifth character. When you perform the sort, the titles will be in the proper order by year:

1971:Teletypes: Wave of the Future?
1984:Text for Fun and Profit
1985:Telltale Symptoms of I/O Clogging
1986:The Truth About DB-9 Connectors

6.3.4
AlphaWRITE Reference Guide Binder

Along with the 1.2 release of the AlphaWRITE software you received a revised set of AlphaWRITE documentation, including the AlphaWRITE Reference Guide (DSS-10133-00 Rev. A00). The sad fact is the binder accompanying this document is not big enough to hold the book and allow you to easily thumb through pages to work with it.

Because of the lead time required for binders, we often must order them long before the document they hold is final--such is the case with the AlphaWRITE Reference Guide. We took our best guess, which wasn't quite good enough, and offer apologies for any frustration this misjudgement may have caused you.

Along with the next major release of the AlphaWRITE software we intend to correct this problem by using two binders for the Reference Guide. Until then, it will be easier to work with the Guide if you separate it into two binders. For easy access, we suggest putting these parts in one binder:

- Front Matter
- Chapters
- Index

And these parts in the other binder:

- Reference Sheets
- Appendices
- Release Notes

3.2.2
Availability of New Manuals

Several new user manuals are available for sale in January. (See the January Alpha Micro Dealer Price List for prices.)

The new documents are:

Absoft FORTRAN 2.2 Compiler User's Manual, DPO-00001-00

Absoft FORTRAN 2.2 Linker User's Manual, DPO-00002-00

AlphaC Release Notes, DSS-10146-00

Change Page Packet #1, "AlphaC User's Manual", DSS-10076-01

Change Page Packet #1, "AlphaC Interface to AMOS/L Monitor", DSS-10078-01

AMSD JOURNAL TABLE OF CONTENTS UPDATE PAGES

The next pages of the Journal are updated Table of Contents pages for your back issue volumes. The updated pages are:

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SOFTWARE INFO. VOLUME:	- Section 1 - General Information - Section 3 - AMOS/L Operating System (1 page) - Section 6 - Software Packages - Section 8 - AMOS/32 Operating System
GENERAL INFO. VOLUME:	- Section 3 - Manuals

- A footer line at the bottom of each table of contents page shows you revision information. This line shows month, year, volume and issue number of the Journal this table of contents page arrived with.

- All table of contents pages have a title line showing which volume they belong in: Hardware, Software or General Information.

- Entries for articles published since 1983 show the month and year of publication.

- Cross reference article entries use this format:

  "Article Name" - Cross reference: See Volume Name Article #.#.# - [Month Year]

  Where Volume Name is Hardware, Software or General Information. Where #.#.# is the article number designating section, category and article number. (For example, article 6.4.3 is filed in section 6, under category 4 and is the 3rd article in category 4.) [Month Year] is the Journal publication date for the article.

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