SECTION IV

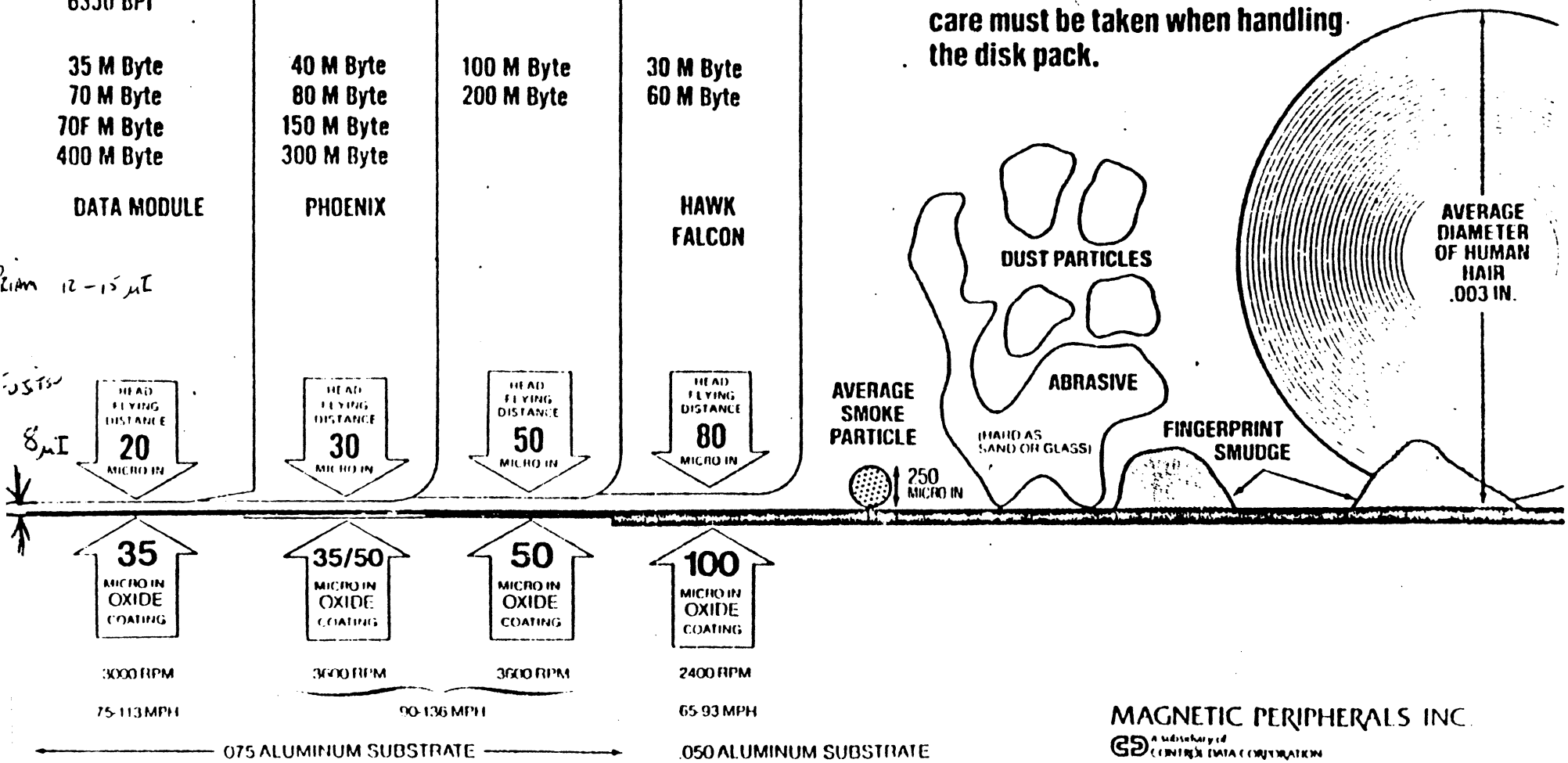
Disk Drives

HEAD/DISK RELATIONSHIP

FLYING DISTANCE AND CONTAMINATION

Data heads fly on a very thin layer of air that is squeezed between the heads and the disk. Due to the extremely small distance between the heads and the disk, care must be taken when handling the disk pack.

3340 TYPE 3350 TYPE	STORAGE MODULE DRIVE	3330 TYPE	2314 TYPE
5500 BPI 6350 BPI	6000 BPI	4000 BPI	2220 BPI
35 M Byte 70 M Byte 70F M Byte 400 M Byte	40 M Byte 80 M Byte 150 M Byte 300 M Byte	100 M Byte 200 M Byte	30 M Byte 60 M Byte
DATA MODULE	PHOENIX		HAWK FALCON



MAGNETIC PERIPHERALS INC.

CDC A subsidiary of CONTROL DATA CORPORATION

6.1.31 AM-1000 Hard Disk Cleaning Procedure

Current Alpha Micro product (AM-1000E) with 30 MB disks falls into one of three categories:

1. CMI disks.
2. Quantum disk without a dust seal.
3. Quantum disk with a dust seal.

Some of these disks have a tendency to accumulate a dust build-up on the optical encoder and require preventive maintenance. The recommended PM cycle is 3 to 6 months depending upon the environment surrounding the system. When the encoder needs cleaning, the sympton is often exhibited as soft errors.

The following is Alpha Micro's recommended service approach.

Service approach for #1, CMI 30 MB disk:

> Preventive maintenance of systems with CMI 30 MB disks will include cleaning of the optical encoder. Failure of the CMI disk should be serviced by replacement with a spare and the failed unit should be repaired and returned to stock.

Service approach for #2, Quantum 30 MB disk without dust seal:

> Preventive maintenance of systems with these Quantum disks should include cleaning of the optical encoder and installation of the dust seal gasket. This action will change the disk to a category #3 disk with no preventive maintenance requirement. Units which fail and are routed through AMTS will be updated with the dust seal gasket in conjunction with the repair. Approximately 600 of these units are in the field.

Service approach for #3, sealed Quantum disks:

> No preventive maintenance is recommended for these units.

The above recommended service should be followed by Alpha Micro direct field service and by Alpha Micro authorized service groups. AMTS can furnish the gasket kit to seal the Quantum disks.

A regular preventive maintenance procedure and program is important to insure troublefree operation of all computer equipment. This is particularly true of the AM-1000E systems containing 30MB disk drives. Due to the construction of these drives, it is important that the index sensor periodically be cleaned. For some systems containing the Quantum 30MB drive, a replacement gasket may be installed to eliminate the need for preventive maintenance.

Alpha Micro recommends that a regular preventive maintenance schedule that includes checking and cleaning of the index sensor be followed. The frequency of any maintenance schedule will depend upon the environment in which the system is located. The cleaner the environment, the less frequent the program will have to be carried out. Symptoms of a dirty index sensor are random drive errors for no apparent reason. For further information on maintenance and environment, refer to the Site Preparation Guide published in the August, 1981 ISSG Newsletter and in the Hardware Volume AMTS Journal.

Please note the procedure below pertains to 30MB Winchester hard disks only.

PROCEDURE:

1. Spin down the drive using the MOUNT/U command.
2. Turn the Master A/C Power switch off and remove the power cord from the rear of the AM-1000E.
3. Remove four screws from the top rear of the AM-1000E.
4. Remove four screws from the top rear of the AM-1000E.

5. Carefully remove the top cover by pulling upward on it until it slides off. The main logic board will now be in view.

6. Rotate the AM-1000E so that the rear panel of the computer is facing you. Remove the four screws holding the rear connector panel and main logic board.

7. Lift up on the rear of the circuit board, using the ground posts, until the latch on the left locks the board in the up position. The controller and disk drive will now be in view on the right side. The disk drive controller board is mounted to the top of the disk drive with four nylon screws.

8. Remove the three connectors on the rear of the controller board; begin with the 20 pin connector on the left, then the 34 pin connector, and finally the 4 pin power connector. Be careful not to break any wires on the power connector.

9. With a short slotted screwdriver, remove the four nylon screws holding the controller to the disk drive.

10. Lift the controller board up slightly and remove the 50 pin connector on the front of the board. The controller board may now be removed and set aside.

11. Remove the four screws on the bottom of the AM-1000 holding the hard disk drive in place. Carefully remove the disk drive from the chassis.

12. Remove the two side plates on the drive by removing the four screws, two on each side.

Quantum Disk Drives (Without Dust Seal)

The following information is for the Quantum drive only. If you have a CMI drive then refer to the section for CMI.

1. Turn the drive upside down. With the circuit board up, remove the five screws holding the circuit board in place. The screws are not all the same length so keep them separate for reassembly.

2. Remove the black front plate by carefully pulling it away from the drive. The front plate is secured to the drive by velcro and two of the four screws removed in the previous step. Disconnect the connector to the indicator lamp on the front plate.

3. Carefully lift the circuit board up and disconnect the connector on the side of the board and set the board aside.

4. Orient the drive so that the fly wheel is closest to you and locate the index sensor at the 12 o'clock position. The index sensor is located under the fly wheel and is difficult to see.

5. Using a spray can of Freon TF solvent, hold the drive on its side and spray the index sensor with the solvent. Angle the spray nozzle to spray directly on the sensor to get the best cleaning results. Rotate the fly wheel while spraying the solvent to clean the bottom surface of the fly wheel. Use Q-tips to clean the sensor off after spraying.

6. Remove the black spacer from the drive and discard. Remove the protective paper from the tape on the replacement spacer/gasket and install it where the old one was. Press down firmly on the new gasket to be sure and get a good seal.

7. Reinstall the board by connecting the connector on the side and placing it on top of the new spacer/gasket. Connect the front plate connector and reinstall the front plate on the drive.

8. Reinstall the five (5) screws which hold the front plate and circuit board in place. Be sure and use the correct lengths in the right place. The two longest screws hold the front plate to the drive.

CMI Disk Drives

The following steps are for CMI drives only.

1. Turn the drive upside down. With the circuit board up, remove the three screws holding the circuit board in place. The screws are not all the same length so keep them separate for reassembly.

2. Remove the black front plate by removing the screw on each side of the plate. Disconnect the connector to the indicator lamp on the front plate.

3. Carefully lift the circuit board up and disconnect the connector in the middle of the board and the ribbon connectors on the front of the board. Be very careful with the ribbon connectors which go the the HDA head assembly. Set the logic board aside.

4. Orient the drive so that the remaining circuit board is closest to you and locate the index sensor at the 11 o'clock position. The index sensor is located under the fly wheel and is difficult to see.

5. Using a spray can of Freon TF solvent, hold the drive on its side and spray the index sensor with the solvent. Angle the spray nozzle to spray directly on the sensor to get the best cleaning results. Rotate the fly wheel while spraying the solvent to clean the bottom surface of the fly wheel. Use Q-tips to clean the sensor off after spraying.

6. Reinstall the board by connecting the connector in the middle and the ribbon connectors in the front of the board. Carefully lower the board back on the drive. Connect the front plate connector and reinstall the front plate on the drive.

7. Reinstall the three (3) screws which hold the circuit board in place. Be sure and use the correct lengths in the right place. The shortest screw goes in the middle front of the board.

Reinstalling the Drive

1. Reinstall the two side plates on the drive. Be sure and use the correct screws.

2. Reinstall the drive in the AM-1000E chassis and secure with the four screws on the bottom of the AM-1000E.

3. The controller board may now be reinstalled on the disk drive.

4. Position the controller over the drive and reconnect the 50 pin connector to the controller board. Be very careful when reconnecting the 50 pin connector so as not to miss or bend any of the pins.

5. Reinstall the four nylon screws which hold the controller to the disk drive. Do not over tighten these screws as they will break.

6. Reinstall the 4 pin Power connector, the 34 pin connector, and the 20 pin connector on the rear of the controller board.

7. Be sure all connectors are tight, and carefully lower the main circuit board by releasing the latch on the left side.

8. Install the four screws which hold the main circuit board to the rear panel. Do not tighten these screws yet.

9. Install the A/C power cord on the rear of the AM-1000E.

10. Turn on A/C power and run the AM-1000E self-test. If the self-test passes then continue with reassembly. If self-test fails then go back to step 7 and check all connectors.

11. Unmount the drive using the MOUNT/U command. Turn the A/C power off and remove power cord.

12. Position the cover over the AM-1000E and gently push it down until it aligns with the screw holes on the sides.

13. Install, but do not tighten, the six screws on ;the side of the cover. (three on each side)

14. Install the four (4) remaining screws on the rear of the cover and then tighten.

15. Tighten all screws.

16. This completes this change procedure.

If you have any questions, please contact the Technical Support Group at (714) 957-8500.

SERIAL NUMBERS
QUANTUM DRIVES WITHOUT DUST SEAL

B11869	B26235	B28858	B32897	B33648	B34305
B18815	B26236	B28870	B33049	B33649	B34310
B19044	B26240	B28978	B33057	B33655	B34315
B19239	B26256	B28985	B33075	B33667	B34320
B19300	B26272	B29094	B33102	B33668	B34321
B19393	B26436	B29097	B33105	B33669	B34322
B19458	B26552	B29099	B33106	B33680	B34325
B19522	B26784	B29105	B33116	B33770	B34337
B19535	B26806	B29107	B33141	B33820	B34338
B19969	B26916	B29125	B33159	B33826	B34354
B20194	B27099	B29186	B33281	B33876	B34363
B20300	B27494	B29187	B33290	B33881	B34374
B20302	B27558	B29679	B33350	B33892	B34378
B20620	B27620	B29682	B33353	B33893	B34385
B20668	B27660	B29690	B33356	B33899	B34389
B20711	B27670	B29697	B33358	B33905	B34400
B20783	B27956	B30691	B33359	B33906	B34402
B20870	B27992	B30729	B33361	B33907	B34410
B21542	B28010	B30743	B33366	B33911	B34411
B22652	B28069	B30747	B33367	B33912	B34443
B22680	B28154	B30779	B33368	B33961	B34445
B23485	B28189	B30882	B33370	B33963	B34480
B23907	B28229	B30919	B33402	B33967	B34505
B23923	B28307	B30951	B33403	B33976	B34550
B24261	B28378	B30973	B33404	B33979	B34555
B24321	B28381	B30986	B33406	B33984	B34557
B24605	B28409	B31170	B33450	B34165	B34571
B24608	B28412	B31240	B33451	B34167	B34599
B24611	B28415	B31285	B33459	B34168	B34657
B24636	B28485	B31371	B33460	B34183	B34661
B24651	B28568	B31586	B33461	B34186	B34671
B24872	B28569	B32031	B33470	B34187	B34674
B24918	B28593	B32165	B33520	B34190	B34675
B24945	B28598	B32211	B33524	B34192	B34679
B25020	B28600	B32347	B33573	B34204	B34681
B25064	B28614	B32363	B33574	B34207	B34698
B25065	B28616	B32381	B33576	B34209	B34701
B25105	B28644	B32558	B33580	B34210	B34760
B25191	B28648	B32600	B33582	B34222	B34762
B25257	B28681	B32670	B33583	B34228	B34764
B25306	B28682	B32691	B33601	B34237	B34778
B25311	B28695	B32707	B33602	B34250	B34787
B25386	B28697	B32714	B33610	B34254	B34793
B25624	B28759	B32731	B33617	B34259	B34795
B25789	B28770	B32766	B33624	B34268	B34822
B25805	B28773	B32771	B33625	B34269	B34825
B26099	B28793	B32773	B33637	B34284	B34832
B26229	B28796	B32879	B33640	B34286	B34907
B26231	B28797	B32890	B33641	B34294	B34989
B26233	B28799	B32894	B33647	B34298	B35833

B36137
B36236
B37066
B37282
B37864
B38096
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B52015
B52019
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B71492
B71495
B71496
B71700
B71964
B71992
B72017
B72021
B72032
B72037
B72048
B72084
B72140
B72277
B72311
B72312
B72333
B72334
B72416
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B72487
B72492
B72494
B72506
B72525
B72607
B72622
B72665
B72680
B72682
B72711
B72712
B72717
B72738
B72763
B72790
B72793
B72794
B72795
B72798
B72804
B72805
B72807
B72809
B72891
B72902
B72903
B72904
B72906
B72950
B73789
B77487
B78146
B83295

To remove the diskette from the drive, open the door by pressing gently on the rectangular button. Then, slowly pull the diskette out. Place it immediately in its protective envelope.

Never attempt to insert or remove the diskette while power to the drive is turned off. *Do not turn the power off to a drive that contains a floppy diskette.* Random data might accidently be written onto the diskette, destroying some of its contents.

Always store floppy diskettes horizontally in their protective envelopes, and do not stack more that 10 at a time. It is best to store them in plastic or cardboard containers as metal containers may become magnetized.

A diskette should be kept away from direct sunlight, which can cause warping. With extreme temperature variations the diskette may expand and contract, causing wear and difficulty in reading data.

Diskettes will operate between 10 and 50 C (50 - 122 F) and a relative humidity of 10%-80%. If a diskette has been exposed to a temperature below 5 C (41 F) or 50 C (122 F) it should be presumed a damaged diskette and discarded.

Winchester 60MB Motor Control Circuit Board Enhancement

The following procedure is designed to reduce current spikes on the +24V produced during a "Switch Mode" operation, increase performance reliability under increased temperatures and to improve noise immunity to power line noise spikes. The last part of this enhancement procedure is designed to reduce electronic distortion in the servo position signal.

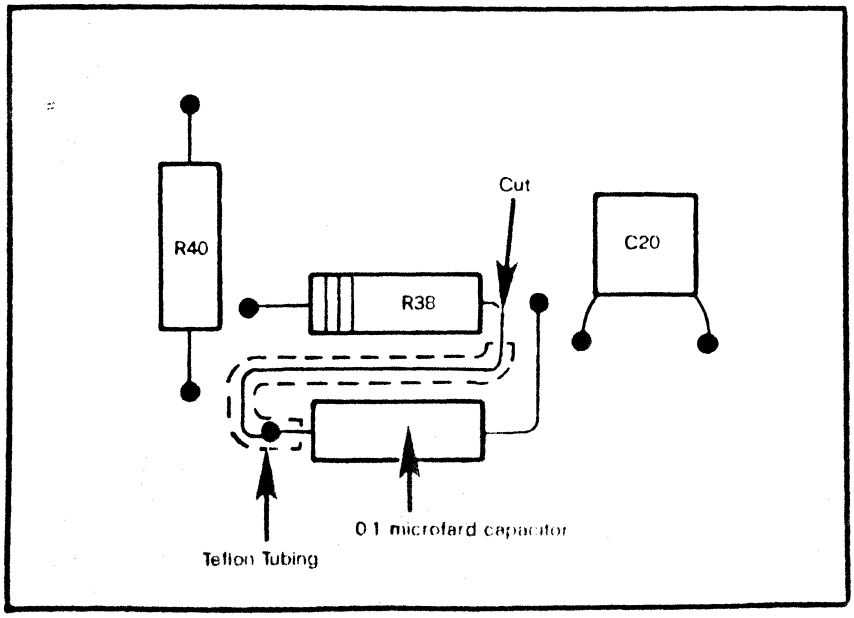
The following Alpha Micro products are affected by this change:

1. AM-1061 Integrated Systems
2. AM-423 Subsystem

Procedure

Please read this procedure carefully before attempting to implement the steps listed below. Be sure all necessary tools and parts are available before starting.

1. Change the resistor located R59 from a 27K ohms 1/4w (5%) to a 36K ohms 1/4w (5%) resistor.
2. Change the resistor located R63 from a 100K ohms 1/4w (5%) resistor to a 10K ohms 1/4w (5%) resistor.
3. Locate the 100 picofarad MO/CER 50v 5% capacitor at C24. Replace this capacitor with a 390 picofarad MO/CER 50v 5% capacitor.
4. Remove the 2M ohm 1/4w resistor at R40 and replace it with a 620K ohm 1/4w resistor.
5. Install a 0.1 microfarad MO/CER capacitor in series with resistor R38. Refer to the illustration below.



60MB Winchester Drive Motor Control Board (Component Side)

6. Locate the F1 fuse in the upper-left hand corner of the component side of the motor control circuit board. Install a 0.1 microfarad capacitor as shown below.

7. On resistor pack RP25, install the following jumpers:

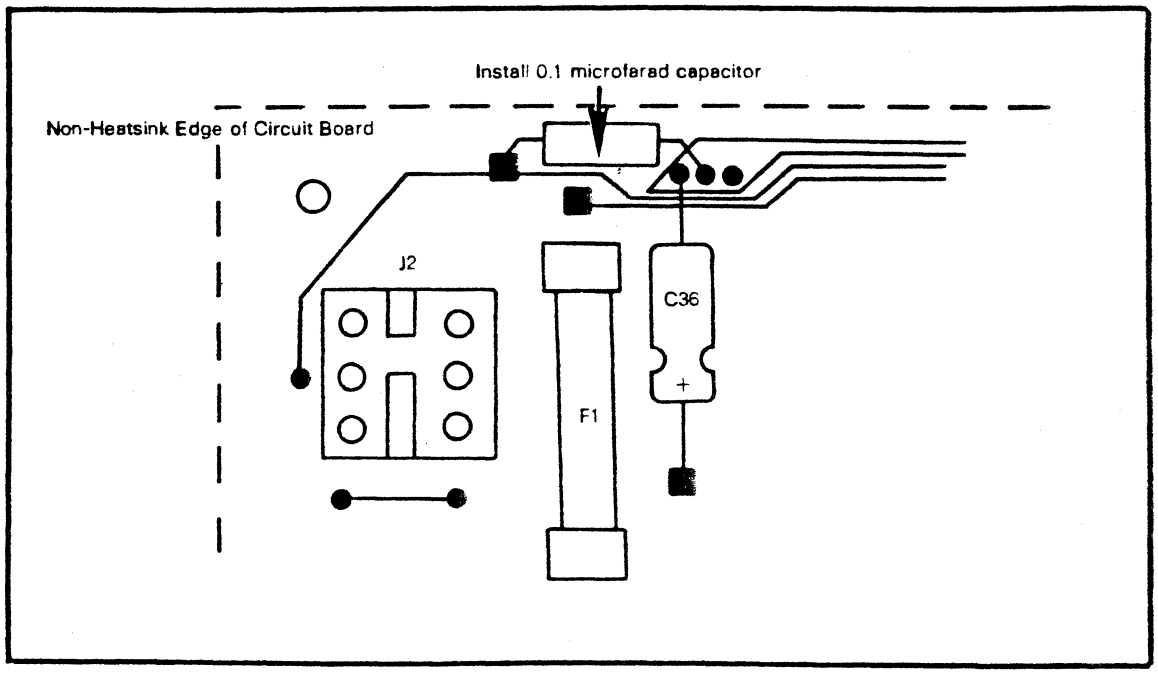
   Pin 2 to Pin 3
   Pin 5 to Pin 6

8. On resistor pack RP26, install the following jumpers:

   Pin 2 to Pin 3
   Pin 5 to Pin 6

9. After all of the above steps are completed, add "FCO 1-5" to the revision block on the drive motor control circuit board.

If you have any questions concerning this procedure, please contact our System Support Group at (714) 957-0392.



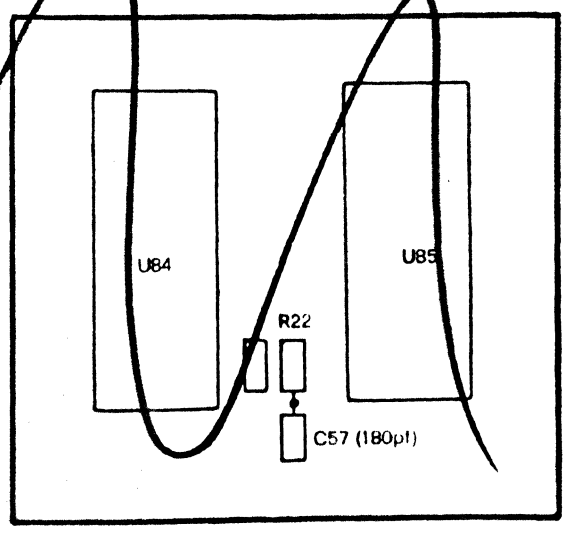
60MB Winchester Drive Motor Control Board (Component Side)

AM-610 Enhancements

In an effort to continually enhance the performance of our products, Alpha Micro releases modifications and enhancement procedures that further improve the performance of our products. The enhancement procedures to the AM-610 VCR Interface described below are designed to be implemented on Revision B03 and earlier circuit boards.

Procedure

1. Remove the 180 picofarad capacitor (C57) between U84 and U85. (See below.)



AM-610 VCR Interface - Component Side

ASSORTED DRIVE SIZES

SEAGATE--- All drive sizes are 10 MEGABYTES ONLY.

CMI------- Drives can be either 10 or 30 MEGABYTES.
10M drives are identified by a model number (on the drive) tha
begins with a 5___ .(model # is 4 digits)
30M drives are identified by a model number (on the drive) tha
begins with a 6___ .(model # is also 4 digits)

QUANTUM--- All drives are 30M ONLY.

CDC------- All drives are 30M ONLY.

VERTEX---- All drives are 55M ONLY.

DRIVE SIZE MAY ALSO BE CALCULATED BY FINDING OUT THE BITMAP SIZE.

A 1 logical 10M drive will have a BITMAP size of ----- 1216

A 2 logical 10M drive will have a BITMAP size of ----- 608

A 1 logical 30M drive will have a BITMAP size of ----- 3687

A 2 logical 30M drive will have a BITMAP size of ----- 1844

A 2 logical 55M drive will have a BITMAP size of ----- 3407
(55M drives are configured as 2 logicals only)

(bitmap sizes can also be calculated thru the FIX420 program once you know the physical drive size and manufacturer.)

5.1.25 AM-1000 Booting - VCR Delay Bypass

The AM-1000 Series Computers have the built-in capability of booting from an alternate device other than the system device. This provides a means of booting the system if for some reason it cannot boot from the primary device. A VCR can be such an alternate boot device.

When the VCR is used as the alternate boot device, a built-in time delay allows time for valid data to be received from the VCR. If the VCR is not being used and it is desired to bypass the 25 to 30 second delay, all that is required is to change the boot jumpers.

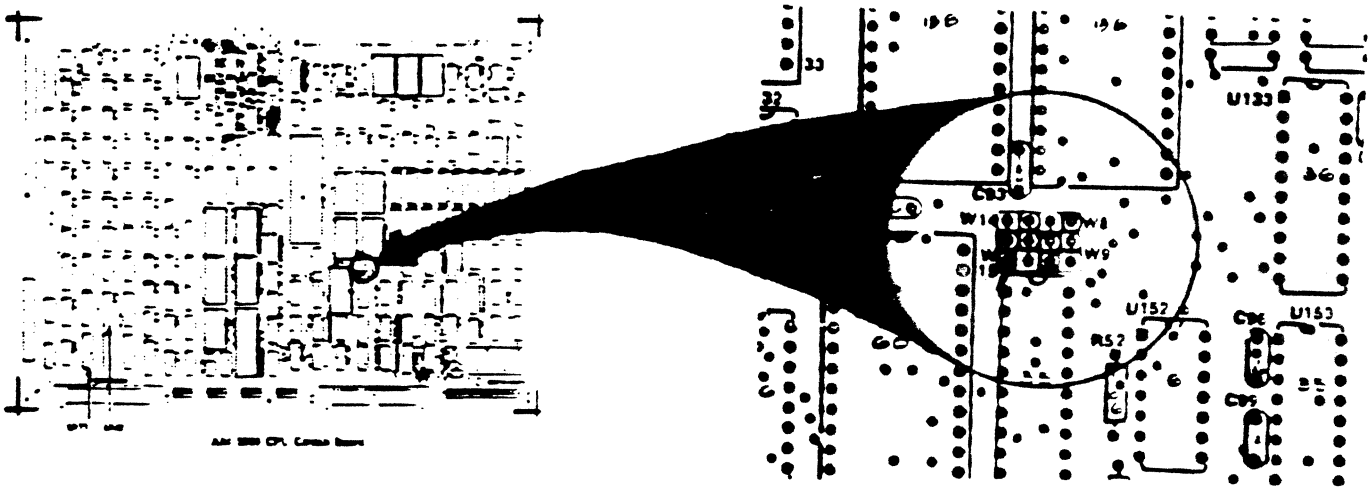
Figure 1 shows the location of the boot jumpers on the AM-1000 CPU circuit board and the jumper configuration required for different boot devices. Notice that Boot Device ID code 9 is the only configuration identifying the VCR. Assuming that the system contains a Winchester disk as the primary booting device, all that needs to be done to bypass the VCR delay is to reconfigure the boot jumpers to Boot Device ID code A (Floppy/Winch).

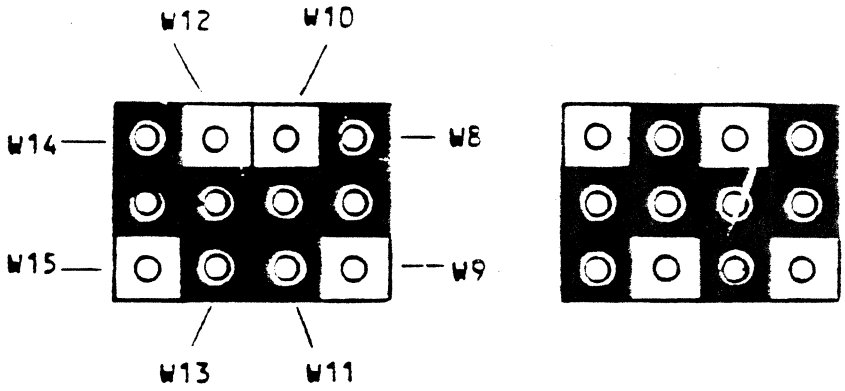
Note: Beginning with C00 Revision Boot PROMS an additional delay will be encountered as the system looks to determine which Winchester disk drive is installed. This allows for the same PROM to be used for either the AM-1000 or the AM-1000E.

When the system begins to boot with this configuration, it will look to see if a floppy diskette is installed in the floppy drive. If a diskette is installed and the door is closed, the system will attempt to boot from the floppy. If these conditions are not met, the system will attempt to boot from the Winchester. If a floppy drive is not installed the system will attempt to boot from the Winchester. In both cases the VCR delay will be bypassed.

Reminder: If it is desired to boot the system using a VCR tape, the jumpers will have to be returned to the position shown for Boot Device ID code 9 (VCR/Floppy/Winch).

SEE NEXT PAGE





9 A

Boot Device Jumper Selection

Boot Device ID Code	W8	W9	W10	W11	W12	W13	W14	W15	Boot Device
9	I			I		I	I		VCR/Floppy/Winch
A	I			I	I			I	Floppy/Winch

I = Installed

Self-Test Error Codes

When utilizing the self-test feature of the AM-1000 system and monitoring the status on the terminal at 300 baud, specifically the disk test, the disk controller may display a series of five, two-digit numbers. For example. "08 92 00 05 10" may appear. The first two-digit number is the code for the command that the controller tried to execute. The second two-digit number is the disk controller error code with bit 7 set (add 80 hex to the error codes). The remaining numbers give the disk block number where the error was encountered. Please note that the AM-1000 self-test does not execute all of the following disk controller commands.

Table IV
Disk Controller Command Codes

Command Code	Description
00	Test for drive ready
01	Recalibrate (position heads on track 00
02	(Not used)
03	Request sense status
04	Format disk drive
05	Check track format
06	Format disk drive
07	Format bad track
08	Read
09	(Not used)
0A	Write
0B	Seek
0C	Initialize drive characteristics
0D	Read ECC burst error length
E0	Ram Diagnostic (sector buffer test)
E1 - E2	(Not used)
E3	Drive diagnostic
E4	Controller internal diagnostics
E5	Read long
E6	Write long

EXAMPLE FROM SELF TEST:

Table V
Disk Controller Error Codes

Hex Error Code	High Bit Set	Meaning
00	80	No error detected
01	81	No index detected from disk drive
02	82	No seek complete from disk drive
03	83	Write fault from disk drive
04	84	Drive not ready after selection
05	85	(Not used)
06	86	Track 00 not found
07-0F	87-8F	(Not used)
10	90	ID field read error
11	91	Uncorrectable data error
12	92	Address mark not found
13	93	(Not used)
14	94	Target sector not found
15	95	Seek error
16-17	96-97	(Not used)
18	98	Correctable data error
19	99	Bad track flag detected
1A	9A	Format error
1B-1F	9B-9F	(Not used)
20	A0	Invalid command
21	A1	Illegal disk address
22-2F	A2-AF	(Not used)
30	B0	RAM diagnostic failure
31	B1	Program memory checksum error
32	B2	ECC diagnostic failure
33-3F	B3-BF	Not used

Any questions concerning these error codes may be directed to the Technical Services Group at (714) 957-8500.

CONTROLLER TEST PASSED
FIND DIAGNOSTIC CHANDER FAILED
~~ERROR~~ ERROR CODE 0C A1 00 4C 40

0C = INITIALIZE DRIVE
A1 (+80) = 21 = ILLEGAL DISK ADDRESS
00 4C 40 = BLOCK #

Error Codes on AM-1000 Systems

There are three classifications of error codes that may be encountered on AM-1000 systems - status codes, disk controller error codes and self-test error codes. The status codes, displayed on the AM-1000 front panel, are described in the A.M.T.S. Journal, Volume 4, Number 8 (August, 1982).

Disk Controller Error Codes

During system operation, the disk controller may detect disk errors. These errors are identified by a type number and a code number followed by the block number where the error was encountered. For example, the system may display: ?DISK ERROR TYPE 1, CODE 2 ON (DEVICE) BLOCK 1234. The tables below define the errors that may appear.

Table I
Type 0 Error Codes - Disk Drive

Hex Code	Definition
0	Controller detected no error during the execution of the previous operation.
1	The controller did not detect an index signal from the drive.
2	The controller did not receive a seek complete signal from the drive after seek operation.
3	The controller detected a write fault from the drive during last operation.
4	After the controller selected the drive, the drive did not respond with a ready signal.
5	(Not used)
6	After stepping maximum number of cylinders, the controller did not receive a track 00 signal from the drive.

Table II
Type 1 Error Codes - Controller

Hex Code	Definition
0	ID read error: The controller detected an ECC error in the target ID field on the disk.
1	Data error: The controller detected an uncorrectable ECC error in the target sector during a read operation.
2	Address mark: The controller did not detect the target address mark (AM) on the disk.
3	(Not used)
4	Sector not found: The controller found the correct cylinder and head, but not the target sector.
5	Seek error: The controller detected an incorrect cylinder or track, or both.
6	(Not used)
7	(Not used)
8	Correctable data error: The controller detected a correctable ECC error in the target data field.
9	Bad track: The controller detected the bad track flag during the last operation.
A	Format error: During a check-track command, the controller detected either 1) track not formatted, 2) wrong interleave, or 3) ID ECC error on at least 1 sector.

Table III
Types 2 and 3 Error Codes
Command and Miscellaneous

Type	Hex Code	Description
2	0	Invalid command: the controller has received an invalid command from the host.
2	1	Illegal disk address: The controller detected an address that is beyond the maximum range.
3	0	RAM error: The controller detected a data error during the RAM sector buffer diagnostic.
3	1	Program memory checksum error: During internal diagnostic, the controller detected a program memory checksum error.
3	2	ECC polynomial error: During the controller's internal diagnostic, the hardware ECC generator failed its test.

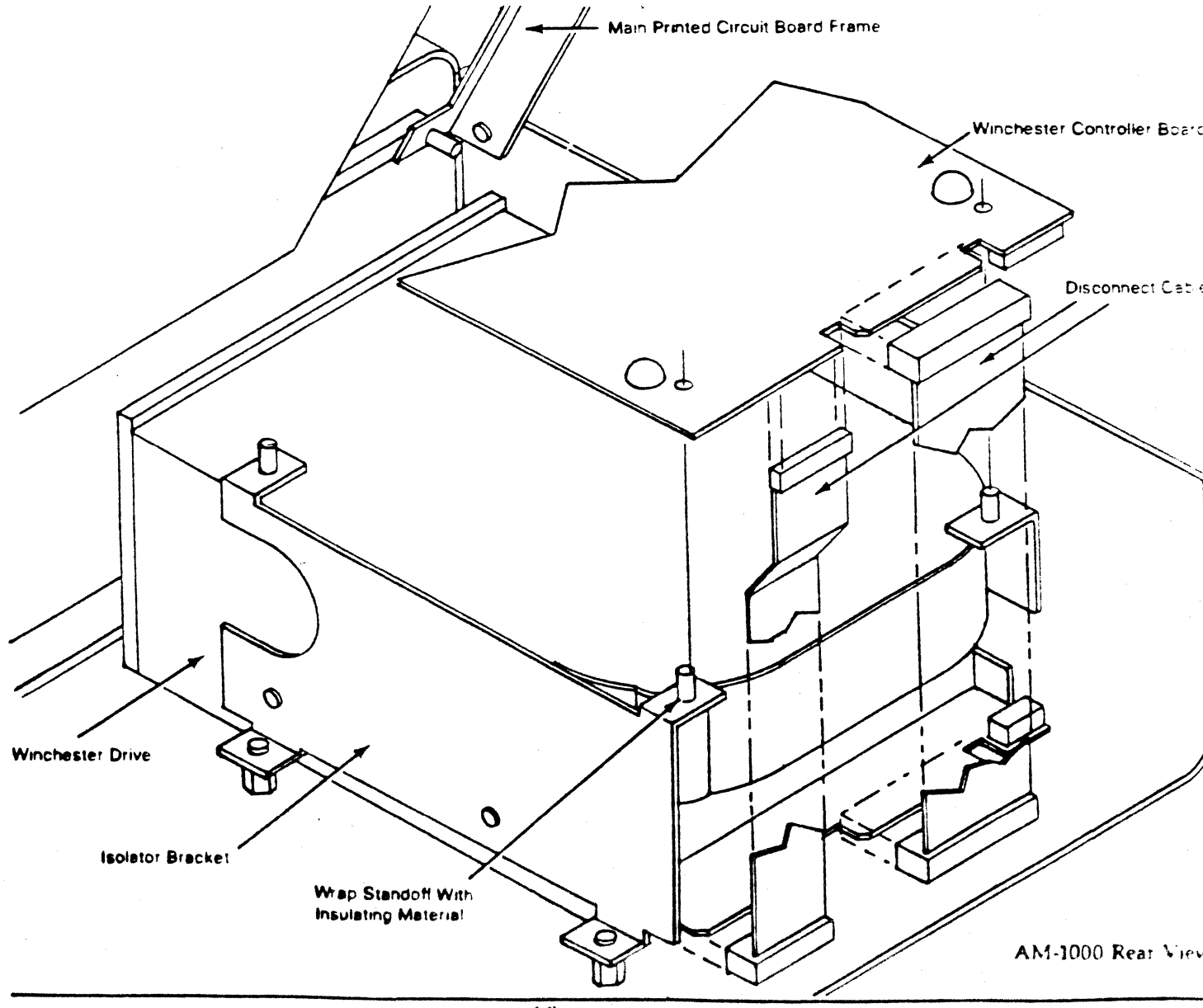
AM-1000 Winchester Drive Assembly Modification

The following modification will prevent a possible shorting of the disk controller circuit board because of contact with the isolator bracket which may cause device errors, error code 1 or random or intermittent errors.

Procedure

Carefully follow the steps listed below.

1. Remove the top cover from the AM-1000 chassis.
2. Facing the rear of the AM-1000, raise the main printed circuit board frame.
3. Locate the Winchester drive and drive controller circuit board on the right-hand side of the AM-1000 chassis.
4. Disconnect the cables from the controller board and remove the circuit board.
5. Locate the rear left standoff on the isolator bracket. Wrap this standoff with kapton tape or an equivalent insulating material.
6. Replace the controller circuit board and connect the cables. Lower the main printed circuit board frame and replace the chassis top.



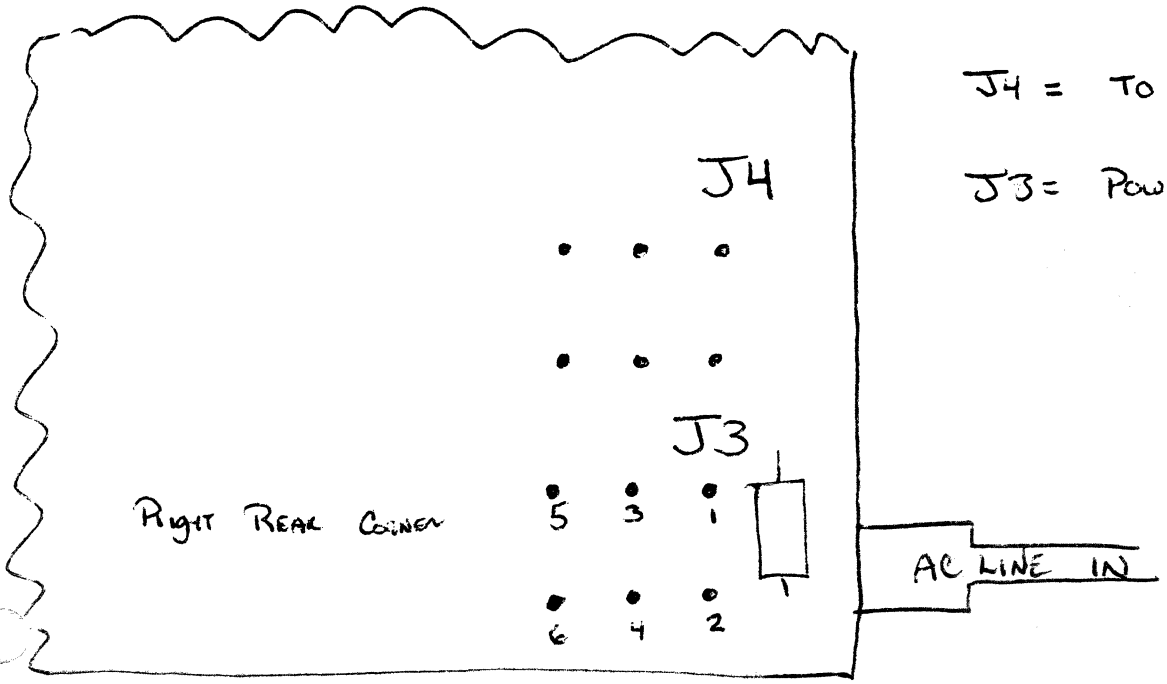
AM-1000 Rear View

WRITE PROTECT SWITCH SETTINGS FOR THE WINCHESTER DRIVES

60 MB	SWITCH 10K - 6	OFF = WRITE PROTECTED ON = WRITE ENABLED
32 MB	SWITCH 6K - 8	OFF = WRITE PROTECTED ON = WRITE ENABLED

14" PRIAM 60 MB

Power Supply Voltages



J4 = To motor control circuit

J3 = Power Supply IN

Pin	(Color)	Desc
1	(Black)	[redacted] Return
2	(Yellow)	+24V
3	(Brown)	−5V
4	(Orange)	−12V
5	(Red)	+5V
6	(White)	+24V Return

Switch Settings

K10 = 1, 2, 3, 4 = Physical Address
(Only one should be closed)
6 = Write Enable (Closed - Norm)

5, 7 - Closed
8 - Open

* K11 - 1, 2, 4, 5, 7, 8 - Open
- 3, 6 - Closed

Jumpers

W3, W4, W7, W13, - Installed

W6 - BC
W8 - BC
W11 - BC
W16 - CB
W12 - AD
W17 - BC
W15 - BC

HAWK DRIVE

SEEK ERROR

Indicates that the unit was unable to successfully complete a seek operation.

NOTE

A RTZS will clear the control logic and command the carriage back to cylinder 0.

5.3 DAISY CHAIN TERMINATION

The last unit in the chain must be terminated. This can be accomplished by:

- connecting a special terminator plug (Refer to Figure 5-2), or
- installing terminator chips on the I/O board. (Refer to Figure 5-2).

RM (ODD) = 220Ω / RM (EVEN) = 330Ω

SWITCH SETTINGS

SEE PAGE 15-6

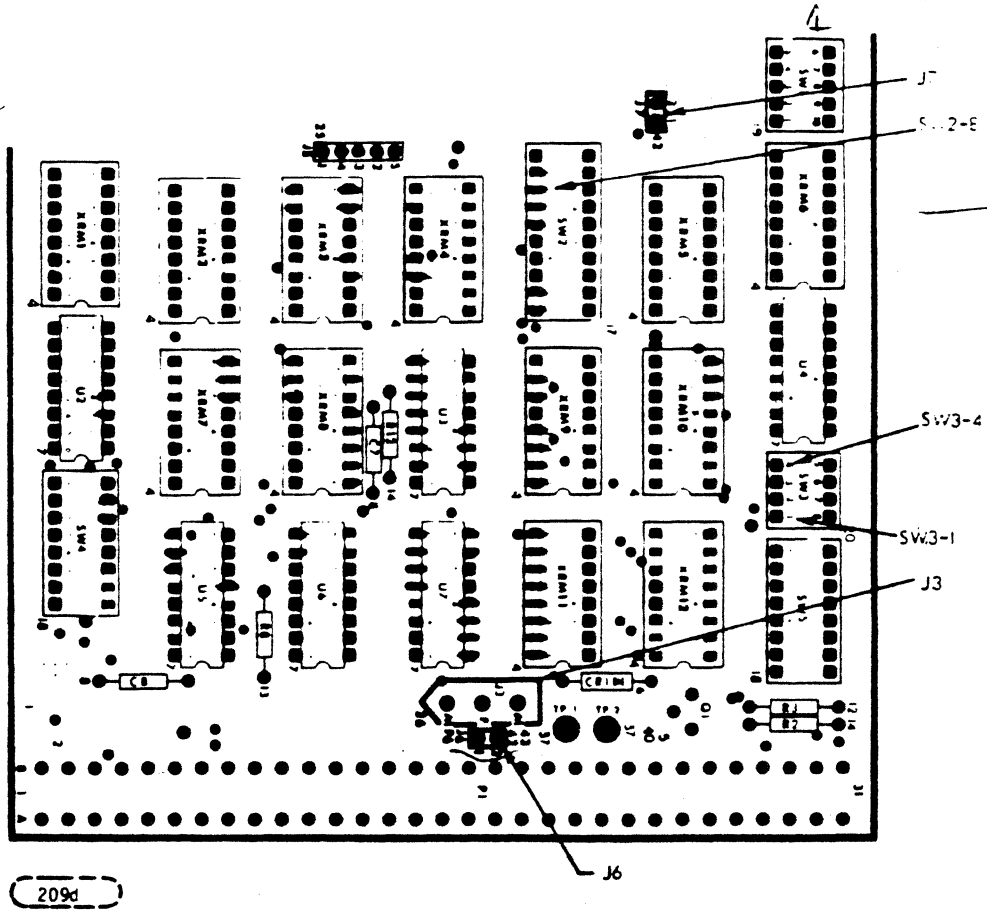
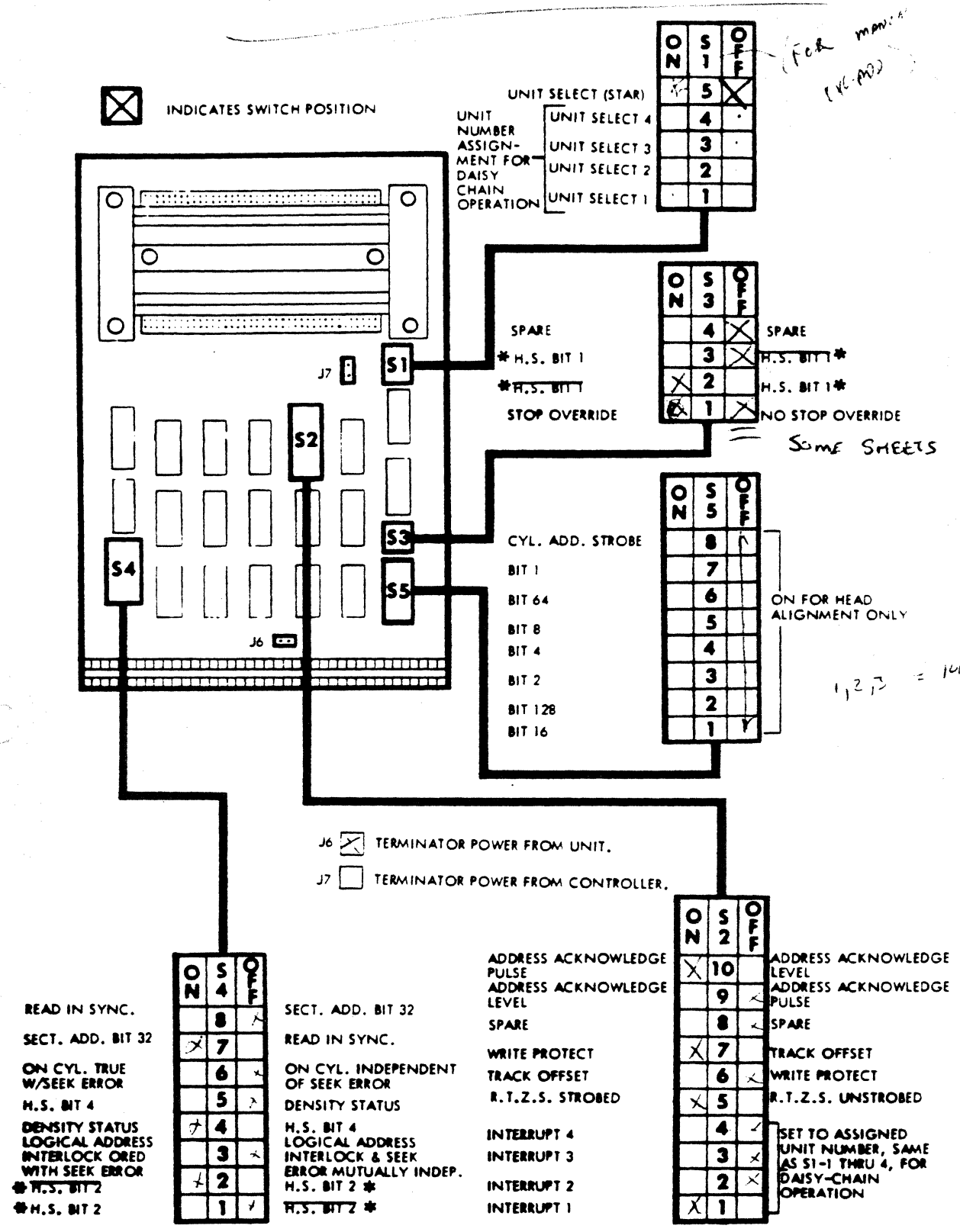


FIGURE 5-2. TERMINATOR CHIPS

HAWK DRIVE I/O BOARD



* WITH HEAD SELECT SWITCHES SET TO UNINVERTED POSITIONS, HEADS ARE NUMBERED 0, 1, 2, 3 FROM TOP TO BOTTOM. WITH HEAD SELECT SWITCHES SET TO INVERTED POSITIONS, HEADS ARE NUMBERED 0, 1, 2, 3 FROM BOTTOM TO TOP. H.S. BIT 2 IS EQUIVALENT TO DISK SELECT. H.S. BIT 1 SELECTS THE TOP OR BOTTOM SURFACE OF THE SELECTED DISK.

** S3-2 MUST BE OFF IF S1-5 IS ON.

FIGURE 15-2. 3M - I/O BOARD (RACK) (SHEET 1 OF 8)

AM-422 Subsystem Main PCB Modification

This modification is designed to reduce electronic distortion and improve noise immunity which may cause the 32MB Winchester drive to require resetting more than once in order to spin up. A second indication of electronic distortion may be the inability to mount the 32MB subsystem after the main system power is turned on. This modification will help to insure the proper operation of the motor controller printed circuit board on this drive.

Procedure

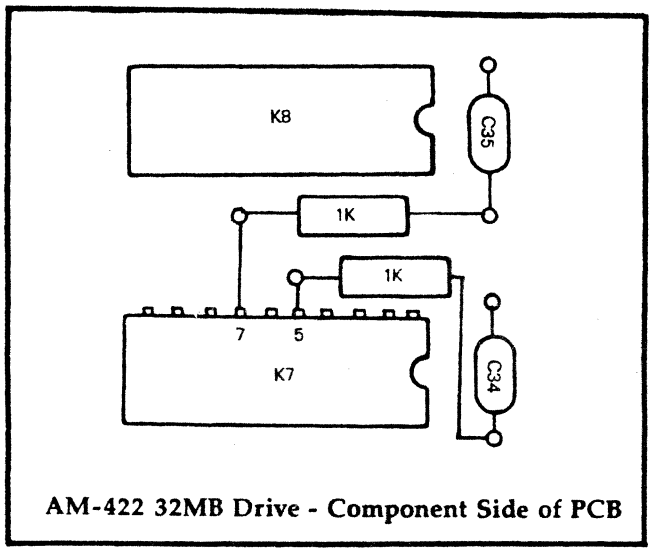
On the component side of the board, install three 1K pull up resistors as follows:

NOTE: All Joints Must Be Mechanically As Well As Electrically Sound.

1. Install the first resistor with one lead connected to the feedthrough above K7, pin 5, and solder the other lead to the lower capacitor lead at C34.

2. Remove the wire located at the feedthrough above K7, pin 7 and wrap this wire around the lead of the second resistor. Then, install this resistor with one lead connected to the feedthrough above K7, pin 7, and solder the other lead to the lower capacitor lead at C35.

3. Install the third resistor with one lead connected to the feedthrough located above K2 between pins 2 and 3, and solder the other lead to the lower end of the capacitor lead at C37.

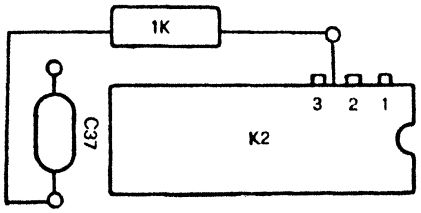


AM-422 32MB Drive - Component Side of PCB

4. Mark the board with the latest revision in the area between F and E, above R23 and R22.

	IS	WAS
32MB DRIVE	AM001	AM000 - OR UNMARKED

If you have any questions concerning this procedure, please call the System Support Group at (714) 957-0392.



AM-422 32MB Drive - Component Side of PCB

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