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04/03/86

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DATE: October 9, 1980

REVISION DATE: June 24, 1983

BULLETIN NO.: III:1

PRODUCT: 26-1061/2/3/4/5/6 Model III

SUBASSEMBLY: RCA video PCB

PURPOSE: To correct a problem causing horizontal retrace lines to appear on the CRT. These lines cannot be eliminated by turning down the brightness control.

DISCUSSION:

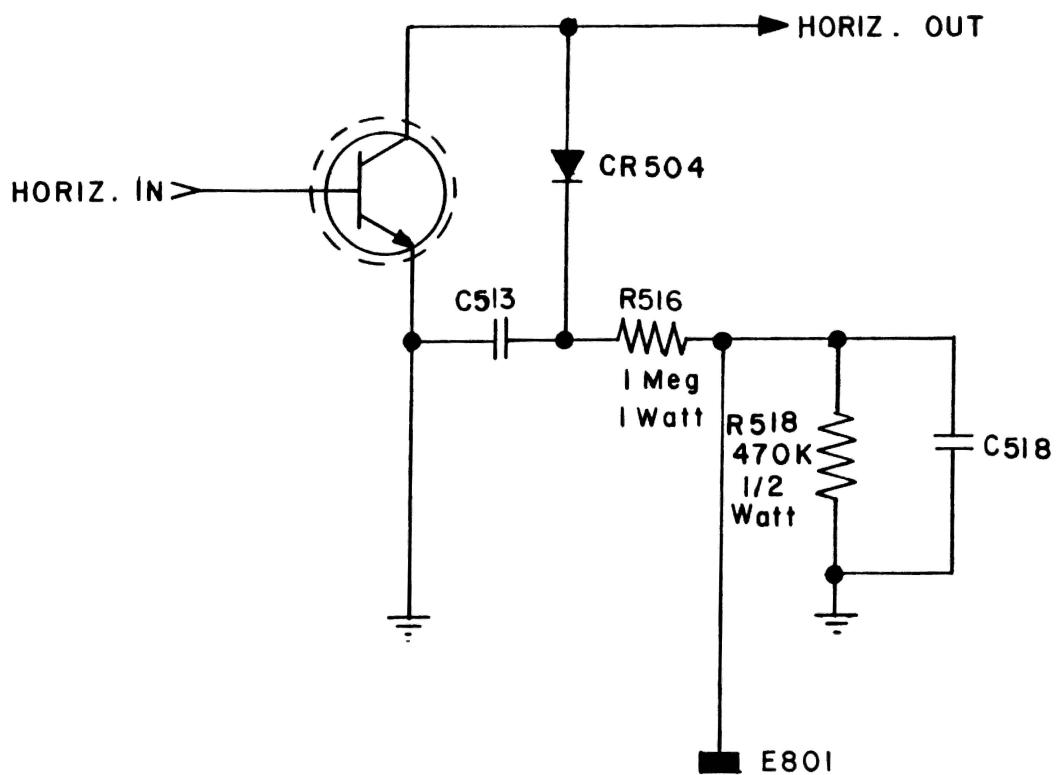
This problem has been found to be caused by a defective voltage divider network, R516 (1 Megohm, 1 watt) and R518 (470K ohm, 1/2 watt). The 1 Megohm resistor usually decreases in value, while the 470K ohm resistor generally increases in value.

Another possibility is a defective damper diode, CR504 (National Parts number ADX-1070). Note that it is possible for this diode to fail only during actual usage, so it may test good with an ohmeter, but still fail under normal use.

PROCEDURE:

Measure the voltage at point E801. It should be between 150 VDC and 200 VDC. If it is not, measure and replace if necessary either R516 or R518, or both.

If it is necessary to replace the damper diode, you MUST use a FAST RECOVERY diode.



DATE: October 28, 1980
REVISION DATE: June 24, 1983
BULLETIN NO.: III:2
PRODUCT: 26-1061/2/3/4/5/6 Model III
SUBASSEMBLY: AXX-0507 Main Logic PCB

PURPOSE: To discuss differences in different ROM 'C's used in the Model III.

DISCUSSION:

There are currently 4 different ROM 'C's in use in the Model III Microcomputer. Below are some of the differences.

ORIGINAL ROM (8040316)

First released version. Did not allow control codes to be entered from the keyboard although those codes were documented in the owners' manual.

VERSION 2 (8040316B)

Corrects problem with control codes. Changes screen print from <S><P> to <SHIFT><DOWN ARROW><*>.

VERSION 3 (8040316C) (National Parts number AMX-4642)

Current release. Corrects "garbage on screen" power up problem discussed in Technical Bulletin III:10.

VERSION 4 (National Parts Number AXX-7078)

This is the Network III ROM C used for Network III Student Stations. This part is found ONLY in the 26-1059 Model III Student Station, or Network III Student Station upgrade kits.

DATE: November 19, 1980
REVISION DATE: June 24, 1983
BULLETIN NO.: III:3
PRODUCT: 26-1063 Model III
SUBASSEMBLY: AX-8793 "Old style" FDC board

PURPOSE: To detail the FDC board alignment procedure

DISCUSSION:

This procedure should be done **EVERY** time the FDC board is replaced, or if disk drive alignment does not seem to help I/O errors or formatting problems.

PROCEDURE:

- 1) Remove the PCB mounting screws, cassette interface cable, and keyboard connector from the main logic board.
- 2) Without removing the disk drive spectra strip connector, swing the bottom of the PCB away from the chassis and lay it component side down on top of the disk drive chimney. Put a book or other insulating material under the PCB components so that they will not short against the disk drive logic board or the metal chassis. Reconnect the keyboard cable to the PCB.
- 3) Attach a **DIGITAL** voltmeter to TP-12 and adjust R7 (the pot nearest the bottom of the PCB) for 1.4 VDC. Note that the FDC must be in the IDLE condition, ie: no operation in progress. The LED on the disk drive should be OFF.
- 4) Using a 30MHz or better oscilloscope, attach a scope probe to TP-13. Use a 10X probe, internal trigger, 0.2 VDC/Div vertical, and 0.1 µSec/Div timebase. Adjust R6, the center pot, for a 2.0 MHz square wave.
- 5) Attach the scope probe to TP-8. Use negative slope trigger. Load the TDC program, step the head to a track GREATER than 24, and select CONTINUOUS WRITES under the Head Amplitude. Note that this test will destroy any information on the disk, so use only a BLANK, BULK ERASED disk. While the TDC program is writing, adjust R5, the top pot, for a 200 nSec precomp pulse.

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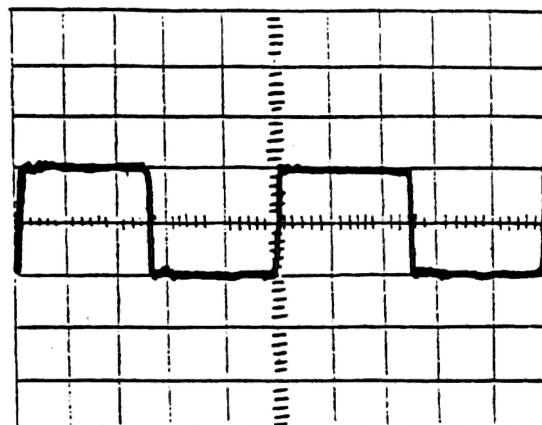
If a TDC program is not available, boot TRSDOS, and at TRSDOS READY, type BACKUP. Answer all prompts, and wait for BACKUP to read the first few tracks and begin writing. While the FDC is writing to the destination drive, observe the waveform on the oscilloscope and adjust R5 for a 200 nSec precomp pulse.

Remember, the precomp pulse is available ONLY while the FDC is writing.

- 6) Remove the test probes, install the main PCB into its proper position, and reinstall all removed cables. Do a FORMAT and BACKUP to all drives to verify system operation, and as a final checkout.

SCOPE PATTERNS AND SETTINGS

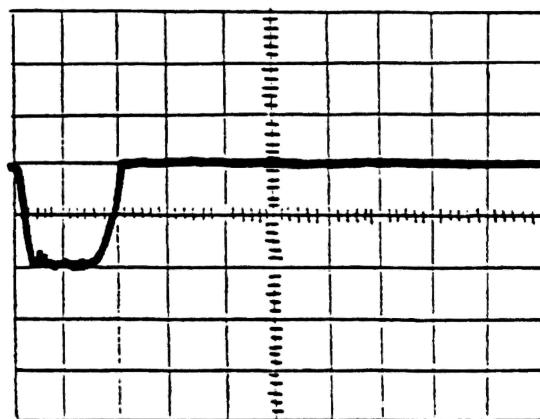
PLL Frequency



Probe 10X - TP13

.2V/div vertical - .1 usec/div time base

Precomp Adjustment



Probe 10X - TP8 - Negative Slope

.2V/div vertical - .1 usec/div time base

DATE: November 24, 1980

REVISION DATE: June 24, 1983

BULLETIN NO.: III:4

PRODUCT: 26-1061/2/3/4/5/6 Model III

SUBASSEMBLY: AX-8789 Main PCB

PURPOSE: To correct random characters being displayed upon power-up with no key depressions. Random characters may be displayed with multiple key depressions during normal operation.

DISCUSSION:

Some early units were produced with a 325 Ω ohm resistor pack at RP5. On most units this will cause no problems, but a few may require replacement to cure the random keyboard entry problem.

Be aware that STATIC can also cause this problem, especially in dry climates.

PROCEDURE:

Check the value of RP5. If it is 325 Ω ohm, replace it with a 150 Ω ohm resistor pack (National Parts number ARX-0237).

DATE: November 24, 1980

REVISION DATE: June 24, 1983

BULLETIN NO.: III:5

PRODUCT: 26-1063/5/6 Model III

SUBASSEMBLY: AXX-0510 FDC PCB, AX-8793 "old style" FDC PCB
Revision 'A' through Revision 'E'

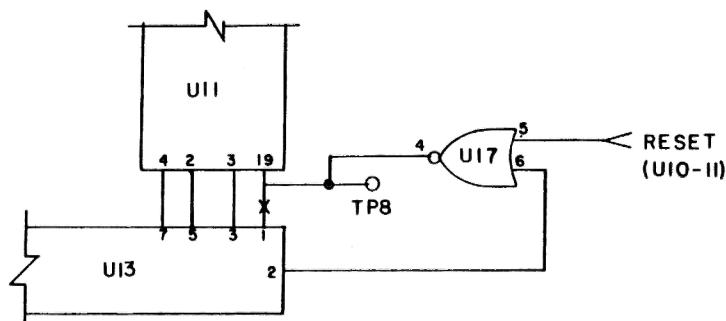
PURPOSE: FORMAT and BACKUP respond slowly or not at all above track 21.

DISCUSSION:**THIS MODIFICATION IS MANDATORY TO ALL FDC BOARDS, REVISION A THROUGH REVISION E!!**

This modification compensates for an intermittent problem found in the WD1691 IC.

PROCEDURE:

- 1) Cut trace between pin 1 of U13 (WD2143) and TP8.
- 2) Connect pin 2 of U13 (WD2143) to pin 6 of U17 (72LS02).
- 3) Connect pin 11 of U10 (74LS260) to pin 5 of U17 (74LS02).
- 4) Connect pin 4 of U17 (74LS02) to pin 19 of U11 (WD16791).
- 5) After performing the above modification, re-align the FDC board as per Technical Bulletin III:3.

Re-alignment after modification is MANDATORY.**Radio Shack®**

DATE: December 19, 1980
REVISION DATE: June 24, 1983
BULLETIN NO.: III:6
PRODUCT: 26-1063/5/6 Model III
SUBASSEMBLY: AX-8793, AXX-0510 Revision N/C, A, B, C, D
"old style" FDC boards

PURPOSE: To correct intermittent operation of the FDC board.

DISCUSSION:

Under certain conditions, the VCO on the FDC board may lock onto a harmonic of its expected operating frequency. This would render the FDC inoperative. This failure may be chronic or only slightly intermittent.

PROCEDURE:

Check the PCB for the presence of C30. If C30 is present this modification is not necessary.

Install a 100pf capacitor between pins 3 and 7 of U25. Install the capacitor directly to the IC pins on the component side of the PCB.

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DATE: January 15, 1981
REVISION DATE: June 24, 1983
BULLETIN NO.: III:7
PRODUCT: 26-1162/3 Model III Internal disk drives
SUBASSEMBLY: N/A

PURPOSE: Addendum to 26-1162/1163 Modification Kit installation instructions.

DISCUSSION:

Both the 26-1162 and the 26-1163 are packed with a bracket to be used to mount the Motor Speed Control board to the pulley side of the disk drive chassis.

PROCEDURE:

- 1) Remove the cables attached to the Linear Servo (motor speed control) board.
- 2) Remove the screws and standoffs from the Servo board, and save them for reinstallation.
- 3) Install the bracket to the chassis with the side having the cutaway towards the REAR of the drive. Use two 6x32x3/8" screws.
- 4) Install the Servo board to the PULLEY side of the bracket using the screws and standoffs that were removed from the board.
- 5) Clip the wire ties holding the wires from the disk drive motor, and on the white leads at the rear of the chassis.
- 6) Connect the motor leads (plug 21) to P21 on the Servo board. If the wires do not come from the top side of the motor, the motor will have removed and turned 180 degrees.
- 7) Connect plug 20 to P20 on the servo board. The 26-1163 contains a special, longer cable for this purpose.

DATE: February 18, 1981

REVISION DATE: June 24, 1983

BULLETIN NO.: III:8

PRODUCT: 26-1061/2/3/4/5/6 Model III

SUBASSEMBLY: AXX-6005 Power Supply

PURPOSE: Power supply fails. No output voltages. Computer is dead.

DISCUSSION:

If the output voltages are measured, all voltages will measure zero volts. However, if the power supply is operated with NO LOAD, the voltages will measure zero volts, even on a good, working unit.

Always measure the output voltages AT THE 'LOAD' END of the DC cables, ie: on the CPU board, FDC board, or RS232 board. This will help check for broken cables bad connectors, etc.

NOTE: NEVER OPERATE THE POWER SUPPLY WITHOUT A LOAD!!

PROCEDURE:

If no voltages are present on the CPU, FDC, or RS232, first check for broken cables, bad connectors, etc. Watch especially for cables that may have been pinched between the shield and the chassis plate.

Loss of output voltages from the power supply can also be caused by an open fusible resistor R25. R25 is a 2 ohm 2 watt sandstone resistor, National Parts number ARX-0251.

Check R25 with an ohmmeter, and replace it if necessary.

DATE: March 18, 1981
REVISION DATE: June 24, 1983
BULLETIN NO.: III:9
PRODUCT: 26-1061/2/3/4/5/6 Model III
SUBASSEMBLY: AX-8789 Revision 'F' Main Logic PCB
AX-8795 RS232 PCB

PURPOSE: To assure compatibility of some Revision 'F' CPU boards and the RS232 PCB.

DISCUSSION:

It has been found that some Revision 'F' CPU boards may lack sufficient drive capability on the 5.06 MHz clock line to drive the longer circuit paths and extra ICs of the RS232 board.

PROCEDURE:

CHANGE #1 IS TO BE DONE ON THE REVISION 'F' CIRCUIT BOARD:

- 1) Remove R64. Replace it with an INSULATED jumper.
- 2) Remove C108. Replace it with a 220 pf disk capacitor.
- 3) Add a 220 ohm 1/4 watt 5% resistor from the 'R64' hole adjacent to U4 pins 5 and 6, to the grounded side of C108.

FIGURE 1 details these changes on the schematic.

CHANGE #2 IS TO BE DONE TO THE RS232 BOARD:

- 1) Cut the trace between P2 pin 14 and U1 pin 18. Cut near C3.
- 2) Change U7 from a 74LS04 to a 7404 (National Parts number AMX-3655).
- 3) On the SOLDER side of the RS232 board connect a wirewrap jumper from U7 pin 11 to the feedthru connected to P2 pin 14.
- 4) On the SOLDER side of the RS232 board connect a jumper between U7 pin 10 to U7 pin 1.
- 5) Remove CR1 and CR2.

FIGURE 2 details these changes on the schematic.

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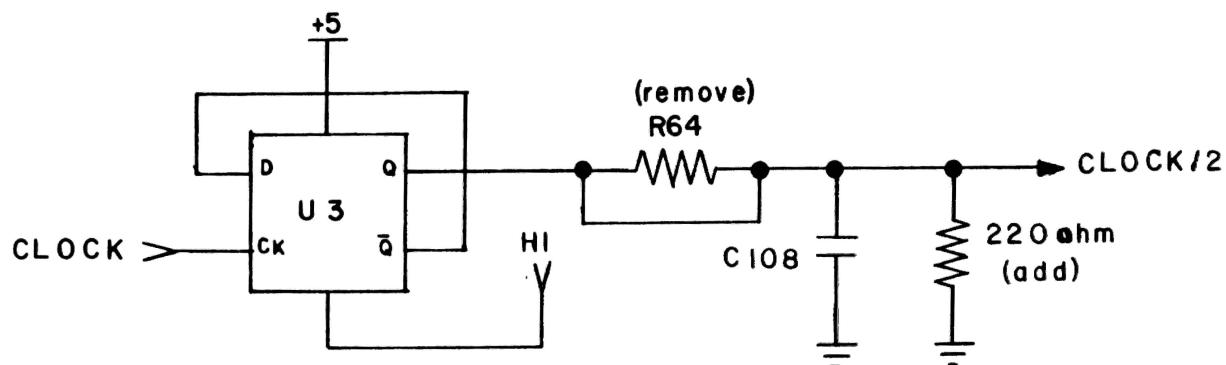


FIGURE 1

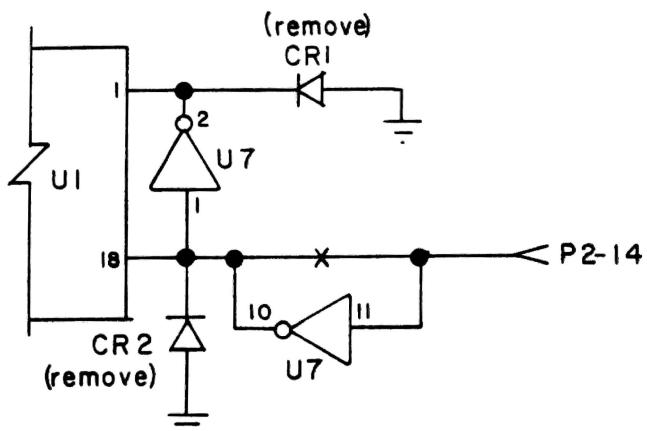


FIGURE 2

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DATE: March 26, 1981

REVISION DATE: June 24, 1983

BULLETIN NO.: III:10

PRODUCT: 26-1061/2/3/4/5/6 Model III

SUBASSEMBLY: AXX-0507 CPU board, AX-8789 CPU board

PURPOSE: Unit powers up with "garbage" on the screen that clears after 10-15 seconds.

DISCUSSION:

Some Motorola RAM chips may power up incorrectly, causing the processor to 'lock up' until the power supplies are correct at the RAM chips.

PROCEDURE:

The RAM chips at positions U12, U9, and U8 seem to be the most sensitive to this problem. In many cases the complaint can be cured by simply exchanging these RAMS with others in another position. In other cases the RAMS will have to be replaced.

The removed RAM chips should not be considered "bad" unless they fail the memory diagnostics test. The problem is in their power up requirements, and it usually does not affect their operation once the power supply requirements are met.

This problem can also be cured by installing a Revision 'C' ROM C, marked 8041364A, National Parts number AMX-4642 under catalog number 26-1062. This ROM is discussed in Technical Bulletin III:2.

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DATE: March 26, 1981

REVISION DATE: June 24, 1983

BULLETIN NO.: III:11

PRODUCT: 26-1063/4/5/6 Model III

SUBASSEMBLY: AXX-0510 FDC board, AX-8793 FDC board

PURPOSE: To describe some common failures on the FDC board.

DISCUSSION:

In most cases, failure of the FDC board has been traced to one of three chips. Only a small amount of circuit probing will allow the Technician to make an accurate diagnosis of the problem.

PROCEDURE:

The FDC alignment procedure is the the most important troubleshooting tool the Technician has. In most cases, the FDC board has not failed, but is simply out of alignment.

ALWAYS DO THE FDC ALIGNMENT AS THE FIRST STEP IN TROUBLESHOOTING THE FDC BOARD!! Many problems can be cured by this simple procedure!

Both READ DATA (RDD*) and READ CLOCK (RCLK) must be present at the FDC chip if the unit is to read. Missing or unsynchronized RCLK can usually be traced to a bad WD1691 (National Parts number AMX-4471).

Select a test to WRITE on a track ABOVE 21. If the PRECOMP pulse is missing or cannot be adjusted, the WD2143 CLOCK GENERATOR (National Parts number AMX-4472) is a likely failure.

The WD1793 FDC chip itself (National Parts number AXX-3041) can cause all of the above problems and very many more. However, the FDC chip has been found to be very hardy, and a failure of this chip is less likely than the WD1691 or the WD2143. Failures that can often be traced directly to the FDC chip include:

Failure to write to a disk -- no WRITE GATE (WG) or WRITE DATA (WD) present at the chip.

Drive won't step -- no DIRECTION (DIRC) or STEP PULSE (STEP) present chip.

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Locks up -- No INTERRUPT REQUEST (INTRQ) signal present at chip.

Note that all of the above could also have been caused one of several buffers used on the FDC board. The Octal Bi-Directional Buffer, U2 (National Parts number **AMX-4470**), is also a common failure, although it fails much less than the FDC chip itself.

DATE: April 12, 1981

REVISION DATE: June 24, 1983

BULLETIN NO.: III:12

PRODUCT: 26-1061/2/3/4/5/6 Model III

SUBASSEMBLY: AXX-0507 CPU board, AX-8789 CPU board

PURPOSE: Model III won't output to line printer.

DISCUSSION:

There are only three ICs in the Printer Interface section of the Model III. This does not include the address decoding section. A failure of any one of the three chips would cause the Model III to not print.

U93, a 74LS123 one-shot (National Parts number AMX-3803), is used to generate the DATA STROBE signal to the printer.

U94, a 74LS273 Octal 'D' Flip-flop (National Parts number AMX-4227), is used to latch the 8-bit data word to be sent to the printer.

U95, a 74LS244 Octal Buffer (National Parts number AMX-3803), is used to buffer the incoming status lines from the printer.

PROCEDURE:

If a Model III won't output to a line printer, first eliminate CPU, ROM, or RAM as the cause by direct substitution of these parts.

Next, enter and run the following program:

10 A=INP(248):OUT248,65:GOTO10

While the program is running, use an oscilloscope and check:

U94 pin 11 -- Should be very narrow negative going pulses.

U95 pins 1 & 19 -- Should be very narrow negative going pulses.

U93 pin 2 -- Should be very narrow negative going pulses.

The above three tests verify that the address decoding section is functioning properly. If any of the three pulses are missing, isolate and repair the faulty circuit(s) in the address decoding section.

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With the program still running, use the oscilloscope to check:

U93 pin 4 -- Should be very narrow (approximately 1.5 μ sec)
negative going pulses.

These pulses are the DATA STROBE pulses to the printer, and their presence verifies operation of U93. Note that if these pulses are missing U94 or U95 may also be bad.

If all of the above tests pass, it is reasonable to assume the either U94 or U95 could be faulty. It is easiest to verify this by direct replacement.

The part numbers for U93, 94, and 95 are:

U93 --- 74LS123 --- AMX-3803

U94 --- 74LS273 --- AMX-4227

U95 --- 74LS244 --- AMX-3864

All are available under catalog number 26-1061

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DATE: April 15, 1983

REVISION DATE: June 24, 1983

BULLETIN NO.: III:13

PRODUCT: 26-1161/2/3/4 5 1/4" disk drive with Tandon chassis

SUBASSEMBLY: ART-2895 Index assembly

PURPOSE: After replacing the TYPE II index assembly, the index burst cannot be adjusted.

DISCUSSION:

There have been a few TYPE II index assemblies which have been drilled wrong. The fault lies in the plastic mount for the emitter. This piece attaches to the cone lever.

PROCEDURE:

Use the old emitter mount from the removed assembly.

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DATE: April 22, 1981
REVISION DATE: June 24, 1983
BULLETIN NO.: III:14
PRODUCT: 26-1061/2/3/4/5/6 Model III
SUBASSEMBLY: Internal drive assemblies

PURPOSE: Intermittent drive problems: Read/write errors, lost data, sector not found, etc. These problems may be particularly troublesome on Drive 1.

DISCUSSION:

In many cases these problems can be traced to RFI 'noise' affecting drive operation. Proper shielding of the drive chimney can often cure these problems.

There are three shields available for the drive chimney. The first two are supplied with the drive upgrade kit, and should have been installed when the first drive was added.

The third shield was introduced in November of 1982. It should be on all NEW Model IIIs which had drive 1 installed at the factory. It will be missing on all units built before November 1982, and may not be in units that were upgraded to drive 1 after purchase. The third shield covers the top of drive 1, making the drive chimney almost totally shielded if the other two shields are in place.

National Parts #	Description
ART-3085	Shield, left side (under power supply)
ART-4485	Shield, right side
ART-4815	Shield, drive 1

All three shields are available under catalog number 26-1062.

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DATE: April 23, 1981

REVISION DATE: June 24, 1983

BULLETIN NO.: III:15

PRODUCT: 26-1061/2/3/4/5/6 Model III

SUBASSEMBLY: AX-8793 Rev 'F' PCB

PURPOSE: Varied random or intermittent problems.

DISCUSSION:

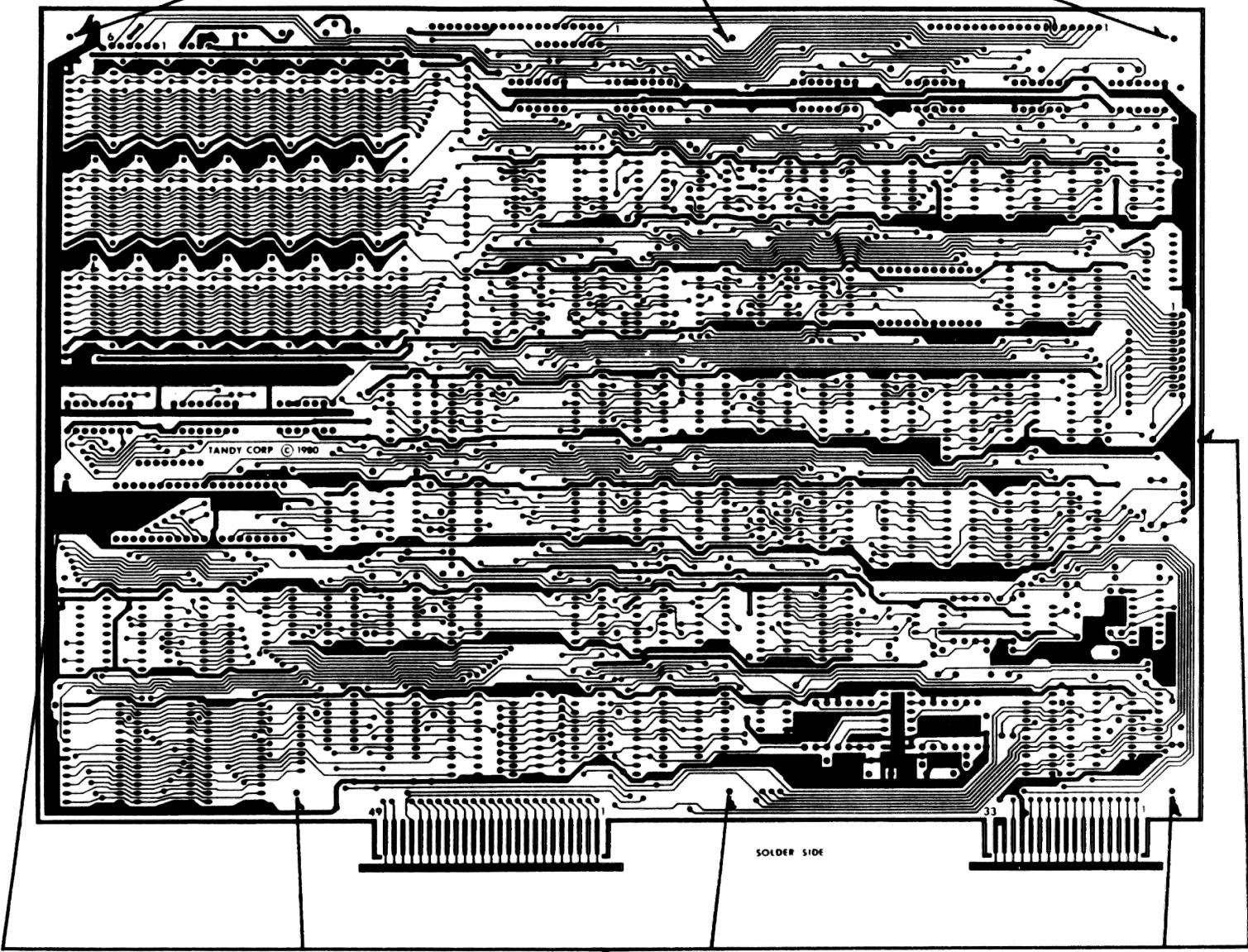
There are mylar washers attached to the PCB to prevent accidental shorts between the PCB and the chassis. Their location is detailed in the attached drawing. The National Parts number of these washers is AHC-0787.

PROCEDURE:

Check these washers to see if they are damaged or missing. Replace them if necessary.

Note that in some cases it may be necessary to use two washers to prevent shorts.

ATTACH WASHERS HERE



ATTACH WASHERS HERE

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DATE: July 16, 1982
REVISION DATE: June 24, 1983
BULLETIN NO.: III:16
PRODUCT: 26-1063/4/5/6 Model III
SUBASSEMBLY: N/A

PURPOSE: Explain why diskettes must be bulk erased before being used for testing purposes.

DISCUSSION:

THIS INFORMATION APPLIES TO ALL COMPUTER SYSTEMS WHICH USE DRIVES -- MODEL I, MODEL II, MODEL III, MODEL 4, MODEL 12, MODEL 16, MODEL 16B, AND COLOR COMPUTER. THE INFORMATION IS NOT LIMITED TO MODEL III SYSTEMS ONLY.

It is essential that you BULK ERASE a diskette before use, especially if you plan to do a head amplitude measurement, or use FORMAT and BACKUP as a diagnostic test after repairs.

During every write operation a CRC byte is generated by the FDC and stored on the disk. However, the FDC chip only checks to see that the CRC is valid for the data AS IT IS READ. It does NOT compare this CRC with the one calculated during the write phase of the operation.

If a DOS diskette, or even one that has been simply formatted, is used, and the drive fails to write, NO ERRORS WILL BE REPORTED since the CRC bytes already written to the disk will be valid.

The same problem will show up if you use a formatted diskette during head amplitude tests. If the drive under test is not writing, the drive will read the signals already on the disk, giving good results for the test when in fact the drive will not write at all.

DATE: July 16, 1983

REVISION DATE: June 24, 1983

BULLETIN NO.: III:17

PRODUCT: 26-1063/4/5/6 Model III

SUBASSEMBLY: AXX-0507 Old style CPU board
AX-8789 CPU board -- FCC
AXX-0510 Old style FDC board
AX-8793 FDC board -- FCC

PURPOSE: Improper function of 74LS04 in Model III clock circuits.

DISCUSSION:

Manufacturing has determined that National Semiconductor IC number 74LS04 will not work properly as U2 on the Model III CPU board, or as U25 on the Model III FDC board.

Use a 74LS04 from any other manufacturer.

74LS04 National Parts number AMX-3552 under catalog number 26-1061

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DATE: August 31, 1981
REVISION DATE: June 28, 1983
BULLETIN NO.: III:18
PRODUCT: 26-1161/4 External drive
SUBASSEMBLY: AXX-5010 TPI chassis

PURPOSE: A potential grounding problem exists with the TPI 5 1/4" SINGLE BOARD chassis when used as an external drive.

DISCUSSION:

The SINGLE BOARD drive TPI drive chassis does not supply a ground between the power supply PCB and the chassis.

PROCEDURE:

Connect a ground wire between power supply board and the chassis. The wire should run from the feed-thru hole near CR10 on the disk drive power supply to the ground lug on the back side of the chassis.

This wire should NOT be attached to the old style, two board chassis or a ground loop may be induced, causing more problems.

ONLY THE SINGLE BOARD CHASSIS ARE TO BE GROUNDED IN THIS MANNER!

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DATE: August 31, 1981
REVISION DATE: June 27, 1983
BULLETIN NO.: III:19
PRODUCT: 26-1061/2/3/4/5/6 Model III
SUBASSEMBLY: MS-260-1061 Service manual
AXX-0507 CPU board
AX-8789 CPU board FCC

PURPOSE: 1) To prevent or cure random RAM failures after unit is warm
2) To correct error in service manual

DISCUSSION:

U24 and U42 are the Memory Address Multiplexers, and are specified as 74LS157 devices. These two chips are required to drive a relatively large number of inputs. After the unit becomes warm, these chips may become "weak" and fail to drive these inputs, causing intermittent memory errors.

PROCEDURE:

These two chips should be replaced with 74157 devices (National Parts number AMX-4668 catalog number 26-1061), not 74LS157s as specified in the schematic.

Please mark this change on your schematic and parts list.

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DATE: October 13, 1981
REVISION DATE: June 27, 1983
BULLETIN NO.: III:2Ø
PRODUCT: 26-1Ø65/6 Model III
SUBASSEMBLY: AXX-Ø51Ø FDC board
AX-8793 FDC board FCC

PURPOSE: R4 installed on wrong pads

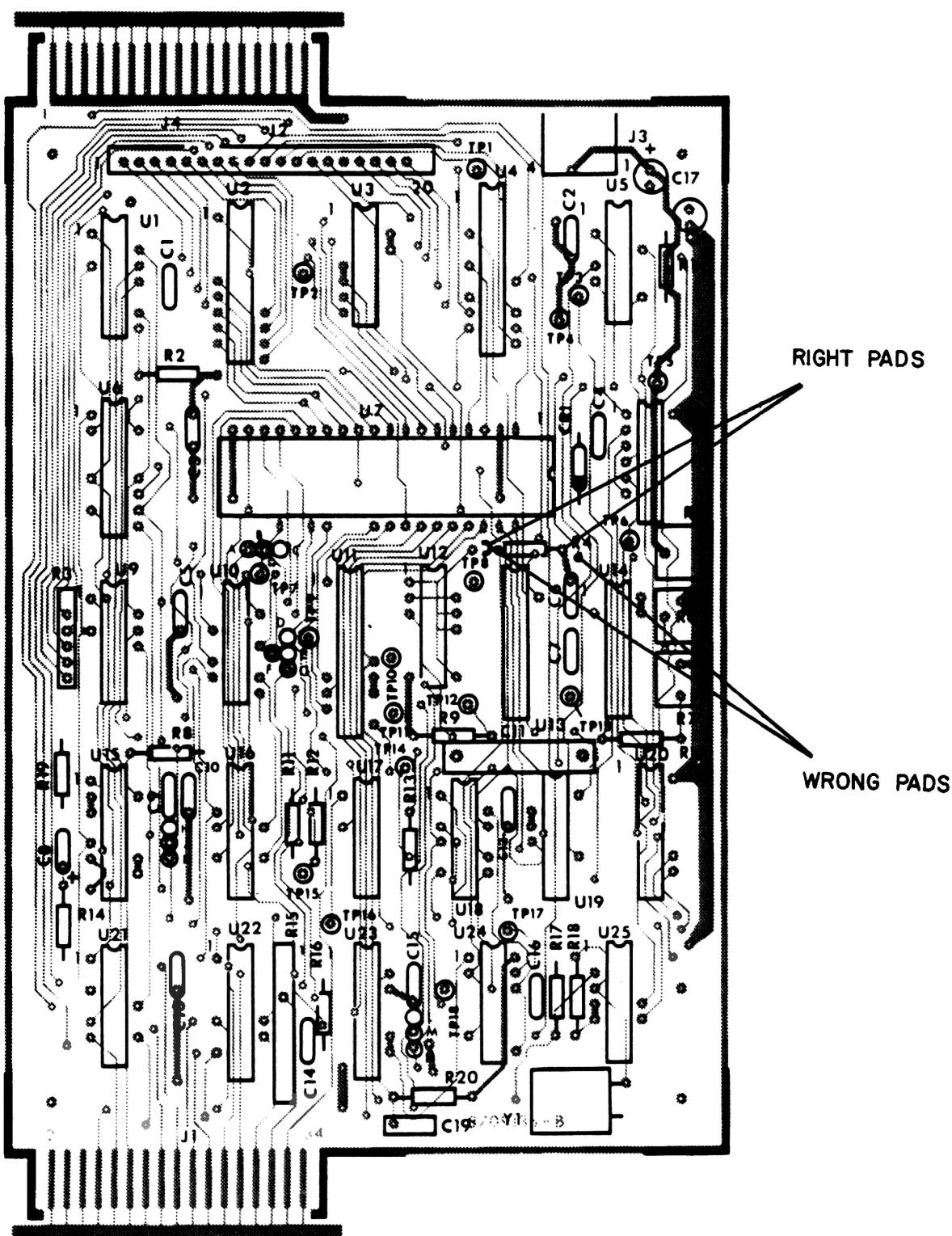
DISCUSSION:

Some Model III FDC boards have been found with R4 installed on the wrong pads (see Figure 1). The correct pads have a white line between them.

If R4 is installed wrong it could cause wrong wait time outs (WAITIMOUT) to occur.

PROCEDURE:

ALL FDC boards should be checked to see that R4 is on the correct pads. If R4 is NOT installed correctly, simply remove it and re-install it on the correct pads.



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DATE: MAY 25, 1982
REVISION DATE: June 27, 1983
BULLETIN NO.: III:21
PRODUCT: 26-1061/2/3/4/5/6 Model III
SUBASSEMBLY: MS-2601061 Service manual

PURPOSE: To correct pin numbers on schematic diagram

DISCUSSION:

The Spectra-strip ribbon connector pins are improperly labeled on the Floppy Disk Interface Schematic. Please make the following changes to your schematic:

SIGNAL NAME	J2 PIN #	U4 INPUT PIN #
DISKIN*	9	15
DISKOUT*	10	8
A0	11	13
A1	12	11
RESET*	14	2
WRNMIMASKREG*	16	4
RDNMIMASKREG*	17	17
DRVSEL*	18	6

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DATE: July 21, 1982
REVISION DATE: March 21, 1983
BULLETIN NO.: III:22
PRODUCT: 26-1063/5/6 Model III with one or more disk drives
SUBASSEMBLY: AXX-5010 Drive chassis

PURPOSE: 1) To describe new TPI 5.25 inch disk drive
2) To describe alignment procedures for new TPI drive.

DISCUSSION:

The new TPI 5.25 inch disk drive is functionally identical to the former TPI drives. However, several noteworthy differences exist.

1) LOGIC BOARD MOUNTING SCREWS ARE REPLACED WITH LOCKING "PUSH PINS"

The two screws used to hold the logic board to the chassis have been replaced with re-usable, easy to use push pins. To remove the pin, take a pointed object and push the center of the pin up from the bottom. It can now be grabbed from the top and pulled out. The main body of the pin can now be removed. To replace the board, insert the main body of the pin into the hole, then insert the center.

You should keep a small stock of the push pins (National Parts number AHC-1567 under catalog number 26-1164) to replace those that may become damaged. Some units may use mounting screws, some units may use push pins, and some units may use a combination of both. You must replace missing or damaged hardware with like items.

2) THE HEAD LOAD BUTTON IS NOW REPLACEABLE

To remove the button, gently squeeze the back of the button and push it through the arm assembly. Use extreme caution, as a slip could damage the head.

3) UNITS CONTAIN A DIFFERENT TRACK 00 MOUNTING ARRANGEMENT.

Due to the mounting of the Track 00 switch, the drive MUST be aligned external to the Model III. Do not attempt to align the drive while it is mounted inside the Model III.

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PROCEDURE:**TRACK ØØ SWITCH ALIGNMENT**

NOTE: You must take EXTREME care during this procedure that the TPI logic board is not accidentally shorted.

Perform the Head Radial Alignment test from the drive alignment diagnostic program. Next, select the Track ØØ Alignment section of the test, and verify that the "cat-eye" pattern remains on track 16. Select the 50% duty cycle section of the test.

Remove any diskettes from the drive. Swing the logic PCB away from the drive chassis. Use a rag or piece of cardboard to prevent accidental shorts to the drive mechanism or computer.

Unplug J-12 (the cable supplying power to the rotational motor), and carefully remove the rotational motor from the chassis to allow easier access to the Track ØØ switch. Adjust the switch as instructed in the alignment program. Be careful not to short the Track ØØ switch, as program lockup may occur.

Re-install the rotational motor. Step to Track ØØ and verify the presence of data with the Alignment Diskette installed.

TRACK ØØ STOP ADJUSTMENT

On the new TPI chassis the Track ØØ stop is the rear bracket (butterfly clip) that holds the guide rails in place. Verify that the head is at Track ØØ, using the Alignment Diskette. Adjust the rear butterfly clip to that there is a clearance of .Ø1Ø inch between the head assembly and both sides of the clip. This is most easily done with the following procedure:

- 1) Step the head to Track 3.
- 2) Loosen the screw that holds the butterfly clip.
- 3) With the head at Track ØØ, hold the stepper cam and turn it ONE click counter-clockwise. This will position the head to Track -1.
- 4) Push the butterfly clip towards the head assembly until BOTH sides make contact with the head assembly. Be careful not to move the head assembly.
- 5) Tighten the screw which holds the butterfly clip. Do not over-tighten the screw.

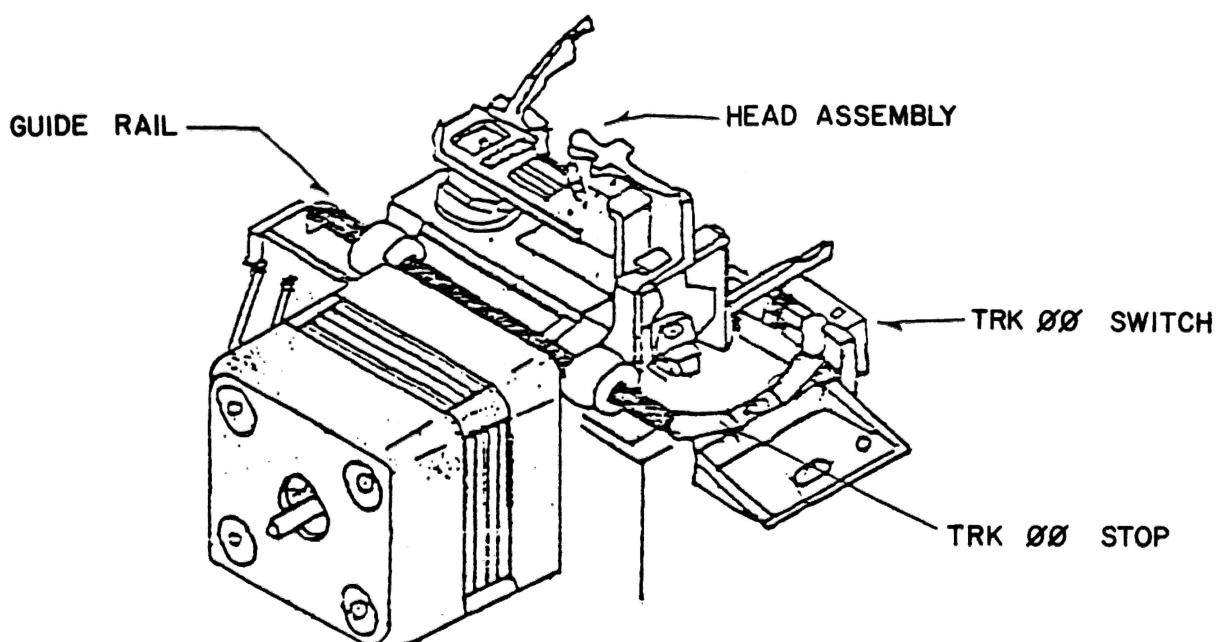
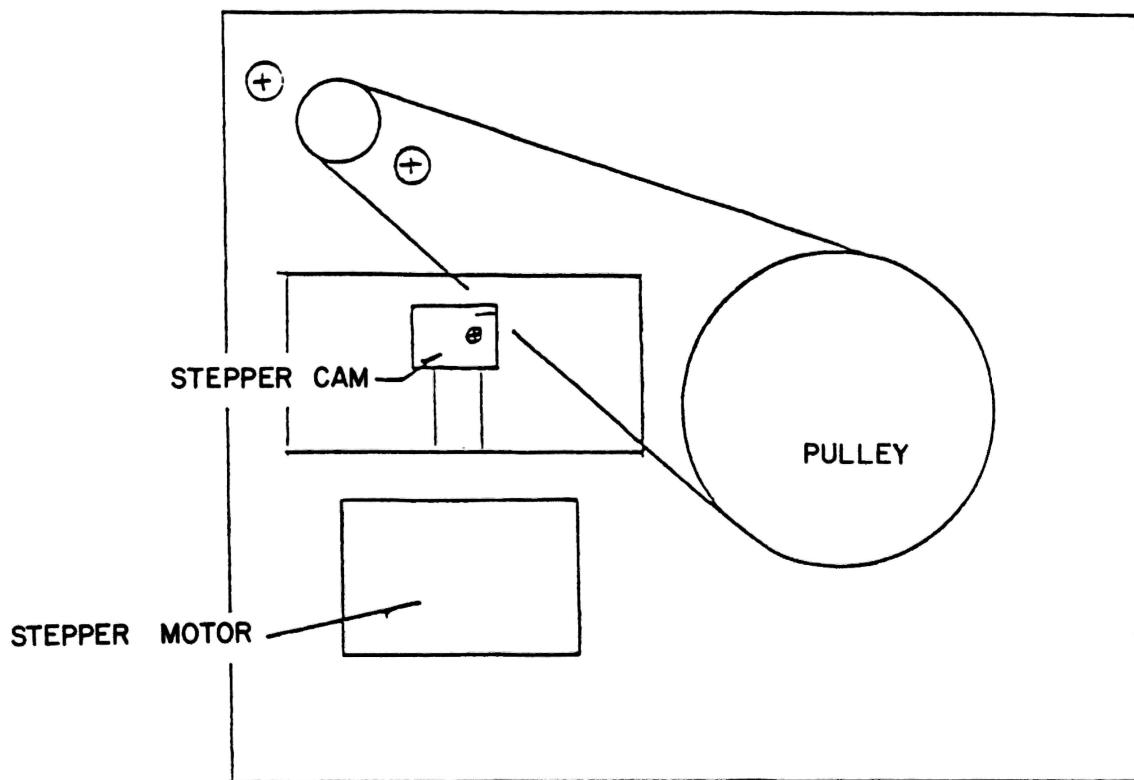
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- 6) Step the head to Track $\emptyset\emptyset$ and verify that there is . $\emptyset1\emptyset$ inch gap between the Track $\emptyset\emptyset$ stop (butterfly clip) and the head assembly.

MISCELLANEOUS INFORMATION

The National Parts number for the Track $\emptyset\emptyset$ stop (butterfly clip) is ART-4234 under catalog number 26-1164.

There is no clear module cover included with the drive assembly. Do not attempt to mount one, as the holes are not tapped.



DATE: September 22, 1983

REVISION DATE: June 27, 1983

BULLETIN NO.: III:23

PRODUCT: 26-1061/2/3/4/5/6 Model III

SUBASSEMBLY: N/A

PURPOSE: Varied failures -- intermittent won't boot, random reboot, endless loop boot-AUTO FUNCTION ENGAGED-reboot, some machine level programs won't work, scrambles BASIC programs, syntax errors in obviously good lines, many other problems. Appears to be memory related, but memory passes all tests. Drives and FDC all check OK.

DISCUSSION:

Some RAM chips seem to be sensitive to certain bit patterns, and will fail only under very strict circumstances. If the RAM test doesn't check these patterns the chip will pass the test.

It may be possible to partially isolate the section of RAM which is bad by knowing what sections of RAM contain certain functions of BASIC or TRSDOS. Referring to Figure 1, we see that certain "pointers" are kept in low RAM and TRSDOS uses memory up to about 7000H. BASIC will use any memory not used by TRSDOS, and will take over most of low memory if no disks are used (TRSDOS not present).

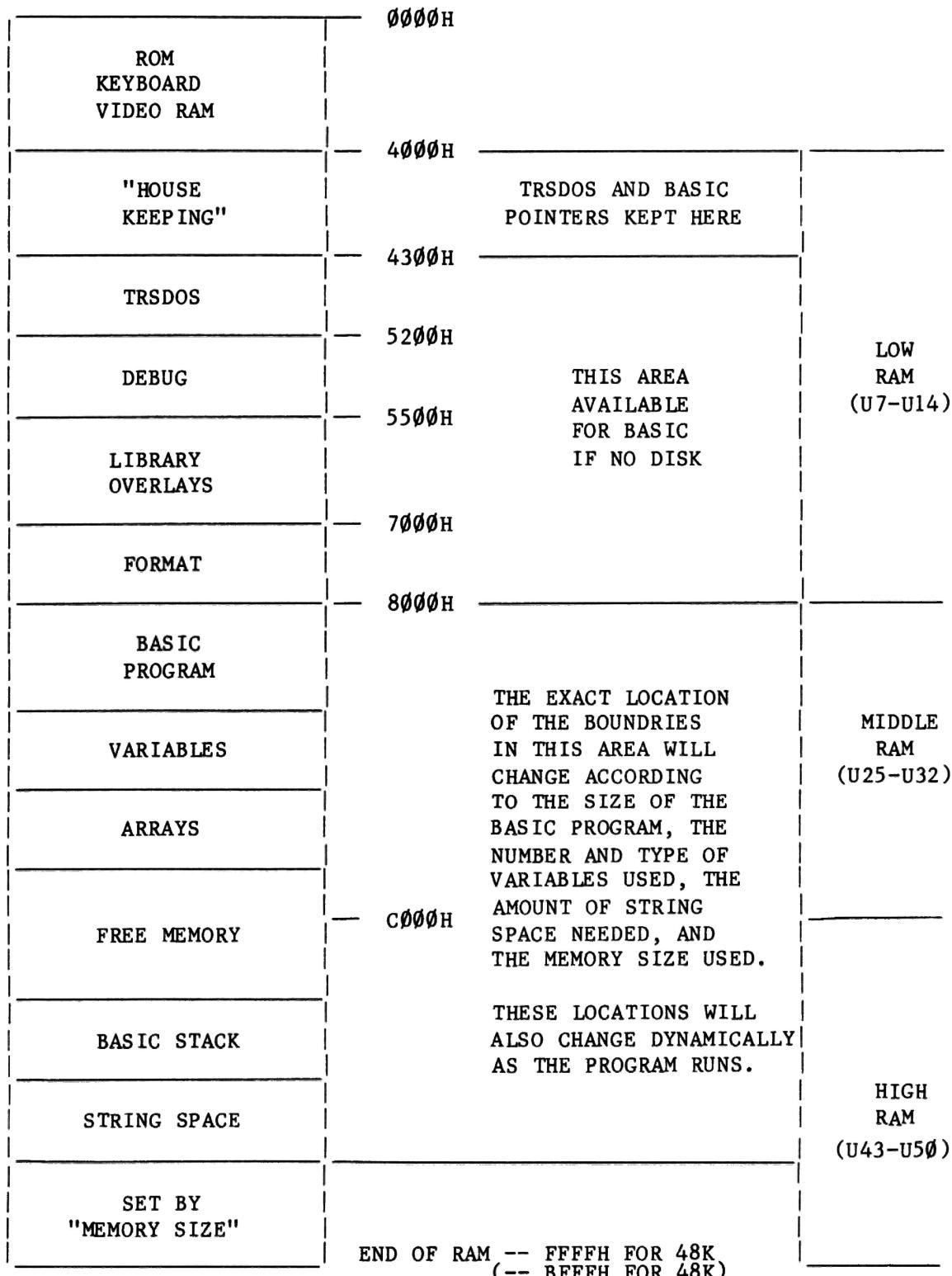
If parts of TRSDOS fail, suspect the LOW bank of memory (U7-U14), as this is where TRSDOS resides. Errors in BASIC could be in any bank of memory due to the dynamic memory usage of the BASIC interpreter.

PROCEDURE:

First, check the power supply voltages, and scope them out for excessive noise. Also, re-verify the FDC and drive alignment. Then, using small pieces of masking tape, mark each RAM chip with its position (U7, U43, etc). Replace the RAMs with known good chips and re-test the machine. If the machine no longer fails, reinstall each individual RAM chip ONE AT A TIME into its proper position. Recheck the machine after each chip replacement. Continue until the faulty RAM chip is found.

If the unit fails even after complete RAM replacement there may be further electrical problems with the drives, FDC board, power supply(s), or RS232 board (if installed).

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TRS-80 MODEL III MEMORY MAP**Radio Shack®**

DATE: November 4, 1982

REVISION DATE: June 27, 1983

BULLETIN NO.: III:24

PRODUCT: 26-1061/2/3/4/5/6 Model III

SUBASSEMBLY: AXX-7078 Network III ROM

PURPOSE: Installation and checkout of Network III ROM

DISCUSSION:

The Network III ROM for the Model III Computer is available from National Parts as part number AXX-7078. This ROM allows the Student Station to load the Student Station System Software directly from the HOST through the Network III without need for a Network II or auxillary cassette recorder.

Installation of the Network III ROM does not affect the Model III's ability to function as a stand alone unit using TRSDOS or Radio Shack business and educational software.

LDOS will not function with the Network III ROM installed. This will exclude the use of a hard drive with a Model III which contains the Network III ROM. However, the HOST unit does **NOT** require the Network III ROM, and the HOST computer is the most likely to have the hard drive installed.

PROCEDURE:

Open the computer, remove ROM 'C' (U106), and install the Network III ROM in its place. Place the old ROM 'C' in the conductive foam which held the Network III ROM to protect it.

Load MEM6 in a manner appropriate to the particular machine -- from disk or tape. Using the <0> option, verify the checksums for the ROMS. The correct checksum for the Network III ROM 'C' is 276A.

Reassemble and test using the Network III system as follows:

- 1) Minimum equipment required is a HOST computer (Model III 32K 1 disk drive with RS232 port), Network III Controller, and the upgraded Model III Student Station. Connect all equipment, and turn everything ON.

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2) At the HOST system boot the NETWORK III OPERATING SYSTEM and answer the DATE and TIME prompts.

2a) Type HOST <enter>. When the "BAUD RATE?" prompt appears, press <enter>.

The HOST copyright screen will appear:

Model III Network III HOST - 1.1
Copyright 1982, Micro-Systems Software, Inc.
Licensed to Tandy Corp. All Rights Reserved

Student Station: **
Print Spool: **
Files Open: ØØ

The HOST program MUST be version 1.1 OR GREATER. If version 1.0 appears the customer must obtain the latest update of the HOST software.

3) At the Student Station answer the "CASS?" and "MEMORY SIZE?" prompts with <ENTER>.

3a) When "READY" appears, type SYSTEM <enter>. At the "*?" prompt type /12327 <enter>. The Student System program should begin to load from the HOST disk.

3b) After the Student System program finishes loading, answer the "BAUD RATE?" question by pressing <ENTER>. The Network III prompt should appear, and the system should now function normally.

DATE: November 17, 1982

REVISION DATE: June 27, 1982

BULLETIN NO.: III:25

PRODUCT: 26-1063/5/6 Model III

SUBASSEMBLY: AXX-5019 5.25" TPI Floppy Disk Drives

PURPOSE: To define several Track-ØØ Switch mounting arrangements and a modification to eliminate adjustment and migration problems encountered with the older mounts.

PROCEDURE/DISCUSSION Currently there are three arrangements for mounting the Track-ØØ Switch on the TPI chassis. These are:

- 1) Track-ØØ Switch mounted with two small bolts and a tinnerman mount. The tinnerman mount is made from thin metal and will bend or strip under heavy torque when tightening the mount screws. This mounting arrangement allows for switch adjustment.
- 2) Track-ØØ Switch mounted with two small bolts and a nut-plate. The nut-plate is made from heavy steel stock and will not bend or strip under heavy torque when tightening the mount screws. This mounting arrangement allows for switch adjustment.
- 3) Track-ØØ Switch mounted with two small screws and nuts at an angle. During manufacture the positioning of the switch is determined and two holes are drilled into the casting allowing the switch to be mounted. This results in a switch mount which will not migrate, and is not adjustable. At this time, this is the current mounting procedure.

If an adjustment problem is encountered with the tinnerman assembly, a possible cure will be to replace the tinnerman mount with the nut-plate mount. This will allow a wider adjustment margin as well as allowing the switch to be tightened to a more reliable degree.

Track ØØ Nut Plate
National Parts number ART-5028
Catalog number 26-116Ø-1

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DATE: December 7, 1982
REVISION DATE: June 27, 1983
BULLETIN NO.: III:26
PRODUCT: 26-1065/6 Model III
SUBASSEMBLY: ATA-1015 Aztec Power Supply

PURPOSE: 65 watt Aztec power supply for Model III

DISCUSSION: A 65 watt power supply has been introduced for the Model III. This power supply is capable of powering the CPU, video driver, RS232, FDC board, and two drives. This means that Model III's will now contain only ONE power supply.

Several parts have been changed to accommodate the 65 watt power supply. Below is a list of new and old parts and their National Parts order numbers.

The old-style part numbers are still available from National Parts.

ITEMS CHANGED IN NEW PRODUCTION MODEL III'S

DESCRIPTION	PART #	ADDED/REMOVED
Old style power supply	AXX-6005	removed
Old AC harness	AW-2531	removed
Old CRT harness	AW-2536	removed
DC harness first drive	AW-2686	removed
DC harness second drive	AW-2738	removed
CPU DC cable	AW-2741	removed
RS232 DC cable	AW-2705	removed
New style power supply	ATA-1015	added
New AC harness	AW-3053	added
New CRT harness	AW-3055	added
New DC harness for CPU, RS232, both drives, and FDC board	AW-3054	added

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DATE: December 20, 1982
REVISION DATE: September 10, 1983
BULLETIN NO.: III:27
PRODUCT: 26-1125 Model III High Resolution Graphics Board
SUBASSEMBLY: Model III Main Logic Boards -- All revisions
AX-9357 Hi-Res Graphics logic PCB

PURPOSE: Installation procedures for Model III High Resolution Graphics

PROCEDURE:

1) PREPARE THE COMPUTER FOR INSTALLATION

- A) Remove all cables (RS232, printer,etc) from the bottom of the computer. Remove all screws holding the case halves together. Do not forget the one #6 screw in the rear panel of the case.
- B) Remove the case top by CAREFULLY lifting it straight up. Be careful not to catch the neck of the CRT on the internal wiring harnesses. Set the case top/CRT assembly to the left of the computer (as viewed from the front), being careful not to exceed the length of the video cable.
- C) Remove the shield covering the main CPU logic board, if the shield is present.
- D) Remove all cables connecting to the main CPU logic board. This includes power supply, video, cassette, keyboard, and the RS232 and FDC Spectra-strips if they are present.
- E) Remove the five (5) screws holding the main CPU logic PCB to the frame. Make sure that ALL cables have been disconnected from the main CPU logic PCB, and then remove the PCB from the case.

2) MODIFY THE MAIN CPU LOGIC BOARD

- A) Cut pin 1 of U103 away from the PCB. DO NOT cut the pin loose from the IC. Cut the pin right at the PCB. Refer to the attached drawing for clarification. Bend the pin up so that it can be soldered to later.
- B) Using a short piece of wire wrap wire, jumper U103 pin 1 (the pin just cut) to U87 pin 7 (ground).

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3) INSTALL THE GRAPHICS BOARD

- A) Connect the 50-wire flat cable to the Graphics Board and the CPU board. Refer to the attached diagram. The middle connector attaches to the Model III I/O Bus connector.
- B) Replace the main CPU logic board back into the case. The unused 50-pin connector should exit the case through the opening for the I/O Bus. Use the five mounting screws removed earlier to hold the PCB to the frame.
- C) Make sure that all the components of the Graphics Board assembly are in place. The Graphics Board should be attached to a new rear shield. Attached to the back side of the Graphics Board should be three (3) layers of material. Two of the layers are an insulator and a shield for the Graphics Board. The third layer is an insulator (clear tape) to prevent the CPU board from shorting against the Graphics Board ground plane.
- D) Connect the remaining cables to the Graphics Board and main CPU logic board. The short 6-pin cable connects the CPU video output (J5) to the Graphics Board video input (J3). The video cable from the CRT connects to the Graphics Board video output (J2).

The final cable supplied with the Graphics Board is a replacement for the power connector to the FDC Interface Board, with an additional connector for the Graphics Board. Remove the old power connector to the FDC board and replace it with the new connector. The extra 2-pin connector plugs into the power input of the Graphics Board.

- E) Place the Graphics Board and shield assembly into position and reconnect the shield with the screws removed from the old shield. If this modification is being done to an older, non-FCC approved unit, utilize the holes that line up on top of the shield. Spring clips will be used to secure the edges.

4) VIDEO ALIGNMENT

- A) Load the alignment pattern from the Model III Diagnostic Diskette using the command GRXX ALGNPAT/GRA. You will see the test pattern load and then the diagnostic options menu will appear.
- B) Press the <ENTER> key and the test pattern will be displayed. Adjust the video monitor board and yoke magnets so that the displayed circles are circular and that straight lines are straight. Further information on Model III video alignment may be found in the Model III service manual.

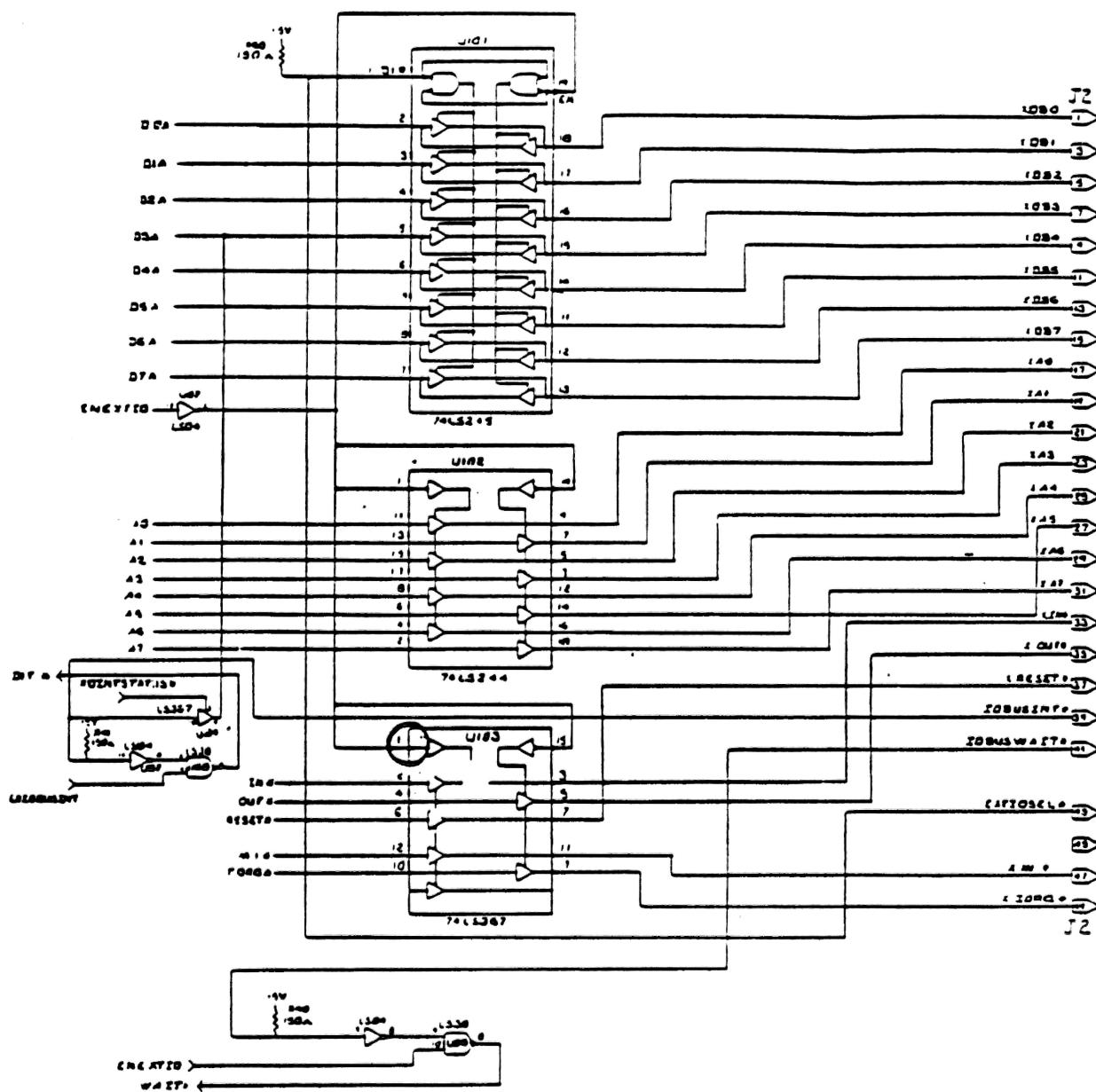
- C) Press <ENTER> again to toggle back to the options menu. There may be some noticeable vertical compression of the display. This is normal.
- D) There are no adjustments to be made to the High Resolution Graphics Board.

5) INSTALL THE CASE

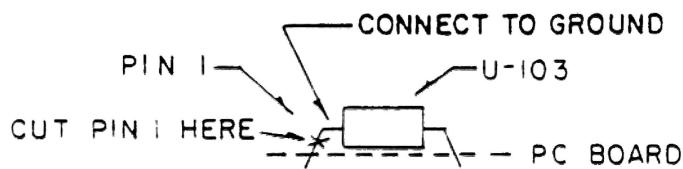
- A) Double check that all cables are correctly connected and all boards are properly installed.
- B) CAREFULLY -- place the case top onto the case bottom. Be extremely careful that the neck of the CRT is not damaged, and see that it does not catch on any wiring harnesses.
- C) Install all screws used to hold the case halves together. Do not forget the one #6 screw used on the case rear panel.

6) FINAL CHECKOUT

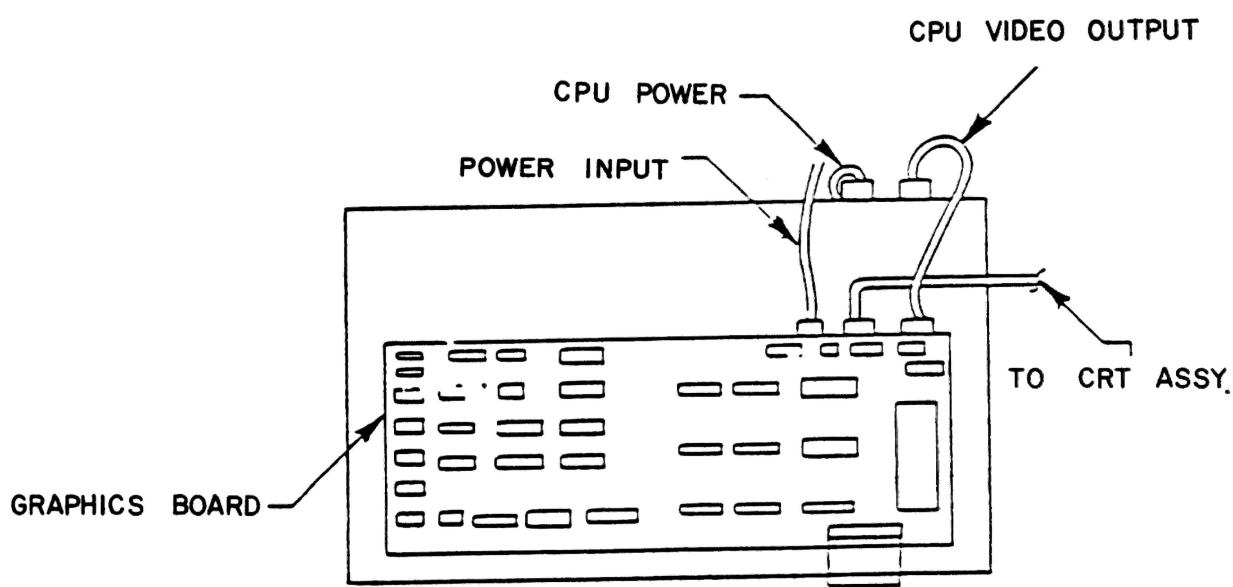
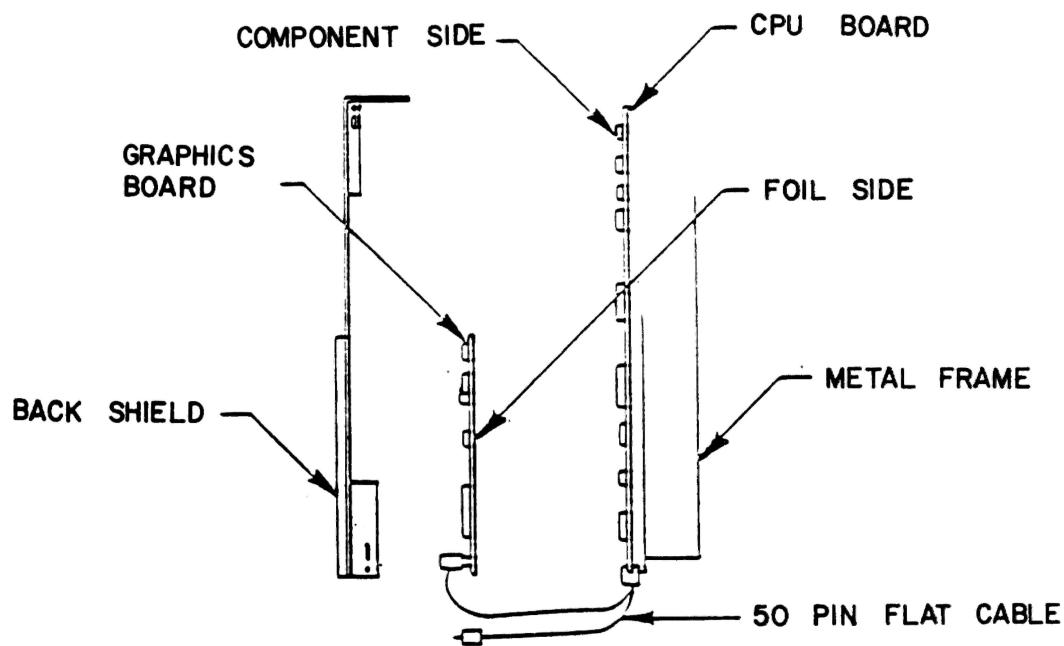
- A) Power up the system. Verify proper operation of the video monitor by looking at the screen. Verify proper operation of the high resolution by using GRXX.
- B) Run **GRAPHIC/CMD** from the Model III Diagnostic Diskette to verify operation of the graphics memory and other features. Refer to the Model III Graphics Diagnostic Manual for further information.



NOTE: Cut pin 1 of U103 at the chip body.



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DATE: February 4, 1983
REVISION DATE: September 10, 1983
BULLETIN NO.: III:28
PRODUCT: 26-1063.5.6 Model III with one or more disk drives
SUBASSEMBLY: FDC, Video PCB, and 65 Watt power supply

PURPOSE: During FDC alignment the video driver PCB MUST be connected to the 65 watt power supply to avoid FDC misalignment

DISCUSSION:

When performing the FDC alignment procedures in a Model III equipped with the 65 watt power supply the video monitor PCB MUST be connected to the 65 watt power supply.

Failure to have the video monitor connected to the power supply will result in a voltage difference of approximately .8 volts on both the +5 and +12 volts lines.

The voltage difference on the power supply lines will cause to precomp to extend to 300 nanoseconds when the video is reconnected.

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DATE: June 29, 1983
REVISION DATE: September 10, 1983
BULLETIN NO.: III:29
PRODUCT: 26-1063/5/6 Model III with 1 or more disk drives
SUBASSEMBLY: N/A

PURPOSE: Screen says "DISKETTE?" if no diskette is inserted. As soon as a diskette is inserted and the door is closed the system boots normally. No other problems are present.

DISCUSSION:

This is normal operation. If NO other problems are present then no attempt should be made to repair the computer.

The following explains what causes the "DISKETTE?" message, and why some machines exhibit this action while others don't.

By definition, the Z-80 processor always starts operation at memory location ~~0000~~ after RESET is released. This location is in ROM. The instruction here is a DISABLE INTERRUPTS. The next step is to clear the accumulator and set the system flags to a known state. The processor is then instructed to jump to the BOOTSTRAP routine contained in ROM C.

One of the first steps of the BOOTSTRAP is to reset the FDC chip. After a suitable delay for the FDC to become ready, the CPU sends a RESTORE command to the FDC chip. The CPU has not yet checked to see if the FDC board exists. The RESET and RESTORE commands are always sent to the FDC.

After performing some other housekeeping functions, BOOTSTRAP then checks to see if the <BREAK> key is pressed. If it is, the CPU jumps to the CASSETTE operating system, bypassing the disk. If the <BREAK> key is not pressed the CPU then checks for the presence of the FDC card. If the FDC is not present, the CPU jumps to the CASSETTE operating system.

If <BREAK> is not pressed and the FDC board is present, BOOTSTRAP now checks to see if Drive Ø has been RESTORED to Track ØØ. In fact, BOOTSTRAP checks 64K times. If, after 64K checks, Drive Ø has not found Track ØØ, BOOTSTRAP assumes that no drive is installed, and instructs the CPU to jump to the CASSETTE operating system. [NOTE: Failure of Drive Ø to find Track ØØ could cause the system to go to CASS? even if a drive is installed.]

If Track ØØ of Drive Ø is found, then BOOTSTRAP checks for the presence of an Index Pulse indication. The Index Pulse is checked 64K times. If no Index Pulse indication is found, the BOOTSTRAP prints "DISKETTE?" and begins to check for the index pulse again. This continues until an Index Pulse indication is found.

When the Index Pulse indication is found BOOTSTRAP checks it five times to be sure it was not a noise spike or a mistake. If the Index Pulse indication is found to be active for five checks then BOOTSTRAP assumes that a drive is present, a disk is inserted, and it proceeds to boot TRSDOS from the diskette. If the Index Pulse indication is not found active for five consecutive checks BOOTSTRAP resets the counters and tries again until a diskette is inserted or the machine is reset.

BOOTSTRAP is responsible for the "DISKETTE?" message. Under normal operation "DISKETTE?" would appear only if Drive Ø is empty and the door is open. THIS IS NORMAL! When a diskette is inserted and the door is closed BOOTSTRAP will detect the index pulse and continue to boot normally. If "DISKETTE?" appears even with a diskette inserted and the door closed then this indicates problems with Drive Ø or the diskette.

It is possible to fool BOOTSTRAP. If the drive is empty and the door is closed, BOOTSTRAP will find the Index Pulse indication signal active. BOOTSTRAP will try to boot from the disk. Unable to read the non-existent disk, the computer will time out, the drives will shut off, and it will be necessary to hit RESET when a diskette is inserted.

The Index Pulse Detector assembly is actually an LED and photo sensor, and is quite sensitive. The photo sensor can be activated by ambient light in the room, or even by the LED itself, producing an active Index Pulse indication even with no disk present and the door open. BOOTSTRAP, finding an active Index Pulse indication, tries to read the disk. The computer again locks up, the drives shut off, and it is necessary to press RESET when a disk is inserted.

In summary, there are THREE possible conditions that can be considered normal operation:

- 1) Drive Ø empty, door open, screen says "DISKETTE?". This is the normal, expected response from the software in ROM.
- 2) Drive Ø empty, door closed, drives run for awhile then shut off. Press RESET to properly boot the computer.
- 3) Drive Ø empty, door open, drives run for awhile then shut off. Press RESET to properly boot the computer.

If any of the above three conditions exist, and NO other faults exist, then the computer should be considered normal and no attempt should be made to repair a problem that does not exist.

DATE: May 11, 1983
REVISION DATE: June 11, 1984
BULLETIN NO.: III:30
PRODUCT: 26-1063/5/6 Model III with 1 or 2 disk drives
SUBASSEMBLY: AX-8793 FDC board Rev. blank and Rev. A only

PURPOSE: To describe modifications to Model III FDC board.

DISCUSSION:

It has been determined that, under certain circumstances, the WAIT state generated by the FDC board will violate the RAS HOLD DOWN specification of the memory ICs.

The RAS HOLD DOWN specification is something often overlooked. The RAS hold down is specified by the manufacturer to be 10 uS for the 4116-type (16K) and 4164-type (64K) memory ICs. In the TRS-80 Computers, the RAS signal lasts for no more than approximately 300 nS. This produces no problem in a normally operating system.

However, if the RAS hold down specification is violated, the result is almost as bad as violating the refresh timing. Depending on how badly the RAS hold down timing is violated, results could range from highly intermittent errors to complete system lockup.

The problem lies in the timing of the WAIT signal. Unmodified, the WAIT is a function of BIT 6 of port F4H. When this bit is latched (to select the WAIT), the WAIT is not recognized until the next Z-80 opcode fetch cycle. Under this condition the WAIT occurs while RAS is active (LOW).

Under normal system operation the FDC chip will begin to perform its assigned command, and generate a DRQ (Data Request) which clears the WAIT and signals the CPU that data can be written or read. Under error conditions DRQ may not be produced and the WAIT may not be released until the 1 ms watchdog timer times out. RAS is held LOW during this wait, far exceeding the RAS hold down specifications.

On the unmodified board the WAIT* signal was latched by the trailing edge of the DRVSEL* signal. On the modified board the WAIT is now latched by the leading edge of DRVSEL*. The result is that the WAIT is now recognized during the actual I/O cycle. RAS is not active during this cycle, so even a 1 ms WAIT will not violate the RAS hold down specification. We now need to be concerned only with REFRESH timing, a problem cured by the 1 ms watchdog timer.

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On the unmodified board, the WAIT can be selected or deselected by manipulating Bit 6 of port F4H. On the modified board a WAIT is always generated. However, if a WAIT is not desired (Bit 6 is not set), a short 1-2 µS WAIT is selected.

PROCEDURE:

You will need a very small set diagonal wire cutters (dykes) and some wire wrap wire to perform the modifications.

MAKE THE FOLLOWING CUT ON THE FOIL SIDE OF THE PCB

- 1) Cut the trace leaving U18 pin 2. Cut the trace close to pin 2.

CUT THE PINS ON THE FOLLOWING ICs

- 1) U1Ø pin 4. Use the small dykes and cut the pin loose from the PCB. DO NOT cut the pin loose from the IC. Bend the pin upwards so you can solder to it later.
- 2) U18 pin 3. Use the small dykes and cut the pin loose from the PCB. DO NOT cut the pin loose from the IC. Bend the pin upwards so you can solder to it later.

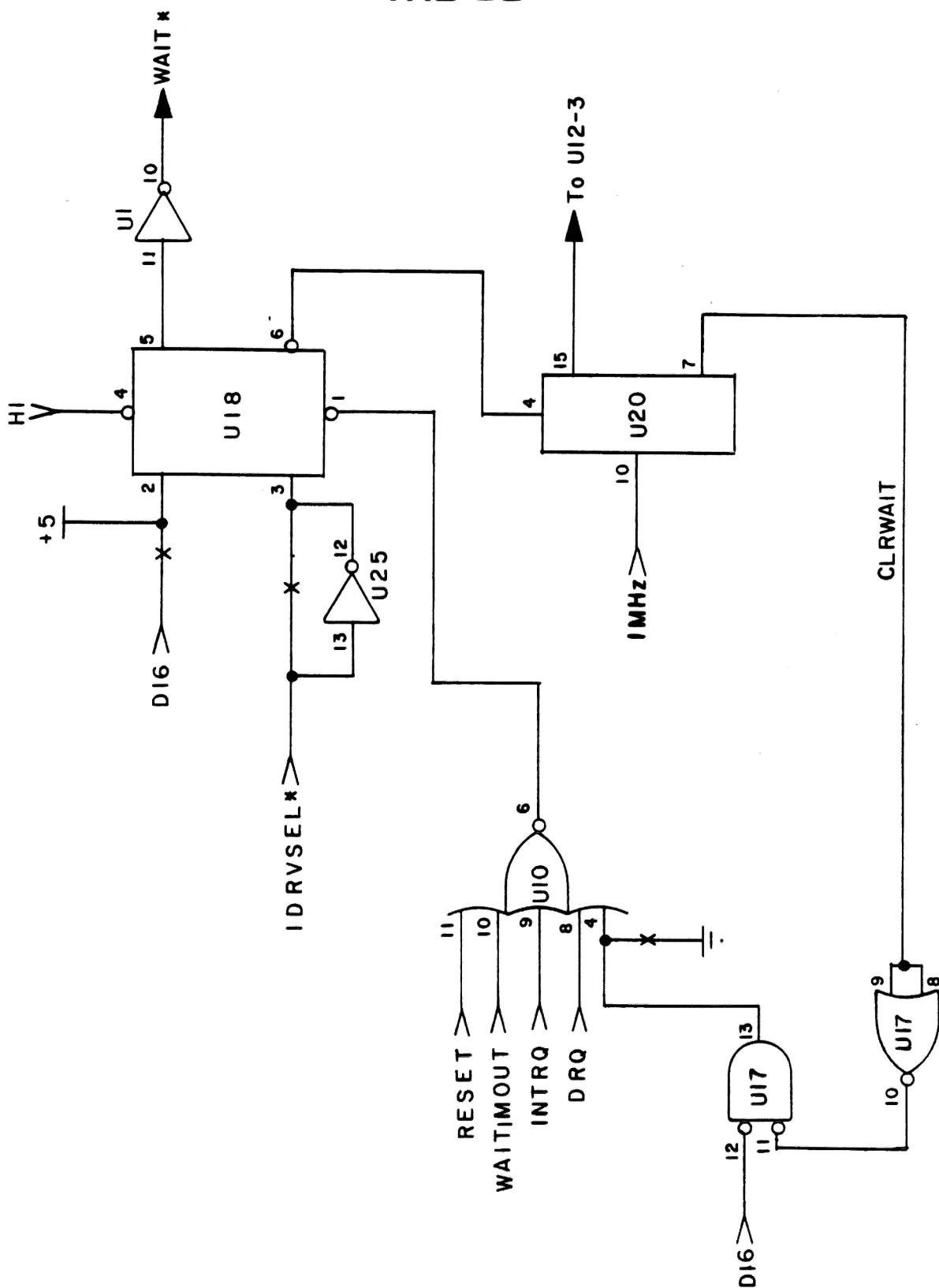
USING WIRE WRAP WIRE, INSTALL THE FOLLOWING JUMPERS ON THE COMPONENT SIDE OF THE PCB. SOLDER DIRECTLY TO THE IC PINS.

- 1) U17 pin 13 to U1Ø pin 4 (the lifted pin).
- 2) U17 pin 12 to U19 pin 13.
- 3) U17 pin 1Ø to U17 pin 11.
- 4) U17 pin 9 to U17 pin 8 to U2Ø pin 7. Note that U17 pins 8 and 9 close together and can be connected by one end of the jumper to U2Ø pin 7.
- 5) U18 pin 2 to U18 pin 14.
- 6) U18 pin 3 (the lifted pin) to U25 pin 12.
- 7) U18 pin 11 to U25 pin 13.

Check and recheck all cuts and jumpers. Make sure that no pins have been accidentally shorted with solder.

Install the modified board into the Model III, **AND REALIGN IT!!!** Check the system using Format, Backup, and DSKDG3 ver. 1.3 to verify operation.

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DATE: September 21, 1983
REVISION DATE: September 21, 1983
BULLETIN NO.: III:31
PRODUCT: Model III 26-1065, 1066
SUBASSEMBLY: Floppy Drives

PURPOSE: Possible errors when checking the Raw Data pulse pair.

DISCUSSION: Potential problems have been found to occur while checking the Raw Data pulses during alignment of the internal drives. If a spring-hook type scope probe is used to attach to TP7, and the probe is set in the vicinity of the head wiring, it can cause an erroneous reading. This error can vary in certain cases from 0 to 500 ns, depending on where the probe is in relation to the head plug. If you place the oscilloscope probe or wires across the head plug, noise is induced into the head circuitry. This will cause false jitter and consequently a perfectly good drive will appear to have too much Raw Data jitter to meet specs.

PROCEDURE: Set the probe parallel to the face of the drive, dressed away from R22 to avoid interference problems.

DATE: March 22, 1984
REVISION DATE: March 11, 1985
BULLETIN NO.: III:32
PRODUCT: 26-1066 Model III
SUBASSEMBLY: ATA-1015 Tandy 65 watt Power Supply

PURPOSE: To correct problem of power supply going into current limiting and the Model III appearing dead.

DISCUSSION:

The Tandy 65 watt power supply incorporates a current limiting mode. This current limiting mode shuts down the supply in the event that the unit draws too much current. The 65 watt power supply is overly sensitive to current load and may shut down without there being a problem with the Model III. To correct this, values of two resistors need to be changed. This will increase the amount of current the 65 watt power supply may draw. Additionally, R-15 (Variable Pot) may not be making proper contact or may be defective. To correct this problem, the pot needs to be changed to a network of resistors.

**** Compliance With This Bulletin Is Mandatory ****

PROCEDURE:

R-21 must remain a 220 ohm resistor.

Change R7 from 4.7k ohm to 1k ohm and change R35 from 47 ohm to 68 ohm.

Remove R-15 and install two (2) 510 ohm resistors, joining them where the center tap on the trim pot was. Check the 5 volt line (V1) for a tolerance of 4.95 to 5.25 volts. To trim the power supply, an additional 1k resistor may be used. To raise the output, locate R14 and install the 1k resistor across the 510 ohm resistor closest to R14. To lower the output, locate R16 and install the 1k resistor across the 510 ohm resistor closest to R16.

The fix kit needed for this modification may be ordered as:

Catalog # 26-1080

Part # AXX-7098

All units should be checked for these modifications.

Please note that only the power harness modification and not the resistor modifications apply to Astec power supplies.

DATE: March 8, 1985
REVISION DATE: March 8, 1985
BULLETIN NO.: III:33
PRODUCT: 26-1066 Model III
SUBASSEMBLY: AX-9574 Gate Array Drive Logic

PURPOSE: Modification to eliminate errors when stepper is put into low current mode.

DISCUSSION: When the stepper motor is not actually stepping, the Gate Array IC on the drive logic board places the stepper in low current mode so as not to cause excessive power drain on the system. This is done by removing power to two of the phases of the motor. It has been found that in doing this the stepper may drift off track causing problems during the next read or write. This has been remedied by adding a piggy-back chip to the gate array which causes power to be removed from all phases of the stepper between seeks.

PROCEDURE:

- 1.) Replace the Gate Array IC (U3) with the modified Gate Array IC. The modified IC can be identified by a 7416 piggy-backed on top of it. This IC is available from National Parts under:
Part# MX-2983 Catalog# 26-1069A
- 2.) Test the drive completely to verify proper operation.

DATE: May 1, 1985
REVISION DATE: June 18, 1985
BULLETIN NO: III:34
PRODUCT: 26-1061/2/3/5/6 Model III
SUBASSEMBLY: ATA-1055 Astec 38 watt switching power supply

PURPOSE: To aid in the repair of the Astec 38 watt power supply.

DISCUSSION:

Failures of the 38 watt power supply can usually be traced down to one or two components which are readily available and inexpensive to replace.

The most common failure is with the fusible resistor R25. This 2 ohm, 2 watt resistor is designed to act as a fuse and open should excessive current flow through the input filter.

Another common failure is with the bridge rectifier DB1. DB1 converts the A.C. voltage off the line into rapidly pulsating D.C. Should one of the diodes within this component short, excessive current would cause the fusible resistor R25 to open.

Transistor Q2 is the main switching transistor. Each cycle of operation brings this transistor into saturation (maximum current flow), so a failure here is not too uncommon.

Along with transistor Q2, R10 is also in the primary circuit. R10 is a current sensing device. Should excessive current flow through R10, transistor Q1 would turn on, which in turn turns off Q2, shutting down the power supply. This is the over current protection and regulatory circuitry. Should Q2 fail by shorting, R10 will burn.

If the power supply "chirps", it is working but the over voltage protection circuit is being activated shutting the system back down. Should the 5 volt output exceed approx. 5.8 volts, zener Z1 will conduct turning on SCR1. When SCR1 turns on, a direct short across the +12 volt output forces excessive current to flow through Q2 on the primary side. This excessive current will be sensed by R10 and the over current protection would be activated.

***** CAUTION *****
***** DANGEROUSLY HIGH VOLTAGES ARE PRESENT *****
***** ALWAYS USE AN ISOLATION TRANSFORMER *****
***** WHEN ANY POWER SUPPLY IS UNDER TEST *****

PROCEDURE:

- Step 1: With an ohm meter, check the resistance of R25 and replace if found open. Do not apply power yet until reason for failure has been found. (see step 2)
- Step 2: With an ohm meter, check all four diodes within DB1. If any are found shorted, replace DB1. If any diode within DB1 has shorted, R25 is sure to burn open.
- Step 3: Check transistor Q2 for a short or open across the collector-emitter. This is the most common type of failure. Also check the resistance of R10 for .75 ohms. If Q2 shorts it may cause R10 to burn open.
- Step 4: Listen for power supply "chirping". Examine cables for shorts. Check for shorts across any of the outputs. Should transistor Q3 or Q1 fail, there would be no +5 volt regulation, the output of the +5 volts would rise triggering SCR1. Replace as needed Q1, Q3, SCR1, Z1.

Common Parts List:

R25	2 ohm, 2 watt resistor	ARX-0251	Catalog 26-1062
DB1	200 volt PIV bridge rectifier	ADX-1709	Catalog 26-1062
Q2	2SC-2502 transistor	2SC2502	Catalog 26-1062
R10	.75 ohm, 1/2 watt resistor	AN-0196EEC	Catalog 26-1160
Q3	B561 transistor	MX-3106	Catalog 26-1062
Q1	D467 transistor	MX-4331	Catalog 26-1062
Z1	5.8 volt zener diode	ADX-1633	Catalog 26-1062
SCR1	GE-8252 rectifier	ADX-1642	Catalog 26-1062

DATE: November 19, 1985
REVISION DATE: November 19, 1985
BULLETIN NO: III:35
PRODUCT: 26-1061/2/3 Model III
SUBASSEMBLY: AXX-0507 CPU PCB

PURPOSE: To allow system to initialize properly when used with Network 4.

DISCUSSION: When a Model III is modified to be used in a Network 4 system, the Network 4 transporter board is interfaced via the I/O bus. The Model III I/O bus does not allow the reset signal to be gated thru on power up, thus not properly initializing the transporter board and possibly causing X1 errors, lockups on initialization, and other transmission errors. In order to remedy this problem the buffer for the reset signal to the I/O bus must be permanently enabled.

PROCEDURE:

- 1.) Cut pin 1 of IC U103 on the CPU away from the board.
- 2.) Jumper U103 pin 1 (the pin just cut) to U87 pin 7 (ground).
- 3.) Test the unit with Network 4 diagnostics and in a Network 4 system in order to verify proper operation.