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04/03/86

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TRS-80 ®

DATE: December 26, 1985

REVISION DATE: December 26, 1985

BULLETIN NO: 3000:1

PRODUCT: 25-4001, Tandy 3000

SUBASSEMBLY: AX-0205, Serial/Parallel Board

PURPOSE: Provide a possible solution to intermittent operational problems.

DISCUSSION: Early Tandy 3000 computers with the **Rev A** serial/parallel board may exhibit random floppy boot problems or intermittent operational problems. This can be caused by a mis-alignment between the serial/parallel board and the connector on the main logic board due to a mechanical alignment problem with the mounting bracket on the serial/parallel board.

PROCEDURE: To address this problem, reseat the serial/parallel board, and while holding the board down, retighten the screw on the mounting bracket. Be certain the serial/parallel board edge connector is not higher at one end or the other.

TRS-80 ®

DATE: December 30, 1985

REVISION DATE: December 30, 1985

BULLETIN NO: 3000:2

PRODUCT: 25-3043 Color Graphics Adaptor

SUBASSEMBLY: AX-9537 PCB, Color Graphics

PURPOSE: To eliminate garbage on the screen when used in the Tandy 3000 in 80 column color mode.

DISCUSSION: When used in the Tandy 3000 in the 80 column mode, The Color Graphics Adaptor may show random garbage on the screen. This is due to a timing problem on the graphics board. To remedy this a capacitor must be placed on a signal line to eliminate a possible race condition. An IC must also be checked for proper manufacturer to insure timing specifications are met.

PROCEDURE:

1.) Check the part at location U36 on the graphics board to insure it is not a Fairchild part. If it is, replace it with the part listed below.

2.) Solder a 47 pf capacitor from pin 13 to pin 14 of U36.

3.) Install the board in a Tandy 3000 and verify proper operation.

Part numbers:

IC SN74LS74	Part# AMX-5692	Catalog# 25-1193
47 pf capacitor	Part# CC-470JJCA	Catalog# 25-3000

Radio Shack®

DATE: January 7, 1986

REVISION DATE: January 7, 1986

BULLETIN NO: 3000:3

PRODUCT: 25-4001, Tandy 3000

SUBASSEMBLY: AX-0204, Main Logic PCB.

PURPOSE: To allow the use of Motorola 64K dynamic RAMs in the Tandy 3000 Computer.

DISCUSSION: Motorola 64K dynamic RAMs use a 128 column refresh per RAS in 2msec. The 256K RAMs in the Tandy 3000 use a 256 column refresh per RAS in 4msec. To allow the use of the 128K memory upgrade kit (Catalog 26-5162) in the Tandy 3000, the following modification must be completed for the memory refresh cycles of the different memory chips to be compatible.

PROCEDURE:

1. On the solder side of the board cut the following traces:
   a. At pin 7 of RP-10
   b. At pin 8 of RP-10

2. On the component side of the board make the following jumpers:
   a. From RP-10 pin 7 to U91 pin 9
   b. From RP-10 pin 8 to U91 pin 12

***** IMPORTANT NOTE *****

Only Motorola 64K memory chips in the kit specified above will require this modification. These chips can be identified by the following manufacturers ID number on the chips themselves.

MCM6664A-15
MCM6665A-15

This modification **will not** affect the use of 256 column refresh 64K chips by other manufacturers.

DATE: March 12, 1986

REVISION DATE: March 12, 1986

BULLETIN NO: 3000:4

PRODUCT: 25-4010 Tandy 3000 HD

SUBASSEMBLY: AXX-5107 20 Meg Hard Drive

SUBASSEMBLY REVISION: All Revisions

PURPOSE: To explain motor speed alignment on Tandy 3000 Hard Drives.

DISCUSSION/PROCEDURE: Currently 2 different 20 meg hard drives may be used in the Tandy 3000. These are the Seagate ST225 and the Mitsubishi MR522. The motor speed alignment for each of these drives is described below.

Mitsubishi:

1.) Remove the drive from the machine and position it to facilitate power connection to the drive.

Note: Do not operate the drive upside down, as this could damage the drive.

2.) Remove the front panel on the drive (two screws) to allow easy access to the motor speed pot VR1.

3.) Attach a frequency counter to the test point labeled Index on the bottom of the drive logic board.

4.) Adjust VR1 for an index period of 16.97mS (3536 RPM).

Seagate:

1.) Position the drive as in step one for the Mitsubishi.

2.) Attach the frequency counter to pin 20 of the control cable connector.

3.) Check for an index period of 16.66mS (no adjustment on this drive).

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DATE: March 24, 1986

REVISION DATE: October 14, 1986

BULLETIN NO: 3ØØØ:Ø5

PRODUCT: 25-4ØØ1, 25-4Ø1Ø Tandy 3ØØØ

SUBASSEMBLY: AX-Ø2Ø4, Main logic

SUBASSEMBLY REVISION: Rev. A

PURPOSE: Reduce reflected clock signal when using STB video boards.

DISCUSSION: When using the STB Deluxe Graphics & Deluxe Text adapters (25-3Ø46, 25-3Ø47) with the Tandy 3ØØØ, the clock signal has excessive ringing causing memory parity, various software interrupts and other memory related errors. The following modifications will help eliminate this ringing.

PROCEDURE:

1. Locate R1Ø2 and replace the 27 ohm resistor with the 18 ohm resistor.

2. Locate U29. If it is a 74F112 replace it with a 16 pin socket and then install a 74ALS112.

Note: This is a multilayer board. Use standard precautions as outlined in General Information Bulletin ''INF:Ø1Ø'' when removing parts.

Parts for this modification are available from National Parts under the following part numbers.

Description	Part Number	Catalog number
18 ohm 1/2 W 5% Resistor	N-ØØ75EFC	26-9999R
74ALS112 I.C.	MX-498Ø	25-4ØØ1 or 25-4Ø1Ø
Socket, IC 16 pin	AJ-6581	25-4ØØ1 or 25-4Ø1Ø

DATE: April 17, 1986

REVISION DATE: April 17, 1986

BULLETIN NO: 3000:6

PRODUCT: 25-4060, 25-4068 Hard disk controller and 35 meg hard drive.

SUBASSEMBLY:

SUBASSEMBLY REVISION: All revisions

PURPOSE: Installation procedures for the 35 Meg hard drive kit.

DISCUSSION: To install a 35 meg HD in the Tandy 3000 you will need.

1. 25-4060 Hard Disk Controller Kit.
2. 25-4068 Hard Disk Drive.

PROCEDURE:

1. Disconnect the load resistor from the power supply and remove the 2 screws mounting the resistor to the drive support. The load resistor will not be reinstalled.
2. Install 4 isolators on the drive assembly in the four holes (2 on each side) of the hard drive.
3. Remove the 3 screws from the front of and four screws from the bottom of the computer that attach the drive support.
4. Place the drive between the mounting plates of the drive support under the floppy drive and install 4 mounting screws in the isolators through the holes provided in the mounting plates.
5. Remove the floppy only controller and set the floppy cable to the side.
6. Check the jumper positions on the Hard/Floppy controller to be sure they are set as shown in Figure 1.
7. Check and be sure that the Terminator resistor is installed and drive select is set to DS1 on the hard drive.

8. Attach the 34 conductor control cable from the installation kit to the hard drive connector. The connector is keyed to insure proper installation. This cable will go to J5 in step 12.

9. Connect the data cable to the hard drive. Face the cable so that when the drive is in place the cable dresses up out of the connector.

10. Attach the hard disk drive LED power cable to the connecter J6 on the Hard Disk Controller board.

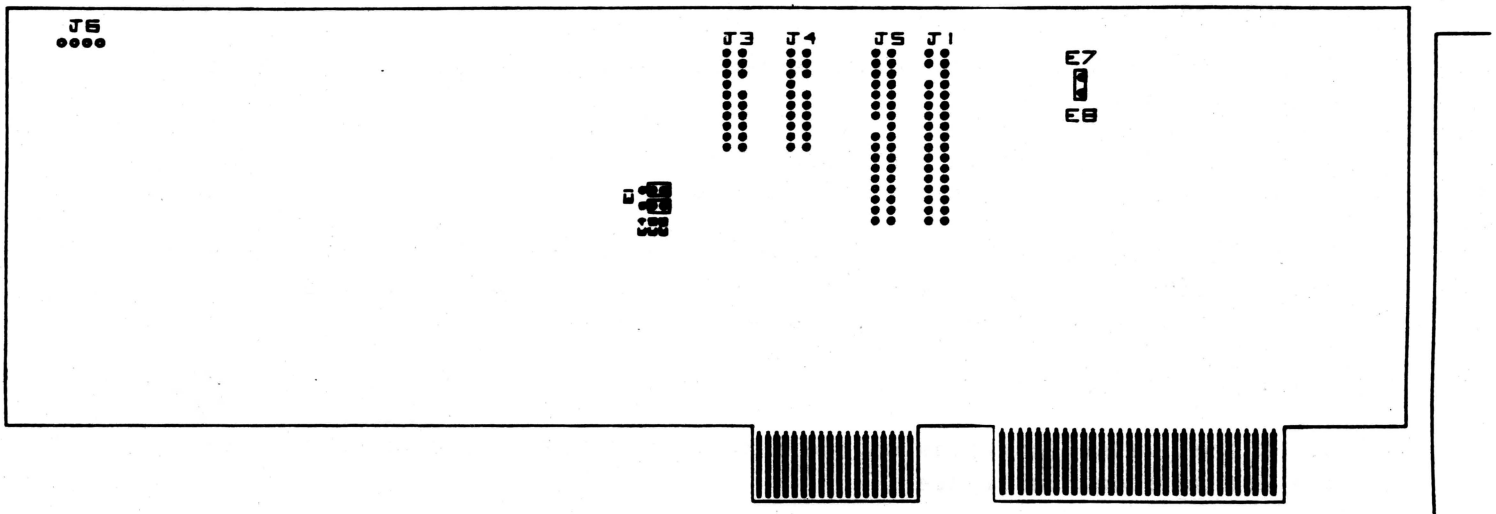
11. Install the drive assembly and Hard/Floppy controller in to the machine.

12. Connect the cable coming from the floppy drive to J1, connect the 34 pin hard disk cable to J5 and the 20 pin cable from the hard drive to J4 on the controller.

13. Connect the power cables to the drives, P4 to the floppy drive and P5 to the hard drive.

Using the "Setup" program define the drive type as a "Type 7" which will give you 8 heads and 462 Cylinders.

Run Diagnostics to insure proper operation.



TANDY 3000
HARD DISK/FLOPPY DISK CONTROLLER

DATE: May 1, 1986

REVISION DATE: May 1, 1986

BULLETIN NO: 3000:7

PRODUCT: 25-3046 Tandy Deluxe Text Adapter

SUBASSEMBLY: AX-0113 PCB, Deluxe Text Adapter

SUBASSEMBLY REVISION: Revision B

PURPOSE: Eliminate video noise from being introduced into the reset line.

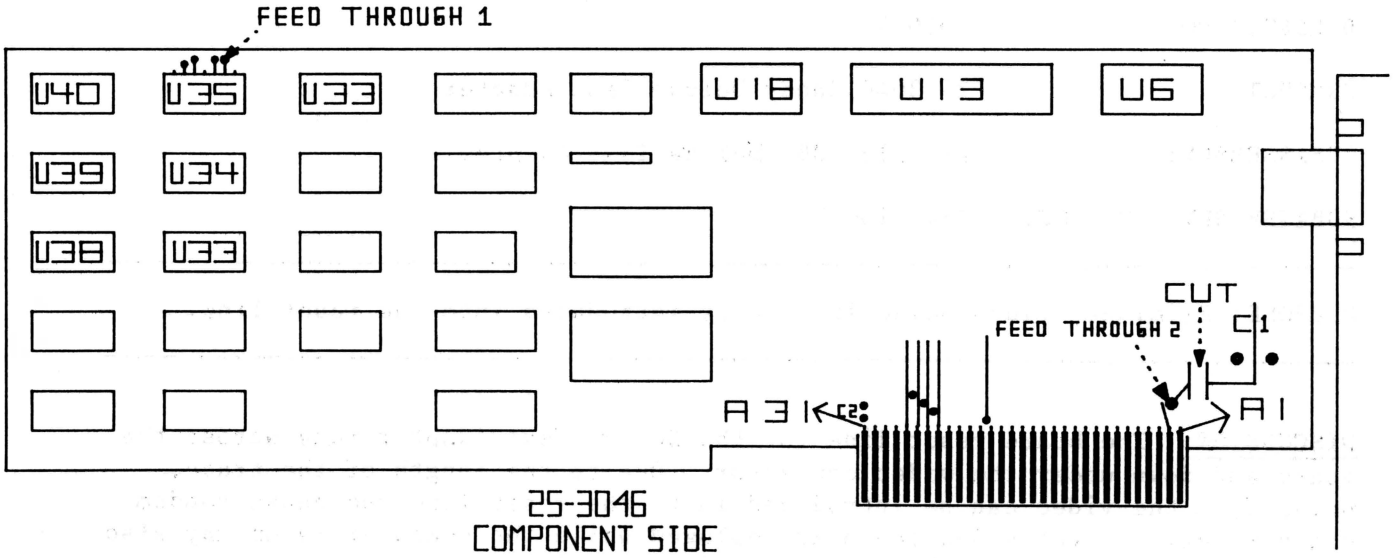
DISCUSSION: The board reset line for the Deluxe Text Adapter runs across the board and down under the video connector. Due to the length of the trace, noise from the video can be introduced in to the reset line and cause random video reset. If the video cable is unpluged while the computer is on may also reset the video board which causes the video to blank out.

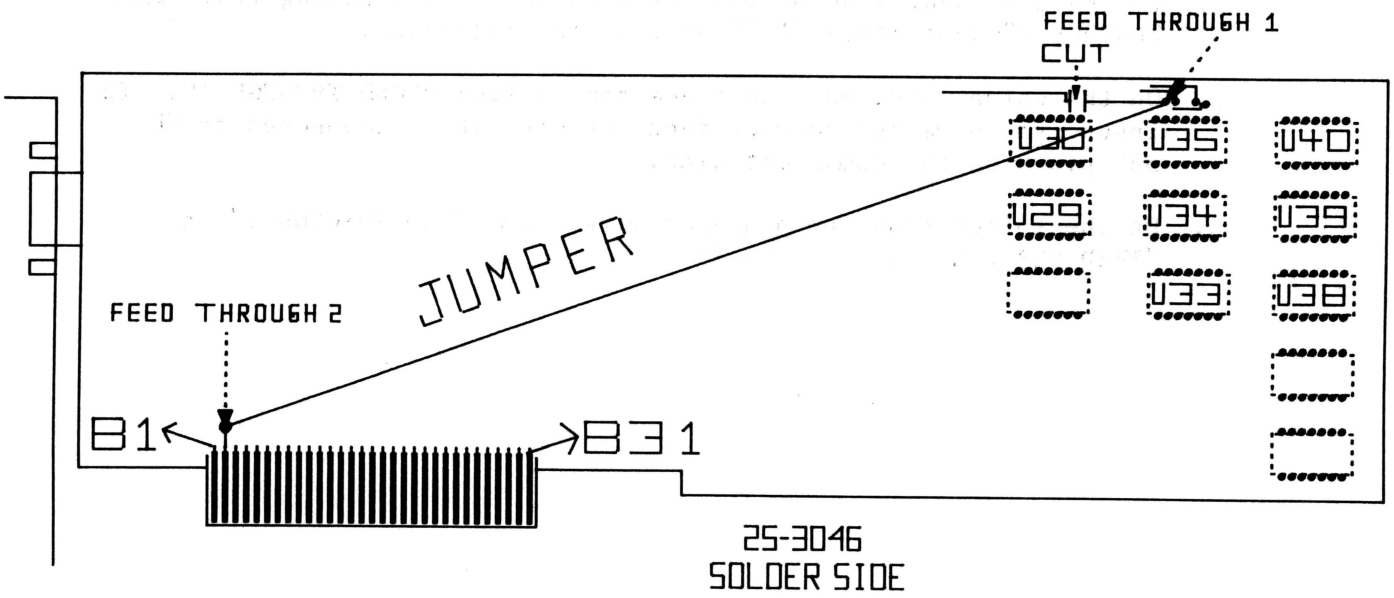
PROCEDURE: By re-routing the reset line as outlined below, electronic noise is reduced thereby increasing product reliability. Refer to the drawing attached.

1. On the component side of the board cut the trace coming from "FEED THROUGH 2" just above "A 2" on the edge connector.

2. On the solder side cut the trace coming from "FEED THROUGH 1". To insure you have the correct feed through, it is connected to "U 35" pin 9 on the component side.

3. On the solder side run a jumper wire from "FEED THROUGH 1" to "FEED THROUGH 2".


FEED THROUGH 1
U40
U35
U33
U18
U13
U6
U39
U34
U38
U33
CUT
FEED THROUGH 2
C1
A31
C2
A1
25-3046
COMPONENT SIDE


FEED THROUGH 1
CUT
U30
U35
U40
U29
U34
U39
U33
U38
JUMPER
FEED THROUGH 2
B1
B31
25-3046
SOLDER SIDE

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DATE: June 9, 1986

REVISION DATE: June 9, 1986

BULLETIN NO: 3ØØØ:8

PRODUCT: 25-4ØØ1 Tandy 3ØØØ
25-4Ø1Ø Tandy 3ØØØHD

SUBASSEMBLY: AX-Ø131 Gate Array Main Logic Board

SUBASSEMBLY REVISION: Rev. A, Rev. B

PURPOSE: To correct the 14.31818 MHz oscillator circuit.

DISCUSSION:

In order to ensure correct operation of the 14.31818 MHz oscillator circuit, the following modifications must be performed.

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

PROCEDURE:

The following steps should be performed:

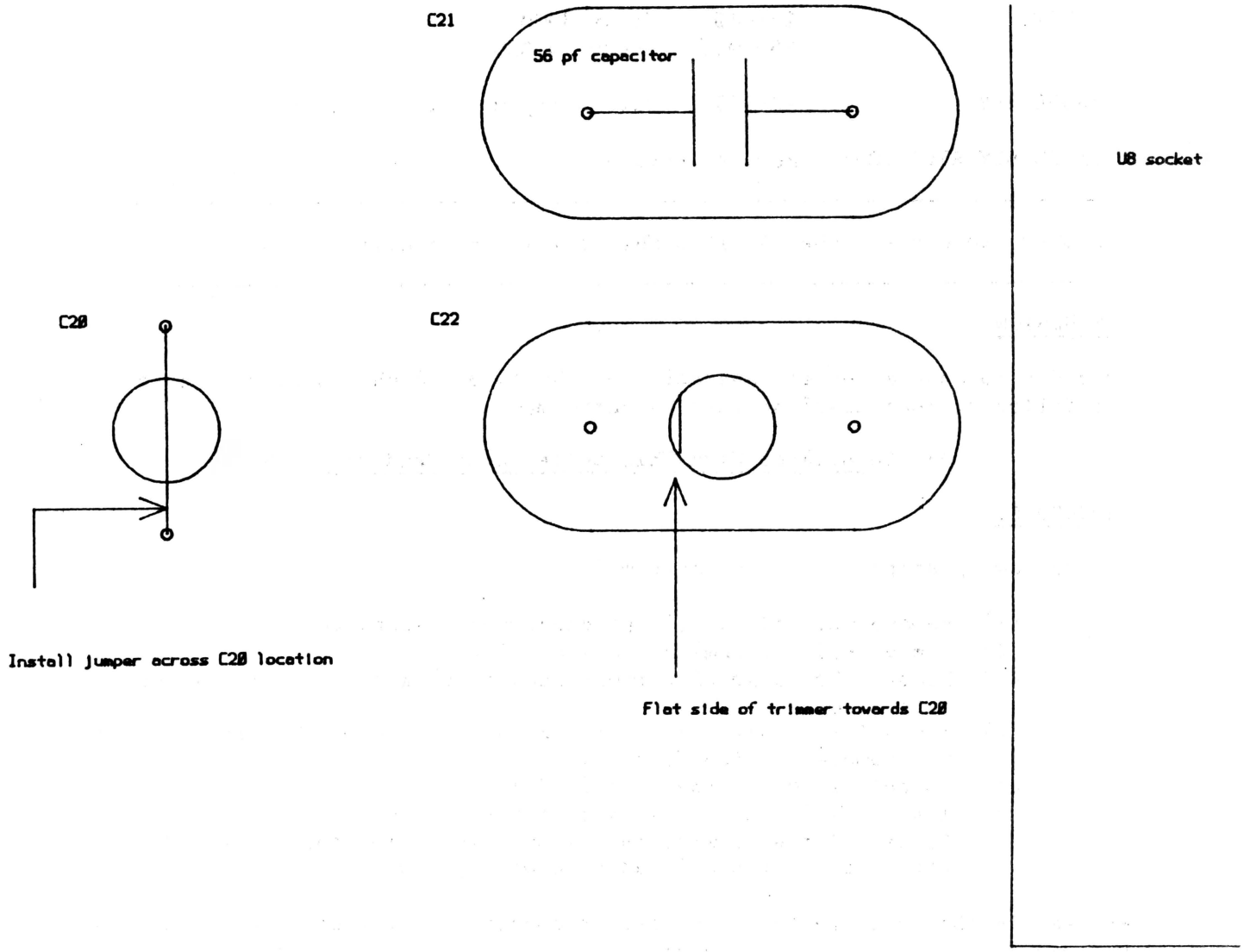
(1) Remove C21 and C22 (1Ø pf caps) and discard them.
(2) Remove R25 (1Ø ohm) and discard it.
(3) Remove C2Ø (5-5Ø pf trimmer capacitor) and set it aside for later use.
(4) Install a jumper wire in the holes where C2Ø (the trimmer cap) was removed. (See figure 1.)
(5) Install a 56 pf capacitor in C21.
(6) Install a 33Ø ohm, 1/4 watt resistor in R25.
(7) Reinstall the trimmer capacitor removed in step (3) at C22 with the rotor pin (flat side of cap) to ground.

Reassemble the unit and test for correct operation. The parts necessary for the modification may be ordered as:

56 pf ceramic capacitor, part # CC-56ØJJBC, cat. # 26-9999C
33Ø ohm 1/4 watt resistor, part # N-Ø159EEC, cat. # 26-9999R

Note: This is a multi-layer board, so extreme caution should be exercised when adding or removing soldered components. For further information on multi-layer board repair, refer to Technical Bulletin INFO:1Ø.

Figure 1.


C21
56 pf capacitor
U8 socket
C20
C22
Install jumper across C20 location
Flat side of trimmer towards C20

DATE: July 2, 1986

REVISION DATE: July 2, 1986

BULLETIN NO: 3ØØØ:9

PRODUCT: 25-4ØØ1 Tandy 3ØØØ
25-4Ø1Ø Tandy 3ØØØHD

SUBASSEMBLY: AX-Ø2Ø4 Main Logic Board

SUBASSEMBLY REVISION: All non-gate array

PURPOSE: To correct invalid interrupt vector causing possible SW Interrupt Ø6, 13 or General Protection failures.

DISCUSSION:

The 8Ø286 CPU chip's interrupt acknowledge cycle can cause the recognition of an invalid interrupt vector. This could cause symptoms such as an SW INTERRUPT Ø6, SW INTERRUPT 13, or General Protection errors. To correct this the upper eight data lines of the CPU data bus require pull-up resistors.

PROCEDURE:

1. Install a 1Ø pin 4.7K ohm SIP (Single Inline Package) resistor as follows:

Resistor pak pin 2	TO	U79 pin 2
Resistor pak pin 3	TO	U79 pin 3
Resistor pak pin 4	TO	U79 pin 4
Resistor pak pin 5	TO	U79 pin 5
Resistor pak pin 6	TO	U79 pin 6
Resistor pak pin 7	TO	U79 pin 7
Resistor pak pin 8	TO	U79 pin 8
Resistor pak pin 9	TO	U79 pin 9
Resistor pak pin 1	TO	U79 pin 2Ø

Note: Pin 1 of the SIP resistor pak can be identified by a dot or bar at one end of the package.

2. Check for proper operation with appropriate diagnostics.

1Ø pin 4.7K SIP National Parts # ARX-Ø333 Catalog # 25-4ØØ1

DATE: September 2, 1986

REVISION DATE: September 2, 1986

BULLETIN NO: 3ØØØ:11

PRODUCT: 25-4ØØ1 25-4Ø1Ø. Tandy 3ØØØ and Tandy 3ØØØHD

SUBASSEMBLY: AX-Ø2Ø4 AX-Ø131, non-gate and gate-array

SUBASSEMBLY REVISION: All revisions

PURPOSE: To reduce memory to 256K for special programs.

DISCUSSION: Some application programs require only 256K of RAM to work properly and will not work with more. Since the computer comes standard with 512K, the memory will have to be changed to cause the computer to access only 256K. The following explains how to configure the Tandy 3ØØØ to 256K.

PROCEDURE:

To reduce memory to 256K:

A. For the non-gate array

1. Replace the PROM at U63 with the new PROM listed below.

2. Remove the jumper from E13 to E14.

3. Run setup and set memory size to 256K.

Parts required:

PROM checksum 81Ø2 Part number MXP-ØØØ2 Catalog number 25-4Ø1Ø

B. For Gate-array boards.

1. Install two sets of 64K RAM chips (18) in sockets U43-U6Ø.

2. Install jumpers between E7-E8 and E9-E1Ø.

3. Run setup and set memory size to 256K.

Parts required:

2 Kits (each containing nine 15Øns RAMs) are required.
Catalog number 26-5162

To reconfigure the computer back for normal operation:

A. For the non-gate array

1. Install jumper between E13-E14

2. Run setup and set memory size to proper size.

NOTE: Because of the PROM change, memory size is set with the "Setup" program to what is installed in the board (512K or 64ØK). The jumper remains on E13-E14 for both.

B. For Gate-array boards.

Since the board now contains all the RAM required for 64ØK You must choose 64Ø or 512 configuration.

1. Remove jumper E7-E8 for 512K.

2. Remove jumper E9-E1Ø for 64ØK.

3. Run setup and set memory size to proper size.

DATE: August 11, 1986

REVISION DATE: August 11, 1986

BULLETIN NO: 3ØØØ:12

PRODUCT: 25-4ØØ1/4Ø1Ø Model 3ØØØ Serial/Parallel board

SUBASSEMBLY: AX-Ø2Ø5

SUBASSEMBLY REVISION: Revision A

PURPOSE: To provide procedures to disable specific interrupts on the revision A Serial/Parallel boards.

DISCUSSION: The main difference between revision A and B of the Serial/Parallel boards is that on the Revision B there are jumpers to enable and disable interrupts 3,4,5 and 7. On the Revision A there are not. To disable the interrupts on Rev A you have to cut a trace on the logic PCB for each of the interrupts you want to disable. The following will explain how to disable the interrupts if needed on the Revision A board to maintain interchangeabilty with revision B boards.

PROCEDURE: To disable interrupt:

Cut the trace on the "Solder side" of PCB outlined below to disable each of the four interrupts as needed. See figure 1.

IR7: Cut trace coming from B-21
IR5: Cut trace coming from B-23
IR4: Cut trace coming from B-24
IR3: Cut trace coming from B-25

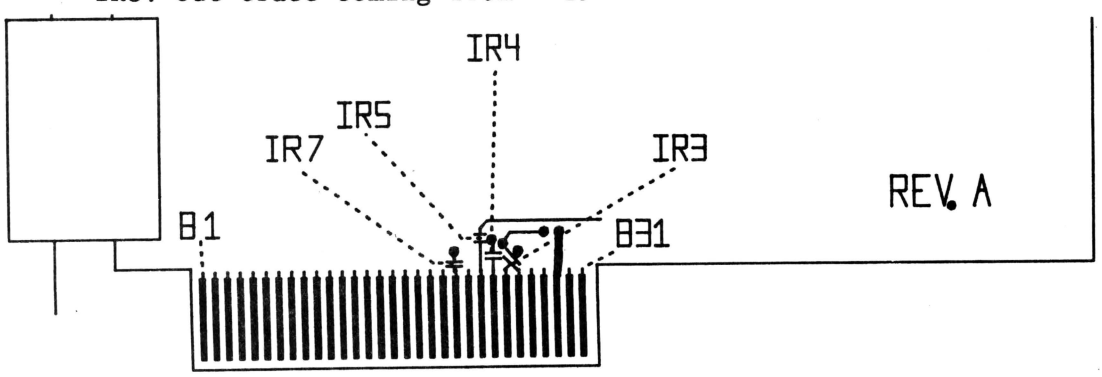


Figure 1 solder side
AX-Ø2Ø5

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DATE: October 6, 1986

REVISION DATE: October 6, 1986

BULLETIN NO: 3ØØØ:13

PRODUCT: 25-4ØØ1
25-4Ø1Ø/1 Tandy 3ØØØ

SUBASSEMBLY: AX-Ø131 Gate Array Main Logic Board

SUBASSEMBLY REVISION: Rev. C

PURPOSE: To supply correct VCC voltage to U8.

DISCUSSION:

To supply the correct VCC voltage to IC U8, it is necessary to add the following jumpers to the Rev. C Gate Array Main Logic Board. Since U8 provides much of the timing for the unit, symptoms of incorrect VCC voltage to this chip are intermittent operation or complete failure of the unit.

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

PROCEDURE:

(1) On the solder side of the board, jumper U8 pin 63 to the +5V side of C36A. (The +5V side of C36A will be closest to U8 pin 63). Keep the jumper as short as possible.

(2) On the solder side of the board, jumper U8, pin 42 to the +5V side of C23. (The +5V side of C23 will be closest to U8 pin 42). Keep the jumper as short as possible.

(3) On the solder side of the board, jumper U8, pin 84 to the DC power connector J23, pin 5. Keep the jumper as short as possible.

(4) After performing these modifications, measure the +5V supply at U8, pins 42, 63, and 84 and verify that the level is at least +5.ØØV.

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DATE: October 6, 1986

REVISION DATE: October 6, 1986

BULLETIN NO: 3ØØØ:14

PRODUCT: 25-4ØØ1
25-4Ø1Ø/1 Tandy 3ØØØ

SUBASSEMBLY: AX-Ø131 Gate Array Main Logic Board

SUBASSEMBLY REVISION: Rev. C

PURPOSE: To insure power up of real time clock by supplying more current.

DISCUSSION:

In order to insure the power up of the real time clock, it is necessary to change the value of a resistor in the Q2 voltage divider network.

PROCEDURE:

Check the value of the resistor at postion R38. The value of this resistor should be 39K. If it is not, remove the old resistor and replace it with a 39K, 1/4 watt resistor. This part is available as:

part # N-Ø33ØEEC, cat. # 26-9999R

Note: This is a multi-layer PC board, and appropriate caution should be taken when removing components. Refer to Technical Bulletin INF:1Ø for correct procedures.

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DATE: January 26, 1987

REVISION DATE: January 26, 1987

BULLETIN NO: 3ØØØ:15

PRODUCT: 25-4ØØ1/1Ø/11 Tandy 3ØØØ

SUBASSEMBLY: AX-Ø2Ø4 Discrete Main Logic Board
AX-Ø131 Gate Array Main Logic Board

SUBASSEMBLY REVISION: A11

PURPOSE: To explain which battery is be used with any given main logic board.

DISCUSSION/PROCEDURE:

There are two types of batteries used for battery backup of the CMOS RAM in the Tandy 3ØØØ. The older type of battery is a 7.Ø volt package; the newer battery is a smaller, 3.6 volt single cell package. **The two are not interchangable.**

In order to correctly match the battery type to the main logic board type, use the following information:

(1) All AX-Ø2Ø4 (discrete) main logic boards are to use the 7.Ø volt battery.

(2) All AX-Ø131 gate array main logic boards **prior to Rev. C** are to use the 7.Ø volt battery.

(3) All AX-Ø131 gate array main logic boards which are **Rev. C or later** should be examined to determine the number of pins on header J24 (the battery connector on the main logic board).

- o If the J24 header has 4 pins, use the 7.Ø volt battery.
- o If the J24 header has 3 pins, use the 3.6 volt battery.

If there is any doubt on any machine, check the battery connector on the main logic board. All four pin headers should use the 7.Ø volt cell; all three pin headers should use the 3.6 volt cell.

These batteries are available as:

7.Ø volt battery: Part # ACS-ØØ2Ø, Cat. # 25-4Ø11

3.6 volt battery: Part # ACS-ØØ4Ø, Cat. # 25-4Ø7Ø

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DATE: November 11, 1986

REVISION DATE: Feburary 9, 1987

BULLETIN NO: 3ØØØ:16

PRODUCT: 25-4ØØ1 Tandy 3ØØØ
25-4Ø1Ø Tandy 3ØØØHD
25-4Ø11 Tandy 3ØØØHD W/4Ø Meg

SUBASSEMBLY: AX-Ø131 Gate Array Main Logic Board

SUBASSEMBLY REVISION: Rev. A, Rev. B

PURPOSE: To eliminate bus noise on data lines 8-15 and other control lines.

DISCUSSION: The bus data lines 8-15 and certain control lines are left floating. This can cause the CPU to process invalid interupts. Typical symptoms are SW INTERRUPT Ø6, SW INTERUPT 13, or General protection errors. Adding pull-up resistors to these lines corrects this problem.

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

PROCEDURE: On the solder side of the board, add a 4.7k 6-pin single-inline resistor pack and a 4.7k 8-pin single-inline resistor pack to U32, the 8Ø287 socket. Attach it according to the following table :

4.7K 6-pin SIP	U32	4.7K 8-pin SIP	U32
pin 1	pin 9	pin 1	pin 9
pin 2	pin 8	pin 2 *	N/C
pin 3	pin 7	pin 3	pin 11
pin 4	pin 6	pin 4	pin 12
pin 5	pin 5	pin 5 *	N/C
pin 6 *	N/C	pin 6	pin 14
		pin 7	pin 15
		pin 8 *	N/C

* Cut these pins off the resistor packs

(over)

Also on the solder side of the board, add a 1Øk 6-pin single-inline resistor pack and a 1Øk 8-pin single-inline resistor pack to U23 and U8. Those pins marked "direct" should be soldered directly to the IC pins. Those marked "jumped" should bent out of the way and jumper wire used to make the connections. Attach these according to the following table:

1ØK 6-pin SIP		U23
pin 1	jumped	pin 18
pin 2	jumped	pin 14
pin 3	jumped	pin 12
pin 4	direct	pin 17
pin 5	direct	pin 15
pin 6	direct	pin 13

8-pin SIP		U23
pin 1	jumped	pin 18
pin 2	direct	pin 2
pin 3	direct	pin 4
pin 4	direct	pin 3
pin 5	direct	pin 5
pin 6	direct	pin 7
pin 7	jumped	pin 6
pin 8	jumped	pin 49 of U8

These parts can be ordered from National Parts under the following:

Description	National Parts #	Catalog #
6 pin 4.7k resistor	ARX-Ø24Ø	25-4ØØ1
8 pin 4.7k resistor	ARX-Ø3Ø7	25-4ØØ1
8 pin 1Øk resistor	ARX-Ø137	25-4ØØ1
6 pin 1Øk resistor	ARX-Ø366	25-4ØØ1