INDEX MODEL I

I:18 Twisted-pair Cables for CPU/EI--After the twisted-pair cable is mounted on the EI board, pressure between the EI PC board and the case of the RS232 compartment can cause the IC pins to be pressed through the cable's insulation and short against the shield.

I:19 RS-232C Diagnostic Test Program--The current RS-232C diagnostic test program will not run with expansion interfaces with less than 16K bytes of RAM in the interface.

I:20 26-1160, 26-1161--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. Problem is most noticeable on drives that have been properly aligned, yet still exhibit lost data during read and disk I/O errors.

I:21 Cassette Recorder CTR-80--Hitting RESET during a CLOAD or turning on and off the cassette recorder while in PLAY position, will cause a glitch on the tape. If this occurs within a program, the program will no longer load.

I:22 TRS-80 CPU, Modification for the FQE (DISD) Software--The following is the instructions for modifying the TRS-80 CPU for operation of the software by the Foundation of Quality Education (Dallas Independent School District Software). This modification is highly CONFIDENTIAL and should not be released to anyone.

I:23 "Disk Diagnostic Package"

I:24 26-0305, Diskette--Disk I/O Failures

I:25 26-1151 Screen Printer--Vertical print positioning too high or too low on paper. Sometimes, bottom line of video screen text will appear at top of print out.

I:26 SA400 Disk Drives-- Belt Replacement

I:27 Expansion Interface (26-1140), Disk Drive (26-1160)--Disk system will not do a back up (Drive Ø to Drive Ø) past Track 32 (approximately).

I:28 Screen Printer--1. Weak print; 2. Tractor tracks in center of paper.

I:29 TRS-80 Cassette Recorders--Azimuth Alignment for the TRS-80 Cassette Recorders

I:30 Quick Printer--Unit runs, head carriage travels, but does not print.

I:31 Screen Printer--The 26-1151 Screen Printer will not work with an expansion interface using the twisted pair modification.

I:32 RS-232C--Intermittent connector contact

I:33 TRS-80 Expansion Interface and CPU-DIN plug modification--This Tech Tip supplements SIB1131, which defines an expansion interface noise problem. This is a clarification of the installation instructions.

I:34 Model I CPU's--Random symptoms that persist after CPU logic board has been replaced. Problem may affect different sections of CPU, i.e. CPU, ROM, cassette operations, etc.

I:35 New Model Expansion Interface Board--System will not backup in single drive configuration using the new model expansion interface board.

I:36 Power Supplies--intermittent or unreliable operation of the disk drive.

INDEX MODEL II

SOFTIP INDEX MODEL I

S O F T I P I N D E X M O D E L I I

INPUT / OUTPUT INDEX

catalog number 26 - 1151

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205 N.W. Seventh Street
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DATE: May 15, 1978

TO: All Repair Centers

FROM: National Technical Support

TECH TIP # 1

PRODUCT: Screen Printer

PROBLEM/SYMPTOM:

Printing not clear.

Printer unrolling entire roll of paper.

SOLUTION:

The screen printer will require periodical cleaning. Suggestion of cleaning twice per roll of paper, for best results. This keeps brushes from becoming clogged.

When screen printer is left on, there is a chance of a power surge or drop out. This will cause the printer to unroll the entire roll of paper.

Tech Support Rep.	Approval	Engineer
Jim Johnston	Paul Huff Director of Computer Services	

catalog number
26 - 1160, 1161

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TECH TIP # 2

PRODUCT: Disk Drives

PROBLEM/SYMPTOM:

Shorts on edge connectors of drives.

SOLUTION:

Brush with a small, stiff wire brush.

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TECH TIP #3

PRODUCT: Video Monitor

PROBLEM/SYMPTOM:

White line across the screen from READY.

SOLUTION:

Be sure the CRT ground strap is grounded before CPU power up, when servicing video monitor; if it is ground after power up, this could cause RAM crash.

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TECH TIP # 4

PRODUCT: Disk Drives

PROBLEM/SYMPTOM:

Erroneous errors on disk and lost data during write.

SOLUTION:

Check to see if you have an unmodified disk logic card. It should have a dipshunt that is cut between pins 1-14 and 5-10. There should be a jumper from pin 32 on the logic card to pin 10, 12 or 14.

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TECH TIP # 5

PRODUCT: Disk Drives

PROBLEM/SYMPTOM:

Head has jumped off track.

SOLUTION:

This can be caused by improper adjustment of carriage return limiter. Adjusting the carriage limiter according to section 2.4.16 in the Shugart Disk Service manual will cure this. This only applies to the older disk chasis. The newer ones do not need adjustment.

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TECH TIP # 6

PRODUCT: Software

PROBLEM/SYMPTOM:

Will not load programs off cassette using the command CLOAD "Filename" under disk basic.

SOLUTION:

2.1 DOS does not support filenames on cassette files. This is due to a timing problem. The files can be loaded by positioning the tape before the file and using the regular CLOAD command.

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TECH TIP #7

PRODUCT: Line Filter

PROBLEM/SYMPTOM:

Erratic system errors.

SOLUTION:

Installing an inline power filter on the electrical cords to the power supplies of the expansion interface and CPU will help eliminate these problems. We recommend the Corcom 10R1 (Allied catalog number T54-2060). The disk drives should not be plugged into the same line with the CPU and EI. The disk drives can be powered from a common filter, however.

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DATE: October 3, 1979

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FROM: National Technical Support

TECH TIP # 8

PRODUCT: Screen Printer

PROBLEM/SYMPTOM:

When screen printer is used under "disk basic" it will print "@" symbols.

SOLUTION:

A fix for this problem is to use the following subroutine suggested by Jon Shirley:

```
100 CMD"T"
110 OUT 254,255
120 INPUT A$
130 CMD "R"
```

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TECH TIP # 9

PRODUCT: Disk Drive

PROBLEM/SYMPTOM:

Disk Media being chewed up by the disk drive.

SOLUTION:

Installation of diskette into the disk drive properly and careful operation of door when closing, will eliminate this problem. Use of diskettes with reinforced centers will also help.

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TECH TIP # 10

PRODUCT: RS-232 Board

PROBLEM/SYMPTOM:

Intermittent or inoperative operation.

SOLUTION:

Care should be taken to ensure proper RS-232 board alignment on the Expansion Interface edge connector. If it is not properly aligned, the RS-232 will give many varying problems. Ensure the contacts are free of corrosion and that the board is aligned correctly on the pins.

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TECH TIP # 11

PRODUCT: Disk Drive

PROBLEM/SYMPTOM:

Restricted movement of head assembly in the guide rods.

SOLUTION:

Removing the guide rods and polishing them with crocus cloth will remove all burs and other matter that might impede the sliding of the head. Crocus cloth is available from most lumber yards or hardware centers.

NOTE: Do not use any abrasive more course than crocus cloth, such as emery cloth. Also, do not use any lubricant because it will collect foreign matter and eventually gum the rods. Lubricant should not be used anywhere in the unit.

Tech Support Rep.	Approval	Engineer
	PJH	
Jim Johnston	Paul Huff Director of Computer Services	

catalog number
26 - 1002, 1004, 1006

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DATE: February 8, 1979

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TECH TIP # 12

PRODUCT: CPU

PROBLEM/SYMPTOM:

READ DATA problem with disk drives.

SOLUTION:

A standard repair is POKEing 16553, 255. Also, a hardware fix is to install at least one NEC RAM for 16k Level II or at least one Mostek RAM for 4k Level II.

These RAMs are available from National Parts under the following numbers: 16k NEC RAM - AMX-39902; 4k Mostek RAM - AMX-3903.

Tech Support Rep.	Approval	Engineer
	PJH	
Jim Johnston	Paul Huff Director of Computer Services	

catalog number MEM4/CMD

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DATE: March 26, 1979

TO: All Repair Centers

FROM: National Technical Support

TECH TIP #13

PRODUCT: NEW MEMORY TEST FOR EI AND CPU - MEM4/CMD

PROBLEM/SYMPTOM:

MEM/CMD, original memory test, does not display correct location of defective RAM. Checksums of new ROMs not in test.

SOLUTION:

MEM4/CMD is a new updated version of the memory test MEM/CMD. MEM4 has been changed so the defective RAM is correctly displayed, it also includes the checksums for the new ROMS. This test replaces all other versions up to date. MEM4 still uses the same control commands as MEM/CMD which are listed below:

⟨A⟩ RAM Memory Test
⟨C⟩ Complete Test
⟨Q⟩ Quick Test
⟨P⟩ Push Pop Test
⟨O⟩ ROM Memory Test
⟨V⟩ Video Memory Test
H Stop (Use with any test - Stop RAM Test Display when defective RAM located; to stop, complete or Push Pop at RAM test - hold H until next Hex digit)
C Continue after H
E Return to Test Menu after H
RESET Return to DOS

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catalog number

DATE: April 12, 1979

TO: All Repair Centers

FROM: National Technical Support

TECH TIP #14

PRODUCT: CPUs (Level II or higher)

PROBLEM/SYMPTOM:

Isolating defective video RAMS.

Characters remain after a CLS command has been executed or after the CLEAR has been pressed.

SOLUTION:

Key in the following program. Its execution takes 30.9 seconds in a 16K Level II machine.
NOTE: The real-time-clock (RTC) must be turned off.

```
10 CLS:DIMA(1025):FORX=15360TO16383:A(X-15360)=PEEK(X):NEXT
15 PRINT"THE FOLLOWING CHIPS ARE BAD:"
20 FORV=0TO5:READA$(V):NEXT:RESTORE
30 FORX=0TO1023:A=A(X):IFA=32THENNEXT:END
40 FORN=1TO6:READK$:NEXT
50 FORW=5TO0STEP-1:READB:IF(AANDZ[W)=BTHENGOSUB90
60 NEXTW:IFA>128THENPRINT"Z63"
70 RESTORE:NEXTX:END
80 DATA "Z48","Z47","Z46","Z45","Z61","Z62",0,16,8,4,2,1
90 IFA$(W)=""THENRETURNELSEPRINTA$(W),:A$(W)="":RETURN
```

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Jim Johnston	Paul Huff Director of Computer Services	

catalog number 26 1160. 1161

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DATE: April 10, 1979

TO: All Repair Centers

FROM: National Technical Support

TECH TIP # 15

PRODUCT: 26-1160, 26-1161

PROBLEM/SYMPTOM:

Disk Drive Alignment

SOLUTION:

Shugart Disk Drive Check and Alignment Procedure

Tech Support Rep.	Approval	Engineer
JB TK		
Tom King	Paul Huff Director of Computer Services	

SHUGART DISK DRIVE CHECK AND ALIGNMENT PROCEDURE

Equipment required: 30 MHZ Dual Channel Triggered Sweep Scope (or better), Shugart SA809 Drive Exerciser, Shugart Alignment Diskette (SA124) and blank diskette

Before starting procedure, connect Diskexerciser to drive under test.

Preliminary check of the drive should include 12VDC alignment and motor speed adjustment.

I. Carriage Movement Check

Recal drive to track zero. Autostep drive between track ØØ and 34. Check to be certain that the carriage is not binding at any point in its travel. If binding, use crocus cloth to polish guide rails. (Do not use any type of lubricant; use of lubricant will collect dust, which will eventually bind carriage.)

II. Head Amplitude Check

Connect scope as follows:
Channel 1 to TP1; 50 MV/DIV, AC Coupled, PROBE=DIRECT
Channel 2 to TP2; 50 MV/DIV, AC Coupled, PROBE=DIRECT, Invert Channel!
Both Test Probe Grounds to TP5.
Set mode to add channels.
Set Timebase to 1.0 millisecond/DIV.
Connect external sync. to TP7. Auto triggers should be off.
Set trigger source to external.

Insert erased blank diskette. Recal to track ØØ.
Step to track 34 and write 250KHZ on diskette
Head amplitude should be 200MV or greater.
If head amplitude does not meet this spec.,
- Check and clean head.
- Rotate head load button 45 degrees (1/8 turn) until
- Spec. is met.
- Replace head load button.
- Check diskette media.
- Replace head carriage assembly.

At this time, check displayed waveform for any dropouts below 200 MV. If dropouts are observed, redo head amplitude procedure. (Note: Media is prime suspect for dropouts!)

III. Head/Radial Alignment

Set CH1 and CH2 attenuators to 50MV/DIV. Set timebase to 20 milliseconds/DIV. (Channel mode should still be in ADD position.)

Load the Shugart Alignment diskette and recal to track ØØ.
Step the carriage to track 16; set trigger level for a steady display.
If the two lobes are within 85% amplitude of each other, the head/radial alignment is ok.
If the two lobes are not within 85% amplitude, loosen the two mounting screws on the stepper motor, and rotate the stepper motor until the amplitudes are within 85%.
Tighten the mounting screws.

III. Head/Radial Alignment (cont'd)
Before torque sealing the mounting screws, step the carriage to track ØØ, and back to 16. Refine the alignment if the lobes are not within 85% amplitude.
Step the carriage from track 16 to 34, and back to 16.
Refine the alignment if the lobes are not within 85% amplitude.
Repeat above steps until lobes are within 85% amplitude of each other.
Torque seal screws when alignment is done.

IV. Index/Sector Timing Adjustment
Change channel voltage attenuators to 0.2 volts/DIV.
Time base to 50 microseconds/DIV. Set trigger to positive slope:
Trigger to external mode.
Recal drive to track ØØ; step to track 01.
Set trigger for steady display.
Display should show a ØVAC trace for 200 microseconds (+/-50 microseconds), followed by data burst.
If out of spec., loosen the screw on the index detector, and slide assembly towards front or rear of drive as necessary to obtain spec.
Open and close door and recheck specification.
If sector timing changes more than +/- 50 microseconds, repair or replace hub assembly. (Be sure hub of alignment diskette is not bad.)

V. Raw Data Check (to be performed after steps I - IV only)
Disconnect scope probes.
Connect CH1 probe to TP6 and test probe ground to TP5.
Set CH1 to 1 volt/DIV; timebase to 1 microsecond/DIV.; Coupling=DC
Triggering=Internal; Slope=Negative (trigger as loose as possible to maintain steady display)

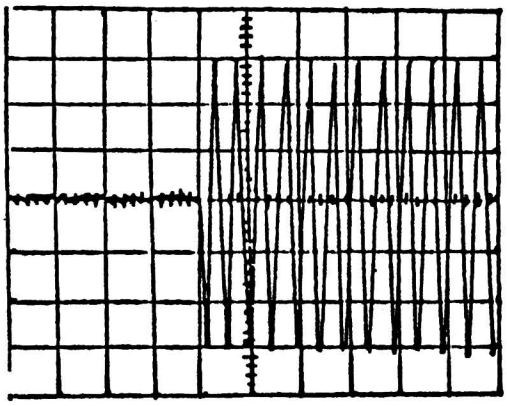
Insert erased blank diskette. Recal to track ØØ. Step to track 34. Write 250KHZ on diskette.
Adjust display so that the negative edge of the data pulse (second pulse) is at the center of your display. Pull the scope magnifier and check for jitter at the negative edge of the data. (NOTE: It may be necessary to defeat the trigger on the data pulse to see the jitter. This can be done on the 30 MHZ B&K oscilloscope, by turning timebase to .5 microseconds/DIV.
Adjust R13 for minimum jitter. Now check the jitter at the third pulse (the third pulse jitter is not adjustable).

Referring to the diagram of the scope display, note that there is a clock pulse, followed by a data pulse, and another clock pulse. The presence or absence of a data pulse between the clock pulses, determines a logical '1' or '0' data state. The jitter of the data pulse should be no more than 300 nanoseconds, and 500 NS for the clock pulse. The jitter of the clock pulse determines the stability of the motor, belt, flywheel and/or bearings of the drive train. (NOTE: R13 only adjusts data jitter. Excessive mechanical jitter in the train will effect both clock and data jitter.) Improper grounding of the logic card test probes will result in false data jitter, thus improper adjustment.
NOTE: For drives with excessive data pulse jitter, it may be easier to align R13 by adjusting for symetry of the three pulses. On obtaining symetry, 'fine tune' data jitter with above method (using magnifier).

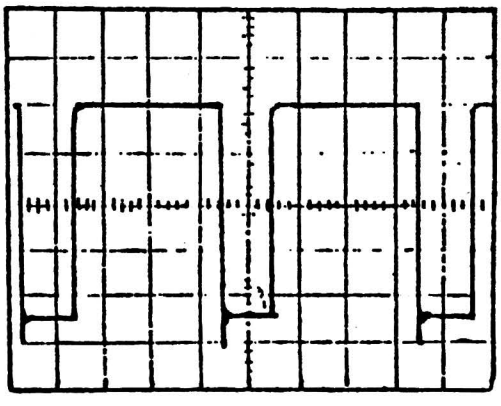
VI. Track ØØ Alignment

Connect scope to TP8. Vert=2 volts/DIV.
Recal drive to track ØØ. Set drive exerciser to autostep between track ØØ, and track Ø1. Logic '1' and Logic 'O' should be equal, +/-2.5 milliseconds. Adjust if necessary by loosening microswitch bracket screw, and sliding assembly toward front or rear of chassis.

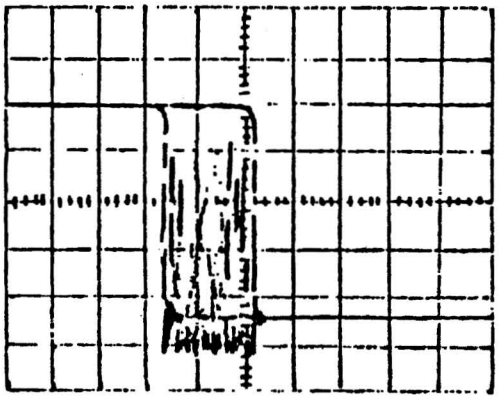
If alignment is complete, torque seal stepper motor screws, and track ØØ microswitch screw.



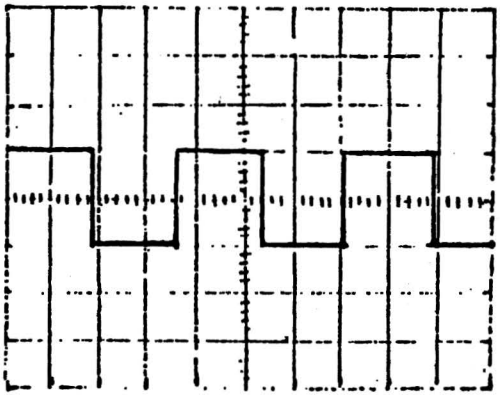
INDEX/SECTOR TIMING



RAW DATA CHECK



DATA/MOTOR JITTER (X10 MAG)



TRACK ØØ ALIGNMENT

DISK DRIVE CHASSIS CHECK LIST

DATE_____ TECHNICIAN_____

RepairDept./Computer Store #_____ Repair Info. Sheet #_____

Serial #_____

CHECK LIST

I. Carriage Movement Check

☐ OK

☐ Repair/Parts_____

II. Head Amplitude Check

	Measured		After Repair
Amplitude	_____mv	/	_____mv

☐ Repair/Parts_____

_____

III. Head/Radial Alignment R=Right L=Left

	Measured	After Alignment
Track ØØ - 16	_____% of _____	_____% of _____
Track 34 - 16	_____% of _____	_____% of _____

☐ Repair/Parts_____

_____

IV. Index/Sector Timing Adjustment

	Measured	After Adjustment
Sector Timing	_____us	_____us

☐ Repair/Parts_____

V. Raw Data Check

	Measured	After Repair
Motor Jitter	_____ns	_____ns

☐ Repair/Parts_____

VI. Track ØØ Alignment

☐ OK

☐ Aligned

☐ Repair/Parts_____

NOTE: These measurements may vary due to shipment vibration; please recheck and verify that alignments are as given for your unit.

catalog number
26 - 1160, 1161

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DATE: April 18, 1979

TO: All Repair Centers

FROM: National Technical Support

TECH TIP # 16

PRODUCT: Disk Drive Motor Control PCB

PROBLEM/SYMPTOM:

Motor speed drift of Disk Drive

Some units manufactured during the period of 12/15/78 to 2/23/79 may exhibit spindle motor speed drift problems. Problem is caused by unstable capacitor C2 on Motor Control PC board.

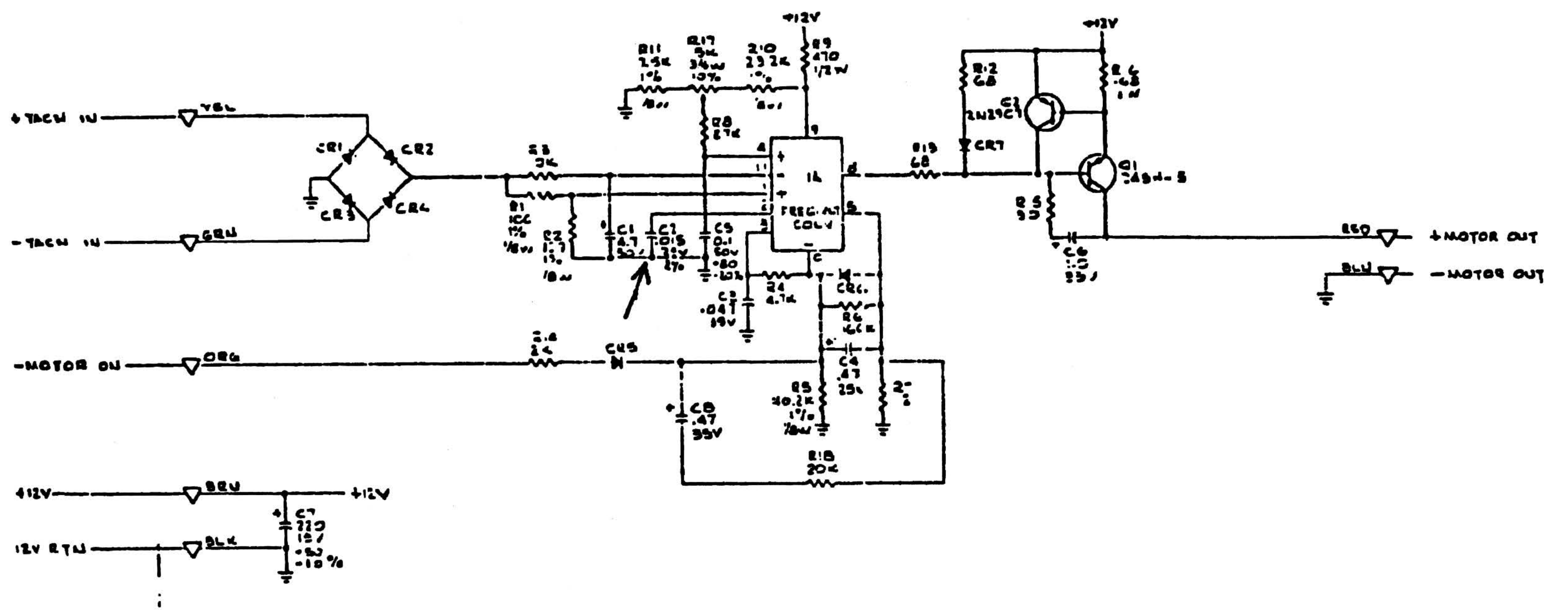
SOLUTION:

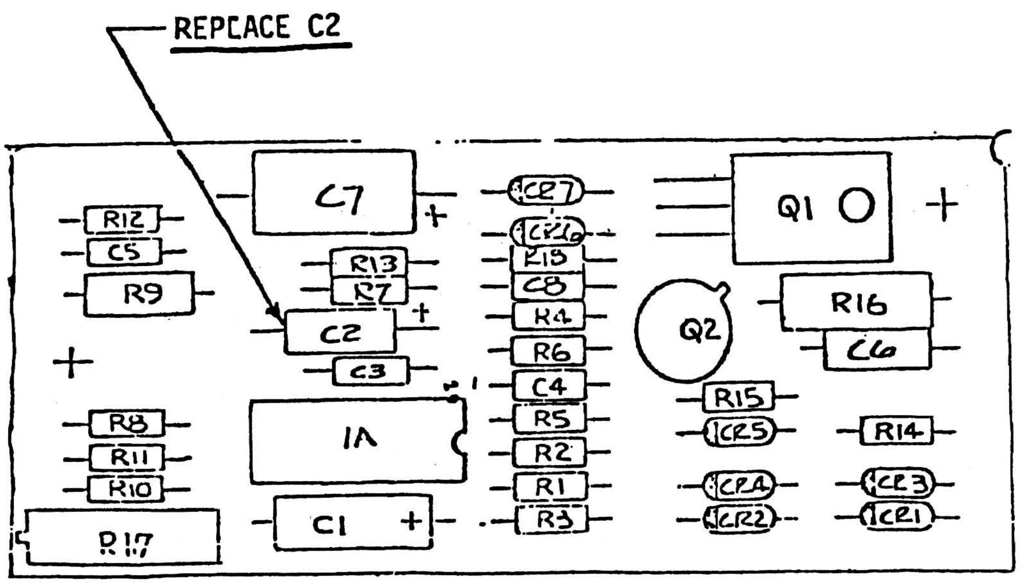
This series PC board can be identified by a vertically mounted speed adjust potentiometer (R17), in the lower right corner. If C2 on this type PCB is a glass capacitor, then it should be replaced with a .015 ufd +/- 2% @ 50V mylar capacitor.

Refer to component location layout and schematic for location of C2.

Tech Support Rep.	Approval	Engineer
JB		
Jerry Ballard	Paul Huff Director of Computer Services	

25128-1





NOTES: UNLESS OTHERWISE SPECIFIED;

1. ALL CAPACITORS ARE IN MICROFARADS, 10%.
2. ALL DIODES ARE IN4148.
3. ALL RESISTORS ARE IN OHMS, 1/4W, ±5%.
4. ▽ INDICATES SOLDERED WIRE CONNECTION.
5. INTEGRATED CIRCUIT 1A IS TYPE LM2917N.

AUG 14 1978

SHUGART ASSOCIATES

SCHEMATIC DIAGRAM - SPEED CONTROL

D | SC | 25128-1

128-1

catalog number AW-2369

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DATE: April 25, 1979

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FROM: National Technical Support

TECH TIP # 17

PRODUCT: TWISTED-PAIR CABLES FOR CPU/EI

PROBLEM/SYMPTOM:

Part 1 is a mistake in the installation instructions of the twisted-pair cable in the CPU/EI, Service Information Bulletin #1131.

Part 2 is that on both ends of the twisted-pair cables, the shield is left exposed where the insulation stripped off. When installed, the exposed shield can short out pins on the CPU and/or EI PCB.

SOLUTION:

Part 1 is on page 6 (at bottom of page), instructions for cutting RAS and CAS etches are deleted. These are instructions A, B, C, and D. Use only the instructions on page 5 for installation of cable to CPU PCB. See attached sheet of page 6.

Part 2 is before installation of cables, use heat-shrinkable tubing or other insulating material around cable so shield is insulated from PCB.

Tech Support Rep.	Approval	Engineer
JB	PGH	
Jerry Ballard	Paul Huff Director of Computer Services	

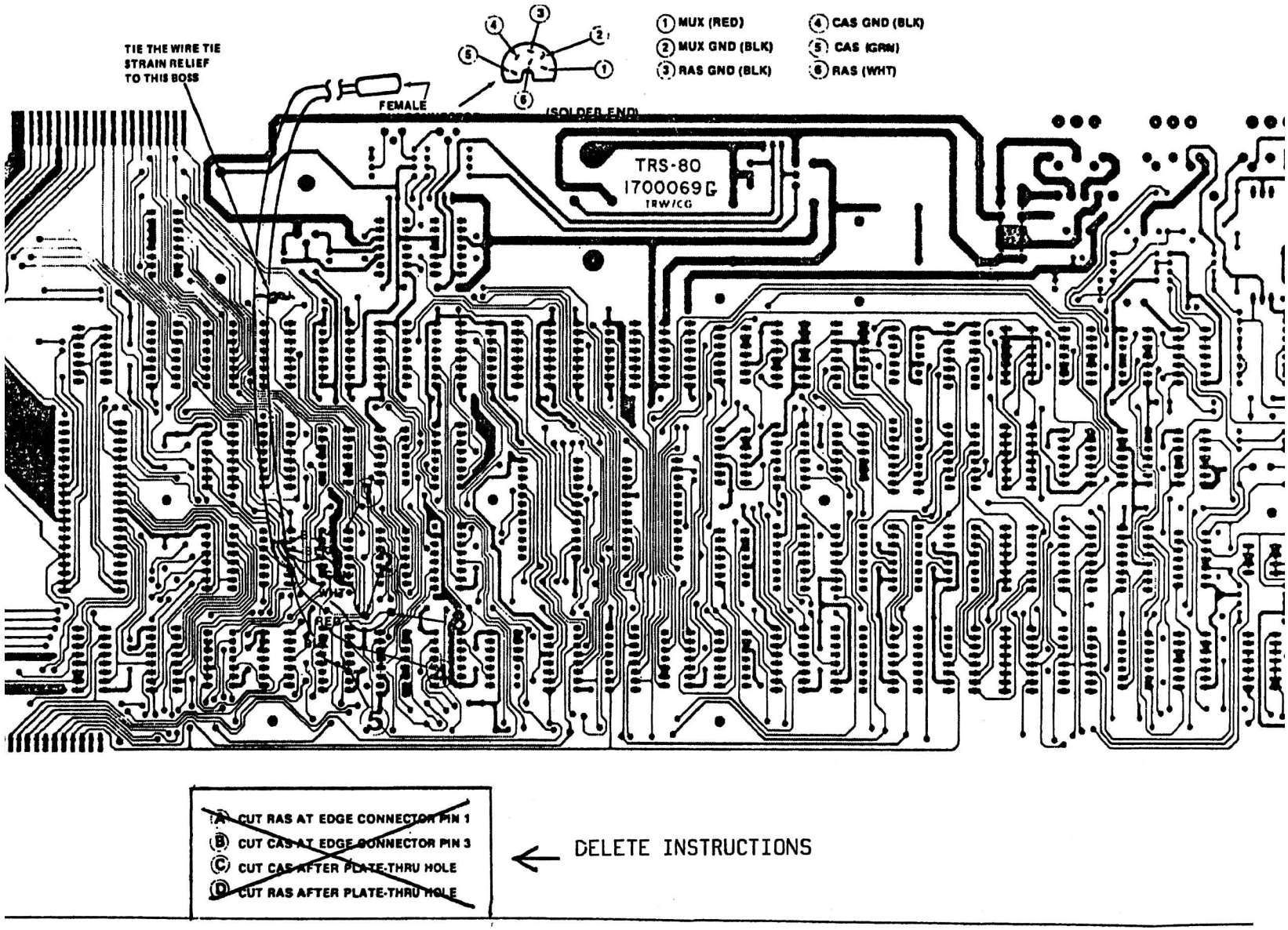

FIGURE 3. TRS-80 P.C. BOARD (CIRCUIT SIDE)

To install The modification, remove the CPU Logic Board from the case (follow the procedures in the Service Manual 26-1101/1102/1103 TRS-80 Modification Kits, Section I, steps 1 through 6).

NOTE

This modification applies to both "D" and "G" level CPU Logic Boards; the Cable connection points on both Boards are the same.

Procedures for Component Side of Board (see Figure 3)

1. Select the cable with the female DIN connector and connect the twisted wire pairs as described in steps 2 through 6.
2. Solder the common leads (blk) of twisted wire pairs grn/blk and wht/blk to point (1).
3. Solder the grn lead (CAS) to point (2).
4. Solder the wht lead (RAS) to point (3).
5. Solder the common lead (blk) of twisted wire pair red/blk to point (5).
6. Solder the red lead (MUX) to point (4).

Procedures for Reassembly

1. Position the CPU and keyboard PCBs into the lower case.
2. 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).
3. Reassemble the top and bottom case.

Procedures for Checkout

1. Position the TRS-80 and Expansion Interface in their normal operating locations.
2. Connect the flat cable to the TRS-80 and Expansion Interface.
3. Connect the CPU and EI Cable DIN plugs and run the following programs for checkout:

   a. Push-Pop (run for a complete line or longer).
   b. Business Demo – three Telephone Lists and three Inventory Lists.

Radio Shack
A DIVISION OF TANDY CORPORATION
1801 S.Beach, Ft. Worth, Tx 76105 (817)390-3561

May 5, 1979

MEMO

TO: Distribution List H

cc: C. Phillips, Dr. Patterson

FROM: Jim Johnston-Tech Support

SUBJECT: Twisted Wire Pair, As Used with the Screen Printer (26-1151)

(Reference Service Information Bulletin # 1131)

If a screen printer is to be used with the twisted wire pair the terminators on the $\overline{RAS}$ line only, must not be installed.

Installation of the $\overline{RAS}$ terminators will result in improper operation of the screen printer.

Radio Shack
A DIVISION OF TANDY CORPORATION
1801 S.Beach, Ft. Worth, Tx 76105 (817)390-3561

May 5, 1979

MEMO

TO: Distribution List H

cc: C. Phillips, J. Roach, J. Shirley,
J. Mortenson, F. Withers

FROM: George Voltz

SUBJECT: Twisted Pair Cable Installation

(Reference Service Information Bulletin # 1131)

Each repair center has received S.I.B. #1131 concerning the twisted pair cable (Subject: Expansion Interface "Noise"). The Radio Shack part number for these cables are:

AW-2372 = Male connector for Expansion Interface

AW-2373 = Female connector for C.P.U.

AW-2369 = Both male and female as a set

Charges for this installation will be handled in the following manner:

1.) Amount to charge (Note - all charges are not to be discounted. Tech's commision equals total charge.)

a.) The charge for installation of the twisted pair on both C.P.U. and E.I. Boards will be $9.50.

b.) The charge for installation of the female portion only on the C.P.U. will be $6.00.
(Note - in the future all E.I.'s are going to be shipped with the female part of the twisted pair

already installed. The male part will also be shipped with the E.I. for installation on the C.P.U.)

c.) NO - Charge for parts.

2.) How To Charge

a.) The twisted pair installation will be No- Charge to the store and customer.

b.) All installations will be charged to Dept. 0059 by the Repair Centers. The repair tag #, store #, customers name (if avaiable), catalog #s and date of installation will be listed on each ICRT (see attached example I.) One copy of the ICRT will be mailed to:

Tandy Advanced Products
6363 Grapevine Hwy.
Ft. Worth, Texas 76118

ATTN: Fred J. Withers

The copy of the ICRT going to T.A.P. will be mailed the same day the installation is made.

Radio Shack
A DIVISION OF TANDY CORPORATION

INTRA-COMPANY REPAIR TRANSFER

SO- 013128

SHIP AND CHARGE TO		REPAIRED BY & CREDITED TO	
STORE NUMBER	LOCATION	SHOP NUMBER	LOCATION
0059		0804	

DATE SHIPPED	CHECKED BY	PACKED BY	SHIPPED VIA

TICKET NO.	CATALOG NO.	DESCRIPTION		CUSTOMER	PARTS	LABOR
P479641	26-1141	8305	4-5-79	Jim James	N/C	-
P479642	26-1006	8305	4-5-79	Jim James	N/C	9.50

CIAL INSTRUCTIONS

POSTAGE/UPS/FRT	--
TOTAL PARTS	N/C
% TOTAL LABOR	N/A
PACKING CHARGE	N/A
TOTAL	9.50

ACCOUNTING

catalog number AW-2369

Radio Shack®

COMPUTER SERVICES
TECHNICAL SUPPORT

205 N.W. Seventh Street
Fort Worth, TX 76106

(817) 390-3810

DATE: May 11, 1979

TO: All Repair Centers

FROM: National Technical Support

TECH TIP # 18

PRODUCT: TWISTED-PAIR CABLES FOR CPU/EI

PROBLEM/SYMPTOM:

After the twisted-pair cable is mounted on the EI board, pressure between the EI PC board and the case of the RS232 compartment can cause the IC pins to be pressed through the cable's insulation and short against the shield.

SOLUTION:

Before remounting the EI PC board, cut the pins off flush with PC board and carefully route the cable where it can lay against board without contacting any IC pins.

Tech Support Rep.	Approval	Engineer
JB		
Jerry Ballard	Paul Huff Director of Computer Services	

catalog number

Radio Shack®

COMPUTER SERVICES
TECHNICAL SUPPORT

205 N.W. Seventh Street
Fort Worth, TX 76106

(817) 390-3810

DATE: May 11, 1979

TO: All Repair Centers

FROM: National Technical Support

TECH TIP # 19

PRODUCT: RS-232C DIAGNOSTIC TEST PROGRAM

PROBLEM/SYMPTOM:

The current RS-232C diagnostic test program will not run with expansion interfaces with less than 16k bytes of RAM in the interface.

SOLUTION:

A new version is being written to run with Ø k expansion interfaces and will be released upon approval.

Tech Support Rep.	Approval	Engineer
Tom King	Paul Huff Director of Computer Services	

catalog number 26-1160, 1161

Radio Shack®

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TECHNICAL SUPPORT

205 N.W. Seventh Street
Fort Worth, TX 76106

(817) 390-3810

DATE: May 29, 1979

TO: All Repair Centers

FROM: National Technical Support

TECH TIP # 20

PRODUCT: 26-1160, 26-1161

PROBLEM/SYMPTOM:

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. Problem is most noticeable on drives that have been properly aligned, yet still exhibit lost data during read and disk I/O errors.

Attached sheet gives results of fix.

SOLUTION:

Install a Ø.Ø1 ufd capacitor in parallel with a 2.2 megohm resistor from the ground lug on the back of the chassis to the closest ground foil on the power supply printed circuit board.

Component specs:
resistor - 2.2 megohm, ± 1Ø%, carbon composition, 1/8 or 1/4 watt
capacitor - Ø.Ø1 ufd, 5Øv, ceramic disk +100%, -20%

Tech Support Rep.	Approval	Engineer
Tom King	Paul Huff Director of Computer Services	

7879
Technical Support

April 17, 1979
Jerry Ballard

RESEARCH SHEET

SUBJECT: Noise on Chassis of Disk Drive

EQUIPMENT: 16k Level II CPU, 32k EI, Disk Drive (3 units), Display Monitor, 465 Tektronix Scope

METHOD: Induced noise on disk drive chassis by setting drive on left side of Monitor in flyback field. Data taken from Pin 27 of FDC Chip.

First test was checking jitter of data pulse on 3 Disk Drives at certain distances from Monitor. Second test was the result of both fixes for problem.

Distance from Monitor	Data Jitter		
	Drive #1	Drive #2	Drive #3
Monitor turned off (no noise)	260 ns	240 ns	220 ns
Monitor on - Drive directly against Monitor	820 ns	900 ns	880 ns
1 inch	660 ns	780 ns	720 ns
2 inches	520 ns	620 ns	580 ns
3 inches	440 ns	520 ns	490 ns
4 inches	380 ns	460 ns	420 ns
5 inches	340 ns	380 ns	370 ns
6 inches	300 ns	340 ns	320 ns
7 inches	280 ns	290 ns	280 ns

Drive Directly Against Monitor		Data Jitter	
		before fix	after fix
Drive #1	.01 µf Cap.	820 ns	265 ns
Drive #2	.01 µf Cap.	900 ns	250 ns
Drive #3	.01 µf Cap.	880 ns	230 ns
Drive #1	earth ground	820 ns	260 ns
Drive #2	earth ground	900 ns	240 ns
Drive #3	earth ground	880 ns	220 ns

catalog number 26-1205

Radio Shack®

COMPUTER SERVICES
TECHNICAL SUPPORT

205 N.W. Seventh Street
Fort Worth, TX 76106

(817) 390-3810

DATE: May 31, 1979

TO: All Repair Centers

FROM: National Technical Support

TECH TIP # 21

PRODUCT: Cassette Recorder CTR-80

PROBLEM/SYMPTOM:

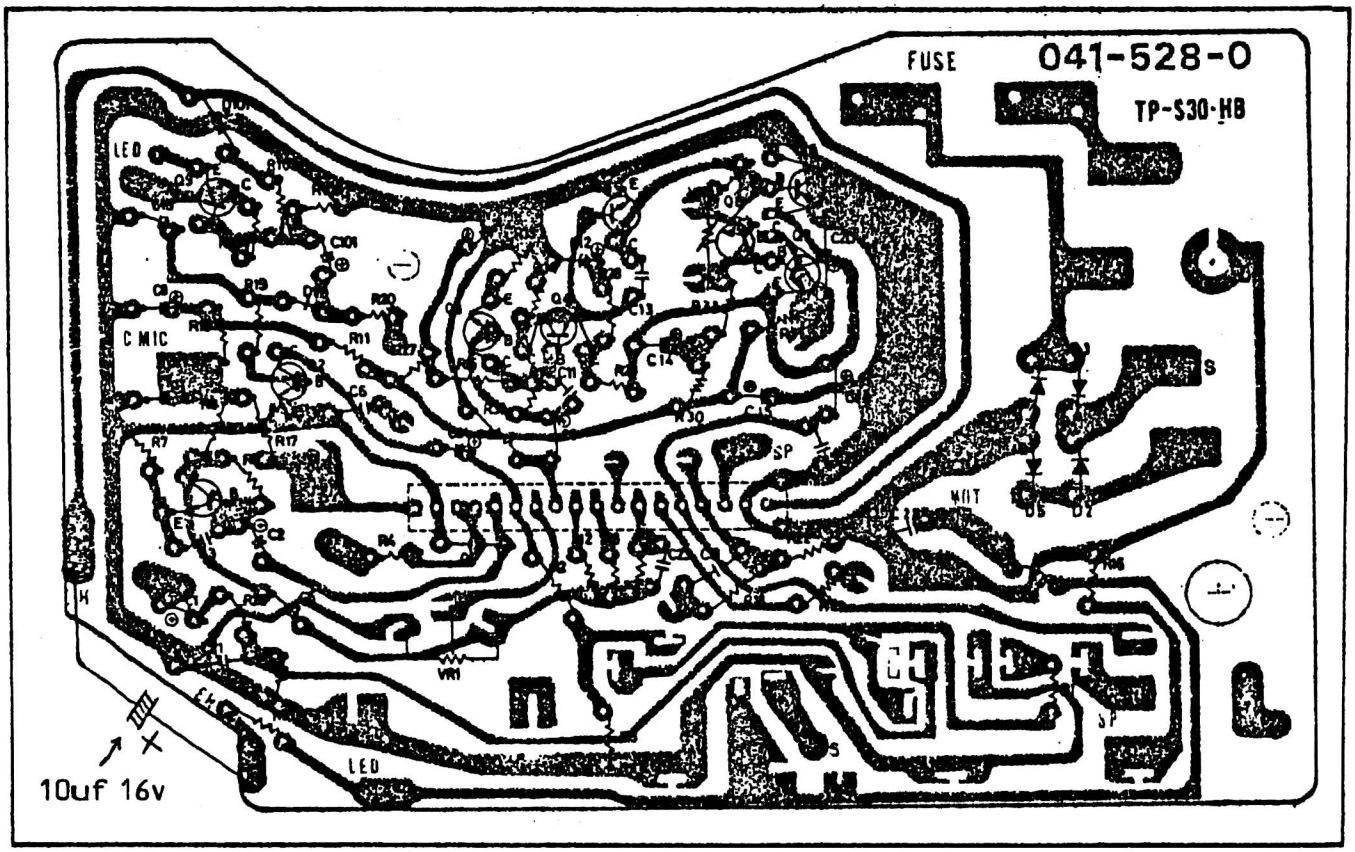
Hitting RESET during a CLOAD or turning on and off the cassette recorder while in PLAY position, will cause a glitch on the tape. If this occurs within a program, the program will no longer load.

SOLUTION:

The fix is to install an 10uf 16v capacitor across the erase head terminals on the PC board. Refer to attached T.S.D. memo and PC board layout for installation. This will become an engineering change in future CTR-80s. Fix should be installed on all CTR-80s with complaint.

Tech Support Rep.	Approval	Engineer
JB	PHH	
Jerry Ballard	Paul Huff Director of Computer Services	

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



Radio Shack®
A Division of Tandy Corporation

TANDY SYSTEMS DESIGN 817-390-3011
1100 ONE TANDY CENTER, FORT WORTH, TEXAS 76102

MAY 25 1979

DATE: MAY 24, 1979

MEMO TO: PETE FALCONE, JOHN PATTERSON

COPIES TO: JON SHIRLEY, PAUL HUFF, GEORGE VOLTZ, CHRIS KLINE

FROM: T.S.D. PETE HAAGEN

SUBJECT: ERASE HEAD TAPE GLITCHES WITH CTR-80

It was observed that by turning on and off the CTR-80 using the remote jack and with the recorder in the play position creates spikes onto the tape. These spikes are of a size and magnitude so as to be confused as data pulses.

This problem could occur anytime you would have a bad cassette load and the cassette is turned off in the middle of the program.

The fix is to add an 10uf 16V capacitor (an axial seems to work fine) across the erase head (EH) terminals on the PC board. The + lead would go to the EH terminal closest to the edge of the plastic case.

TSD strongly recommends that this additional capacitor be added as an immediate running change and also used on any CTR-80's in repair. This fix should help customers who have had tapes that all of a sudden do not load but they did load before. The problem seems to be a problem only with the CTR-80.

P H Haag

Radio Shack
A DIVISION OF TANDY CORPORATION

June 19, 1979

MEMO

TO: All Repair Centers, Computer Repair Centers
cc: Coordinators, C. Tully, R. Garboski, R, Krantz

FROM: George Voltz

SUBJECT: Flat Rate Charges for CTR-80

In reference to Tech TIP 21 for the CTR-80 Cassette Recorder we are automailing some of the 10uf 16V capacitors to all repair centers. This change effects units before date code 2A9. A flat rate for adding this modification will be a temporary charge of $6.50 until further notice.

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205 N.W. Seventh Street
Fort Worth, TX 76106

(817) 390-3810

CONFIDENTIAL

catalog number
26-1006

DATE: June 8, 1979

TO: All Repair Centers

FROM: National Technical Support

TECH TIP # 22

PRODUCT: TRS-80 CPU, Modification for the FQE (DISD) Software

---

PROBLEM/SYMPTOM:

The following is the instructions for modifing the TRS-80 CPU for operation of the software by the Foundation of Quality Education (Dallas Independent School District Software). This modification is highly CONFIDENTIAL and should not be released to anyone.

SOLUTION:

Procedure for component side of board (see Figure 1):

1.) Cut the top etch between Z43, pin 1 and Z44, pin 14.

Procedures for foil side of board (see Figure 2):

1.) Cut the etch between Z59, pin 14 and Z44, pin 14, near pin 14 of Z44.
2.) Connect jumper wire from Z44, pin 14 to Z44, pin 8.
3.) Connect jumper wire from Z43, pin 1 to Z59, pin 14.

Procedure to test proper operation of the modification, preform the following steps:

1.) Push SHIFT →)
2.) CPU should go into 32 character mode, if not, check etch cuts and jumper wire from Z43 to Z59.
3.) Push CLEAR.
4.) Type PRINT INP (255) (ENTER).
5.) If valve displayed is 63 modification is good if not, recheck connections.

Tech Support Rep.	Approval	Engineer
JB	J Johnston	
Jerry Ballard	Paul Huff	

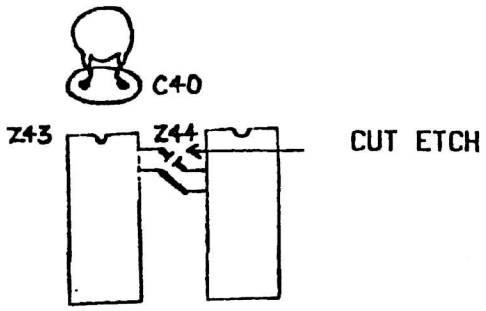

FIGURE #1

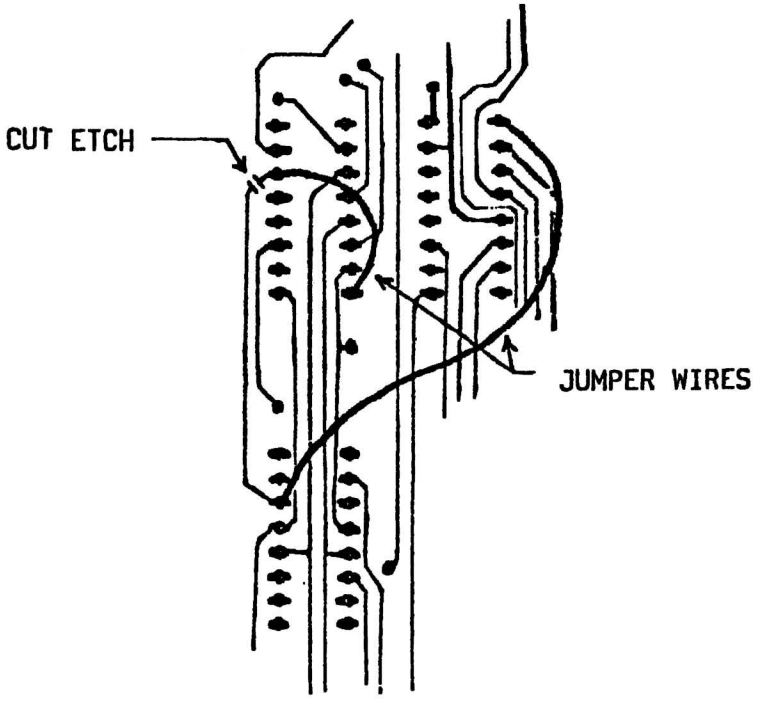

FIGURE #2

Radio Shack®
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205 N. W. 7th FORT WORTH, TEXAS 76106
(817) 390-3583 (800) 433-1679

DATE: June 12, 1979

TO: All Repair Centers

FROM: National Technical Support

TECH TIP #23

PRODUCT: 'DISK DIAGNOSTIC PACKAGE'

The 'Disk Diagnostic Package' provides the technician with all the current disk stored diagnostics on one diskette.

With this package you should receive a diskette with the following programs:

SA809/CMD

RS232D/CMD

DISKDG/CMD

MEM4/CMD

In addition, the package contains instructions for using the diagnostics and a cassette tape, 'RS232T', for checking the RS232 (26-1145) on non-disk systems.

Note: The disk programs are stored on TRS-DOS, version 2.1. DO NOT ATTEMPT TO COPY SA809/CMD TO TRS-DOS 2.2! This program is not compatible with version 2.2. A 2.2 compatible version of SA809/CMD will be released upon completion.

Tech Support Rep.	Approval	Engineer
Tom King	Paul Huff Director of Computer Serv.	

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(817) 390-3583 (800) 433-1679

catalog number 26-0305

DATE: June 19, 1979

TO: All Repair Centers

FROM: National Technical Support

TECH TIP #: 24

PRODUCT: 26-0305, DISKETTE

PROBLEM/SYMPTOM: Disk I/O Failures

Disk I/O "parity" errors could be caused by a defective, early version, diskette. It can be identified by the color and texture of surface (a dull, light brown color). An improved style is now in stock under the same catalog number and will replace the old style on a "next order" basis. It can be identified by it's darker, polished surface.

SOLUTION:

Test a possible defective diskette surface, by using the "Disk DG/CMD Exerciser". Select the "C" test and perform the soft and hard sector error test. If errors exist, replace the diskette with the new style and retest.

TECH REP.	APPROVAL	ENGINEER
	PAUL HUFF Director of Computer Services	

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Fort Worth, TX 76106
(817) 390-3810

catalog number

DATE: June 26, 1979

TO: All Repair Centers

FROM: National Technical Support

TECH TIP # 25

PRODUCT: 26-1151 Screen Printer

PROBLEM/SYMPTOM:

Vertical print positioning too high or too low on paper. Sometimes, bottom line of video screen text will appear at top of print out.

SOLUTION:

Upon opening screen printer case, find the cover pointed out in Figure 1. Removal of this cover will reveal a thin disk with a set screw securing it to the motor shaft. Loosen the set screw and reposition the disk one way or the other. Tighten the set screw and try a print out. Adjust again as necessary to position start of text to desired print position.

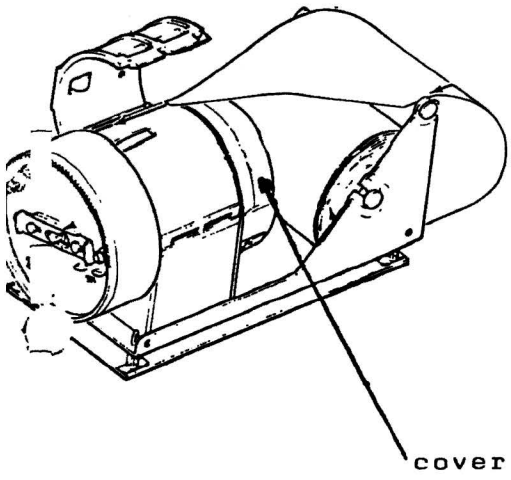

Figure 1

Tech Support Rep.	Approval	Engineer
Stephen Apple	Paul Huff Director of Computer Services	

catalog number 26 - 1160

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COMPUTER SERVICES
TECHNICAL SUPPORT

205 N.W. Seventh Street
Fort Worth, TX 76106

(817) 390-3810

DATE: July 10, 1979

TO: All Repair Centers

FROM: National Technical Support

TECH TIP # 26

PRODUCT: SA400 DISK DRIVES

PROBLEM/SYMPTOM:

Belt Replacement

SOLUTION:

The only suitable replacement belt for the SA400 disk drive is RS part number B6397. 8-track tape player belts are not a satisfactory replacement.

Tech Support Rep.	Approval	Engineer
Tom King		
TOM KING	PAUL HUFF DIRECTOR OF	

Radio Shack
A Division of Tandy Corporation

EXECUTIVE OFFICES 817-390-3011
1600 ONE TANDY CENTER, FORT WORTH, TEXAS 76102

June 22, 1979

To: Distribution Lists A, B, D, E, F, H, J

From: R. Keto

Subject: Cassette Loading, Buffered Cable, CTR-80, Modifications

---

The above modifications to the TRS-80 Model I are performed at no cost to the customer. Warranty has no effect. The store will be charged:

Cassette Load	$13.00
Twisted Pair	No cost to stores
Buffered Cable	$26.00
CTR-80 Capacitor (Date code before 2A9)	$ 6.50

Customer modified units may have the above modifications installed by repair. This again will be at no cost to the customer. The cost to the store is the same as shown above.

The repair center, on units with customer modification, will warranty only the modification they install and will do no other work.

GV:vr

catalog number 26-1140

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205 N.W. Seventh Street
Fort Worth, TX 76106

(817) 390-3810

DATE: June 29, 1979

TO: All Repair Centers

FROM: National Technical Support

TECH TIP # 27

PRODUCT: Expansion Interface (26-1140)
Disk Drive (26-1160)

PROBLEM/SYMPTOM:

Disk system will not do a back up (Drive Ø to Drive Ø) past track 32 (approximately).

SOLUTION:

Replace R15 (200 KΩ) with a 270 KΩ resistor. This should prevent the one shot (#29) from timing out during an inner track read or write.

Tech Support Rep.	Approval	Engineer
Jim Johnston	Paul Huff Director of Computer Serv.	

catalog number 26-1151

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205 N.W. Seventh Street
Fort Worth, TX 76106

(817) 390-3810

DATE: June 29, 1979

TO: All Repair Centers

FROM: National Technical Support

TECH TIP # 28

PRODUCT: Screen Printer

PROBLEM/SYMPTOM:

#1. Weak Print

#2. Tractor tracks in center of paper

SOLUTION: (See attached for more information)

#1. (a.) Carefully bend the three sets of print brushes up to just under the window of the print head.

(b.) Resistive connection at the brush on the paper ground roller (inside the unit).

#2. Replace grounding roller.

Tech Support Rep.	Approval	Engineer
J. Johnston	Dave Peacock Manager of Tech Support	

SCREEN PRINTER

There are two types of paper being supplied for the Screen Printer. They have been described as "thick paper" and "thin paper".

The so called "thin paper" has been associated with two main problems, although you may have seen these same problems with the "thick paper" (assuming the print head is clean).

1. Weak print and/or lack of completely printed characters.
2. Tractor tracks printed across the center of the paper.

The first can possibly be repaired by carefully bending the three sets of print brushes up to just under the window of the print head. This will apply more brush pressure to the paper during print operations.

The second is caused by a nonconductive build up on the paper ground roller. You can see the print pattern on the grounding roller. Replace the roller or, using a fine grade emory cloth, polish the roller until the pattern is no longer physically on the roller. Be sure the roller is polished free of scratches or the same thing will occur again.

If you have weak print and the brushes are clean and bent up to the window of the head assembly, check the grounding brush on the grounding roller. It is probably dirty or corroded.

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205 N. W. 7th FORT WORTH, TEXAS 76106
(817) 390-3583 (800) 433-1679

catalog number 14-841/ 26-1205

DATE: July 13, 1979

TO: All Repair Centers

FROM: National Technical Support

TECH TIP #: 29

PRODUCT: TRS-80 CASSETTE RECORDERS

PROBLEM/SYMPTOM: Disk I/O Failures

Azimuth Alignment for the TRS-80 Cassette Recorders

SOLUTION:

Align cassette recorder using the attached TRS-80 Cassette Recorder Azimuth Alignment and the Teac Alignment Tape MTT-113.

TECH REP.	APPROVAL	ENGINEER
JB	PH	
Jerry Ballard	PAUL HUFF Director of Computer Services	

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COMPUTER SERVICES
205 N. W. 7th FORT WORTH, TEXAS 76106
(817) 390-3583 (800) 433-1679

July 13, 1979

TO: Pete Falcone, Roy Robertson
cc: George Voltz, Paul Huff

FROM: Jerry Ballard
Technical Support Representative

SUBJECT: AZIMUTH ALIGNMENT FOR TRS-80 CASSETTE RECORDERS

I aligned the azimuth on several cassette recorders using the Azimuth Alignment Procedure and found that it did improve the loading of cassette programs.

I have written the Azimuth Alignment Procedure (developed by Ned Nedrow) as Tech Tip #28, which will be shipped along with the Teac Test Tape #MTT-113 to all Repair Centers.

I am enclosing a copy of the Tech Tip for your files.

Radio Shack
A Division of Tandy Corporation

COMPUTER SERVICES
(800) 433-1679
(817) 390-3583
900 TWO TANDY CENTER, FORT WORTH, TEXAS 76102

catalog number 26-1153

DATE: September 21, 1979

TO: All Repair Centers

FROM: National Technical Support

TECH TIP #: I:30

PRODUCT: QUICK PRINTER

PROBLEM/SYMPTOM:

Unit runs, head carriage travels, but does not print.

SOLUTION:

Check for broken -34 volt PC print at the heat sink.

Tech Support Rep.	Approval
Tom King	Paul Huff Director of Computer Services

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A Division of Tandy Corporation

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(800) 433-1679
(817) 390-3583
900 TWO TANDY CENTER, FORT WORTH, TEXAS 76102

catalog number 26-1151

DATE: September 21, 1979

TO: All Repair Centers

FROM: National Technical Support

TECH TIP #: I:31

PRODUCT: SCREEN PRINTER

PROBLEM/SYMPTOM:

The 26-1151 Screen Printer will not work with an expansion interface using the twisted pair modification.

SOLUTION:

See attached documents.

Tech Support Rep.	Approval
Stephen Apple	Paul Huff Director of Computer Service

Tech Tip #3[1]
September 21, 1979

Problem/Symptom: The screen printer is the only peripheral device currently used by the TRS-80 Model I which uses Direct Memory Access (D.M.A.). 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.

A look at the schematics in the back of the TRS-80 Technical Reference Handbook will reveal that the signals RAS*, MUX and CAS*, as well as all the address lines are ran through non-inverting tri-state buffers. When pin #1 of Z72, for example, is low (Ø volts), the signals RAS*, MUX and CAS* will be passed through the buffers (refer to schematic symbol Z72 pins 1, 4, 5, 10, 9, 2 and 3) where they will both go elsewhere on the logic board and to the expansion connector to be used by the expansion interface. If Z72 pin 1 is high (3.5 or greater volts), the outputs of these buffers will take on a high impedance nature and become "off"; the signals would then be prohibited from passing through.

When the screen printer is running a "print-out", pin 1 of Z72 is high and thus prohibits the signal RAS* from passing from pin 4 to pin 5 or point "A". With no expansion interface connected or with just the buffered cable and E/I connected, this line has the electrical appearance of being low (0 volts) when pin 1 is high; with the twisted pair cable installed, however, the signal gets "pulled up" to a high state by the added "pull-up" resistor on the expansion interface board. It is this signal being pulled high that causes our problems. The same pull-up resistors are used with the buffer/cable modification but the signal RAS* is buffered and, at the CPU, still remains a low at point "A".

What is all of this leading to? Just this: If you will look at the address decoder Z21 and at the G1 and G2 enables for that I.C., you will notice the enabling signal (a Ø volt low) must come from Z73 pin 6. In order for a low to come from pin 6 of Z73, pins 4 and 5 of the same IC must both be low. If the decoder is not enabled, the video memory will never be selected (VID* will not go low).

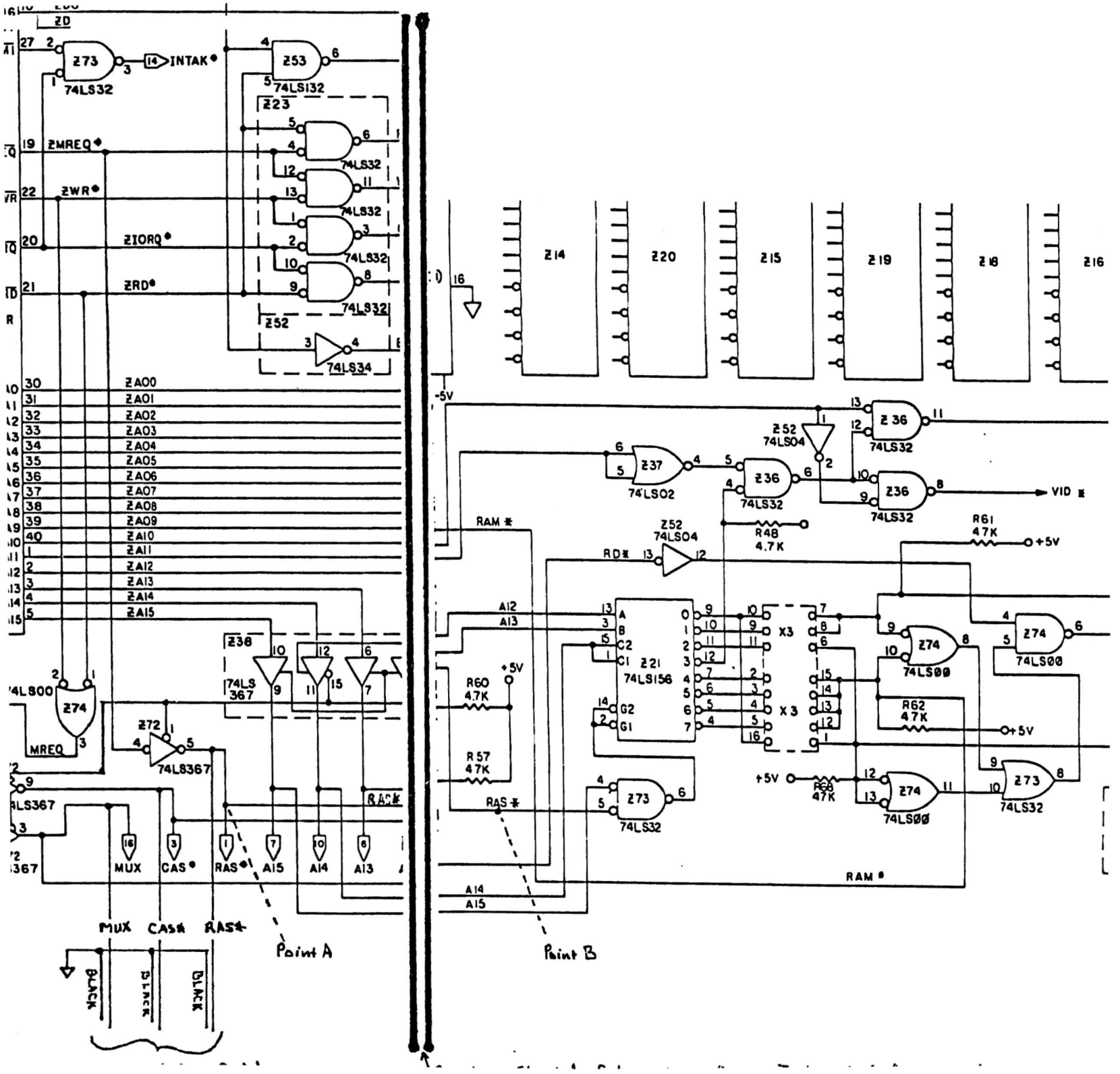
Pin 4 Z73 is A15 but pin 5 is RAS*. It can be seen from this that if pin 5 of Z73 is high, no video addresses may be decoded. If you remember, we said that RAS* was "pulled-up" to a high by the "pull-up" resistor on the expansion interface when Z72 pin 1 was high. If pin 1 of Z72 was low, however, the buffer would not be tri-stated and could follow RAS* when RAS* went low. But, when Z72 pin 1 is low, all of the address buffers would then be enabled (a condition we do not wish when using D.M.A.) so we come up with a repair for the situation.

Tech Tip #31
September 21, 1979

SOLUTION: 1) Cut the trace on the component side of the CPU board that goes to Z72 pin 1.

2) Solder a wire from Z72 pin 1 to Z72 pin 8 (ground) thus grounding pin 1 always.

This procedure will remedy the situation and be compatible with all existing TRS-80 Model I peripheral devices.


Z73
74LS32
INTAK*
Z53
74LS132
Z23
74LS32
74LS32
74LS32
74LS32
Z52
74LS34
ZMREQ*
ZWR*
ZIORQ*
ZRD*
ZA00
ZA01
ZA02
ZA03
ZA04
ZA05
ZA06
ZA07
ZA08
ZA09
ZA10
ZA11
ZA12
ZA13
ZA14
ZA15
Z38
74LS 367
Z74
74LS00
MREQ
Z72
74LS367
MUX
CAS*
RAS*
A15
A14
A13
RAS
Point A
MUX
CAS*
RAS*
BLACK
BLACK
BLACK
Z14
Z20
Z15
Z19
Z18
Z16
-5V
Z52
74LS04
Z37
74LS02
Z36
74LS32
Z36
74LS32
VID *
RAM *
R48
4.7K
R61
4.7K
+5V
RD*
Z52
74LS04
A12
A13
Z21
74LS156
X3
X3
+5V
R60
4.7K
R57
4.7K
R62
4.7K
+5V
Z74
74LS00
Z74
74LS00
Z74
74LS00
Z73
74LS32
Z73
74LS32
RAS *
RAM *
A14
A15
Point B

Radio Shack
A Division of Tandy Corporation

COMPUTER SERVICES
(800) 433-1679
(817) 390-3583

900 TWO TANDY CENTER, FORT WORTH, TEXAS 76102

catalog number 26-1145

DATE: September 27, 1979

TO: All Repair Centers

FROM: National Technical Support

TECH TIP #: I:32

PRODUCT: RS-232-C

PROBLEM/SYMPTOM:

Intermittent connector contact

SOLUTION:

NOTE: This fix is to be used only as required, and is not a mandatory fix for all units.

I. Use fine emery cloth and lightly polish connector pad fingers on the RS232 board (do not use steel wool). Be certain that there is no solder masking covering the connector pads.

II. Using a soldering iron with a 1/16 inch tip or smaller, 600 or 700 degree tip, flow solder the connector pads on the RS232 board. 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.

NOTE: A flow height of .003" to .010" is acceptable.

III. Before reinstalling the board, lightly polish the connector fingers with a No. 2 pencil eraser. Be careful not to polish away the plating of the connector fingers.

Tech Support Rep.	Approval
Tom King	Dave Peacock Manager of Technical Support

Tech Tip #I:
September 27, 1979

IV. Follow steps I-III on the expansion interface RS232 connection pads, for EI PCB's that have not been flow soldered.

V. Reinstall the board.

This is a recommendation from System's Design that should take care of the majority of connector problems. Should there be further difficulties with this fix, please contact Tech Support.

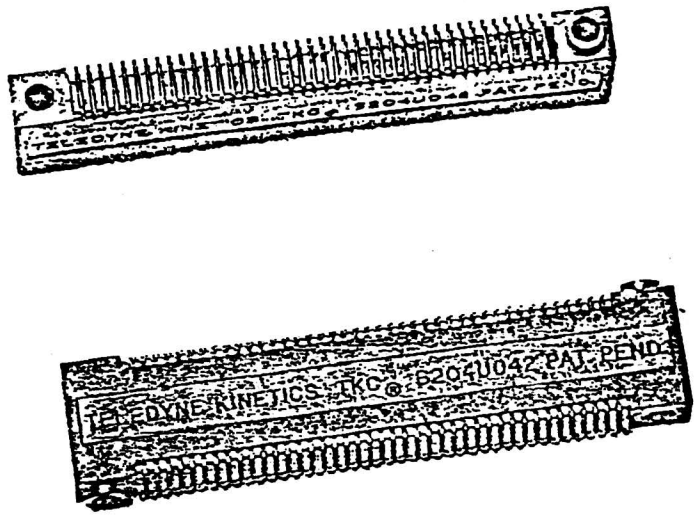
The flat rate labor charge for this repair is $10.00, and is to be charged to the store, as per George Voltz. The customer is not to be charged.

® SERIES "T" SOLDERLESS STACKING CONNECTORS: STYLE Y

NO GOLD... therefore LOW PRICE!

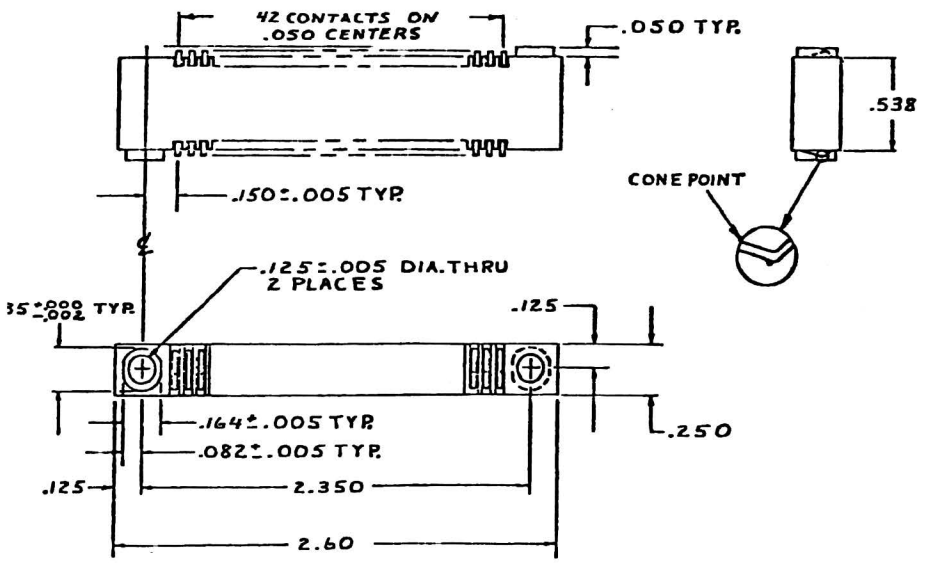
TKC Solderless Stacking Connectors are completely gold-free, yet provide equal-to-gold connection reliability for virtually every application. Low contact resistance is assured over long periods, even in hostile environments.

Key to the positive electrical connection is the "cone point" formed into each contact plus the use of tin plating. Upon connection, the point penetrates the board's matching solder pad, the pressure piercing the surface film. The resulting contact interface—tin to solder—joins nascent metal on both sides of the junction to produce a "gas-tight" connection impervious to environmental chemical stresses.



Top and front views showing cone point on each contact, holes for bolt-on assembly to boards, and arrangement of contacts top and bottom.

PART NO. B204U042



FEATURES

- NO GOLD—low price
- Easy mounting—low assembly costs
- "Cone point" contacts for positive, gas-tight connection
- Tin-plated special alloy contacts
- Rugged, glass-filled phenolic body
- Also available with optional gold-plated contacts
- CUSTOM DESIGN AT OFF-SHELF PRICES

All dimensions in inches.
Tolerances: .00 = ±.02; .000 = ±.010.
Contact-spacing tolerance non-cumulative.

15K-5/6-97 W/INSERTS

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900 TWO TANDY CENTER, FORT WORTH, TEXAS 76102

catalog number 26-1140

DATE: October 12, 1979

TO: All Repair Centers

FROM: National Technical Support

TECH TIP #: I: 33

PRODUCT: TRS-80 Expansion Interface and CPU-DIN Plug Modification

---

PROBLEM/SYMPTOM:

This Tech Tip is being sent to supplement SIB1131, which defines an expansion interface noise problem. This is a clarification of the installation instructions.

SOLUTION:

See Attached.

Tech Support Rep.	Approval
Bert Reitsma	Dave Peacock Manager of Tech Support

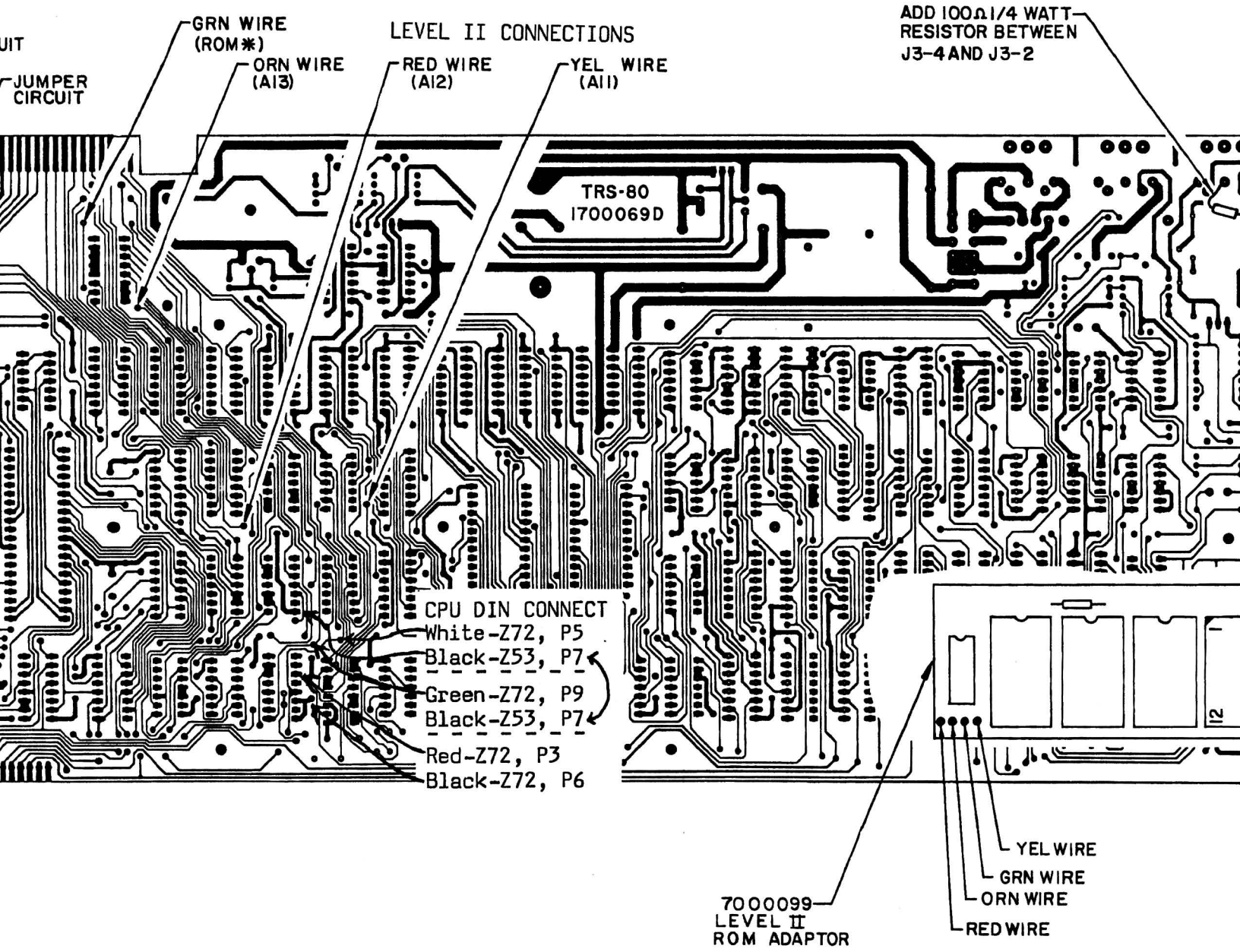

FIGURE 4. LOGIC PRINTED CIRCUIT BOARD (BOTTOM VIEW).

PARTS LIST

DESCRIPTION	QUANTITY	PART NUMBER
Assembly, Level II ROM Adaptor	1	7000099
Cassette Tape, Recorded Program Conversion, 4K, Side 1 Conversion, 16K, Side 2	1	2000063
Cassette Tape, Recorded, Data Conversion	1	2000064
Manual, Owner's, Level II	1	2980086
Manual, Level II BASIC Kit	1	2980085
Manual, Conversion Level I to Level II	1	2980087
Cable, Ribbon, 4-Conductor	1	6000912
DIP Shunt, 16-Pin	1	2100041
Resistor, Fixed, 100 ohm, 1/4 W, 5%	1	4704025
Case, Cassette Tape	3	2000009
Case, Insert, Foam	1	2960050
Cable, Connecting	1	6000913

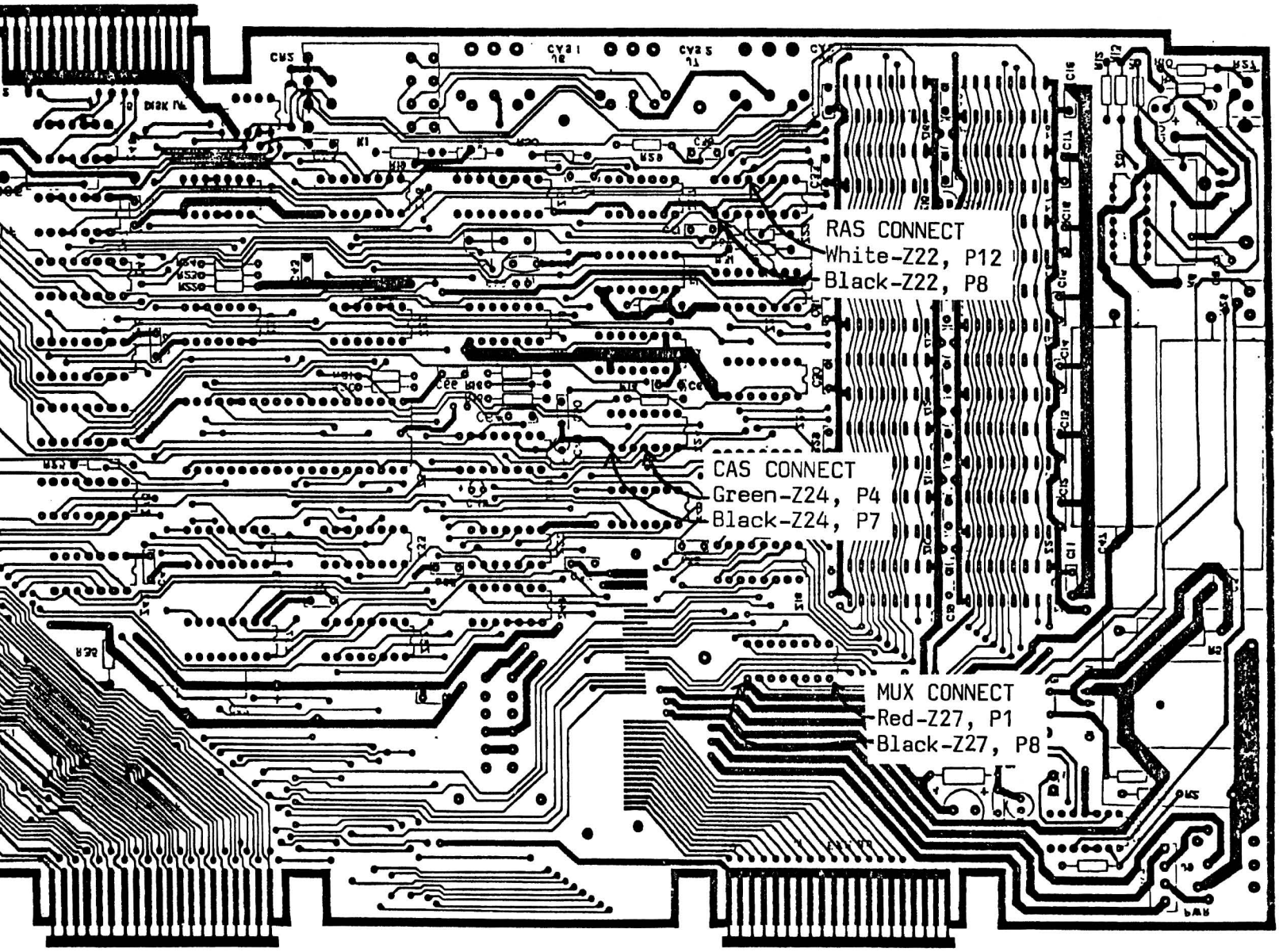

FIGURE 6. EXPANSION INTERFACE P.C. BOARD (BOTTOM VIEW)

Radio Shack

NO. 1131

Service Information Bulletin

Catalog No.: 26-1141, 26-1142

Description: TRS-80 Expansion Interface

SUBJECT: Expansion Interface "Noise".

Some TRS-80 Expansion Interface units with memory are not compatible with all TRS-80 Microcomputers and have unpredictable performance, such as loss of memory or disk restart. Units that consistently exhibit these problems should be modified to use the Buffered Expansion Interface Cable. The TRS-80 Microcomputer Logic Board must also be modified. Perform the procedures described herein.

Before performing the modifications, check for consistent memory errors. Perform the fix for random type memory errors in the Push-Pop, Business Demo or customer software programs.

SAFETY NOTE

After the Expansion Interface has been modified, the new Buffered Expansion Interface Cable must be used. If the original cable is used, the Power Supply in the Expansion Interface will be shorted. See Figure 4 for the schematic of the Buffered Expansion Interface Cable.

A Screen Printer will not function with the Buffered Expansion Interface Cable. A special adaptation of the Buffered Cable must be used in order to drive the Screen Printer.

It should be noted that poor computing practices, or improper maintenance of media or hardware (dirty read/ write head, dirt on the disk or scratched surface on the disk); or using an AC power source that is also used for powering large motors or other electrical devices (refrigerators, microwave ovens, etc.), can cause the same trouble symptoms. This modification will not prevent program crashes resulting from bad media or noise on the AC line as is generated when large motors are turned on or off.

INSTALLATION PROCEDURES FOR THE TRS-80

To install The modification, remove the CPU Logic Board from the case (follow the procedures in the Service Manual 26-1101/1102/1103 TRS-80 Modification Kits, Section I, steps 1 through 6).

NOTE

This modification applies to both "D" and "G" level CPU Logic Boards; the Cable connection points on both Boards are the same.

Procedures for Component Side of Board (see Figure 3)

1. Select the cable with the female DIN connector and connect the twisted wire pairs as described in steps 2 through 6.
2. Solder the common leads (blk) of twisted wire pairs grn/blk and wht/blk to point (1).
3. Solder the grn lead (CAS) to point (2).
4. Solder the wht lead (RAS) to point (3).
5. Solder the common lead (blk) of twisted wire pair red/blk to point (5).
6. Solder the red lead (MUX) to point (4).

Procedures for Reassembly

1. Position the CPU and keyboard PCBs into the lower case.
2. 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).
3. Reassemble the top and bottom case.

Procedures for Checkout

1. Position the TRS-80 and Expansion Interface in their normal operating locations.
2. Connect the flat cable to the TRS-80 and Expansion Interface.
3. Connect the CPU and EI Cable DIN plugs and run the following programs for checkout:

   a. Push-Pop (run for a complete line or longer).
   b. Business Demo — three Telephone Lists and three Inventory Lists.

INSTALLATION PROCEDURES FOR THE EXPANSION INTERFACE

To install the modification, remove the P.C. Board from the case and perform the following procedures:

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.

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 the resistors together in pairs (see Detail A).

DETAIL A

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

   point (A), pin 1 of Z17 (MUX)
   point (B), pin 4 of Z24 (CAS)
   point (C), 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.

6. Select the cable with the male DIN plug and connect the twisted wire pairs as described in steps 7, 8 and 9.

7. Connect the red and black, 12" twisted wire pair:

   Red to point (A), MUX to the common of the resistor pair at Z17.
   Black to the ground of the Z17 resistor pair.

8. Connect the green and black, 12" twisted wire pair:

   Green to point (B), CAS to the common of the resistor pair at Z24.
   Black to the ground of the Z24 resistor pair.

9. Connect the white and black, 12" twisted wire pair:

   White to point (C), RAS to the common of the resistor pair at Z22.
   Black to the ground of the Z22 resistor pair.

10. Reassemble the Expansion Interface and then:

    Replace the Catalog Number label (on the top of the case) with the appropriate dash one (—1) label.
    Place the WARNING label directly above the input port from the Microcomputer (on the left front of the Expansion Interface case).

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900 TWO TANDY CENTER, FORT WORTH, TEXAS 76102

catalog number
26-1001 to 26-1004

DATE: November 1, 1979

TO: Distribution List H

FROM: National Technical Support

TECH TIP #: I:34

PRODUCT: Model I CPU's

PROBLEM/SYMPTOM:

Random symptoms that persist after CPU logic board has been replaced. Problem may affect different sections of CPU, i.e. CPU, ROM, cassette operations, etc.

SOLUTION:

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. Refer to the Technical Reference Handbook, page 44 for further details of operation.

Tech Support Rep.	Approval
Tom King	Dave Peacock-- Manager, Technical Support

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900 TWO TANDY CENTER, FORT WORTH, TEXAS 76102

catalog number

DATE: November 13, 1979

TO: Distribution List H

FROM: National Technical Support

TECH TIP #: I:35

PRODUCT: New Model Expansion Interface Board

PROBLEM/SYMPTOM:

System will not backup in single drive configuration using the new model Expansion Interface board.

SOLUTION:

Replace R25 in Expansion Interface with a 270 K ohm 1/8th watt resistor.

(NOTE: In the older model Expansion Interface board the component replaced was R15.)

Tech Support Rep.	Approval
TK	
Tom King	Dave Peacock, Manager of Technical Support

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900 TWO TANDY CENTER, FORT WORTH, TEXAS 76102

catalog number 26-1160/61

DATE: December 20, 1979

TO: Distribution List H

FROM: National Technical Support

TECH TIP #: I:36

PRODUCT: Power Supplies (26-1160/61)

PROBLEM/SYMPTOM:

Intermittent or unreliable operation of the disk drive.

SOLUTION:

Look for proper 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, causing intermittent non-traceable errors. By replacing the nylon insulating screw with a metal screw and an insulator, you can avoid this happening again, thus improving reliability.

NOTE: Heat has a tendency to make the nylon insulating screw stretch.

Tech Support Rep.	Approval
Jim Johnston	Dave Peacock, Manager of Tech Support

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900 TWO TANDY CENTER, FORT WORTH, TEXAS 76102

catalog number 26-1160/61

DATE: December 21, 1979

TO: Distribution List H

FROM: National Technical Support

TECH TIP #: I:37

PRODUCT: 26-1160/61

PROBLEM/SYMPTOM:

Unreliable operation of Disk Drive or Disk system.

SOLUTION:

Ground the chassis of the drive. This can be done by replacing the older two-wire transformer with the newer three-wire grounded transformer. This has a purple ground wire which is to be attached to the ground lug on the motor speed control board.

NOTE: These findings were derived by the use of "DISKDG" Test Software. Most units on the bench undergoing "DISKDG" will not exhibit the errors because the scope probe ground is hooked to the DC return of the logic board. This will affect error generation the same as grounding the chassis.

********** THIS TECH TIP SUPERCEDES TECH TIP #20, DATED MAY 29, 1979 **********

Tech Support Rep.	Approval
JJ	Dop
Jim Johnston	Dave Peacock, Manager—Technical Support

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900 TWO TANDY CENTER, FORT WORTH, TEXAS 76102

catalog number

DATE: January 3, 1980

TO: Distribution List H

FROM: National Technical Support

TECH TIP #: I:38

PRODUCT: Tandon Disk Drive (TM-100)

PROBLEM/SYMPTOM:

Belt slipping off drive mechanism.

SOLUTION:

Some Tandon drives may have the belt inversed. The proper orientation is: Smooth rubber-like side goes down, fabric-like side goes up.

NOTE: If belt was inversed, stretching may have resulted and a new belt may be required if it continues to dislodge itself.

Tandon Drive Belt Part Number AB-6443

Tech Support Rep.	Approval
Bert Alan Reitsma	Dave Peacock, Manager of Technical Support

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(817) 390-3583
900 TWO TANDY CENTER, FORT WORTH, TEXAS 76102

catalog number 26-1160,61

DATE: January 3, 1980

TO: Distribution List H

FROM: National Technical Support

TECH TIP #: I:39

PRODUCT: Tandon Disk Drive (TM-100)

PROBLEM/SYMPTOM:

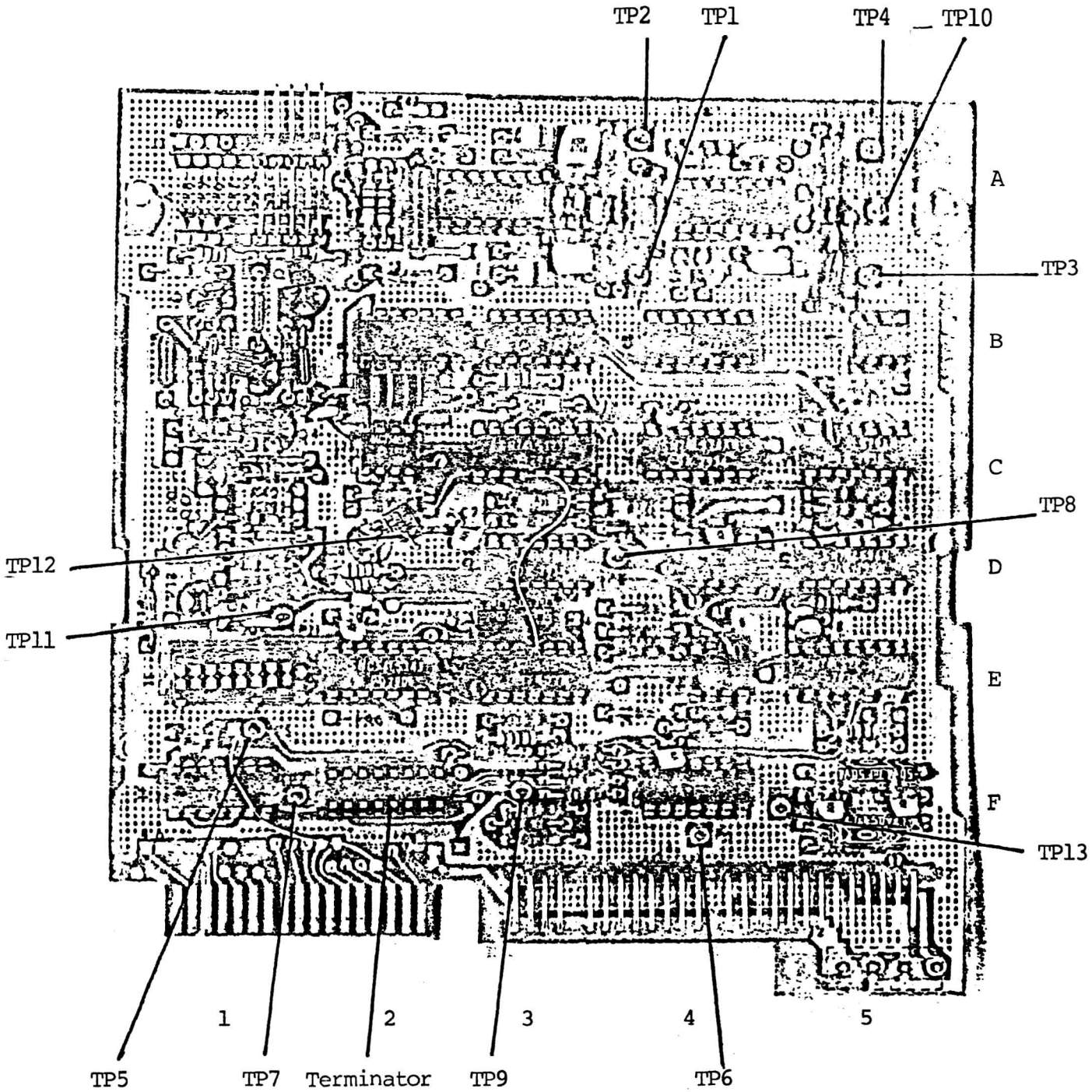
Some internal logic cards were not silk-screened and have no component I.D. markings.

SOLUTION:

Attached is a picture and layout of all test point and I.C. locations.

Tech Support Rep.	Approval
Bert Alan Reitsma	Dave Peacock, Manager of Technical Support

TEST POINTS AND I. C. LOCATIONS



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900 TWO TANDY CENTER, FORT WORTH, TEXAS 76102

catalog number 26-4001

DATE: September 21, 1979

TO: All Repair Centers

FROM: National Technical Support

TECH TIP #: II:1

PRODUCT: TRS-80 MODEL II, SINGLE DRIVE UNIT

PROBLEM/SYMPTOM:

Disk will not boot; will not restore to 00.
Several different errors may be caused by problem.

SOLUTION:

Check for proper insertion of drive terminator. Terminator can inadvertantly be plugged in one row to right or left of the proper row of pins. Also check for bent or otherwise damaged connector pins.

NOTE: This terminator should be checked before attempting any disk drive repairs.

Tech Support Rep.	Approval
Tom King	Paul Huff Director of Computer Service

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900 TWO TANDY CENTER, FORT WORTH, TEXAS 76102

catalog number

DATE: October 24, 1979

TO: Distribution List H

FROM: National Technical Support

TECH TIP #: II:2

PRODUCT: SA800

PROBLEM/SYMPTOM:

SA800 Disk Drive Alignment

SOLUTION:

SA800 Disk Drive Alignment package

This package should include:

(2) 8 inch alignment diskettes
(1) alignment program diskette
Documentation for: Shugart SA800 Disk Drive Alignment Procedure
'Exer' Alignment program

The alignment procedure documentation is the recommended SA800 alignment procedure. For assembly replacement refer to the SA800/801 Diskette Storage Drive Maintenance Manual.

Tech Support Rep.	Approval
Tom King	Dave Peacock Manager of Tech Support

SA800 DISK DRIVE ALIGNMENT PROCEDURE

RADIO SHACK TECHNICAL SUPPORT

EQUIPMENT REQUIRED: 60 MHZ DUAL CHANNEL TRIGGERED SWEEP SCOPE (OR BETTER), 'EXER' SOFTWARE ALIGNMENT PROGRAM, OR SHUGART SA809 HARDWARE EXERCISER, SHUGART ALIGNMENT DISKETTE (SA120-1) OR EQUIVALENT, BLANK DISKETTE, FEELER GAUGE (0.005", 0.010", 0.020", 0.040")

I. CARRIAGE MOVEMENT CHECK

AUTO-STEP DRIVE BETWEEN TRACKS 00 AND 76. CHECK CARRIAGE TRAVEL FOR BINDING OR OTHER ABNORMALITIES.

II. HEAD LOAD TIMING

SCOPE SETTINGS:

CH1 TO TP1 SET INPUTS TO ADD
CH2 TO TP2 INVERT ONE CHANNEL
SYNC TO TP11 TIMEBASE-10 MSEC/DIV
VERTICAL DEFLECTION-100 MV/DIV

INSERT ALIGNMENT DISKETTE
STEP CARRIAGE TO TRACK 00

ENERGIZE THE HEAD LOAD SOLENOID AND OBSERVE THE SIGNAL ON THE OSCILLOSCOPE. THE SIGNAL MUST BE AT 50% AMPLITUDE BY 35 MSEC. (REFER TO FIG. 1). IF THIS SPECIFICATION IS NOT MET, ALIGN AS FOLLOWS:

CHECK TRACKS 00 AND 76 FOR APPROXIMATELY 0.020" CLEARANCE BETWEEN THE HEAD LOAD BAIL AND HEAD LOAD ARM WITH THE HEAD ENERGIZED. THE HEAD LOAD BAIL SHOULD NOT BE LIFTING THE HEAD WHEN THE HEAD IS ENERGIZED. THIS CLEARANCE IS ADJUSTED BY THE DOWN STOP ADJUSTMENT SCREW (SEE FIG. 3).

STEP CARRIAGE TO TRACK 00 AND RECHECK TIMING. IF TIMING IS STILL NOT MET, ADJUST THE UP STOP ADJUSTMENT SCREW UNTIL TIMING IS MET (SEE FIG. 2). REPEAT ENTIRE PROCEDURE IF NECESSARY UNTIL SPECIFICATION IS MET.

III. HEAD RADIAL ALIGNMENT

SCOPE SETTINGS:

CH1 TO TP1 SET INPUTS TO ADD
CH2 TO TP2 INVERT ONE CHANNEL

SYNC TO TP12 TIMEBASE-20 MSEC/DIV
VERTICAL DEFLECTION-100 MV/DIV

STEP CARRIAGE TO TRACK 38

THE TWO LOBES MUST BE WITHIN 70% AMPLITUDE OF EACH OTHER. THE FORMULA FOR THE AMPLITUDE RATIO IS: (AMPLITUDE OF SMALL LOBE/AMPLITUDE OF LARGE LOBE)*100. STEP CARRIAGE TO 76, AND BACK TO 38 AND CHECK SPEC. STEP CARRIAGE TO 00 AND BACK TO 38 AND CHECK SPEC. THE 70% SPECIFICATION SHOULD HOLD TRUE IN BOTH CASES (REFER TO FIG 5). IF NOT, THEN ALIGNMENT IS NECESSARY.

TO ALIGN:

LOOSEN THE TWO MOUNTING SCREWS WHICH HOLD THE MOTOR CLAMP TO THE MOUNTING PLATE.

***** CAUTION: DO NOT LOOSEN THREE *****
***** SCREWS COATED WITH GLYPTOL!! *****

ROTATE THE STEPPER MOTOR TO RADIALLY MOVE THE HEAD IN OR OUT. IF THE LEFT LOBE IS LESS THAN 70% OF THE RIGHT, TURN THE STEPPER MOTOR COUNTERCLOCKWISE AS VIEWED FROM THE REAR. WHEN THE LOBES ARE OF EQUAL AMPLITUDE, TIGHTEN THE MOTOR CLAMP MOUNTING SCREWS.

CHECK ADJUSTMENT BY STEPPING OFF TRACK AND RETURNING. CHECK IN BOTH DIRECTIONS AND RE-ADJUST AS REQUIRED TO MEET SPECS.

WHENEVER THE HEAD RADIAL ALIGNMENT HAS BEEN ADJUSTED, THE TRACK 00 FLAG, TRACK 00 STOP, AND R/W HEAD AZIMUTH MUST BE CHECKED.

IV. R/W HEAD AZIMUTH ALIGNMENT

SCOPE SETTINGS:

CH1 TO TP1 SET INPUTS TO ADD
CH2 TO TP2 INVERT ONE CHANNEL
SYNC TO TP12 TIMEBASE-0.5 MSEC/DIV
VERTICAL DEFLECTION-50 MV/DIV

INSERT ALIGNMENT DISKETTE AND STEP TO TRACK 76

COMPARE OBSERVED WAVEFORM WITH FIGURE 4. THE FIRST AND FOURTH SECTORS SHOULD HAVE AMPLITUDES EQUAL TO OR LESS THAN THE MIDDLE TWO SECTORS. IF NOT WITHIN THIS RANGE, THE HEAD AZIMUTH WILL REQUIRE ALIGNMENT.

TO ALIGN: SLIGHTLY LOOSEN THE TWO RIGHT-HAND STEPPER PLATE MOUNTING SCREWS ONLY.

**** DO NOT LOOSEN THE LEFT-HAND SCREW!! ****
**** THIS WILL AFFECT THE HEAD PENETRATION ****
**** WHICH WILL REQUIRE FACTORY ADJUSTMENT! ****

PUSH THE STEPPER DOWN TOWARDS THE A.C. DRIVE MOTOR UNTIL THE FIRST SECTOR IS LARGER THAN THE SECOND SECTOR. PRY THE RIGHT-HAND SIDE OF THE STEPPER PLATE UP WITH A MEDIUM SCREW DRIVER UNTIL THE FIRST AND FOURTH SECTORS HAVE EQUAL TO OR LESS AMPLITUDE THAN THE MIDDLE TWO SECTORS. RE-TIGHTEN THE TWO RIGHT-HAND SCREWS. AFTER TIGHTENING, RECHECK THE ALIGNMENT BEING CERTAIN THAT THE OUTSIDE SECTORS ARE LESS IN AMPLITUDE THAN THE INSIDE SECTORS. PERFORM THE ALIGNMENT AGAIN IF NECESSARY. CHECK AND RE-ADJUST THE HEAD RADIAL ALIGNMENT IF NECESSARY.

V. HEAD AMPLITUDE

SCOPE SETTING:

CH1 TO TP1 SET INPUTS TO ADD
CH2 TO TP2 INVERT ONE CHANNEL
SYNC TO TP12 TIMEBASE-20 MSEC/DIV
VERTICAL DEFLECTION-50 MV/DIV

INSERT GOOD BLANK MEDIA
STEP TO TRACK 76
WRITE THE ENTIRE TRACK WITH 500 KHZ SIGNAL (2F, ALL ONES)

THE AVERAGE MINUMUM READ BACK AMPLITUDE, PEAK TO PEAK, SHOULD BE 110 MILLIVOLTS. THIS CHECK IS ONLY VALID WHEN THE ABOVE PROCEDURE IS FOLLOWED.

IF THE AMPLITUDE IS BELOW 110 MILLIVOLTS:

INSURE THAT THE DISKETTE USED FOR THIS CHECK IS NOT WORN OR OTHERWISE DAMAGED ON EITHER THE LOAD PAD OR HEAD SIDE.

REPLACE THE LOAD PAD.

CLEAN HEAD IF NECESSARY (USE ONLY DENATURED ALCOHOL)

RECHECK HEAD AMPLITUDE.

IF THE OUTPUT IS BELOW MINIMUM AND A NEW LOAD PAD AND DIFFERENT MEDIA IS TRIED AND THE OUTPUT IS SILL LOW, IT WILL BE NECESSARY TO INSTALL A NEW HEAD AND CARRIAGE ASSEMBLY.

VI. INDEX/SECTOR TIMING

SCOPE SETTINGS:

CH1 TO TP1 SET INPUTS TO ADD
CH2 TO TP2 INVERT ONE CHANNEL
SYNC TO TP12 TIMEBASE-50 MICROSEC/DIV
VERTICAL DEFLECTION-500 MV/DIV
TRIGGER EXTERNAL NEGATIVE

INSERT ALIGNMENT DISKETTE AND STEP CARRIAGE TO TRACK 01.

OBSERVE THE TIMING BETWEEN THE START OF THE SWEEP AND THE FIRST DATA PULSE (THERE WILL BE ONLY ONE PULSE ON THE SHUGART DISKETTE). THIS SHOULD BE 200 +/- 100 MICROSECONDS. IF THE TIMING IS NOT WITHIN TOLERENCE:

LOOSEN THE HOLDING SCREW IN THE INDEX TRANSDUCER UNTIL THE TRANSDUCER IS JUST ABLE TO BE MOVED. OBSERVE THE TIMING AND ADJUST THE TRANSDUCER UNTIL THE TIMING IS 200 +/- 100 MICROSECONDS. INSURE THAT THE TRANSDUCER ASSEMBLY IS AGAINST THE REGISTRATION SURFACE ON THE BASE CASTING.

TIGHTEN THE HOLDING SCREW AND RECHECK THE TIMING.

VII. RAW DATA CHECK

SCOPE SETTINGS:

CH1 TO TP16 INT TRIGGER
TIMEBASE-100 NS/DIV RESOLUTION
VERTICAL DEFLECTION-2 VOLTS/DIV

INSERT BLANK DISKETTE
STEP CARRIAGE TO TRACK 76 AND WRITE 500 KHZ SIGNAL (2F).
SET SCOPE TO OBSERVE THREE PULSES . USE SCOPE MAGNIFIER TO OBTAIN 100 NS RESOLUTION. ADJUST TRIGGER AND/OR TRIGGER HOLDOFF UNTIL A DOUBLE IMAGE OF WAVEFORM IS PRESENT (REFER TO FIGURE 7). THE TIME FROM THE LEADING EDGE OF THE WAVEFORM TO THE LEADING EDGE OF THE IMAGE WILL BE REFFERED TO AS 'T1'.

THE THIRD PULSE IS 'JITTER' AND 'T1' SHOULD BE LESS THAN 200 NS. EXCESSIVE JITTER WOULD INDICATE DRIVE TRAIN PROBLEMS, HUB OR DOOR MISALIGNMENT.

THE SECOND PULSE IS 'ASYMMETRY' AND 'T1' SHOULD BE LESS THAN

250 NS. NOTE THE ASYMMETRY AND CONTINUE PROCEDURE.

WRITE A 250 KHZ SIGNAL (1F). NOTE THE SECOND PULSE 'T1' 'ASYMMETRY' AT 250 KHZ.

IF THE ASYMMETRY 'T1' IS EXCESSIVE AT 250 KHZ AND 500 KHZ, THE DRIVE CIRCUIT BOARD PROBABLY NEEDS ALIGNMENT OR IS DEFECTIVE. EXCHANGE DRIVE LOGIC BOARD.

IF THE ASYMMETRY 'T1' IS EXCESSIVE AT ONE FREQUENCY ONLY, IT IS PROBABLY DUE TO RESIDUAL MAGNETISM, AND THE HEAD SHOULD BE REPLACED. THIS IS GENERALLY CAUSED BY PULLING THE HEAD CABLE OFF WHILE DRIVE IS POWERED-UP.

**** DO NOT DISCONNECT THE HEAD CABLE ****
**** WHILE THE DRIVE POWER IS ON!! ****

VIII. TRACK 00 FLAG

CONNECT OSCILLOSCOPE TO TP 26. SET VERTICAL DEFLECTION TO 1 VOLT/DIV AND SWEEP TO CONTINUOUS.

STEP CARRIAGE TO TRACK 01. TP 26 SHOULD BE HIGH. IF NOT HIGH, LOOSEN SCREW HOLDING TRACK 00 FLAG AND MOVE TOWARDS STEPPER UNTIL TP 26 JUST GOES HIGH.

STEP CARRIAGE TO TRACK 02. TP 26 SHOULD GO LOW. ADJUST FLAG TOWARDS SPINDLE IF NOT LOW.

CHECK ADJUSTMENT BY STEPPING CARRIAGE BETWEEN TRACKS 00 AND 02, OBSERVING THAT TP26 IS LOW AT TRACK 02 AND HIGH AT TRACKS 01 AND 00.

IX. TRACK 00 STOP

STEP CARRIAGE TO TRACK 00. VERIFY THAT CARRIAGE IS AT 00 BY CHECKING P1 PIN 42 IS MINUS (GROUND).
CHECK THAT STOP IS 0.040" +/- 0.020" BETWEEN COLLAR AND CARRIAGE. TURN POWER OFF, AND MANUALLY ROTATE LEAD SCREW CLOCKWISE UNTIL CARRIAGE STOPS. CHECK THAT STOP IS 0.020" +/- 0.010" BETWEEN COLLAR AND CARRIAGE.

IF CLEARANCES ARE NOT WITHIN TOLERANCE, CONTINUE WITH ADJUSTMENT PROCEDURE.

TURN POWER ON AND STEP CARRIAGE TO TRACK 02.

LOOSEN TRACK 00 STOP COLLAR.

GRASP END OF LEAD SCREW, IN BACK OF STEPPER MOTOR, WITH A PAIR OF PLIERS AND MANUALLY TURN LEAD SCREW CLOCKWISE TO THE TRACK -01 POSITION (NEXT DETENT POSTION ON STEPPER MOTOR).

POSITION THE STOP COLLAR AXIALLY ALONG THE LEAD SCREW SO THERE IS 0.020" +/- 0.010" BETWEEN COLLAR AND CARRIAGE. ROTATE THE COLLAR TOWARD INSIDE UNTIL THE STOP ON THE COLLAR CONTACTS THE CARRIAGE STOP SURFACE. TIGHTEN SCREW.

TURN POWER OFF AND BACK ON. CARRIAGE SHOULD MOVE TO TRACK 00. VERIFY THAT THERE IS DATA AT TRACK 00.

STEP CARRIAGE BETWEEN TRACK 00 AND 76 AND CHECK FOR ANY BINDING OR INTERFERENCE BETWEEN THE CARRIAGE, LEAD SCREW, STOP AND HEAD CABLE.

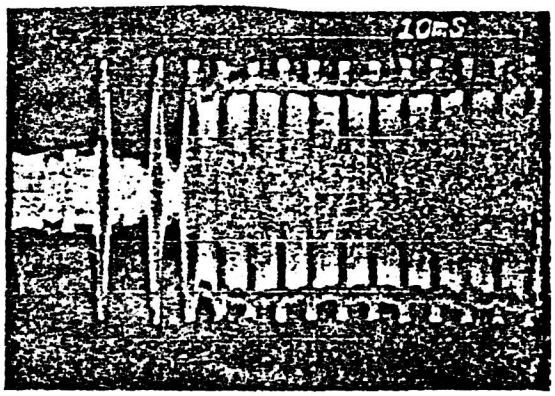


Figure 1 Head Load Timing

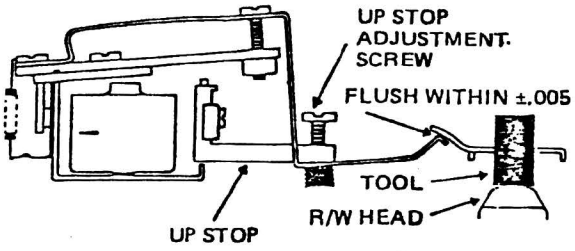


Figure 2 Up Stop adjustment

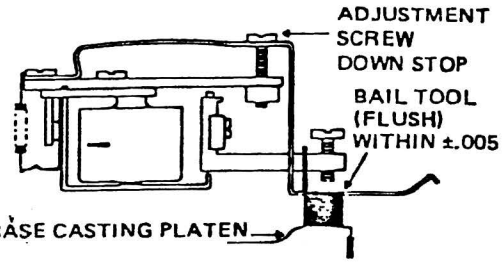


Figure 3 Down Stop adjustment

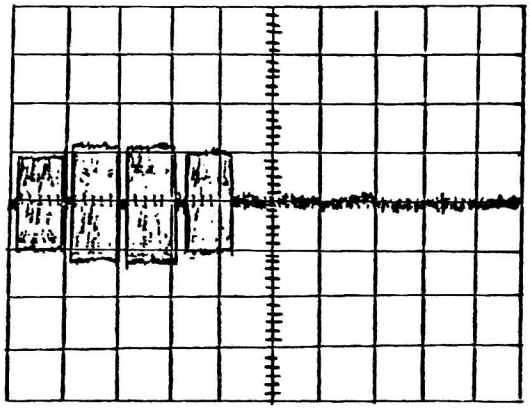
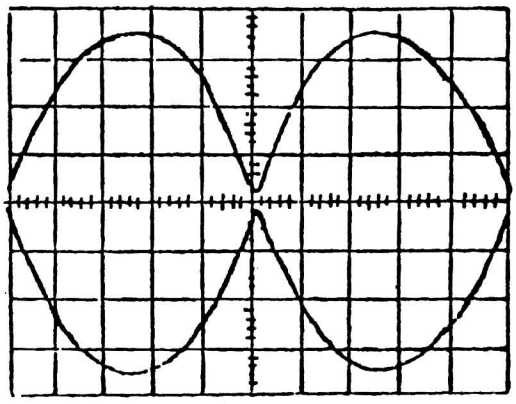


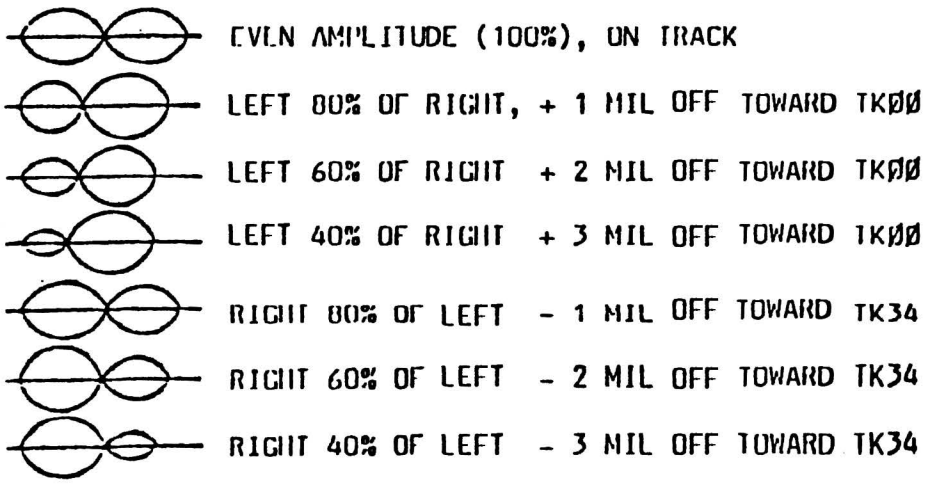
Figure 4 Head Zenith adjustment

Figure 5a.



HEAD/RADIAL ALIGNMENT

Figure 5b.



HEAD/RADIAL ALIGNMENT

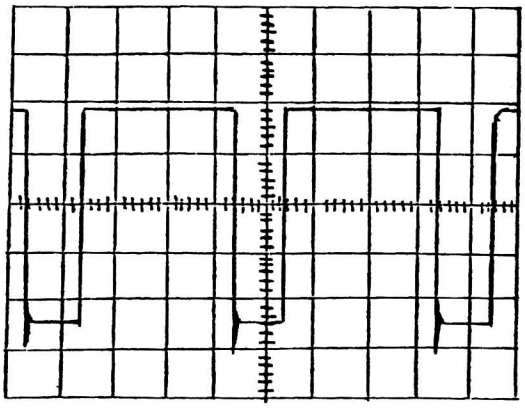


Figure 6 RAW DATA

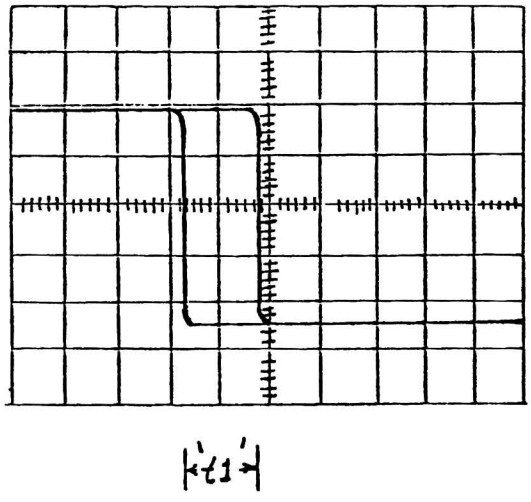


Figure 7 Raw Data with 'IMAGE'

MODEL II DISK EXERCISER VERSION 1.1
PROGRAM DOCUMENTATION

When the program starts up, the technician has the option to use any of the "menu items" on the left of the screen. Referring to "Shugart SA800 Disk Drive Alignment Procedure", note that for each section there is a menu item. As well, at all times the program is running, drive status is displayed (i.e. drive number, track number, and head status). When a number is pressed to activate a specific function, the item is highlighted for reference. Every time a menu function is activated an abbreviated specification is displayed which is reiterated in the alignment procedure. Notice also that when a blank diskette is to be inserted the word "blank" is highlighted.

*****DO NOT HIT A KEY WHEN THIS MESSAGE IS DISPLAYED UNLESS A BLANK*****
*****DISKETTE IS MOUNTED!*****

Along with the nine menu items are several functions created to aid the technician. These functions are collectively called the "executive" and may be used anytime when a specification is on the display. A description of each function follows:

1. Exit to menu: clears the display and allows execution of another menu item.

2. Restore to ØØ elastic: this moves the head to track Ø and then back to the previous track. (Refer to Step III)

3. Step to 76 elastic: this moves the head to track 76 and then back to the previous track. (Refer to Step III)

4. Next Module: executes the menu item following the one highlighted (notice that there is "wrap-around" where if number 9 is highlighted, "N" will cause number 1 to execute next).

5. Previous Module: executes the menu item previous to the one highlighted (notice that there is "wrap-around" where if number 1 is highlighted, "P" will cause number 9 to execute).

6. Head Load/Unload switch: changes the state of the head as indicated by the message at the top of the display.

7. Drive Select: selects the next drive--i.e. Ø, 1, 2, or 3 in that order. There is "wrap-around" such that a selection of 3 will select drive Ø next.

   *****IF THE DRIVE IS NOT HOOKED UP, DO NOT ATTEMPT TO SELECT IT!*****

8. Step Out: used to move the head toward track Ø. Note that the "repeat" key may be used in conjunction with the "0" key to ease stepping long distances.

9. Step In: used to move the head toward track 76. Note that the "repeat" key may be used in conjunction with the "I" key to ease stepping long distances.

10. Command Repeat: repeats execution of command. This command is especially useful in menu items 5 and 7.

One command not listed is the "break" key which aborts the program and returns to TRSDOS. Making efficient use of the program will take some time; so experiment! If any questions arise on the use of the program call:

Tahl Milburn
Technical Support

Radio Shack
A Division of Tandy Corporation

COMPUTER SERVICES

(800) 433-1679
(817) 390-3583

900 TWO TANDY CENTER, FORT WORTH, TEXAS 76102

catalog number 26-4102

DATE: November 1, 1979

TO: Distribution List H

FROM: National Technical Support

TECH TIP #: II:3

PRODUCT: 64K Upgrade Kit (Model II)

PROBLEM/SYMPTOM:

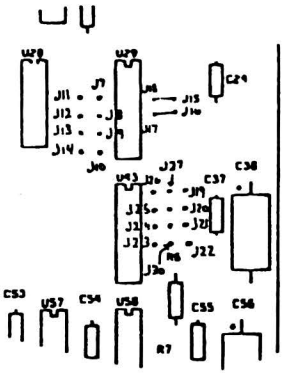
Erroneous instruction sheet. Some instructions may show incorrect jumpering for the BASIC 32K memory board (board received for the upgrade).

SOLUTION:

Attached sheet shows the correct jumper configuration. The correction is J27 should jump to J26, not J19.

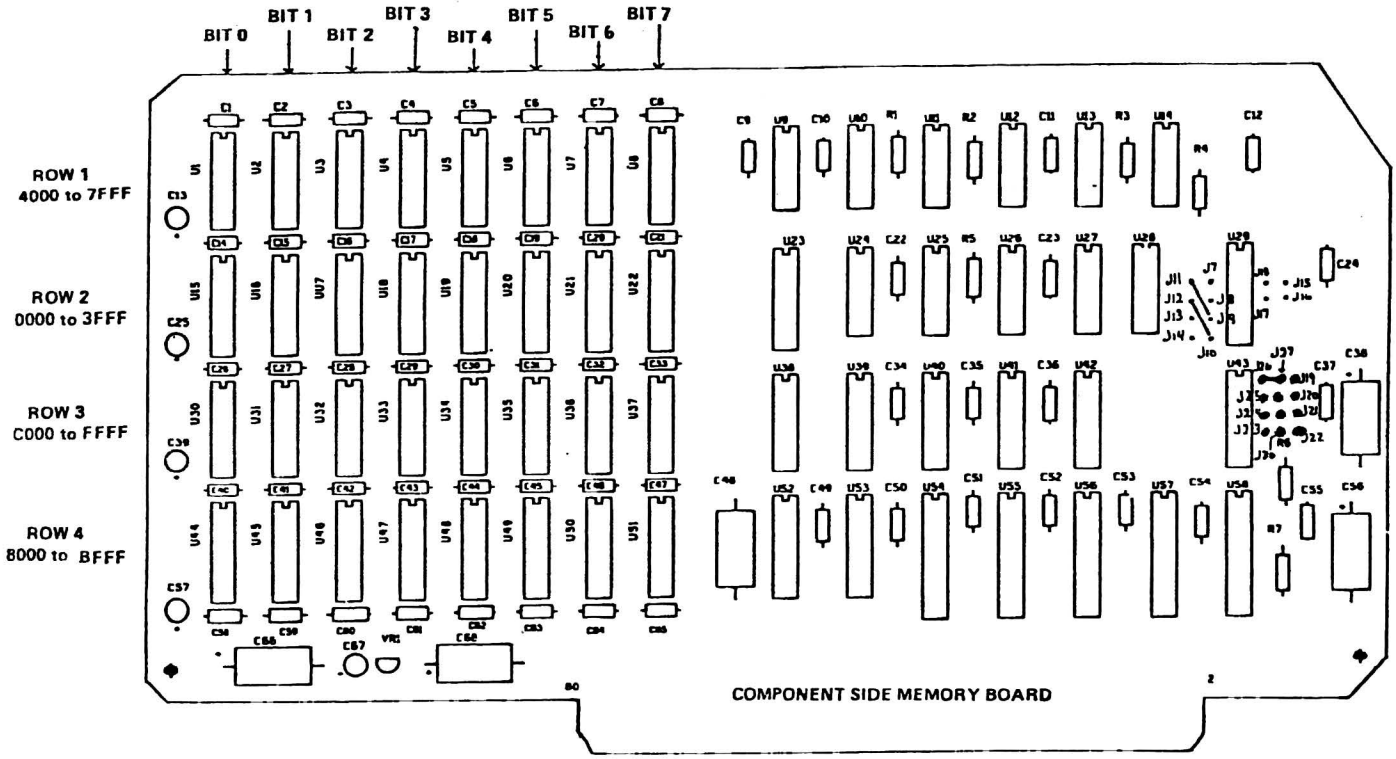
Also note that Row 4 addresses 8ØØØ to BFFF (incorrectly shown as 8000 to 8FFF).

Tech Support Rep.	Approval
Tom King	Dave Peacock-- Manager, Technical Support



Basic 32K Memory Board, Jumper Locations.

Please note that the J26 to J27 jumper wire shown below does not apply to the basic 32K Memory Board.



32K Memory Board. Jumper Locations and Address/Bit RAM Identification.

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COMPUTER SERVICES
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(817) 390-3583

900 TWO TANDY CENTER, FORT WORTH, TEXAS 76102

catalog number
SOFTIP #: . .

DATE: October 3, 1979

TO: All Repair Centers

FROM: National Technical Support

SOFTIP #: I:1
TECH TIP #: II:3

PRODUCT: 64K Upgrade Kit (Model II)

PROBLEM/SYMPTOM:

At times, certain programs (such as TERM put on disk) when executed under TRSDOS have put the computer at MEMORY SIZE?.

SOLUTION:

To avoid this problem get a DIR while under TRSDOS.

Tech Support Rep.	Approval
TM	CAP
Tahl Milburn	Dave Peacock Manager of Technical Support

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900 TWO TANDY CENTER, FORT WORTH, TEXAS 76102

catalog number
SOFTIP #:

DATE: September 28, 1979

TO: All Repair Centers

FROM: National Technical Support

SOFTIP #: I:2

PROBLEM/SYMPTOM:

Problems with EDTASM on disk.

SOLUTION:

A) Using the B command while the disk is running will put you at MEMORY SIZE?. Wait until the drive is stopped before hitting B. You will go to TRSDOS.

B) DEFS statements and multiple ORGs cannot be used unless you
   1) Load the file while in TRSDOS
   2) Use TAPEDISK or DUMP and resave it.

C) You may use 'L' notation, where L stands for any alphanumeric character, instead of an ASCll code. Example: DEFB 'E' ;Ascii for E

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Tahl Milburn	Dave Peacock Manager of Tech Support

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900 TWO TANDY CENTER, FORT WORTH, TEXAS 76102

SOFTIP #: I:3

DATE: September 26, 1979

TO: All Repair Centers

FROM: National Technical Support

SOFTIP #: I:3

PROBLEM/SYMPTOM:

Selecting drives from BASIC and keeping them selected.

SOLUTION:

While in BASIC do a POKE 14304,X

Where X is,
1 for drive Ø
2 for drive 1
4 for drive 2
8 for drive 3

to keep the drive selected for about 3 seconds. The following program allows a drive to stay on until a reset or power-down is done. You must set a MEMORY SIZE which allows the user program about 16K. This will be useful for testing or quick file access. Note that after the program has been run, it may be taken out of memory.

```
0 'SET MEMORY SIZE AT 32749
1 CLS:INPUT"DRIVE 0,1,2, OR 3 SELECTED";A
2 IFA=3THENN=8ELSEIFA=2THENN=4ELSEIFA=1THENN=2ELSEN=1
5 DEFUSR1=&H7FEE
10 FORX=&H7FEETO&H7FFF:READA:POKEX,A:NEXT
20 DATA175,17,254,127,205,16,68,201,245,62,1,50,224
25 DATA 55,241,201,246,127:POKE&H7FF8,N
30 U=USR1(H)
```

CAUTION: Keeping the drives selected for long periods of time will reduce diskette life.

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TM	
Tahl Milburn	Paul Huff Director of Comput Services

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900 TWO TANDY CENTER, FORT WORTH, TEXAS 76102

DATE: January 15, 1980

TO: Distribution List H

FROM: National Technical Support

SOFTIP #: I:4

PROBLEM/SYMPTOM:

New Model I, Level II kit #1120-1 will show ROM failure with Test 1 dated before December 1, 1979.

SOLUTION:

A new Test 1 has been cut on DOS 2.3 Directory dated December 1, 1979 or later. This will work with current and all earlier Level II kits.

Tech Support Rep.	Approval
Penny Sawyer	David A. Peacock - Manager, National Technical Support

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900 TWO TANDY CENTER, FORT WORTH, TEXAS 76102

SOFTIP #: II:1

DATE: September 28, 1979

TO: All Repair Centers

FROM: National Technical Support

SOFTIP #: II:1

PROBLEM/SYMPTOM:

Using 80 and 40 character mode in BASIC.

SOLUTION:

Use Section I once to create the user file, then every time you want to use it, key in Section II. Note that ⟨CR⟩ means hit ENTER and ∅ means hit the space-bar.

I. Go to TRSDOS READY and type the following:

DEBUG∅ON⟨CR⟩
DEBUG⟨CR⟩
MF1EA
F1
5E21F8F116ØØ194E23463EØ7CFC9ØØØØØ1Ø1ØØ
F2
S
DUMP∅CHARS∅{START=F1EA,END=F1FF,RORT=R}⟨CR⟩

II. Go to TRSDOS READY and type the following:

CHARS⟨CR⟩
BASIC∅-M:61929∅-F:n⟨CR⟩ ('n' is the amount of files)
XXXX DEFINT Z:DEFUSR1=&HF1EA (XXXX is the line number)

To use this routine equate ZZ with one of the following.

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Tahl Milburn	Dave Peacock Manager of Tech Support

Softip #II:1
September 28, 1979

SOLUTION:

Ø	4Ø character mode, reverse
1	8Ø character mode, reverse
2	8Ø character mode, normal
3	4Ø character mode, normal

and then do a X=USR1(ZZ) where X is a dummy variable.

Example: 20 ZZ=Ø:X=USR1(ZZ):'4Ø character mode with reverse

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900 TWO TANDY CENTER, FORT WORTH, TEXAS 76102

SOFTIP #: II:2

DATE: October 19, 1979

TO: All Repair Centers

FROM: National Technical Support

SOFTIP #: II:2

PROBLEM/SYMPTOM:

On power-up the video display says, "BOOT ERROR DC".

SOLUTION:

Unless this error happens on a continuous basis, this is not a hardware problem. Due to the fact that the DMA needs an extended initialization on power-up, an additional Reset may be in order to properly re-boot the Operating System. Note that TRSDOS 1.1.1 may cure the symptoms of the problem.

Tech Support Rep.	Approval
Tahl Milburn	Dave Peacock Manager of Technical Support

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900 TWO TANDY CENTER, FORT WORTH, TEXAS 76102

catalog number 26-1156

DATE: October 10, 1979

TO: All Repair Centers

FROM: National Technical Support

TECH TIP #: I/O:1

PRODUCT: Line Printer III---Field Retrofit
The following procedure should be observed on all units sent in for repair

---

PROBLEM/SYMPTOM:

Unit susceptibility to damage from power surges.

SOLUTION: Procedure 1 is to be used for all units in for repair.
Procedures 1 and 2 are necessary only to units with damaged power supplies.

Procedure 1: A) Install one rubber grommet on each of the fingers that is used to mount the wire basket to the printer.

B) Mount the provided surge resistor to the rear of the chassis, as illustrated in Figure 1. Be certain to secure the resistor to the chassis with the mounting clip provided to assure proper heat dissipation.

Procedure 2: A) Replace Q101-Q104 with kit transistors.

B) Replace fuse.

Two Retrofit kits are available from National Parts:

AXX-1004 includes all parts for Procedure 1.
AXX-1005 includes all parts for Procedures 1 and 2.

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Tom King	Dave Peacock Manager of Technical Support

SOLUTION continued:

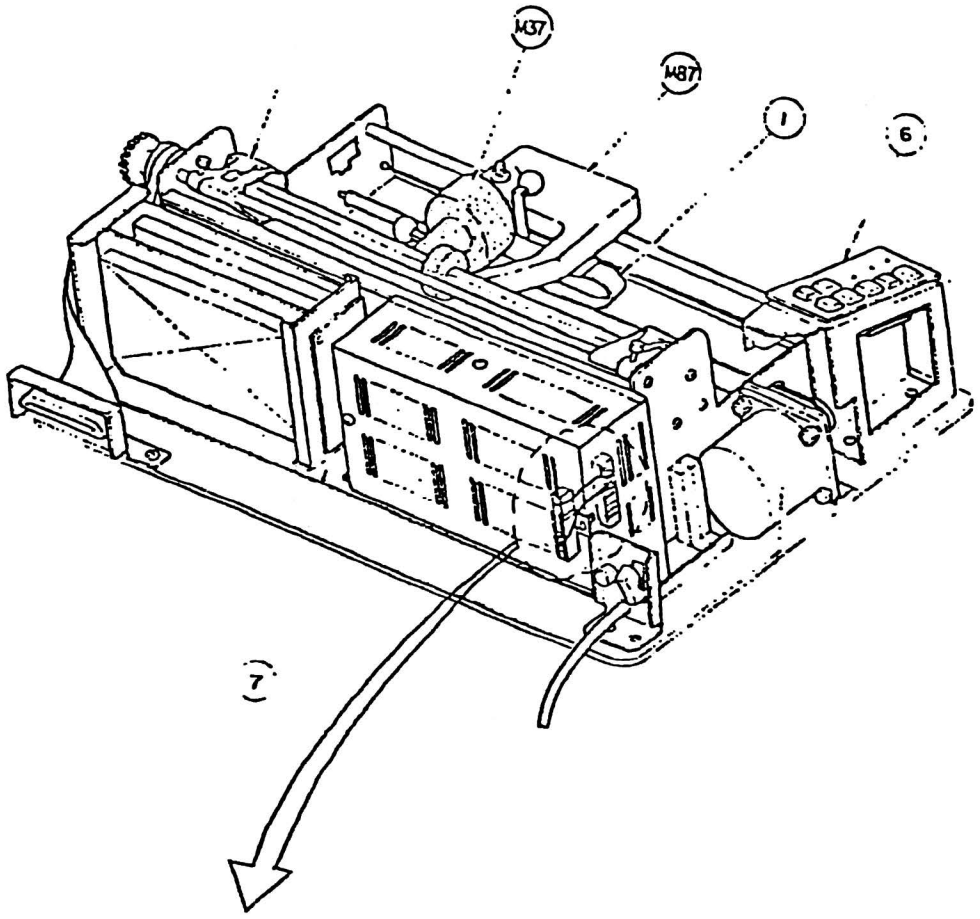
Labor for Procedure 1----------$15.00
Labor for Procedures 1 and 2---$30.00

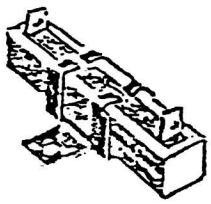
Parts----------no charge

Do not charge the store or customer for these modifications. A unit number to be billed for the retrofits will be assigned. Until notified of this number, maintain a record of all modifications.

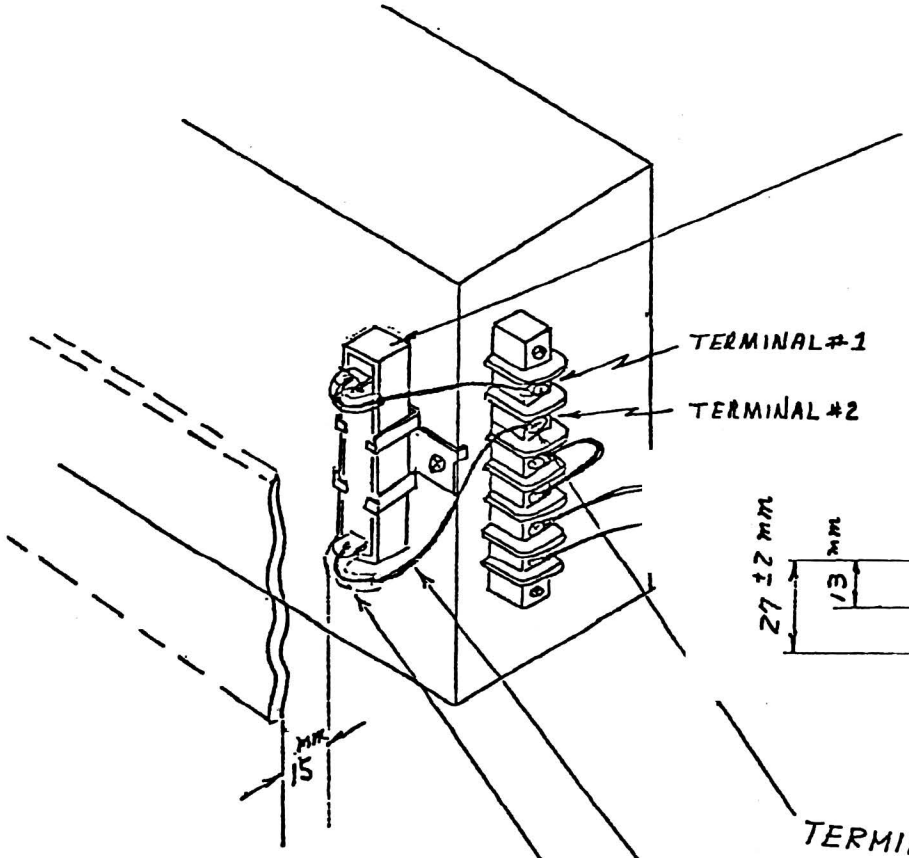
LABOR CHARGES FOR ABOVE PROCEDURES TO #0055 T.F.W.

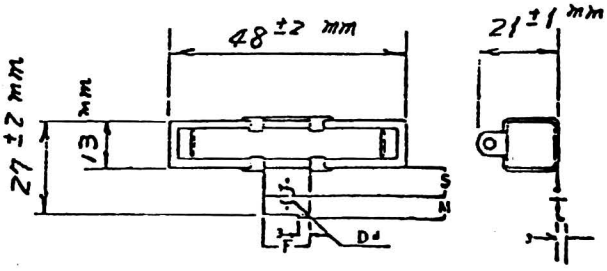
DEN P.L.H.





Rated : 15W 3Ω
TYPE : RGU15H(R) 3ΩK

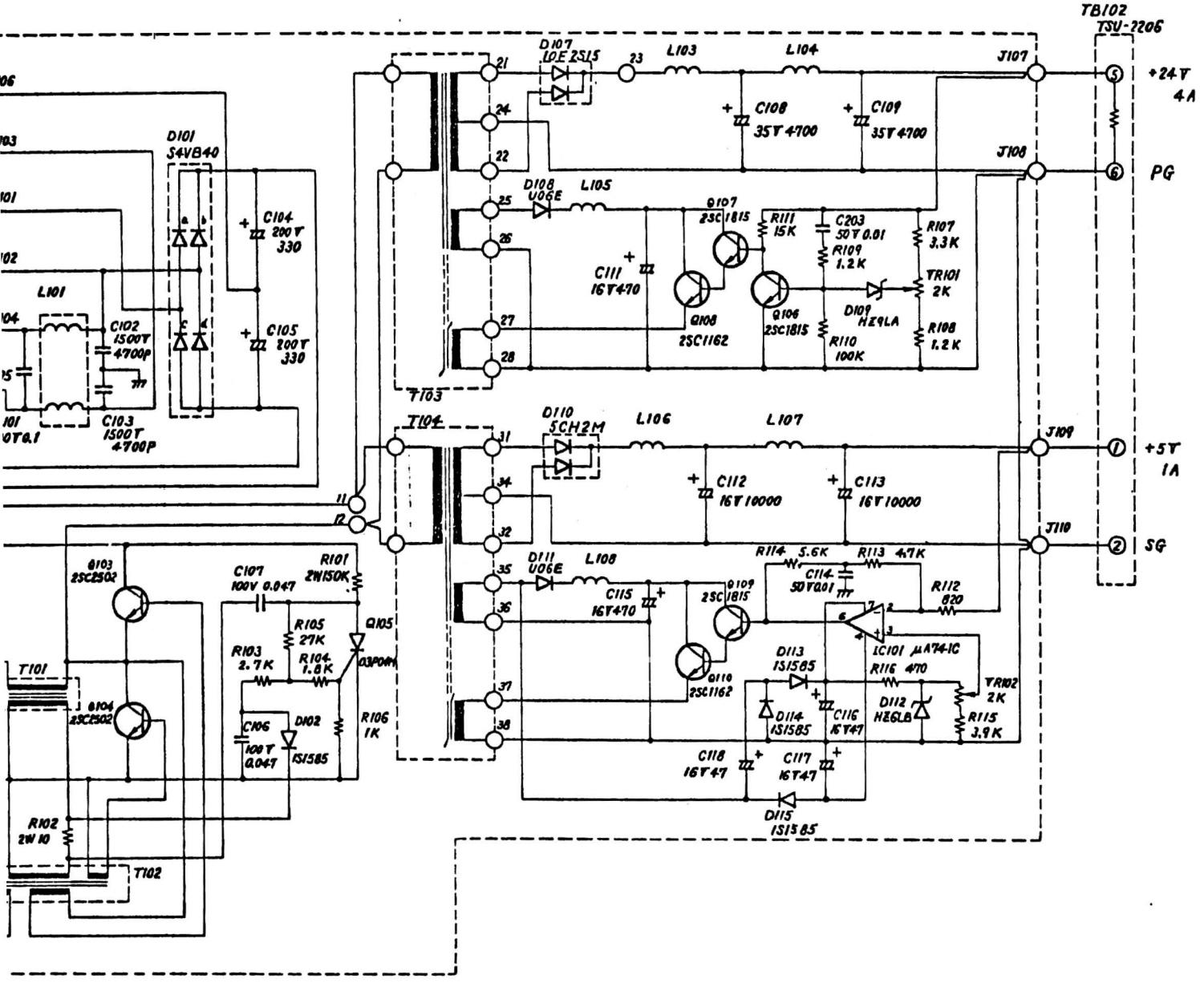




TERMINAL (170781-1 , E13288)
LEAD WIRE (AWM 3266 #18 E)
INSULATING TUBE (Penntube V-L E33531)

FIG. 1.

POWER SUPPLY LOGIC DIAGRAM



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catalog number 26-1145

DATE: October 26, 1979

TO: Distribution List H

FROM: National Technical Support

TECH TIP #: I/O:2

PRODUCT: RS-232 (Model I)

PROBLEM/SYMPTOM:

Missing components R10, R11, and C9.

SOLUTION:

Please note that we are using a new version of the baud-rate generator IC (U1Ø) that does not require a 5 volt supply. With this new chip R10, R11, and C9 are not needed (R10, R11, and C9 supply -5 volts to the BRG). The new IC may be identified by its number: BR1941-L.

The old style that requires the 5 volt supply and these components is number BR2941-L.

Removal of R10, R11, and C9 is not necessary when the BR2941-L is replaced with a BR1941-L.

Tech Support Rep.	Approval
Tom King	Dave Peacock-- Manager, Tech Support

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900 TWO TANDY CENTER, FORT WORTH, TEXAS 76102

DATE: November 1, 1979

TO: Distribution List H

FROM: National Technical Support

SUBJECT: ADDENDUM TO TECH TIP I/O:2

Please correct the first sentence under "Solution" to read:

Please note that we are using a new version of the baud-rate generator IC (U1Ø) that does not require a -5 volt supply.

The BRG does require +5 volts.

TRS-80 CASSETTE RECORDER
AZIMUTH ALIGNMENT

I. Equipment Required:

A. Good resolution Oscilloscope.

B. MTT-113 6.3KHZ Azimuth Alignment Tape.

C. Non-metallic flat point alignment screw driver.

D. 220ohm resistor.

E. Mini-Jack adaptor plug.

F. Recorder power cord.

II. Set-Up:

A. Oscilloscope

1. Time Base .5 millisec./cm.
2. Volts/Div 20 milivolts/cm.
   (x10 probe .2v)

B. Recorder

1. Insert power plug.
2. Insert mini-jack adaptor plug with 220ohm resistor across shield to center wire. (See figure 1)
3. Attach oscilloscope probe to opposite ends of resistor.
4. Insert MTT-113 tape (fast forward tape to approximately center of the tape on each side).
5. Depress "Play".
6. Set volume to show 100 milivolts peak to peak signal on oscilloscope. (See figure 2)

III. Calibration:

A. Check 100 milivolts peak to peak on labeled side of MTT-113 tape and remove tape.

B. Insert MTT-113 tape back into recorder with reverse side up.

C. Check milivolts output.

1. Peak to peak voltage should read 100 milivolts (5cm). (DO NOT CHANGE VOLUME SETTING)
2. Peak to peak voltage should be equal to opposite side and not fluctuate in amplitude. (MAXIMUM ALLOWABLE DIFFERENCE IS $\pm$ 10 milivolts or $\pm$ .5cm)

D. If recorder is out of tolerance insert alignment tool through the hole on the LOGO and adjust to obtain equal amplitude readings from both sides of the tape.

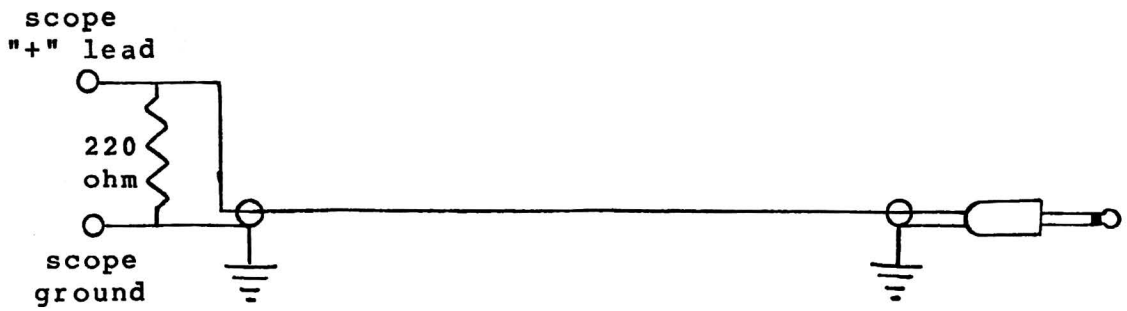

figure 1

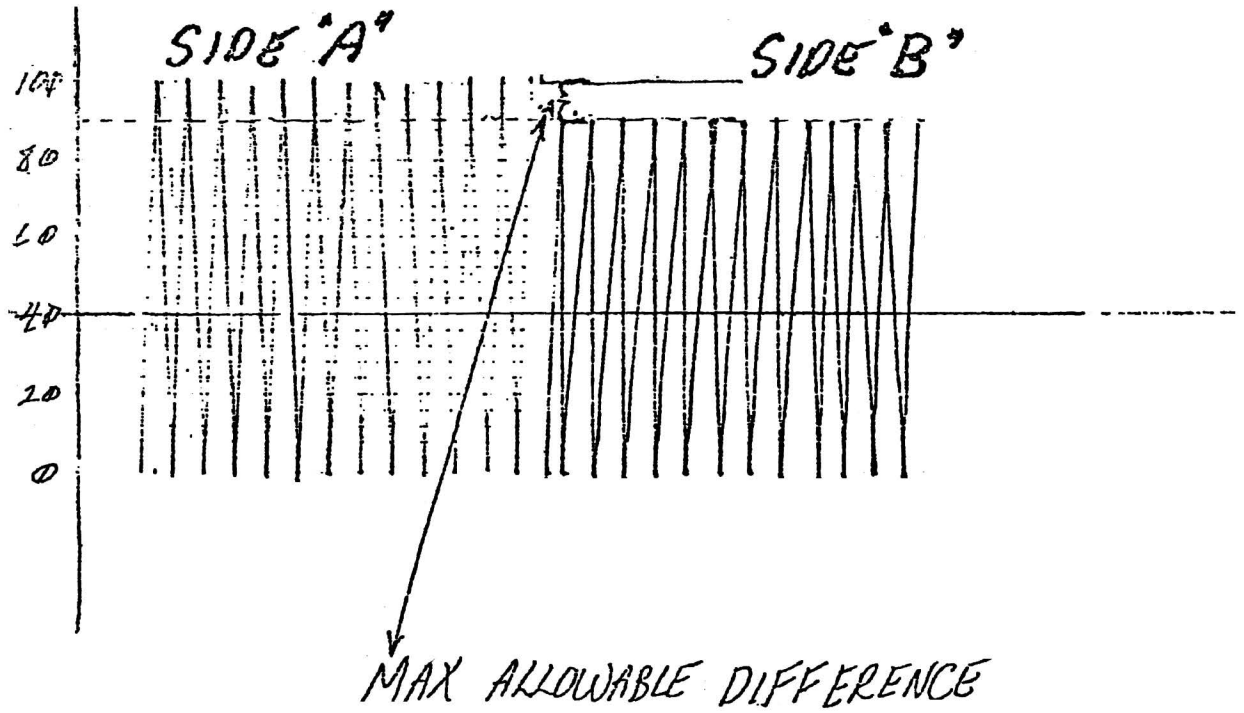

figure 2