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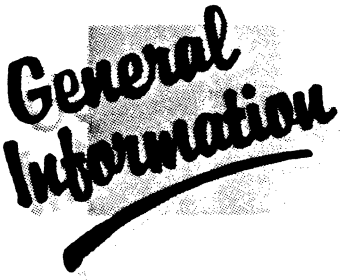
In this issue...



March 1987 **AMSD Journal** Volume 9, Number 3

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Article Filing Instructions

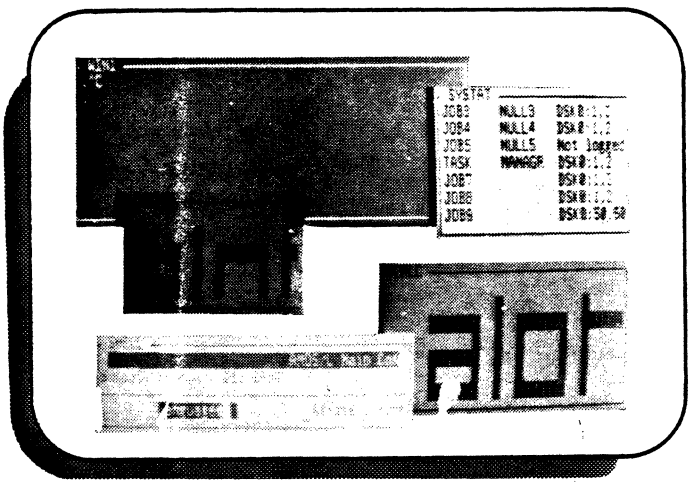
We hope you find the *AMSD Journal* to be a valuable reference tool, and that you will want to refer to its articles frequently in the future. To make it easy and quick to find information, current articles are designed to be filed with articles from past issues. The entire set of *Journal* back issues 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. When I use MULTI in Overview Mode, the terminal cursor does not appear on my screen. And there are times when I would like to see exactly where the cursor is. I checked the documentation which said MULTI purposefully turns off the cursor. Why does MULTI have to do this?



MULTI IN OVERVIEW MODE

ANSWER: Early versions of MULTI left the cursor turned on in the current window as it updated all the window displays when in Overview Mode. However, because MULTI must move the cursor to refresh information in the various windows, but have it appear stationary in the current window, the cursor flashed around on the screen a great deal. And, the extra cursor positioning commands required to keep the cursor "parked" in the currently selected window slowed down MULTI's throughput.

This circumstance illustrates a limitation of the current generation of terminals: there is only one cursor and if it is turned on it must appear wherever changes are being made on the screen. In MULTI's case, to keep the window information current, the cursor must physically move to that screen position to put new information there, move to the next window and update information there, and so on.

People using early versions of MULTI found the trail left by frequent cursor motion very distracting. After showing users versions of MULTI which kept the cursor turned off-- as the current released version does-- and a version keeping the cursor turned on, they preferred no cursor display at all to a flashing, dashing, distracting one.

As you see, this design compromise was brought about as much by aesthetic reasons as technical ones. Perhaps future terminals will allow better control of cursor display location so different screen areas can be updated without creating a disturbing cursor display. Then MULTI could use that terminal capability to maintain a continually updated information display without any distracting cursor movement.

Q. I want to call up MULTI already in Full Screen mode, bypassing Overview Mode completely. How can I do this?

ANSWER: MULTI has two ways of letting you start in Full Screen mode: by using the FULL command and window name when you use the MULTI command at AMOS command level or by putting the FULL command and window name in MULTI's initialization file.

Both methods require you to start MULTI with a previously saved window configuration file so windows are automatically opened for you when you begin MULTI. This saved window configuration file may be either the default MULTI.WSV, or a configuration file you saved with a different name via the SETUP command.

Ask Alpha Micro: Questions and Answers (Continued)

Assume your saved window configurations cause MULTI to open three windows named:

Window1
Window2
Window3

Normally, when you call up MULTI, these three windows are opened and appear on your screen in Overview Mode. At this point, you can use the FULL command to use Full Screen mode so the window you identify occupies the entire screen.

MULTI and FULL Commands

You don't have to always have MULTI begin in Overview Mode though. By using MULTI and the FULL commands, along with the window you want to see in Full Screen mode from AMOS command level, you automatically begin MULTI in Full Screen mode. Like so:

MULTI/FULL:window name **[RET]**

Where window name represents the window you want to see in Full Screen mode as soon as MULTI begins.

If your window name is Window1, you type:

MULTI/FULL:Window1 **[RET]**

The above example assumes you want to use the MULTI.WSV configuration file. If you want to use a different configuration file, saved with a name other than MULTI.WSV, be sure you specify the configuration file name after MULTI and before /FULL, like so:

MULTI Filename/FULL:Window1 **[RET]**

Initialization File Method

If you prefer to always begin MULTI in Full Screen mode, you can put the FULL command in MULTI's initialization file. The syntax for this is:

FULL=window name

Using the example above, you'd include the following in your MULTI intialization file:

FULL=Window1

For more information about the FULL command, and MULTI's initialization file, please see the MULTI User's Guide.

4.6.1
1/2" Cipher Data Magnetic Tape Drive - Switch Settings for Model M891

Alpha Micro is currently shipping Cipher Data 1/2" Magnetic Tape Drive model M890; however we will begin to ship M891 as a replacement. There are no software or functional differences between these two models.

The drive switch settings listed in Table 1 are for controller address 1 and drive address 0. The settings shown assume this is the only tape drive on the system and the AMOS initialization file contains a DEVTBL statement for MTU0:.

TABLE 1

SWITCH SETTINGS
ON CIPHER DRIVE

POSITION	MODEL M890	MODEL M891
1	off	off
2	off	off
3	off	off
4	on	on
5	on	on
6	on	on
7	on	on
8	on	on

Settings for internal operating parameters are shown in Table 2. The switch bank located near the front of the tape drive on either model selects the internal operating parameters. These settings vary between model M890 and M891 at positions 5, 7 and 8:

TABLE 2

SWITCH SETTINGS ON CIPHER DRIVE
INTERNAL OPERATING PARAMETERS

POSITION	MODEL M890	MODEL M891
1	off	off
2	off	off
3	on	on
4	off	off
5	***off***	***on***
6	on	on
7	***on***	***off***
8	***on***	***off***

3.1.14
AMOS 2.0: File System Technical Overview

By Ken Ellson
Manager Software Development
Advanced Products Development

This article gives a preview of three new features of the AMOS 2.0 release currently under development: file I/O enhancements, implementation of record I/O, and changes to ISAM to make use of these features. Remember, when we say "AMOS 2.0" we are referring to both AMOS/L and AMOS/32. [Editor's note: see the February 1987 Journal for an overview of AMOS 2.0.]

AMOS 2.0 FILE I/O DESCRIPTION

File I/O under AMOS 2.0 has been significantly enhanced in the areas of maximum allowed size, protection and descriptive information. AMOS 2.0 does not have hardware memory mapping or protection, so the file protection mechanism is capable of preventing innocent mistakes, but not keeping malicious users away from sensitive data.

Maximum File Size

In previous versions of AMOS, the physical block numbers used to specify location were 16 bit quantities-- this limited the maximum size of a logical device or a file to 32 mb. Under AMOS 2.0, these quantities are now a full 32 bits long, raising the maximum size of a logical device or a file to 2,000 mb!

Practical considerations limit the size to much less than the maximum at the present time, but this size should prove adequate for magnetic disks for quite some time. In addition, optical disks, which have very large capacities, will also be able to be fully supported.

File Protection

File protection under AMOS 2.0 has been enhanced in three different areas.

First, the file creation algorithm has been modified so the file is entered into the directory when it is OPENed, rather than waiting until it is CLOSEd. This prevents the simultaneous creation of two or more files with the same name in the same directory.

Secondly, each file can be individually specified to have specific access rights for each of five different classes of user. These user classes are:

1. Users in the same directory (PPN).
2. Users in the same project.
3. Users from a different project number.
4. Users in the same network level.
5. All other users.

For each of these five classes, a file may allow any combination of these four basic rights:

1. File may be read.
2. File may be written.
3. File may be executed.
4. File may be deleted, renamed or have its protection changed.

Users logged into OPR: can always change the protection codes. Files may also have one other protection level specified; namely, when they are deleted, the disk blocks they used are zeroed.

Finally, AMOS 2.0 includes protection to prevent multiple users from interfering with each other when accessing files. Random (and ISAM) files may be OPENed in shared or exclusive mode. Sequential files are OPENed exclusively when being created and shared when being read.

3.1.14 (Continued)
AMOS 2.0: File System Technical Overview

Descriptive Information

In addition to the file name and extension, the AMOS 2.0 directory also includes the date and time when the file was created, when it was last updated and when it was last backed up. This information is maintained by AMOS, without requiring any direction by the user.

Mixed File Systems

AMOS 2.0, in addition to its native extended file structure, also supports the traditional existing AMOS file structure. The same system can have some logical disks defined as extended format and some defined as traditional format. All of the AMOS utility programs can access either type of disk, and will ignore superfluous information when accessing a traditional logical disk.

RECORD I/O DESCRIPTION

The record I/O facility included in the AMOS 2.0 release is described in the following paragraphs.

This subsystem includes both the ability to specify logical records of virtually any size and the ability to lock these records to prevent multiple users from interfering with each other.

Logical Record Definition

Early versions of AMOS did not include a logical record capability. There were monitor calls to input and output physical blocks of data, typically 512 bytes each. The logical records were independently implemented by ISAM, AlphaBASIC and AlphaCOBOL, on top of and unknown to, the physical block I/O facility in AMOS. ISAM and AlphaBASIC were limited to 512-byte records, did not allow records to span a physical block boundary, and left holes in the file where the records did not evenly fit into 512-byte blocks. Alpha-COBOL records were up to 64Kb in size, spanned block boundaries and left no holes in the file.

AMOS 2.0 supports both types of records under user control. When a random file is created under AMOS 2.0, the user specifies the record size and whether standard records or big records are to be used. The use of big records allows the maximum record size to increase from 512 bytes to 64Kb. In addition, big records also pack the data without holes, since they can span physical blocks. For example, if a file is created with 384-byte records, AMOS would normally allocate one record per 512-byte block. If big records are specified, they would be packed tight and there would be three records in two physical blocks. The penalty for this is speed, since one out of three records would require accessing two disk blocks instead of one.

When the file is being accessed, the user specifies the record size and type of the file. If a record size was defined at the time the file was created, then the access time record size must match, else an error is generated. The records may be locked or not, as the application requires, but only the record in use is locked, not the entire block(s) which contains the record. Thus, if a file contains 128-byte records (four records per block), four separate users could each lock a record in the same physical block simultaneously. This removes a significant bottleneck to multi-user throughput of the system. This record locking is an integral part of the record I/O facility.

3.1.14 (Continued)
AMOS 2.0: File System Technical Overview

Disk Cache

The AMOS 2.0 record I/O facility was designed to work with or without the AMOS disk cache. Allocating even a small amount of memory for a cache however, will have a significant beneficial effect on performance. The system will work without cache, however, performance may very well be worse than under previous AMOS releases without cache.

Sequential Files

The record I/O facility can also be used with sequential files to read a line of data. In this case, a record is defined as a sequence of ASCII characters up to and including a line feed character. The record may be up to 64Kb long. When reading the record, AMOS returns the record size, since this is often different for each line.

ISAM DESCRIPTION

The ISAM facility for AMOS 2.0 has been totally rewritten to take full advantage of all of the new features in this release. Key enhancements include a simpler programming interface, increased performance, the ability to read in reverse order, support for duplicate keys, more efficient record locking and generic key searches.

General Structure

A new ISAM file actually consists of two files: a data file (.IDA) which contains the actual data records, and an index file (.IDX) which contains all of the indices currently defined for the file. Since there is only one index file, the maximum number of indices must be defined when the file is created, in order to allow space in the index file for all of the keys.

Key Definition

An ISAM key must be contained within the record and can be up to 161 bytes long. Keys can be numeric (binary), symbolic (ASCII) or concatenated (combination of symbolics) and must be defined when the index is created. When an index is created, the creator can specify whether duplicates are allowed, including for the primary index, and whether the key value can change during an update operation.

Record Access

ISAM provides the ability to locate (FIND), read (GET), write (PUT), modify (UPDATE) and remove (DELETE) records. Records may be accessed via any key in ascending or descending order or randomly. When accessing a record randomly via its key, the match can be exact or approximate. Approximate relationships are greater than (GT), greater than or equal to (GE), less than or equal to (LE) and less than (LT). The key point here is that each record access takes only one request from the program; allocating/de-allocating records in the data file and inserting/removing keys from the indices are both performed automatically by ISAM, without explicit user instructions. This makes the use of ISAM far simpler and less error prone than in the past.

Record Locking

Record I/O is an integral part of AMOS 2.0 along with multi-user protection via record locking. When a record is read and locked (via GETL), only the record itself is locked; the index and any other records in the same physical block may be accessed by other users. This removes the major bottleneck for ISAM under previous AMOS releases.

3.2.16
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: AMOS/L and AMOS/32.

Patches in the following list include SPNs 246 through 253, released as of 17 February 1987; beginning where the list appearing in the February Journal article left off (see Journal Vol. 9, #2 - Software Article 3.2.15).

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

SPN #	Module	Purpose
246	LOKSER.LOK	Corrects a problem with the OUTPUT monitor calls. When the call is issued, it should not release the lock prior to the data being written to the disk. This patch applies to AMOS/L version 1.3B and AMOS/32 version 1.0. (See Software Volume Article 3.2.18 - LOKSER.SYS Software Patch - SPN-246-00, March 1987 Journal.)
247	- -	Used internally.
248	- -	Used internally.
249	CRT415	Corrects a problem using CRT415 on AM-2000 Systems. This patch applies to AMOS/32 version 1.0.
250	WRMGEN	Corrects a problem which caused intermittent failure of warmbooting when used on systems with 6850 serial chips. This patch applies to AMOS/L version 1.3C.
251	WRMGEN	Corrects a problem which caused intermittent failure of warmbooting when used on systems with 6850 serial chips. This patch applies to AMOS/L version 1.3B and AMOS/32 version 1.0.

(Table continued on next page.)

3.2.16 (Continued)
New Software Patches Available from AMSD

SPN #	Module	Purpose
252	LSYS.MON	Corrects six problems: 1. Corrects problem with LOKSER and OUTPUT monitor calls. 2. Resolves AM-350 semaphore deadlock. 3. Resolves scheduler problem with small quanta. 4. Preserves D1 through failing GETMEM calls. 5. Provides staging for AM-350 Phase II. 6. Resolves problem with failing ASSIGN calls. This patch applies to AMOS/L version 1.3B. (See Software Volume Article 3.2.17 - AMOS/L 1.3B Monitor Patch - SPN-252-02, March 1987 Journal.)
253	32SYS.MON	Corrects seven problems: 1. Corrects problem with LOKSER and OUTPUT monitor calls. 2. Resolves AM-350 semaphore deadlock. 3. Resolves scheduler problem with small quanta. 4. Preserves D1 through failing GETMEM calls. 5. Provides staging for AM-350 Phase II. 6. Resolves problem with failing ASSIGN calls. 7. Flushes on-chip cache during FETCH and SSTS handling. This patch applies to AMOS/32 version 1.0. (See Software Volume Article 8.2.4 - AMOS/32 1.0 Monitor Patch - SPN-253-02, March 1987 Journal.)

3.2.17
AMOS/L 1.3B Monitor Patch - SPN-252-02

For the last few months, we have been tracking down reported problems with some configurations of Alpha Micro high-end systems.

The problems we tracked down fell into the following categories:

1. The majority of the problems were the result of improper power installation and terminal cabling. (Note: See next month's issue for information on preventing and correcting power and cabling problems.)

2. Hardware and software not up to current revisions or of mixed revisions.

3. Applications software problems, including improper multi-user file locking.

4. Assorted operating system problems.

The -6 patches to AMOS/L 1.3B and AMOS/32 1.0 were developed to address the operating system problems found. (-3, -4 and -5 patches were an intermediate step in this problem-solving process, and were never formally released.)

The SPN-252-02 patch resolves six problems:

1. Fixes LOKSER problem during OUTPTL.
2. Resolves AM-350 semaphore deadlock.
3. Resolves scheduler problem with small quanta.
4. Preserves D1 through failing GETMEM.
5. Provides staging for AM-350 Phase II.
6. Resolves problem with failing ASSIGN calls.

NOTE: There are two previous patches to LSYS.MON (SPN# 188, SPN# 229) that must be made prior to this one. The -3, -4 and -5 patches were never released. In order to fix the LOKSER problem correctly, a corresponding LOKSER patch (SPN# 246) needs to be installed at the same time. (See Software Volume article 3.2.18-LOKSER.SYS Software Patch SPN-246-00, March 1987 Journal.)

IMPORTANT NOTE: Before you install this patch-- If you use the AlphaNET Video Network software, make sure the system on which you are installing this patch, and all systems it is connected to, have NODECHECK set to ON.

Installation Instructions

Before installing this patch, use the MONHSH program to verify that you have the correct monitor hash total of LSYS.MON.

Old version and MONHSH:
051-426-117-400 1.3B(151)-2

To install this patch, create a copy of LSYS16.M68, by typing it in (using AlphaVUE) from the attached listing. A copy of LSYS.MON should be copied from DSK0:[1,4] to the account where you have created LSYS16.M68. Now enter the command:

PATCH LSYS.MON WITH LSYS16

You will see the patch file being assembled and installed. You should see no error messages. If you do, check to make sure that you have entered the patch file correctly and are trying to patch the correct version of LSYS.MON. You can find further information on installing patches in AMOS/L System Operator's Guide, DSS-10002-00, Part 3.

3.2.17 (Continued)
AMOS/L 1.3B Monitor Patch - SPN-252-02

After installing the patch, use the MONHSH program to verify that the monitor hash total of the patched file is correct. Enter the command:

MONHSH LSYS.MON

New version and MONHSH:
040-156-636-147 1.3B(151)-6

If the hash total does not match, then check the patch file for errors and enter the patch again or contact Technical Support. If the hash total is correct, then you must use the MONGEN program to install the correct disk driver for your system disk. Once you have completed the MONGEN procedure, use MONTST to make sure that the system will boot properly. After the system has booted correctly, rename LSYS.MON to AMOSL.MON. For example,

RENAME AMOSL.MON=LSYS.MON/D

After the patch has been installed correctly, and you have successfully booted the system via MONTST, the patched version of LSYS.MON should be copied on to DSK0:[1,4].

```
;Patch #6 to SYS:AMOSL.MON Version 1.3B(151)-2 (For AMOS/L 1.3B)
;
;Copyright (C) 1987 - Alpha Microsystems
;
;Note: Patches #3, #4, and #5 were never released
;
          COPY      PATCH

          OVER      1,3,2,151.,2
          NVER      1,3,2,151.,6

          .=4334
          WORD      12

          .=7340
          JMP       20$

          .=10760
          JMP       30$

          .=11212
          WORD      61400,326

          .=11526
          JMP       30$

          .=11656
          JMP       40$

          .=14544
```

(continued on next page)

3.2.17 (Continued)
AMOS/L 1.3B Monitor Patch - SPN-252-02

```
            PUSH    D1
            CALL    340$
            POP     D1
            NOP

            .=15154
            WORD    1777

            .=16122
            CALL    300$

            .=16522
            CALL    300$

            .=17346
            CALL    310$

            .=20374
            JMP     60$

            .=22034
            WORD    400

            .=22304
            WORD    177434

            .=24666
            CALL    360$

            .=24750
            JMP     370$

            .=31744
            WORD    60042

            .=44736
            WORD    4

            .=45520
            JMP     90$

            .=54534
20$:        TSTB    2204
            WORD    63400,132570
            MOVB    2(A1),D0
            CLRB    2204
            WORD    47372,132566
```

(continued on next page)

3.2.17 (Continued)
AMOS/L 1.3B Monitor Patch - SPN-252-02

```
30$:    WORD    6615,4
        MOVB    #100,@A5
        SETB    2204
        CLRB    2300
        REST    A0-A6,D0-D7
        RTE
40$:    BNE     50$
        WORD    6415,4
        MOVW    D6,216(A6)
        SUBW    D6,222(A6)
        ORW     #4000,2(A6)
        CLR     D6
        WORD    6615,4
50$:    MOVB    #100,@A5
        SETB    2204
        REST    A0,A5,A6,D6,D7
        CLRB    2330
        RTE
60$:    LEA     A3,46(A5)
70$:    MOV     @A3,D7
        BEQ     80$
        MOV     D7,A3
        CMP     4(A3),#12
        BNE     70$
        RTN
80$:    WORD    47272,143676
        WORD    47372,143462
90$:    CMPB    D2,#40
        BEQ     130$
        CMPB    D2,#30
        BEQ     100$
        CMPB    D2,#41
        BNE     120$
100$:   MOVB    #43,D2
110$:   CALL    46412
120$:   JMP     44354
130$:   MOV     #1043,D2
        BR      110$
300$:   BCALL   320$
        JWAIT   J.TOW
        RTN
310$:   BCALL   320$
        JWAIT   J.IOW
        RTN
```

(continued on next page)

3.2.17 (Continued)
AMOS/L 1.3B Monitor Patch - SPN-252-02

```
320$:     MOV       A5,D7
          BEQ       330$
          MOV       2(A5),A6
          CMP       -4(A6),#1032357560
          BNE       330$
          ORW       #20000,2(A0)
330$:     RTN
340$:     MOV       #124,D1
          MOV       #1003,D6
          SMSG
          RTN
360$:     MOV       D6,D4
          MOV       A6,A1
          JLOCK
          RTN
370$:     JUNLOK
          REST      A0,A1,D4,D5
          RTE

          END
```

3.2.18
LOKSER.SYS Software Patch - SPN-246-00

AMOS/L Version 1.3B(151)-2
AMOS/32 Version 1.0(154)-1

The SPN-246-00 patch corrects a problem with the OUTPUT monitor call. When the call is issued it should not release the lock prior to the data being written to the disk.

IMPORTANT NOTE: There is a previous patch to LOKSER.LOK (SPN-220L) that must be installed prior to this one. In order to fix this problem completely, there is a corresponding monitor patch that must be installed. For AMOS/L 1.3B systems, use SPN-252L. For AMOS/32 1.0 systems, use SPN-253L. (Please see corresponding Software Volume articles 3.2.17 - AMOS/L 1.3B Monitor Patch SPN-252-02, March 1987 Journal and article 8.2.4 - AMOS/32 1.0 Monitor Patch SPN-253-02, March 1987 Journal.)

Installation Instructions

1. LOG to SYS: and at AMOS/L command level type:

   DIR/H/V LOKSER.LOK

   Compare the existing hash total and version with the beginning hash and version listed in step 5 to insure that this patch has not been installed. If it has not, proceed with the patch.

2. If one does not already exist, create a PPN to be used for patch files.

3. Create an AlphaVUE file named LOKS03.M68 and type the text of the patch which is shown at the end of this article.

4. Create a copy of LOKSER.LOK in the account where you have made the file LOKS03.M68 (i.e., COPY =SYS:LOKSER.LOK).

5. Type the command:

   PATCH LOKSER.LOK WITH LOKS03

   You will see the patch file being assembled and installed. If any error messages appear, be sure you entered the patch filename correctly and are trying to patch the correct version of the program. If the patch file appears to have been entered correctly, and error messages still appear, please contact the Technical Support Group, (714) 641-7608 for further information.

   Old hash and version:
   313-610-117-672 1.1(108)-1
   New hash and version:
   672-375-117-736 1.1(108)-2

6. After the patch has been installed correctly, copy the patched version of LOKSER.LOK in SYS:. If you are using LOKSER, use the LOKGEN program to re-create the LOKSER.SYS file.

   Then install the corresponding monitor "-6" patch (SPN-252L for AMOS/L 1.3B Systems or SPN-253L for AMOS/32 1.0 Systems). These patches must be installed prior to resetting the system. (Please see corresponding Software Volume articles 3.2.17 - AMOS/L 1.3B Monitor Patch SPN-252-02, March 1987 Journal and article 8.2.4 - AMOS/32 1.0 Monitor Patch SPN-253-02, March 1987 Journal.)

3.2.18 (Continued)
LOKSER.SYS Software Patch - SPN-246-00

```
;Patch #2 to DSK0:LOKSER.LOK[1,4] Version 1.1(108)-1
;AMOS/L & AMOS/32
;SPN-246L
;Copyright (C) 1986 - Alpha Microsystems

          COPY      PATCH

          OVER      1,1,0,108.,1
          NVER      1,1,0,108.,2
          OHASH     313,610,117,672
          NHASH     672,375,117,736

          .=124
          LEA       A0,LOKEND

          .=4614
          JMP       OLDEND
PCH1:

          .=4634
OLD90$:

          .=5324

FREREC:

          .=6056
OLDEND:   MOV       @SP,D7
          CMPB      D7,#40
          BNE       60$
          POP       D2
          JMP       OLD90$
60$:      CALL      FREREC
          JMP       PCH1
LOKEND:

          END
```

8.2.4
AMOS/32 1.0 Monitor Patch - SPN-253-02

For the last few months, we have been tracking down reported problems with some configurations of Alpha Micro high-end systems.

The problems we tracked down fell into the following categories:

1. The majority of the problems were the result of improper power installation and terminal cabling. (Note: See next month's issue for information on preventing and correcting power and cabling problems.)

2. Hardware and software not up to current revisions or of mixed revisions.

3. Applications software problems, including improper multi-user file locking.

4. Assorted operating system problems.

The -6 patches to AMOS/L 1.3B and AMOS/32 1.0 were developed to address the operating system problems found. (-3, -4, and -5 patches were an intermediate step in this problem-solving process, and were never formally released.)

The SPN-253-02 patch resolves seven problems:

1. Fixes LOKSER problem during OUTPTL.
2. Resolves AM-350 semaphore deadlock.
3. Resolves scheduler problem with small quanta.
4. Preserves D1 through failing GETMEM.
5. Provides staging for AM-350 Phase II.
6. Resolves problem with failing ASSIGN calls.
7. Flushes on-chip cache during FETCH and DELMEM, and prevents SSTS from hanging.

NOTE: There is one previous patch to 32SYS.MON (SPN# 230) that must be made prior to this one. The -2, -3, -4, or -5 patches were never released. In order to fix the LOKSER problem correctly, a corresponding LOKSER patch (SPN# 246) needs to be installed at the same time. (See Software Volume article 3.2.18 - LOKSER.SYS Software Patch SPN-246-00, March 1987 Journal.)

IMPORTANT NOTE: Before you install this patch-- If you use the AlphaNET Video Network software, make sure the system on which you are installing this patch, and all systems it is connected to, have NODECHECK set to ON.

Installation Instructions

Before installing this patch, use the MONHSH program to verify that you have the correct monitor hash total of 32SYS.MON.

Old version and MONHSH:
327-502-044-246 1.0(154)-1

To install this patch, create a copy of 32SY03.M68, by typing it in (using Alpha-VUE) from the attached listing. A copy of 32SYS.MON should be copied from DSK0:[1,4] to the account where you have created 32SY03.M68.

Now enter the command:

PATCH 32SYS.MON WITH 32SY03

You will see the patch file being assembled and installed. You should see no error messages. If you do, check to make sure that you have entered the patch file correctly and are trying to patch the correct version of 32SYS.MON. Further

8.2.4 (Continued)
AMOS/32 1.0 Monitor Patch - SPN-253-02

information on installing patches is contained in AMOS/L System Operator's Guide, DSS-10002-00, Part 3.

After installing the patch, use the MONHSH program to verify that the monitor hash total of the patched file is correct. Enter the command:

```
MONHSH 32SYS.MON
```

New version and MONHSH:
630-067-131-632 1.0(154)-6

If the hash total does not match, then check the patch file for errors and enter the patch again or contact Technical Support. If the hash total is correct, then you must use the MONGEN program to install the correct disk driver for your system disk. Once you have completed the MONGEN procedure, use MONTST to make sure that the system will boot properly. After the system has booted correctly, rename 32SYS.MON to AMOS32.MON. For example,

```
RENAME AMOS32.MON= 32SYS.MON/D
```

After the patch has been installed correctly, and you have successfully booted the system via MONTST, the patched version of AMOS32.MON should be copied on to DSK0:[1,4].

```
;Patch #6 to SYS:AMOS32.MON Version 1.0(154)-1 (For AMOS/32 1.0)
;
;Copyright (C) 1987 - Alpha Microsystems
;
;Note: Patches #2, #3, #4, and #5  were never released
;
          COPY      PATCH

          OVER      1,0,0,154.,1
          NVER      1,0,0,154.,6

          .=7334
          JMP       220$

          .=10754
          JMP       230$

          .=11206
          WORD      61400,326

          .=11522
          JMP       230$

          .=11652
          JMP       240$

          .=14320
          JMP       350$
```

(continued on next page)

8.2.4 (Continued)
AMOS/32 1.0 Monitor Patch - SPN-253-02

```
.=14346
PUSH        D1
CALL        340$
POP         D1
NOP

.=14756
WORD        1777

.=15724
CALL        300$

.=16324
CALL        300$

.=17150
CALL        310$

.=20176
JMP         260$

.=21644
WORD        400

.=22114
WORD        177434

.=24476
CALL        360$

.=24560
JMP         370$

.=31554
WORD        60042

.=32736
JMP         70$

.=44510
WORD        4

.=45272
JMP         80$

.=54306
```

(continued on next page)

8.2.4 (Continued)
AMOS/32 1.0 Monitor Patch - SPN-253-02

```
50$:    PUSH    D7
        LWORD   ^H04E7A7002
        BTST    #0,D7
        BEQ     60$
        MOV     #11,D7
        LWORD   ^H04E7B7002
        LWORD   ^H04E7B7002
        NOP
        LWORD   ^H04E7B7002
60$:    POP     D7
        RTN
70$:    TST     60(A3)
        WORD    63000,156342
        MOV     14(A3),D1
        ADD     20(A3),D1
        WORD    47372,156252
80$:    CMPB    D2,#40
        BEQ     120$
        CMPB    D2,#30
        BEQ     90$
        CMPB    D2,#41
        BNE     110$
90$:    MOVB    #43,D2
100$:   CALL    46164
110$:   JMP     44126
120$:   MOV     #1043,D2
        BR      100$
220$:   TSTB    2204
        WORD    63400,132660
        MOVB    2(A1),D0
        CLRB    2204
        WORD    47372,132656
230$:   WORD    6615,4
        MOVB    #100,@A5
        SETB    2204
        CLRB    2300
        REST    A0-A6,D0-D7
        RTE
240$:   BNE     250$
        WORD    6415,4
        MOVW    D6,216(A6)
        SUBW    D6,222(A6)
        ORW     #4000,2(A6)
        CLR     D6
        WORD    6615,4
```

(continued on next page)

8.2.4 (Continued)
AMOS/32 1.0 Monitor Patch - SPN-253-02

```
250$:   MOVB    #100,@A5
        SETB    2204
        REST    A0,A5,A6,D6,D7
        CLRB    2330
        RTE
260$:   LEA     A3,46(A5)
270$:   MOV     @A3,D7
        BEQ     280$
        MOV     D7,A3
        CMP     4(A3),#12
        BNE     270$
        RTN
280$:   WORD    47272,143574
        WORD    47372,143360
300$:   BCALL   320$
        JWAIT   J.TOW
        RTN
310$:   BCALL   320$
        JWAIT   J.IOW
        RTN
320$:   MOV     A5,D7
        BEQ     330$
        MOV     2(A5),A6
        CMP     -4(A6),#1032357560
        BNE     330$
        ORW     #20000,2(A0)
330$:   RTN
340$:   MOV     #124,D1
        MOV     #1003,D6
        SMSG
        RTN
350$:   CALL    50$
        REST    A0,A1,A3,A4,D4,D5
        MOVB    #PS.Z,@SP
        RTE
360$:   MOV     D6,D4
        MOV     A6,A1
        JLOCK
        RTN
370$:   JUNLOK
        REST    A0,A1,D4,D5
        RTE

        END
```

8.4.1
AMOS/32 - 68020 Programming Cautions

By David A. Yox
Director of Software
Advanced Products Development

The Alpha Micro AM-2000 series brings a new dimension of computing power to the Alpha Micro product line. With the intelligent AM-350 I/O controller, the AM-515 disk accelerator and the soon to be announced AM-520 disk controller, Alpha Micro computers will be among the highest performing small business computing systems in the marketplace today.

The reason behind all this performance is an architecture based on multiple Motorola M680xx's cooperating to get the user's job done in the most expeditious way possible. With the new architecture in hardware, there is a new structure of AMOS and a distribution of the various tasks to be accomplished on behalf of the user. In short, AMOS and the way it looks to a user program, is changing and is likely to change more as new M680xx's become available.

So, you say, what does that mean to me? We have tried very hard to maintain total user program compatibility while offering a significant performance improvement over our AM-10xx product line. And to a large measure, I think we have succeeded. We believe preserving the investment made in the software running on the Alpha Micro is very important.

However, there are going to be changes in both hardware and software which will make it impossible to maintain compatibility with the current product lines. As a matter of fact, the AM-2000 has an existing incompatibility which has to do with the built-in hardware instruction cache on the M68020 which causes the M68020 CPU to act differently than the M68000 or the M68010 under certain circumstances.

Hardware Instruction Cache

The hardware instruction cache is an on-chip very high speed memory which preserves a number of previously executed instruction segments. If a code sequence to be executed resides in cache, it is accessed from the cache at the time of execution instead of main memory because it can be accessed and executed much faster. The problem, or incompatibility, arises when the executing program modifies itself intentionally to change its characteristics dynamically. If the code being changed is within the range of the cache, the cache gets changed but main memory does not; this is called non-write-through cache logic. The result can be different depending on whether the cache remains intact with the expected changed instruction or it is refreshed from main memory restoring the old instruction into the execution stream.

The resulting problem may be time consuming to troubleshoot. But, if you know a program uses this technique of execution control, it should be changed to use a more appropriate method in order to avoid the problem in the future.

Timing Loop Delays

One other incompatibility in the AM-2000 is caused by its significantly faster speed. Because the M68020 is significantly faster than previous CPU's, timing delay routines depending on execution of a number of machine instructions with known cycle times will no longer provide the correct amount of time delay when run on the AM-2000. The AMOS system timing call TIMER is designed to remain machine and cycle speed independent, and provides timing control for this very reason.

8.4.1 (Continued)
AMOS/32 - 68020 Programming Cautions

Upcoming Changes

There will be more changes affecting the way programs run on future versions of hardware and software. Coming up is AMOS 2.0 with a new file management system supporting large files, a new enhanced ISAM, along with other changes and improvements.

Even with significant changes, our goal is to make it as easy as we can for your programs to migrate to new systems and supporting software. You can help ease the transition by using good programming techniques and using the AMOS operating system program interfaces when you need something done. Directly accessing AMOS system tables from a user program can, and probably will, cause the program to be non-functional when it is run on a new version of AMOS.

In the future, new high-performance hardware assists will become available to implement memory paging and memory access protection. Implementation of these features will result in a more secure operating environment and a more reliable system. Planning ahead for these changes will help ease the transition to new generations of higher performance Alpha Micro systems.

3.2.3
New Documentation Available

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

The new documents are:

AMOS/L 1.3C Release Notes
DSS-10254-00

Change Page Packet #9,
"AMOS Commands Reference Manual,"
DSS-10004-09

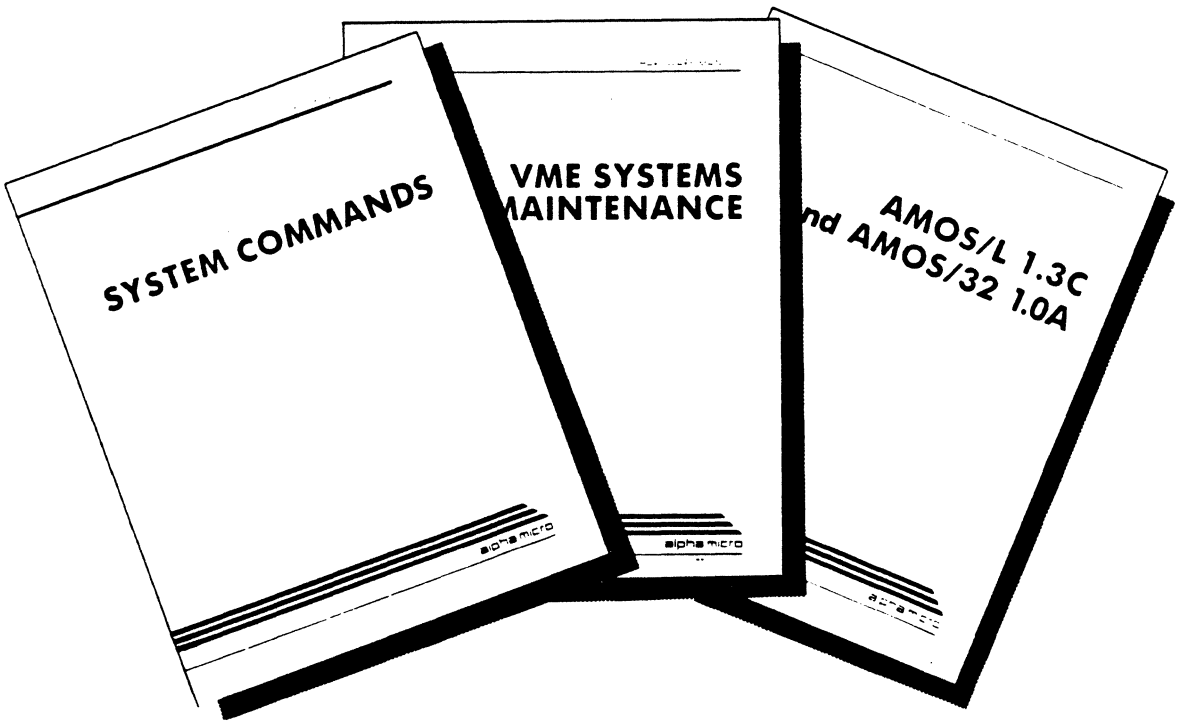
VME Systems Maintenance Manual
DWM-01500-00

New Part Numbers for Existing Manuals

In keeping with our new document numbering conventions, two existing manuals have been assigned new part numbers. No additions or deletions have been made to these documents; however to order them you must use their new numbers.

AM-62 Training Maintenance Manual
New number: PSM-00016-00
(old number: TMM-00062-00)

TXTFMT User's Manual
New number: DSO-00018-00
(old number: DWM-00100-07)



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- 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:

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