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04/03/86

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DATE: February 26, 1982

REVISION DATE: February 21, 1983

BULLETIN NO.: I:1

PRODUCT: 26-1140/1/2 Expansion Interface

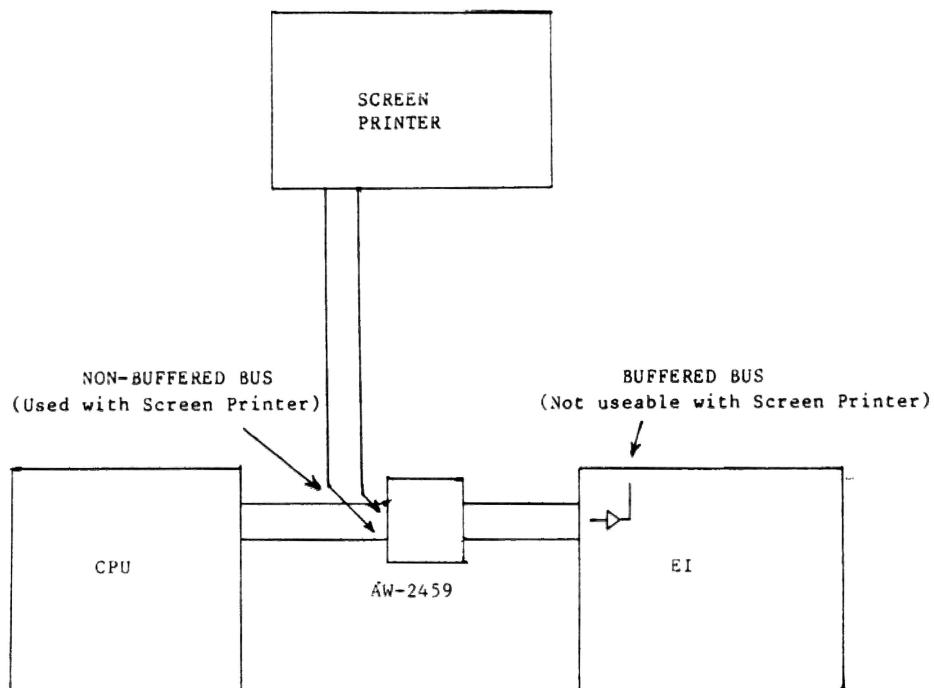
SUBASSEMBLY: AXX-0101 Late Rev. E.I. PCB.

PURPOSE: Enable screen printer to read video RAM from redesigned Expansion Interface expansion port.

PROCEDURE/DISCUSSION:

The Expansion Interface expansion port J3 on the late revision PCB has address buffers on-board to correct problems of loss of memory or disk rebooting. These buffers prevent the screen printer from accessing the Bus, which is required during printing.

A "flat" cable with an additional expansion bus connector, that bypasses the buffers, for the Screen Printer is available from National Parts. The part number is AW-2459 under catalog 26-1151.



DATE: October 26, 1979

REVISION DATE: February 21, 1983

BULLETIN NO.: I:2

PRODUCT: 26-1145 RS-232C

SUBASSEMBLY: AXX-0326

PURPOSE: Later version of baud rate generator IC (U10) on the RS-232 board.

PROCEDURE/DISCUSSION:

The later version of the baud rate generator IC, BR-1943 (Nat'l Parts # AMX-3921 26-1145), does not require a -5 volt supply.

The early version, BR-2941, requires -5 volts. R10, R11 and C9 supply -5 volts to the BRG. The later style IC does not require these components, however, removal of R10, R11 and C9 is not necessary when replacing BR-2941 with BR-1943.

DATE: May 15, 1978

REVISION DATE: February 21, 1983

BULLETIN NO.: I:3

PRODUCT: 26-1151 Screen Printer

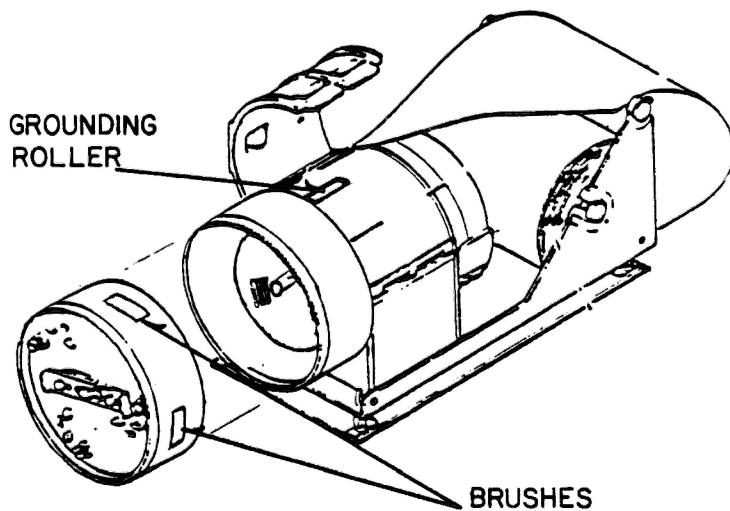
SUBASSEMBLY: N/A

PURPOSE: To cure and prevent unclear printing, and screen printer unrolling the entire roll of paper.

PROCEDURE/DISCUSSION:

Periodic cleaning of the screen printer with a small wire brush keeps the printer brushes from becoming clogged.

Causes of the screen printer unrolling the entire roll of paper are due to power surges or dropouts. Turning the screen printer off after usage eliminates the chances of this problem occurring.



DATE: June 25, 1979

REVISION DATE: February 21, 1983

BULLETIN NO.: I:4

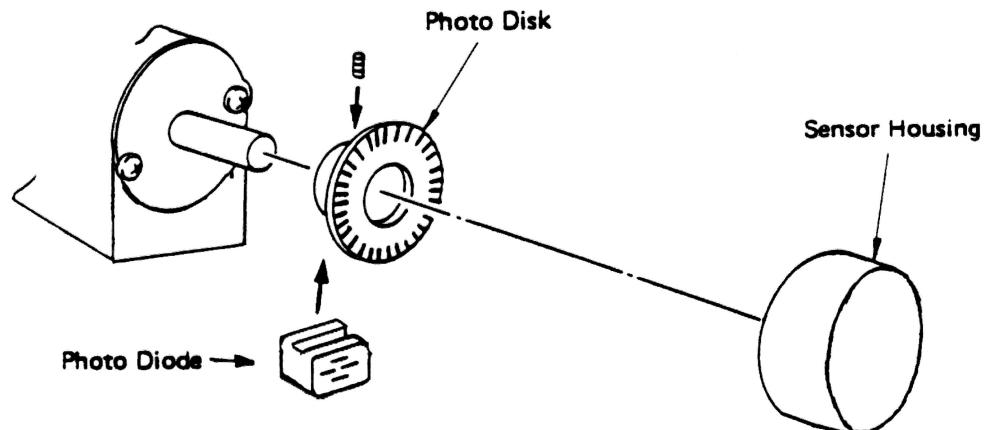
PRODUCT: 26-1151 Screen Printer

SUBASSEMBLY: N/A

PURPOSE: To correct centering of text printed on paper.

PROCEDURE/DISCUSSION:

Under the cover of the screen printer is a timing wheel, attached to the drive shaft, and a light sensor that synchronizes the printer mechanism. Loosening of the set screw will allow repositioning one way or the other of this thin disk to adjust the print position of the text.



DATE: June 29, 1979

REVISION DATE: February 25, 1983

BULLETIN NO.: I:5

PRODUCT: 26-1151 Screen Printer

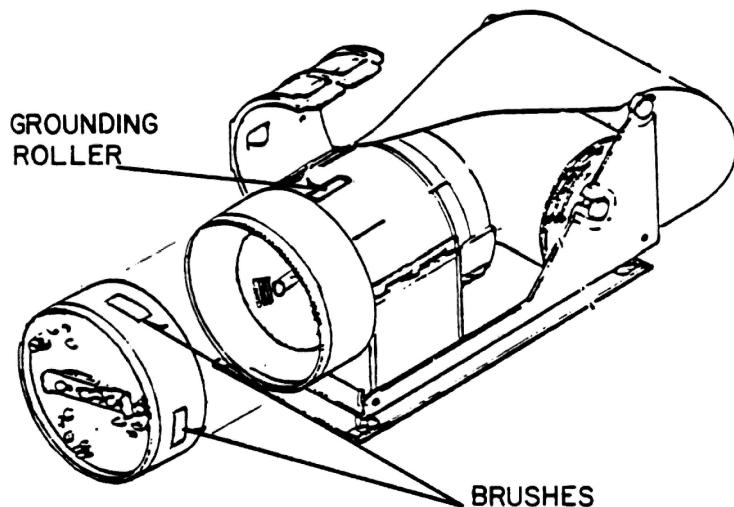
SUBASSEMBLY: N/A

PURPOSE: To prevent or cure weak print, lack of completely printed characters, and/or tractor tracks being printed across the center of the paper.

DISCUSSION: There are two types of paper supplied for the screen printer: "thick" paper and "thin" paper. The problems have been associated with the "thin" paper, although these same problems have been found with the "thick" paper as well.

PROCEDURE: To correct the weak print and/or lack of completely printed characters, carefully bend the three sets of print brushes up to just under the window of the print head. This will apply more pressure to the paper during a print operation.

A correction for the tractor tracks being printed across the center of the paper is to replace the grounding roller or polish it with crocus cloth or a fine-grade emory cloth until the pattern can not physically be seen on the roller. This condition is caused by the non-conductive build-up of the print pattern on the ground roller. Be sure the roller is polished free of scratches to prevent a recurrence of this build-up.



DATE: September 21, 1979

REVISION DATE: February 25, 1983

BULLETIN NO.: I:6

PRODUCT: 26-1006 Model I CPU

SUBASSEMBLY: AXX-0008

PURPOSE: To enable screen printer to work with Expansion Interface having Twisted-Pair modification.

DISCUSSION:

The screen printer is the only peripheral device used by the TRS-80 Model I which uses Direct Memory Access (DMA). What this means is that when the switch on the front of the screen printer is depressed, the control of the address and data lines is taken away from the Z80 microprocessor and is given to the screen printer logic circuitry. The screen printer will then sequentially address all of the video ram locations to obtain the same information that is currently being displayed on the video monitor.

On the CPU, (refer to Fig. 1), the signal RAS* goes through non-inverting tri-state buffer Z72. When pin 1 of Z72 is low, RAS* will pass through. If pin 1 is high, the output of these buffers will have a high impedance state, be "turned off", and will not pass any signals.

Anytime the screen printer is printing, pin 1 of Z72 is high, and RAS* will not pass from pin 4 to pin 5 of Z72. With no expansion interface connected or with expansion interface and just the buffered cable connected, this line has the electrical appearance of being low when pin 1 is high. When the twisted pair modification is installed, this signal gets pulled high by the "pull-up" resistor on the expansion interface board. The same "pull-up" resistors are used with the buffered cable, but RAS* is buffered and, at the CPU, still is low at Z72 Pin 5.

In the address decoding section, (refer to Fig. 2), AND gate Z73 has two inputs; A15 on pin 4, and RAS* on pin 5. The output of Z73 pin 6 is the enable for address decoder Z21. Z21 is enabled by a low at G1 and G2. In order for a low to come from pin 6 of Z73, pins 4 and 5 must both be low. If the decoder is not enabled, video memory will never be selected.

So if the output of pin 1 of Z72 (Fig. 1) is pulled high, making RAS* high, pin 5 of Z73 (Fig. 2) will be high and no video addresses will be decoded. And when pin 1 of Z72 is low, all address buffers are enabled.

PROCEDURE:

The correction is to cut the trace on the component-side of the CPU board going to pin 1 of Z72. Solder a wire from pin 1 of Z72 to pin 8 of Z72 (ground). This will leave pin 1 of Z72 always grounded or low.

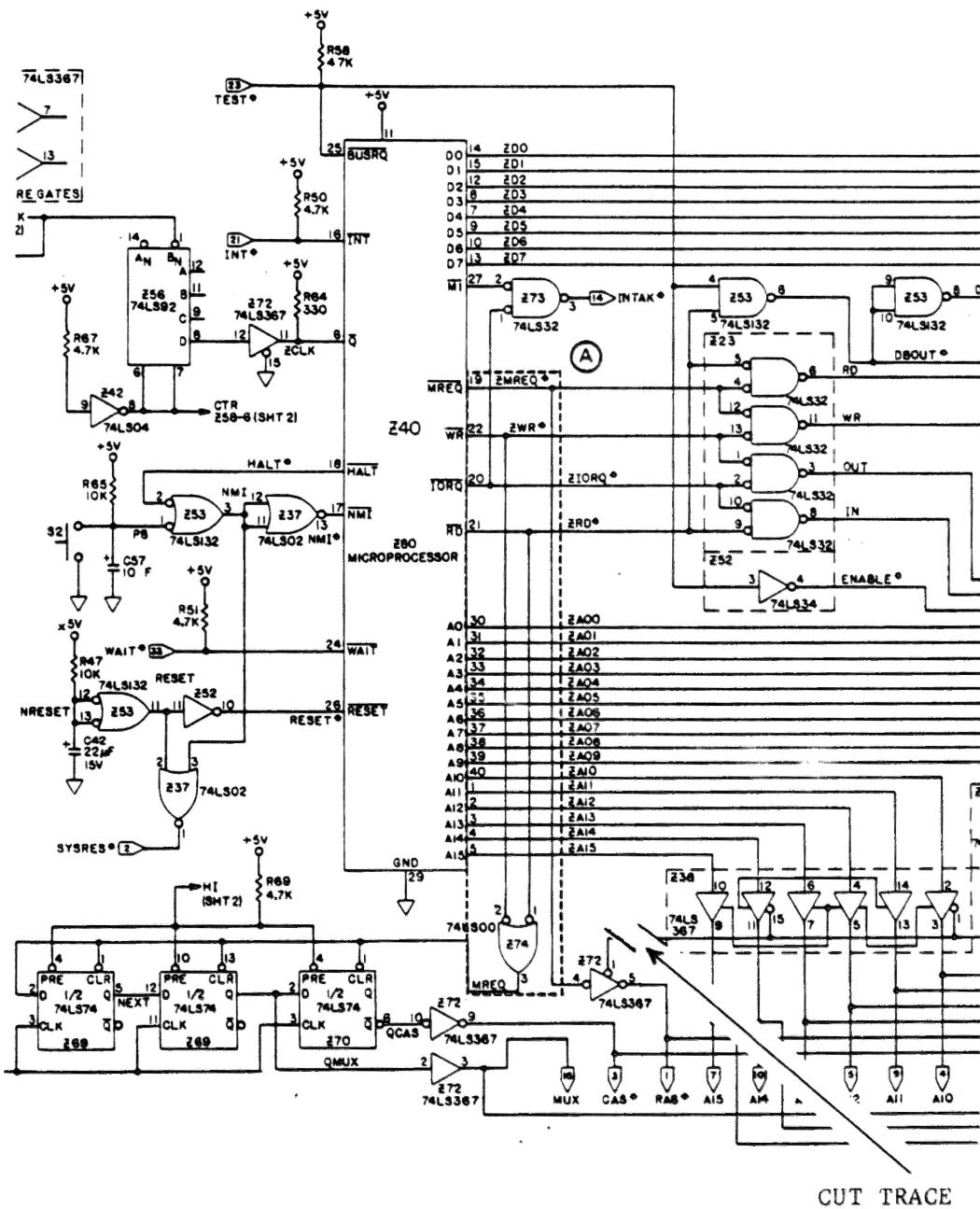


Figure 1

Radio Shack®

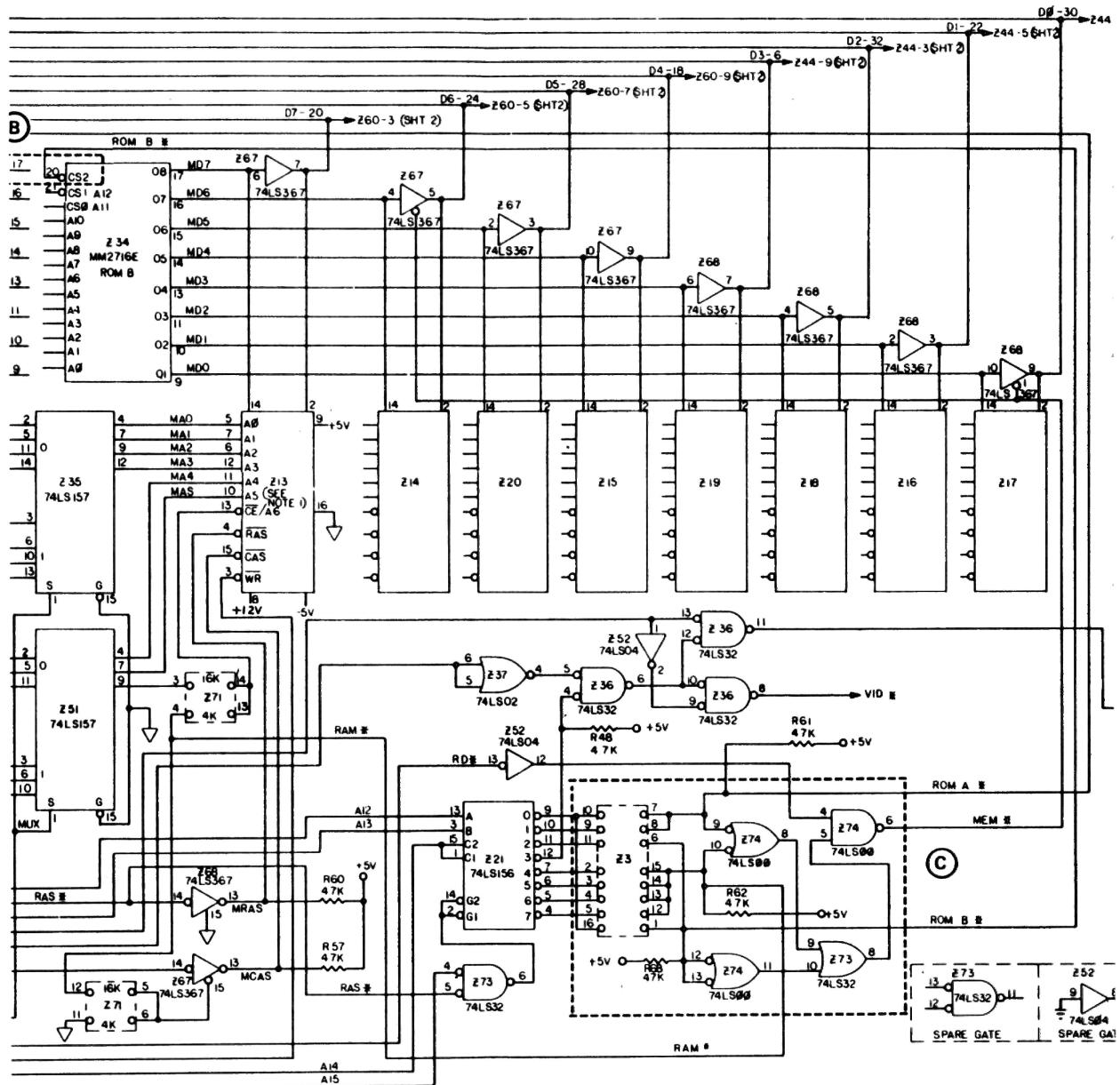


Figure 2

DATE: August 31, 1978
REVISION DATE: February 28, 1983
BULLETIN NO.: I:7
PRODUCT: 26-1160/1 Shugart Drive
SUBASSEMBLY: AXX-0300

PURPOSE: Erroneous errors on disk and lost data during write which could be caused by dipshunt configuration.

DISCUSSION:

On the drive logic board there is a 14 pin dipshunt which is used to configure the different options of the disk drive. With shunt 1-14 closed the head will load when the drive select is brought to an active low. With shunt 1-14 open and 7-8 closed the head will load with the motor on signal regardless of the state of the drive select. Shunts 2-13, 3-12, and 4-11 are used to determine the drive number for that particular drives select. The Radio Shack system however uses the drive interconnecting cable to determine drive numbers, so these shunts should all be closed. Having shunt 5-10 open enables the input/output lines for multiple drive systems. Shunt 6-9 is not used and has no connections.

Due to Radio Shack's drive select system there needs to be a jumper wire connecting all of the drive select signals together. This way any drive can be used in any slot of the interconnecting cable.

PROCEDURE:

The correct shunt configuration is:

1	---	---	14	open
2	-----	-----	13	closed
3	-----	-----	12	closed
4	-----	-----	11	closed
5	---	---	10	open
6	---	---	9	not used
7	-----	-----	8	closed

Jumper J1 pin 32 to J1 pin 10 on the drive PCB.

On most PCB's there is a 12 pin dipshunt in the 14 pin socket with 1-14 empty, 5-10 and 6-9 cut.

DATE: September 27, 1979

REVISION DATE: March 1, 1983

BULLETIN NO.: I:8

PRODUCT: 26-1145 RS-232C

SUBASSEMBLY: AXX-0306

PURPOSE: To prevent or cure intermittent connector contact.

DISCUSSION:

The Model I RS-232 board does not plug into the Expansion Interface, it simply rests on a Teledyne connector. This type of connector specifies the use of a solder housed surface. If the mating surface is not soldered, then poor or intermittent connections may result, aggravated by vibration or contraction/expansion due to thermal cycles. When the PCB is not properly aligned or seated, on the connector, the RS-232 may cause varying problems.

PROCEDURE:

With any intermittent problem with the RS-232, first try reseating the board on the Expansion Interface connector ensuring proper alignment.

If problem still exists use a soldering iron and flow solder the connector pads on the RS-232 PCB. Start at the edge of the board with each pad and move toward the center of the board. Try to maintain the height of the solder as uniformly as possible, and be careful not to solder bridge any of the fingers. On the inside and outside connector fingers, remove any excessive solder buildup with solder wick. This is to insure that the connector will seat properly. After the soldering clean the connections with flux remover, being careful to avoid any plastic parts.

After the above procedure has been done to the RS-232 PCB, it should also be done to the Expansion Interface's side of the RS-232 connection. Remove the EI PCB from the case and remove the 42 pin RS-232 connector plug from the EI PCB. Follow the above procedures with flow soldering and flux cleaning to the connector pads on the EI PCB.

Reassemble the Expansion Interface, with connector and RS-232 PCB, and run the RS232D diagnostics to check for proper operation.

DATE: February 7, 1979

REVISION DATE: March 1, 1983

BULLETIN NO.: I:9

PRODUCT: 26-1160/1 Shugart Disk Drive

SUBASSEMBLY: AXX-5001

PURPOSE: To cure seek errors caused by restricted movement of head assembly.

DISCUSSION:

The read/write head of the Shugart 5 1/4" drive uses two rods to guide it along the diskette. If any foreign matter or burs of any kind are on these rods the read/write head will not move freely.

PROCEDURE:

Remove the guide rods and polish them with crocus cloth. Do not use anything more abrasive than crocus cloth, such as emery cloth. After polishing, clean the rods with rubbing alcohol, allowing time to dry before installing back into the drive. Do not use any lubricant because it will collect foreign matter and eventually gum up the rods.

DATE: February 8, 1979
REVISION DATE: March 1, 1983
BULLETIN NO.: I:10
PRODUCT: 26-1004/6 Model I CPU
SUBASSEMBLY: AXX-0008 with Level II (3 chip ROM)

PURPOSE: To correct Basic's READ statement from repeatedly reading the first DATA variable.

DISCUSSION/PROCEDURE:

Early Level II ROM's (3 chip), had a power up problem with initializing causing the Basic statement, READ, to repeatedly read only the first data variable. There are three corrections that will work to solve this problem.

1. After power up type POKE 16553,255
2. Replace the ROM with the latest version. (Nat'l Parts # AXX-0007 26-1006)
3. Mix the RAMs with different manufactures (half Motorola and half NEC, or some Mostek and TI).

DATE: April 18, 1979
REVISION DATE: March 1, 1983
BULLETIN NO.: I:11
PRODUCT: 26-1160/1 Shugart Drive
SUBASSEMBLY: AXX-0301 Assembly No. 25129

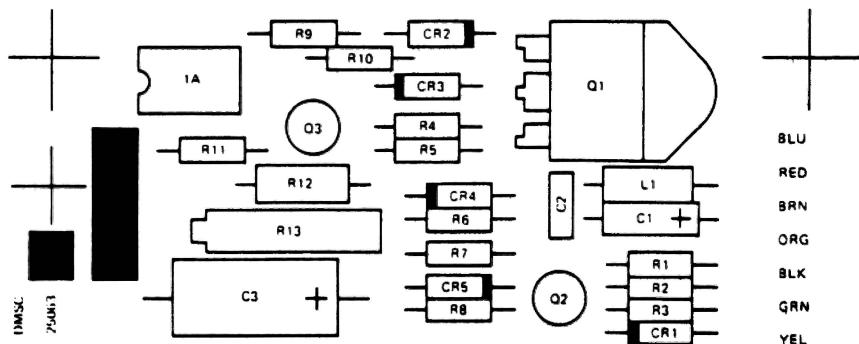
PURPOSE: To correct motor speed drift of Disk Drive.

DISCUSSION:

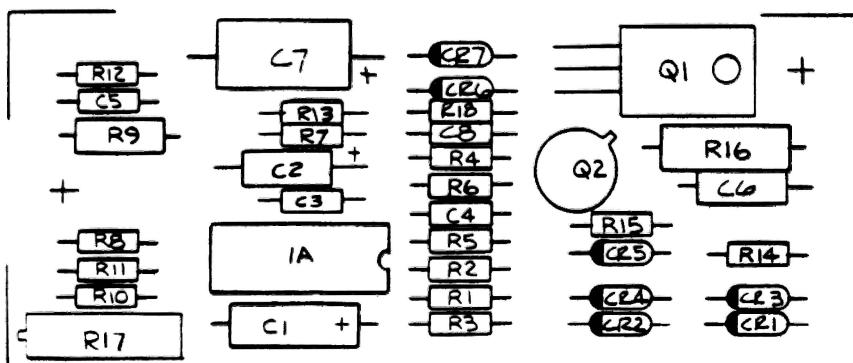
Some Disk Drive units manufactured during the period of 12/15/78 to 2/23/79 may exhibit spindle motor speed drift problems. The problem is caused by an unstable capacitor, C2, on the motor control PCB. There are two assembly versions for the motor control PCB, No. 25129 and No. 25063. Refer to figure 1 for PCB component location layout. The problem assembly (No. 25129), can be identified by a vertically mounted speed adjust potentiometer (R17), in the lower left corner.

PROCEDURE:

If C2 on this PCB is a glass capacitor, then it should be replaced with a .015 ufd +-2% 50 volt mylar capacitor (Nat'l Parts# ACC-153GJMA 26-9999C).



**COMPONENT LOCATIONS
MOTOR CONTROL PCB ASSEMBLY 25063**



COMPONENT LOCATIONS
MOTOR CONTROL PCB ASSEMBLY P/N 25129

Figure 1

DATE: April 25, 1979
REVISION DATE: March 7, 1983
BULLETIN NO.: I:12
PRODUCT: 26-1140/1/2 Expansion Interface
SUBASSEMBLY: AXX-0100 and AXX-0008

PURPOSE: Buffer cable and Twisted-Pair cable installation instructions.

DISCUSSION:

The following are the procedures for installing the Buffered cable and the Twisted-Pair cable. These modifications are to correct system noise on the CAS, RAS, and MUX lines which could cause random reboots or memory crashes. These instructions incorporate some fixes for problems that have shown up after other installations. This Technical Bulletin covers installation of both modifications. If you install the Buffered cable, you MUST install the Twisted-Pair. If you have a Buffered cable already installed, goto the Twisted-Pair modification.

PROCEDURE:

BUFFERED CABLE INSTALLATION

Procedures for Component Side of Board (see Figure 1)

1. Cut the MUX etch at points (1) and (2), above pin 23 of the Edge Connector and below pin 1 of Z17 respectively.
2. Cut the etch at point (7) between pins 37 and 39 of the Edge Connector.
3. Cut the etch at point (8) between pin 37 and point (G).
4. Connect pin 39 to point (G) with a 3/16" bare wire.
5. Connect pin 37 to point (H) with a 2 1/2" jumper wire.

Procedures for Copper Side of Board (see Figure 2)

1. Cut the CAS etch at points (3) and (4), near pin 2 of the Edge Connector and below pin 4 of Z24.

2. Cut the RAS etch at points (5) and (6), above pin 2 of the Edge Connector and below pin 1 of Z43.
3. Prepare three pairs of 220 ohm resistors. Cut one lead of each of the six resistors to 1/4". Allow 1/8" and bend the lead into a right angle, then solder them together into pairs (see Detail A).



DETAIL A

4. Solder the common lead of the resistor pairs to:

Point (B), pin 1 of Z17 (MUX)
Point (D), pin 4 of Z24 (CAS)
Point (F), pin 12 of Z22 (RAS)

5. Of the remaining leads of each resistor pair, solder one lead each to the nearest +5V and the other to ground.

TWISTED-PAIRS INSTALLATION

Procedure for Expansion Interface board (see Figure 2)

1. If Buffer Cable modification above has just been installed proceed to step 3. If Buffer Cable was already in unit proceed to step 2.
2. Cut the White-Black, Blue-Black, and Red-Black twisted wires where they connect to the resistors pairs. Then cut the same wires at points (A), (C), (E), and the common ground. Discard these wires when finished.
3. Select the cable with the male DIN connector and connect the twisted wire pairs as described below.
4. Connect the Red-Black wire pair to:

Red wire to point (B)
Black wire to ground

5. Connect the White-Black wire pair to:

White wire to point (F)
Black wire to ground

6. Connect the Green-Black wire pair to:

Green wire to point (D)
Black wire to ground

7. Route the cable along the board so it comes out beside the Edge Connector to the computer.

8. To prevent possible shorts from IC pins pressing through the cable's shield, cut the pins in the area of the cable flush with the PCB and if available, tape a thin but stiff piece of cardboard under the cable.

9. Installation on the Expansion Interface is complete. Remount the PCB in the case, being carefull not to short the exposed wires of the cable, so the DIN plug connector is alongside the CPU to EI edge connector.

Procedure for CPU Board (see Figure 3)

1. Select the cable with the female DIN connector and connect the twisted wire pairs as described below.
2. Solder the common leads (Black) of twisted wire pairs Green-Black and White-Black to point (1).
3. Solder the Green wire (CAS) to point (2).
4. Solder the White wire (RAS) to point (3).
5. Solder the common wire (Black) of twisted wire pair Red/Black to point (5).
6. Solder the Red wire (MUX) to point (4).
7. Position the CPU board back into the lower case. Route the cable towards the CPU to EI edge connector. With a wire tie, tie the cable to the nearest case standoff, this will prevent the cable from being pulled loose at a later date.

8. Position the top case so that you can route the DIN connector through the card edge cutout (you may have to work the connector through the cutout because of the close tolerance).

SYSTEM CHECKOUT

1. Position the TRS-80 and Expansion Interface in their normal operation locations.
2. Connect the Buffered cable to the TRS-80 and Expansion Interface.
3. The system should be tested with a full 48k of RAM. If needed, install some RAM temporarily for the testing procedures.
4. Connect the CPU and EI DIN plugs and run the following programs for checkout:
 - a. MEM4
 - b. DMT
 - c. FORMAT
 - d. BACKUP

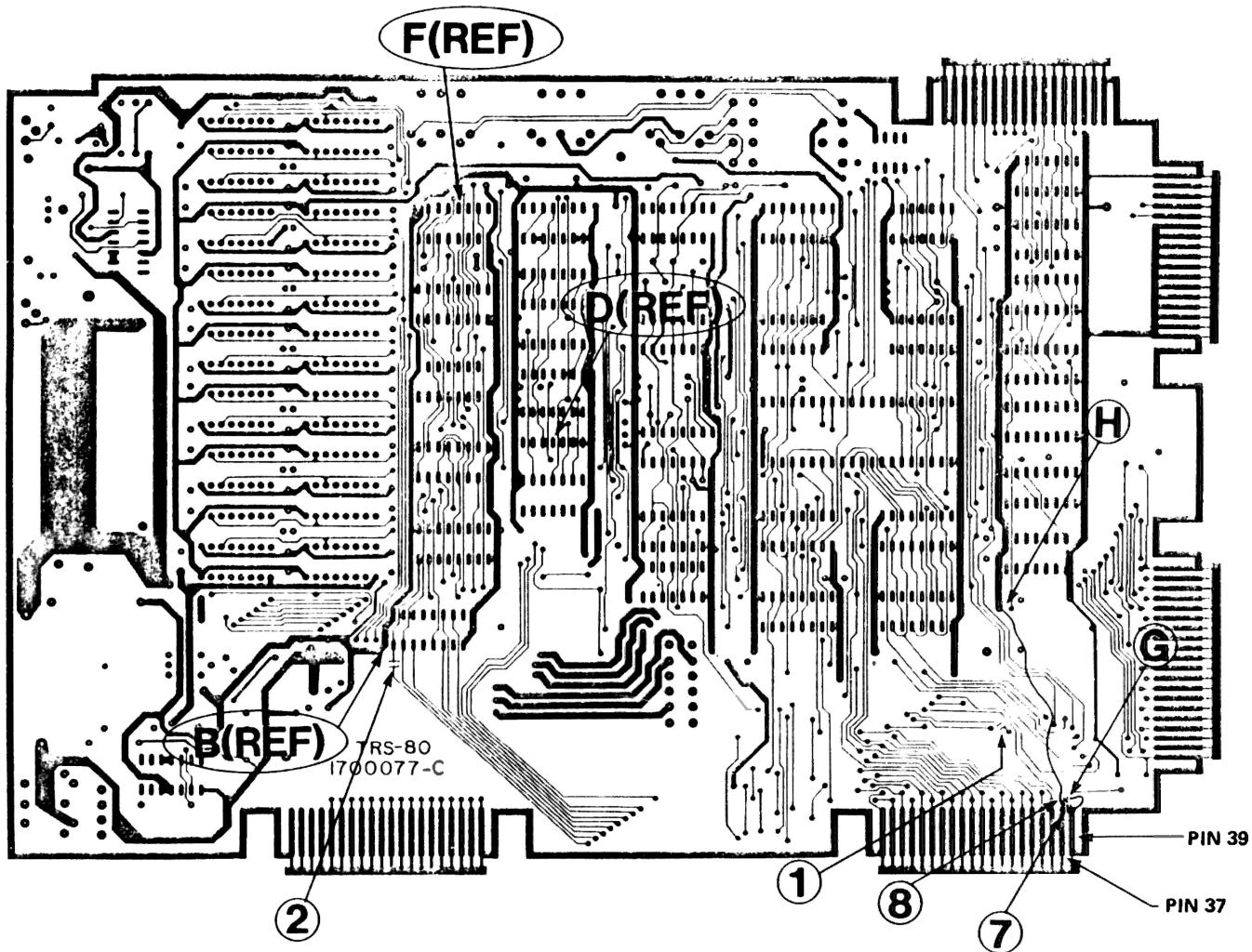


FIGURE 1. COMPONENT SIDE OF P. C. BOARD

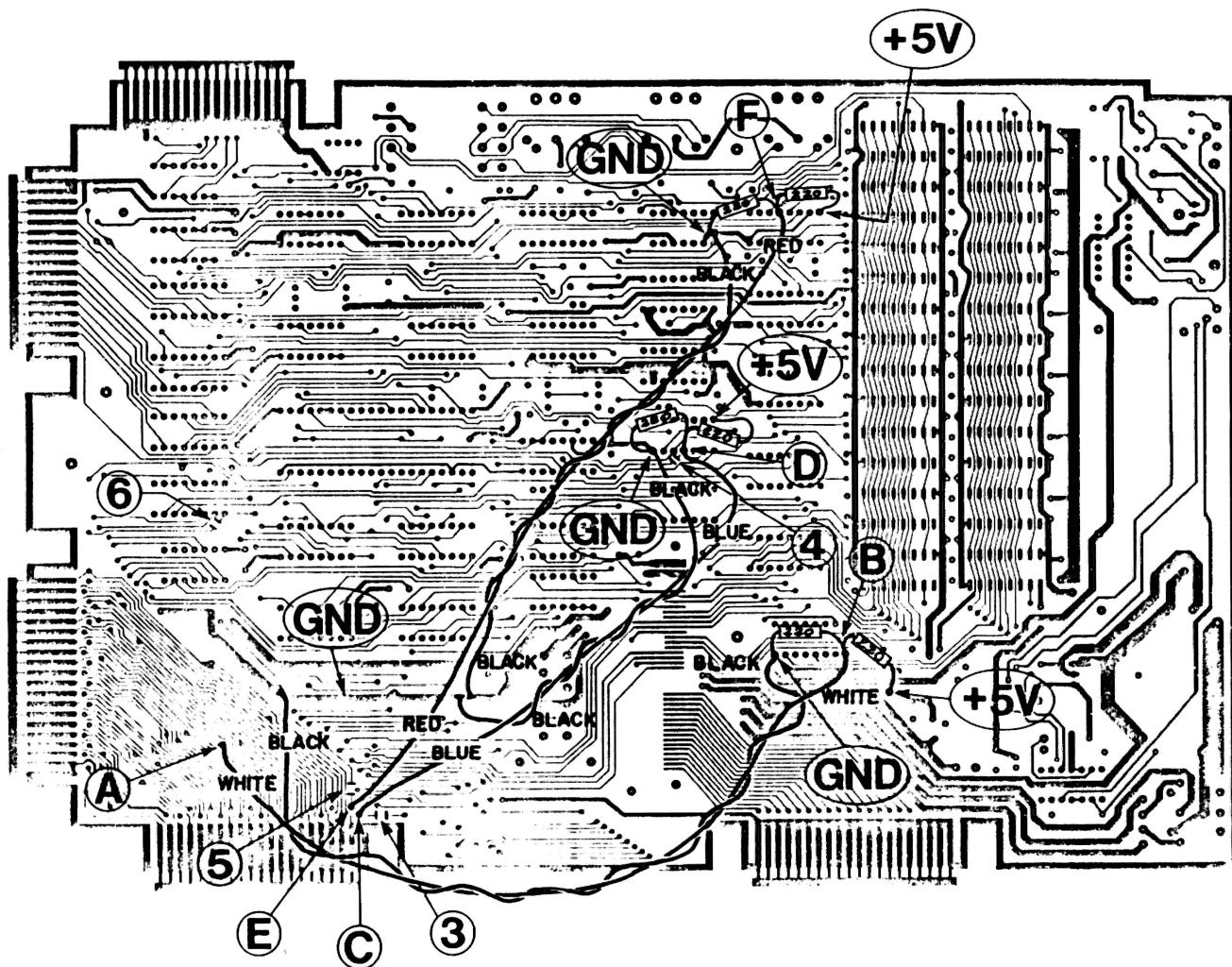


FIGURE 2. COPPER SIDE OF P. C. BOARD

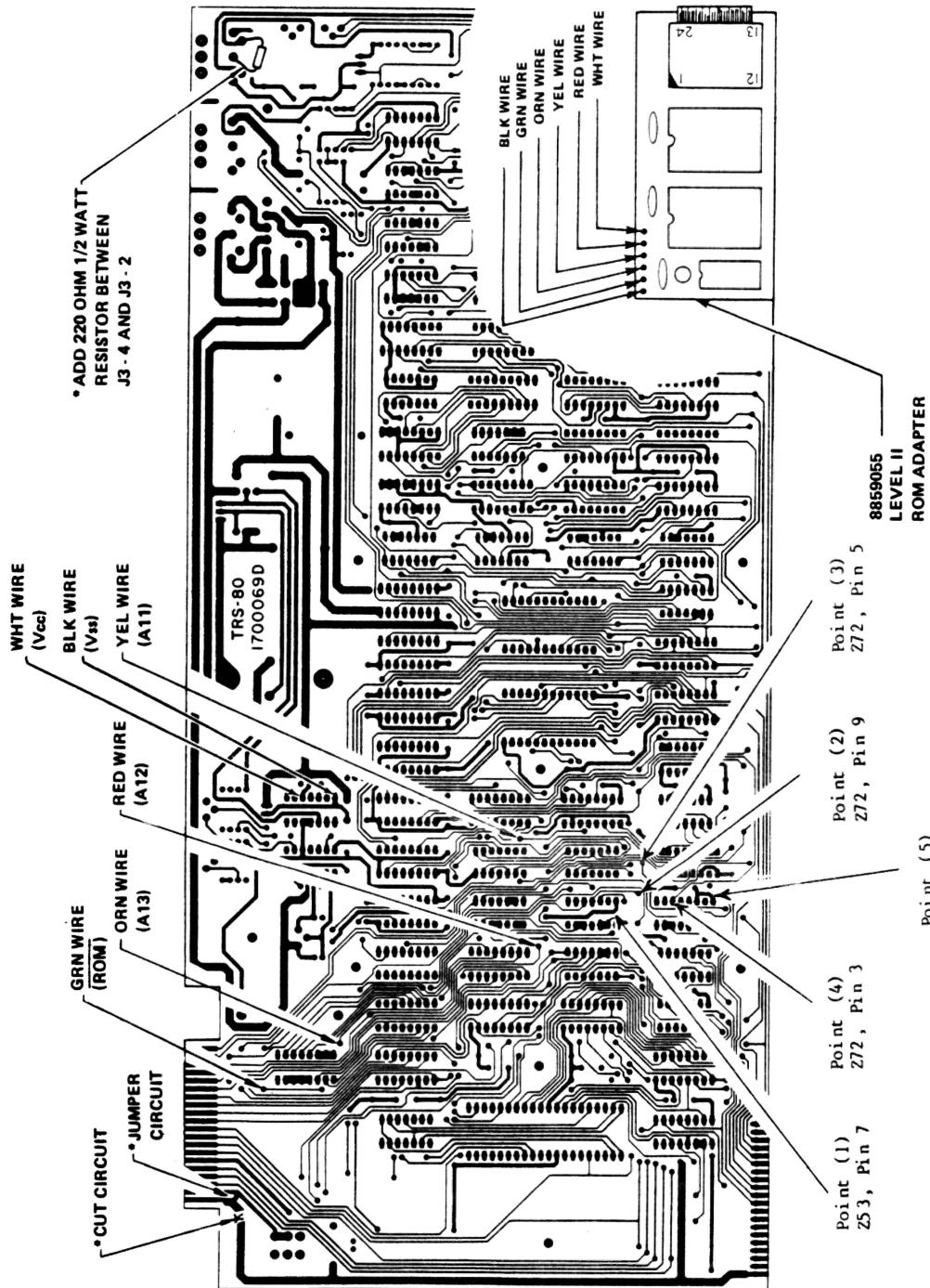


FIGURE 3. LOGIC PRINTED CIRCUIT BOARD

DATE: May 31, 1979
REVISION DATE: March 1, 1983
BULLETIN NO.: I:13
PRODUCT: 26-1205 CTR-80 Recorder
SUBASSEMBLY: Unit date code 2A9 or earlier

PURPOSE: To prevent recorder from putting glitches on tape.

DISCUSSION:

The early CTR-80 recorders, date code 2A9 or earlier, could put a glitch on the cassette tape. This could happen if the reset button on the computer is pressed or the recorder is turned on and off by inserting and removing the remote jack plug, while the unit is in the play mode.

Units with date codes greater than 2A9 have C22 changed to 33ufd as a running manufacturing change to correct this problem. However on units with date code 3A9, and starting with serial number 80741, 0.5ufd capacitors have been installed in this position. This is the WRONG value.

Note: The date code and serial number of the unit can be found in the battery compartment.

PROCEDURE:

To correct the above problem install a 10ufd 16v capacitor (Nat'l Parts# CC-106QDAP 26-9999C) across the erase head terminals on the PCB, observing correct polarity.

Refer to figure 1 for PCB layout and capacitor location (lower left corner).

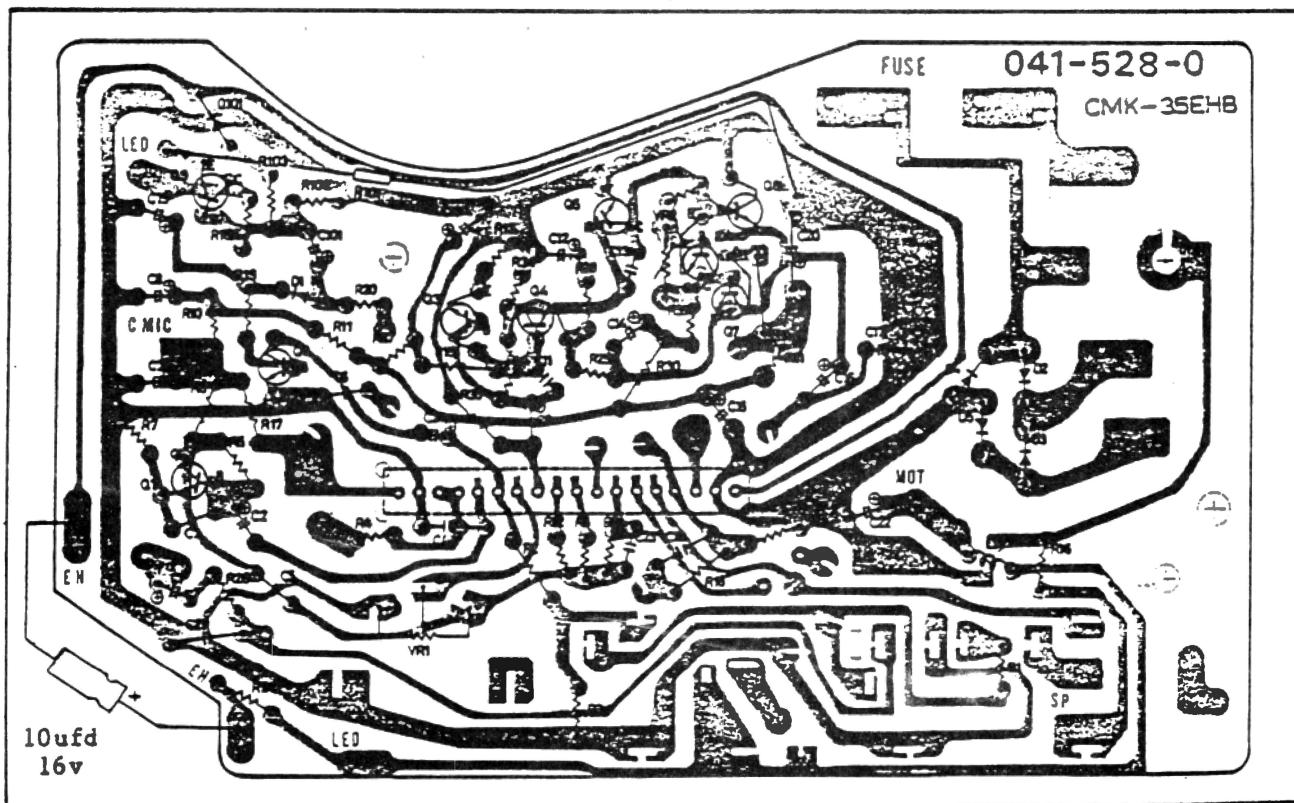
AMPLIFIER P.C.B. PARTS LOCATION — BOTTOM VIEW

Figure 1

DATE: June 29, 1979
REVISION DATE: March 2, 1983
BULLETIN NO.: I:14
PRODUCT: 26-1140/1/2 Expansion Interface
SUBASSEMBLY: AXX-0100 and AXX-0101

PURPOSE: To prevent possible Drive 0 to Drive 0 backup failure.

DISCUSSION:

During a drive 0 to drive 0 backup, the disk select circuit may time out too soon, causing the backup to fail. This problem may happen on early design EI PCB's (AXX-0100) and on late design PCB's (AXX-0101).

PROCEDURE:

Extend the drive select circuit RC time constant by doing the following:

For PCB number AXX-0100 replace R15 (200k) with a 270k ohm resistor.
For PCB number AXX-0101 replace R25 (200k) with a 270k ohm resistor.

A 270k ohm 1/4 watt resistor is part number AN-0402CEB 26-9999R.

DATE: March 22, 1983
REVISION DATE: March 22, 1983
BULLETIN NO.: I:15
PRODUCT: XRX-III Cassette Modification
SUBASSEMBLY: AXX-1002

PURPOSE: XRX-III Cassette modification instructions.

DISCUSSION:

The early Model I computers had a timing problem in the cassette operation causing the volume setting on the recorder to be very critical. The XRX-III (Cload Mod) corrects this problem allowing a broader range of volume settings. This modification should only be done to the Model I computers with the early version ROM chips. The later version ROM's have the timing correction built in. The ROM's can be identified by their power response.

EARLY ROM

MEMORY SIZE ?
RADIO SHACK LEVEL II BASIC

LATE ROM

MEM SIZE ?
R/S L2 BASIC

Refer to Figures 2 and 3 for the following discussion. The XRX-III cassette modification works on the theory of re-setting the R/S Latch, Z24, just as the OUTSIG* line would do, but before the OUTSIG* line does. In this manner, we allow for a stretched audio CASSIN signal (due to poor cassette motor speed control and high-volume stretching) and use only the edge trigger level of the CASSIN signal bit. The remaining stretched CASSIN signal is totally ignored by the CPU's test bit signal at Z44, Pin 15.

As bits are entered from tape into the TRS-80 cassette interface, precise timing of these input bits is essential. The CPU must determine the bit time, and if there was a logical "0" or a logical "1" during that bit time. Each bit time is measured in milliseconds. The rate at which this information is transferred is faster in Level II (500 Baud, or 2ms bit time) than in Level I (250 Baud, or 4ms bit time). Regardless of whether you are in Level I or in Level II, each data pulse from the cassette will measure approximately 200us under optimum equipment operating conditions.

It is these cassette data pulses that are likely to stretch out to 600us. When these pulses are in the range of 500 to 650us, there is great risk that the CPU will recognize this as a second pulse because it is close enough to the next window time.

The RXR-III is essentially a controlled inhibit signal used to halt stretched waveforms and thereby increase loading volume levels. ZA1 is dual functional. Pins 1, 2, 3, 4, 5 and 6 form a control gate with an inverted output that controls the amount of cassette pulse that is used for setting bits into the CPU. Normally, pin 2 will be at a logical low. When the first cassette pulse is received by ZA1, Pin 1; ZA1, Pin 4 will output a negative going pulse which is detected by the R/S Latch, Z24, Pin 4. This sets the R/S Latch. Z24, Pin 8 will go high and Z24, Pin 11 will go low.

Z24, Pin 8 is used to set the R/S Latch contained in ZA1. This R/S Latch is the second function of ZA1 and is formed by Pins 8, 9, 10, 11, 12 and 13. When ZA1, Pin 11 goes high, ZA1, Pin 10 goes low. ZA1, Pin 11 is used to inhibit the gate at ZA1, Pin 2. This causes ZA1, Pin 4 to go back high and remain high until ZA1, Pin 2 goes low again. Information is passed through gate ZA1, Pin 4 only when ZA1, Pin 2 is low. Control of the amount of time that ZA1, Pin 2 stays high is performed by ZA2. ZA2 is a 12-bit Binary Counter.

Because of the high stability required by the timing circuit, a highly stable clock input to ZA2, Pin 10 is used. The clock input to ZA2 comes from the TRS-80 on-board Video Section, Z65, Pin 1. ZA2 starts counting from the time that ZA1, Pin 10 goes low. This start time will follow the first cassette pulse in by approximately 110ns which is the propagation time that is allowed for getting the pulse to the counter. At this time, ZA2 will count 640 pulses of the 887 KHz clock (which, when converted, equals 721us) before resetting R/S Latch ZA1. This causes ZA1, Pin 2 to return low, allowing another cassette pulse to be transmitted through gate ZA1. This set/reset cycle continues for each cassette pulse (refer to the TRS-80 schematic for additional information).

PROCEDURE:

Refer to Figure 1 for the following procedures.

1. Place the modification PCB on the trace side in the upper right corner of the Model I Logic PCB.
2. Carefully cut the foil pattern between Z24, Pin 9 and Z4, Pin 10.
3. Connect the Red wire to Z25, Pin 14 (+5 volts).

4. Connect the Black wire to Z4, Pin 7 (ground).
5. Connect the Yellow wire to Z43, Pin 9.
6. Connect the Green wire to Z4, Pin 10.
7. Connect the Blue wire to Z24, Pin 12.
8. Connect the Violet wire to Z24, Pin 9.
9. Check all solder connections and then check operation with CSAVE and CLOAD.

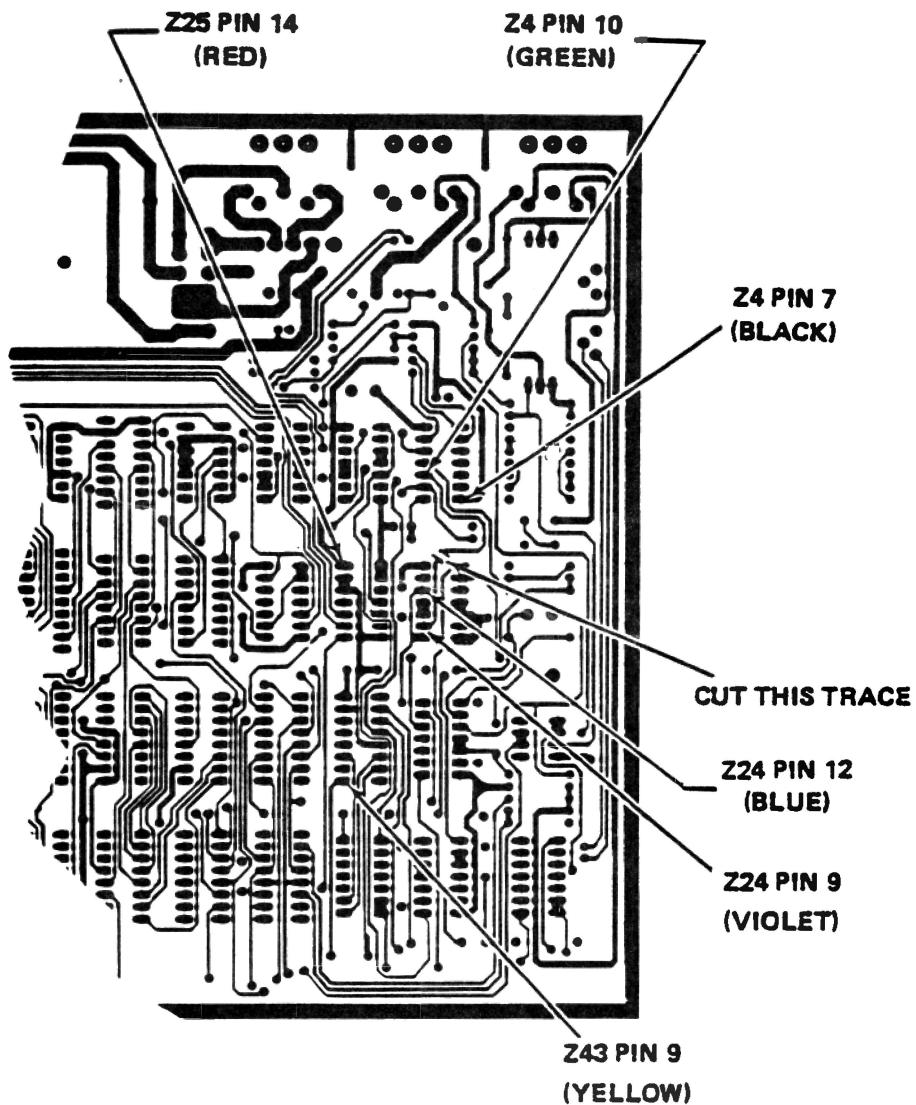


Figure 1. TRS-80 Microcomputer PCB, Bottom Side (Partial View).

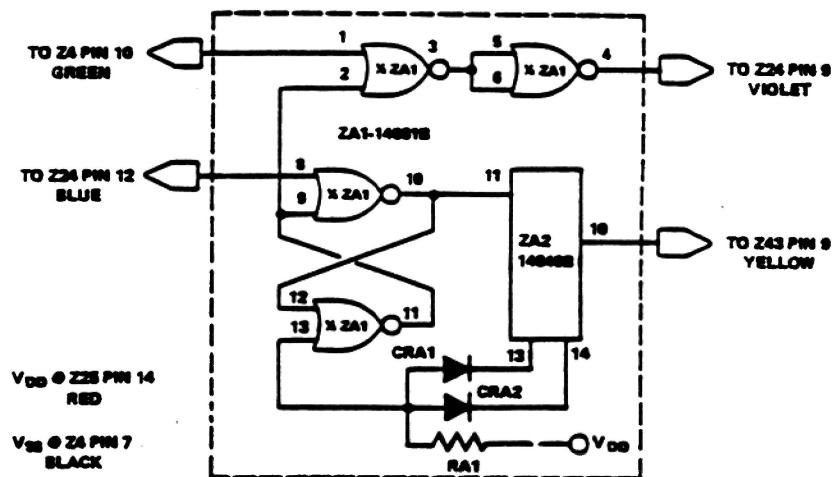


Figure 2. XRX-III Modification Schematic.

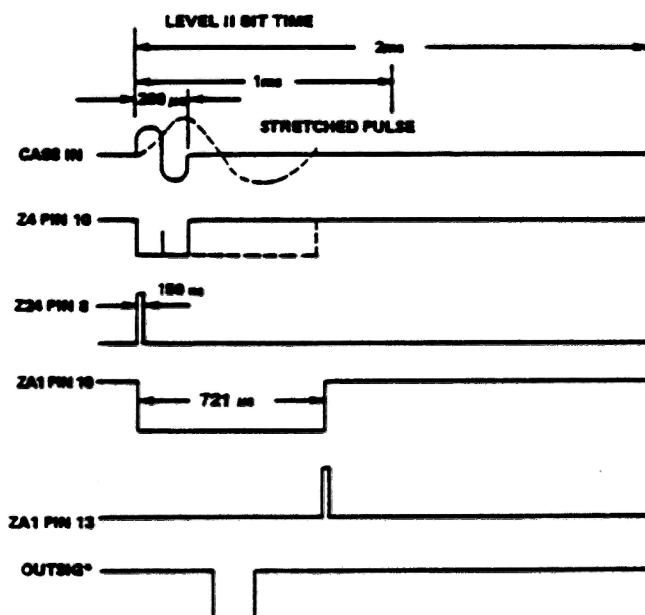


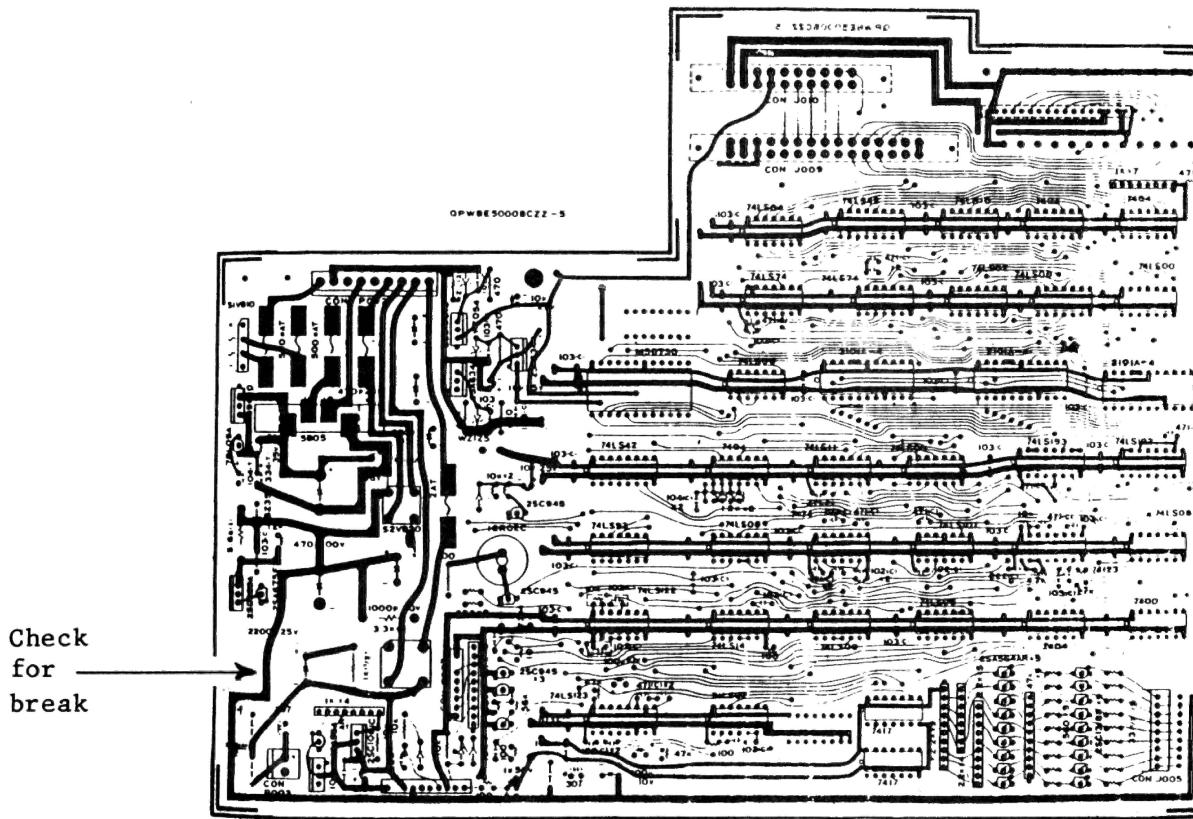
Figure 3. Timing Diagram.

DATE: September 21, 1979
REVISION DATE: March 2, 1983
BULLETIN NO.: I:16
PRODUCT: 26-1153 Quick Printer I
SUBASSEMBLY: AXX-0305

PURPOSE: Possible cause of head carriage moving but not printing.

DISCUSSION/PROCEDURE:

If the unit runs, head carriage travels, but it does not print, check for a broken -34 volt trace on the PCB next to the heat sink.



DATE: November 1, 1979
REVISION DATE: March 2, 1983
BULLETIN NO.: I:17
PRODUCT: 26-1001/3/4/6 Model I CPU
SUBASSEMBLY: Keyboard, All versions

PURPOSE: Possible correction for problems remaining after CPU logic board has been replaced.

DISCUSSION/PROCEDURE:

The keyboard is often being overlooked as a possible source of problems. The keyboard assembly contains tri-state buffers that normally short address to data lines only when the keyboard is decoded. If these buffers become intermittent, they may short the address and data lines when other CPU sections are being accessed, causing random or fatal problems.

DATE: December 20, 1979
REVISION DATE: March 3, 1983
BULLETIN NO.: I:18
PRODUCT: 26-1160/1/4 Disk Drives
SUBASSEMBLY: AXX-0600 Power Supply

PURPOSE: Possible correction for intermittent or unreliable operation of the Disk Drive.

DISCUSSION:

There are three problems with the early Disk Drive power supplies that could cause intermittent or unreliable operation.

1. Disk errors caused by noise introduced on the disk drive chassis; the noise on the chassis couples into the drive circuitry, resulting in excessive data jitter. The problem is most noticeable on drives that have been properly aligned, yet still exhibit lost data during read and disk I/O errors.
2. Intermittent non-traceable errors caused by improper heat-sinking of the 7805 5 volt regulator. If 100% of the back of this regulator is not heat-sinked, the internal thermal cut-off will vary the regulator output voltage from approximately 2 volts to 5 volts.
3. Disk errors caused by AC line spikes getting through power supply.

PROCEDURE:

1. To correct problem one, connect the logic ground to the chassis ground. Do this by attaching a wire from the PCB power supply connector's ground (middle pins) to the grounding lug of the motor control PCB.

2. To correct problem two, replace the nylon screw which mounts the regulator to the chassis with a metal screw and an insulator. The nylon screw tends to stretch with heat causing a loose fit to the chassis. Be sure to keep the regulator insulated from the chassis as this could cause a short.
3. To correct problem three, ground the chassis of the drive. This can be done by replacing the older two-wire transformer with the newer three-wire grounded transformer (ATA-0794 26-11601). This transformer has a purple ground wire which is to be attached to the ground lug on the motor speed control board.

DATE: January 3, 1980
REVISION DATE: March 3, 1983
BULLETIN NO.: I:19
PRODUCT: 26-1160/1 Tandon Disk Drive
SUBASSEMBLY: AXX-5010

PURPOSE: To correct belt slipping off drive mechanism.

DISCUSSION/PROCEDURE:

Some Tandon drives may have the belt reversed. The proper orientation is: Smooth rubber-like side goes down, fabric-like side goes up. If belt was reversed, stretching may have resulted and a new belt (Nat'l Parts# AB-6443 26-11601) may be required if it continues to dislodge itself.

DATE: February 20, 1980
REVISION DATE: March 3, 1983
BULLETIN NO.: I:20
PRODUCT: 26-1004/6 Model I Level II
SUBASSEMBLY: AXX-0008

PURPOSE: To correct 'GARBAGE' on screen during power-up or reset without Expansion Interface connected.

DISCUSSION:

Some Level II computers would power-up with garbage on the screen which could be solved by holding the 'BREAK' key down during power-up. This problem is due to the power-up sequence checking for the Expansion Interface. Without the EI connected the data buffers (Z55, Z75, Z76) are in a floating state at their inputs. Most TTL IC's in this state will float high at their inputs. The problem here, however, is some of these buffers are powering up as low on the outputs causing the CPU to think there is an Expansion Interface connected.

PROCEDURE:

Replace Z55, Z75, and Z76 74LS367 (AMX-3567 26-1001).

DATE: March 25, 1980
REVISION DATE: March 3, 1983
BULLETIN NO.: I:21
PRODUCT: 26-1141/2 with 26-1145
SUBASSEMBLY: AXX-0100 and AXX-0326

PURPOSE: To correct memory malfunctions with RS-232C board installed.

DISCUSSION:

Certain Aztec inverter modules on the RS-232 board may generate excessive noise on the power supplies lines. This may cause memory errors when the RS-232 board is installed.

PROCEDURE:

Replacing the memory IC's may alleviate the problem as some are more immune to line noise. However, replacing the RAM's may not be adequate to prevent the problem. The remaining alternative is to replace the power inverter module (ATA-0722 26-1145).

DATE: March 31, 1980
 REVISION DATE: March 3, 1983
 BULLETIN NO.: I:22
 PRODUCT: 260-1120, 262-1120, 263-1120 Level II kits
 SUBASSEMBLY: N/A

PURPOSE: To explain differences between Level II kits.

DISCUSSION/PROCEDURE:

There have been several versions of the Level II kit for the Model I. The following is a list of the different versions:

Part No.	Catalog No.	Status	Description	Where Used
-----		NLA	3 Chip early version ROM with satellite board	Used on all boards.
AXX-7010 262-1120		NLA	2 chip early version ROM with satellite board	Used on "A", "D" and "E" version boards.
AXX-7052 263-1120		NLA	2 chip early version ROM no satellite board	Used on "G" version boards only.
AXX-7056 260-1120		Current	2 chip Rev. A ROM with satellite board	Used on "A", "D", and "E" version boards.
AXX-7052 263-1120		Current	2 chip Rev. A ROM no satellite board	Used on "G" version boards only.

The early version ROM, required the cassette modification (Nat'l Parts# AXX-1002 26-1006) because of a cassette timing problem.

The Rev. A ROM, DOES NOT require the cassette modification because it has been changed to correct the timing problem.

Power-up text:	<u>Early ROM</u>	<u>Rev. A ROM</u>
	RADIO SHACK LEVEL II BASIC MEMORY SIZE ?	R/S L2 BASIC MEM SIZE ?

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Dip Shunt Z3:

Early ROM
(Rev. A w/satellite board) Rev. A ROM
(without satellite board)

1 -----	16	1 --- --	16
2 -----	15	2 -----	15
3 -----	14	3 -----	14
4 -----	13	4 -----	13
5 -----	12	5 -----	12
6 -----	11	6 -----	11
7 -----	10	7 -----	10
8 -----	9	8 -----	9

DATE: April 24, 1980
REVISION DATE: March 3, 1983
BULLETIN NO.: I:23
PRODUCT: 26-1451 Line Filter
SUBASSEMBLY: N/A

PURPOSE: Possibility of unit tripping AC line circuit breaker.

DISCUSSION/PROCEDURE:

Due to the structure of the Line Filter, there is the possibility of it tripping the AC line circuit breaker if the AC line is protected with a ground fault interrupter circuit (GFI). This could occur even when no load is connected to the filter. If this situation is encountered first check the filter for a short. This can be done by using an ohm meter and checking the AC sockets and power cord from "hot" to "neutral", "hot" to "ground", and "neutral" to "ground". If any of these show a direct short than the problem is in the line filter. If these tests pass, then either the GFI must be removed from the AC circuit, or the filter must be connected to another circuit that does not have a GFI.

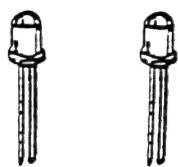
DATE: April 24, 1980
REVISION DATE: March 3, 1983
BULLETIN NO.: I:24
PRODUCT: 26-1160/1 Tandon Disk Drives
SUBASSEMBLY: AXX-5010

PURPOSE: Replacement index assembly may not fit unit.

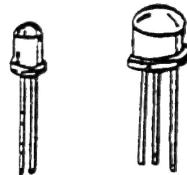
DISCUSSION/PROCEDURE:

Two different index assemblies have been used in the Tandon drives that are not physically interchangeable. The "Type I" assembly consists of a LED and detector that have identical dimensions. The "Type II" assemblies detector is physically larger than the LED, and will not fit in the same bracket as the Type I detector.

Type I index assembly is part number ART-2739 26-1160.
Type II index assembly is part number ART-2895 26-1160.



TYPE I



TYPE II

DATE: April 24, 1980
REVISION DATE: March 3, 1983
BULLETIN NO.: I:25
PRODUCT: 26-1004/6 Model I Level II
SUBASSEMBLY: Level II Rev. "A" ROM

PURPOSE: Changes to CLOAD syntax with Rev. "A" ROM.

DISCUSSION/PROCEDURE:

With Rev. "A" Basic, loading may only be performed using cassette drive number one when using dual cassettes. The Basic commands; CLOAD #-1, "filename", CLOAD #-1,?, CLOAD #-2,"filename", or CLOAD #-2,? will produce a SYNTAX ERROR. Revision "A" Basic does not recognize a cassette drive number with CLOAD. For dual cassette operation with CLOAD place the program tape in cassette one and use either 'CLOAD', or 'CLOAD?'.

All other dual cassette commands function properly under Rev. "A" Basic.

DATE: May 1, 1980
REVISION DATE: March 3, 1983
BULLETIN NO.: I:26
PRODUCT: 26-1004/6 Model I Level II
SUBASSEMBLY: Level II Rev. "A" Basic

PURPOSE: Machine will not load some mass duplicated tapes. Tapes generated by the unit will load.

DISCUSSION/PROCEDURE:

The revision "A" ROM's incorporated a change in the cassette I/O drivers in order to eliminate the need for the XRX-III cassette modification. Due to this modification, however, some earlier versions of Radio Shack's mass duplicated software tapes can not be loaded by the Rev."A" ROM's. **THIS IS NOT DUE TO ANY HARDWARE DEFECTS,** and no attempt should be made to repair these units (except for hardware failures, of course).

The key to determining if the problem is software or hardware is that the unit will load some mass duplicated tapes, but may not load others. These units will load tapes generated by themselves. If the tape is an earlier version, try a newer version of the software.

Note: Installing an XRX-III modification will not solve this problem.

DATE: May 22, 1980
REVISION DATE: March 4, 1983
BULLETIN NO.: I:27
PRODUCT: 26-1160/1 Tandon Drives
SUBASSEMBLY: AXX-0317

PURPOSE: To correct possible power supply problem after logic board replacement.

DISCUSSION/PROCEDURE:

The early drive logic PCB (AXX-0317), has a ground plane on one side of the board and a power plane on the opposite side. If care is not exercised in board replacement, it is possible to damage the power supply from a short circuit. The mounting hole that is nearest the head connector will short out the power plane to the ground plane when the metal mounting screw is inserted, if insulators are not used, or are worn.

DATE: July 2, 1980
REVISION DATE: March 4, 1983
BULLETIN NO.: I:28
PRODUCT: 26-1201 Video Monitor
SUBASSEMBLY: AX-7733 All Revisions

PURPOSE: To correct wavy vertical edges, or loss of vertical sync, when screen is whited out.

DISCUSSION:

The following changes should be incorporated in all video monitor interface boards not conforming to the listed component values. Revision "A", and "B" boards will probably require all changes whereas revision "C", and "D" may require only a few, or none at all.

PROCEDURE:

Refer to figures for component locations.

1. Delete R3, and replace it with a 12volt, 1 watt, Zener diode such as 1N4742.
2. Add R18, 68K, 1/4 watt, 5% resistor from the junction of R11, C2 to the junction of C6, R13.

Note: Some revision boards may have R18 as 220k, in which case change to 68k value.
3. Change the value of resistor R13 from 22K, 1/4 watt, 5%, to 6.8K, 1/4 watt, 5%.
4. Change the value of resistor R16 from 1K, 1/4 watt, 5%, to 2.2K, 1/4 watt, 5%.

After modifications all boards should have the following component values:

R3 (CR1) = 1N4742 diode (Nat'l Parts# ADX-1150 26-1150).
R13 = 6.8K ohm resistor (Nat'l Parts# AN-0262EEC 26-9999R).
R16 = 2.2K ohm resistor (Nat'l Parts# AN-0216EEC 26-9999R).
R18 = 68k ohm resistor (Nat'l Parts# AN-0354EEC 26-9999R).

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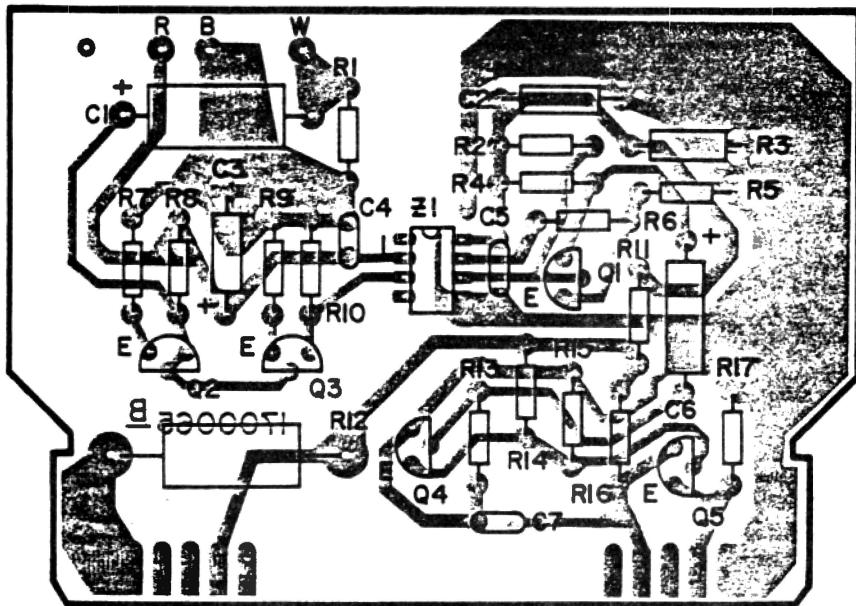


Figure 1 Rev. B

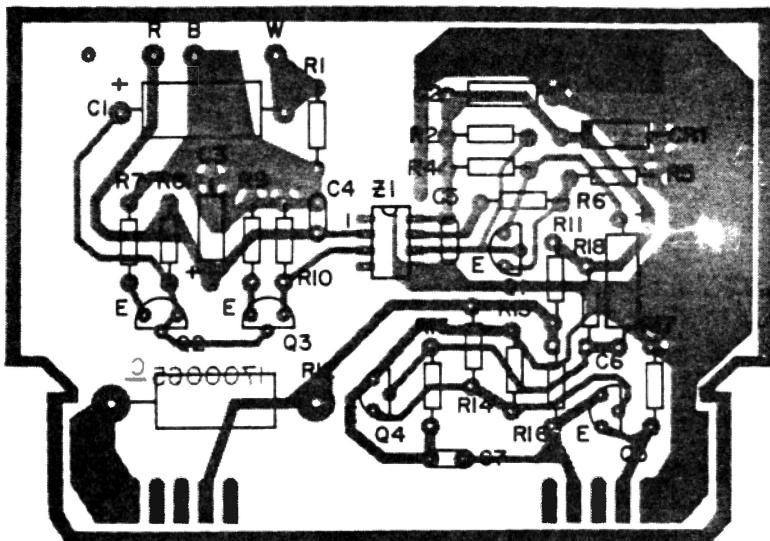


Figure 2 Rev. C

DATE: August 25, 1980

REVISION DATE: March 4, 1983

BULLETIN NO.: I:29

PRODUCT: 26-1160/1/2/3/4 Tandon drive

SUBASSEMBLY: AXX-0317

PURPOSE: To correct possible transistor damage causing read/write errors.

DISCUSSION:

During assembly of some of the early Tandon PCB's, transistors Q1, Q2, Q3, Q4, and Q5 were bent over causing the leads to short together. This causes read and/or write errors during operation.

PROCEDURE:

Closely examine all transistors for shorted leads and repair if necessary. Bend the transistors over at a 45 degree angle with the flat side facing up. This will prevent the above problem from happening again.

DATE: November 6, 1980
REVISION DATE: March 4, 1983
BULLETIN NO.: I:30
PRODUCT: 26-1160/1/2/3/4 Tandon Drives
SUBASSEMBLY: AXX-5010

PURPOSE: To correct Read/Write head from jumping behind track 00.

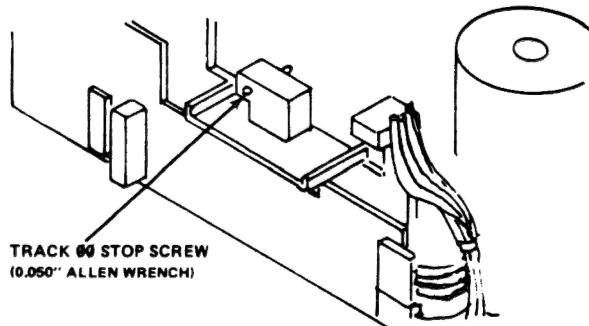
DISCUSSION:

Early Tandon disk drives were not equipped with track 00 stops. Drives without the stop can jump to track -04 on power up causing the drive to not boot unless the head is moved by hand to an inside track.

All Tandon drives that do not have the track 00 stop, should have the stop kit (ART-3004 26-11601) installed and then adjusted with TDC diagnostics.

PROCEDURE:

Remove the rear guide rod clamp screw. Using the long screw supplied with the kit, install the Track 00 stop on top of the rod clamp. Install the hex screw, also supplied with the kit, from the rear screwing it in until it just appears through the other side. Assemble the drive and run the TDC alignment program, adjusting the hex screw as necessary.



DATE: November 6, 1980

REVISION DATE: March 7, 1983

BULLETIN NO.: I:31

PRODUCT: 26-1160/1/2/3/4 Tandon Drive

SUBASSEMBLY: AXX-0317

PURPOSE: To correct insufficient current causing drive problems.

DISCUSSION/PROCEDURE:

On some Tandon Disk Drive PCB's, IC's 4F and 1F are 74LS38's and need to be 7438 TTL to provide more drive current. Various problems can be caused by these two IC's. A drive may exhibit one or more of the following symptoms:

1. Drive won't boot.
2. Drive works by itself but not with another drive connected.
3. Drive works with some EI's and not with others.
4. Drive will not format properly even after alignment.
5. Drive will not backup properly.
6. Intermittent read errors.
7. Intermittent boot problems.

If any of the above problems are occurring and IC 4F and 1F are 74LS38's, then replace with 7438's (Nat'l Parts# AMX-3683 26-11601) before going any further.

Later PCB's have these IC's (7438) as a running production change.

DATE: April 29, 1981
REVISION DATE: March 7, 1983
BULLETIN NO.: I:32
PRODUCT: 26-1160/1 Shugart Drive
SUBASSEMBLY: AXX-0301

PURPOSE: To explain connection changes from older motor speed control PCB to latest version PCB.

DISCUSSION/PROCEDURE:

Shugart has a version of their motor control board which is longer than the older version, and has a connector attached to it. To use the board in place of the older board simply unsolder the wires from the old motor speed board and solder them into the proper holes on the new board. The new board is marked with the correct color code for the wiring.

DATE: October 7, 1982
REVISION DATE: September 10, 1982
BULLETIN NO.: I:33
PRODUCT: 26-1143 Double Density Adapter
SUBASSEMBLY: AX-9080 Double density adapter PCB

PURPOSE: No operation or intermittent operation, either in single density, double density, or both.

DISCUSSION: Some rosin flux residue from the soldering process has been found in the sockets for the FDC chips.

First, remove the board from the Expansion Interface. Remove all socketed chips from the Double Density Adapter. Next, clean the Double Density PCB, paying close attention to the INSIDES of the sockets with Rosin Flux Remover (RS cat. no. 64-2324) and a stiff NYLON brush (an old toothbrush is good). DO NOT use a metal brush. Do not let the Rosin Remover get on the computer or E/I as it also removes paint! Reinstall the chips (watch pin positions), reinstall the PCB into the E/I, and realign.

DATE: February 8, 1983
REVISION DATE: February 8, 1983
BULLETIN NO.: I:34
PRODUCT: 26-1140/1/2
SUBASSEMBLY: AXX-0100 Early E.I. PCB.

PURPOSE: Double Density Adaptor does not function with early Expansion Interface board.

DISCUSSION: The early Expansion Interface PCB's (AXX-0100), had problems with system noise on the CAS, RAS, and MUX lines. There are two modifications for this problem; a Buffered cable (AXX-1000) and a Twisted-Pair cable (AXX-1003). For use with the Double Density board installed, you must have BOTH of these modifications installed.

PROCEDURE: Refer to Technical Bulletin I:12 for installation instructions of both cables.

DATE: July 27, 1983
REVISION DATE: July 27, 1983
BULLETIN NO.: I:35
PRODUCT: 26-1104 Lower Case Kit
SUBASSEMBLY: AXX-7049

PURPOSE: To explain use of separate parts in place of the kit.

DISCUSSION/PROCEDURE: The Lower Case kit for the Model I (AXX-7049) has been discontinued. However, the upgrade will still be offered to customers. To install lower case you will need the following parts:

AXX-3027 Lower case character generator
AXX-3028 Piggyback RAM chips
ACT-0167 Driver program cassette
AJ-6581 16 pin socket
AJ-6701 18 pin socket
MS2601104 Service manual

These parts can be ordered under catalog 26-1104.

It is possible to eliminate the need for the piggybacked RAM AXX-3028, by making your own. You will need a video RAM chip available under part number AMX-3575 26-1001, and two 2 inch pieces of 30 gauge kynar wire. Bend out pins 11 and 12 of the new video RAM chip and attach one of the wires to each pin. Then piggyback the new video RAM on Z46 and solder all leads, except pin 11 and 12, to the corresponding leads of Z46. You can now proceed with the instructions in the service manual.

DATE: September 22, 1983

REVISION DATE: September 23, 1983

BULLETIN NO.: I:36

PRODUCT: 26-1001/3/4/5/6 Model I

SUBASSEMBLY: AXX-0008 Model I CPU PC Board

PURPOSE: Proper DIP shunt settings for Z-3 and Z-71

DISCUSSION:

The following are the proper settings for the DIP shunts found in the Model I computer. Covered are all configurations -- 4K Level I, 4K Level II, 16K Level I, and 16K Level II

LEVEL I

4K	
pin#	1———16
2———15	
3———14	
4———13	
5———12	
6———11	
7———1Ø	
8———9	

Z-3

16K	
pin#	1———16
2———15	
3———14	
4———13	
5———12	
6———11	
7———1Ø	
8———9	

Z-3

4K	
pin#	1———16
2———15	
3———14	
4———13	
5———12	
6———11	
7———1Ø	
8———9	

Z-71

16K	
pin#	1———16
2———15	
3———14	
4———13	
5———12	
6———11	
7———1Ø	
8———9	

Z-71

LEVEL II 2-CHIP PLUG IN SET
REVISION "G" BOARD ONLY

4K

pin#	1	—	—	16
	2	—	—	15
	3	—	—	14
	4	—	—	13
	5	—	—	12
	6	—	—	11
	7	—	—	1Ø
	8	—	—	9

Z-3

16K

pin#	1	—	—	16
	2	—	—	15
	3	—	—	14
	4	—	—	13
	5	—	—	12
	6	—	—	11
	7	—	—	1Ø
	8	—	—	9

Z-3

pin#

1	—	—	16
2	—	—	15
3	—	—	14
4	—	—	13
5	—	—	12
6	—	—	11
7	—	—	1Ø
8	—	—	9

Z-71

pin#

1	—	—	16
2	—	—	15
3	—	—	14
4	—	—	13
5	—	—	12
6	—	—	11
7	—	—	1Ø
8	—	—	9

Z-71

LEVEL II WITH SATELLITE ROMS
ALL BOARDS

4K

pin#	1	—	—	16
	2	—	—	15
	3	—	—	14
	4	—	—	13
	5	—	—	12
	6	—	—	11
	7	—	—	1Ø
	8	—	—	9

Z-3

16K

pin#	1	—	—	16
	2	—	—	15
	3	—	—	14
	4	—	—	13
	5	—	—	12
	6	—	—	11
	7	—	—	1Ø
	8	—	—	9

Z-3

pin#

1	—	—	16
2	—	—	15
3	—	—	14
4	—	—	13
5	—	—	12
6	—	—	11
7	—	—	1Ø
8	—	—	9

Z-71

pin#

1	—	—	16
2	—	—	15
3	—	—	14
4	—	—	13
5	—	—	12
6	—	—	11
7	—	—	1Ø
8	—	—	9

Z-71

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