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DATE: October 26, 1984

REVISION DATE: October 26, 1984

BULLETIN NO.: 1ØØØ:Ø1

PRODUCT: 25-1ØØ3 Tandy 1ØØØ

SUBASSEMBLY: Modem board

PURPOSE: Modification to allow use of Hitachi Modem chip.

DISCUSSION:

The following modification allows the Hitachi Modem chip to be used in place of the Motorola IC.

PROCEDURE:

Change C26 from a .47 mfd ceramic disk capacitor to a 2.2 mfd 5Øv electrolytic capacitor.

NOTE: No polarity markings are on the board. Be sure the positive (+) side of the capacitor is connected to U7 pin 28.

A 2.2 mfd capacitor is available from National Parts under part number CC-225KJAP and catalog 26-9999C.

DATE: November 14, 1984

REVISION DATE: November 14, 1984

BULLETIN NO.: 1000:02

PRODUCT: 25-1000 Tandy 1000

SUBASSEMBLY: AX-9578 Main Logic PCB

PURPOSE: To correct possible cause of unit appearing dead along with speaker squealing.

DISCUSSION:

Manufacturing has been installing a modification to the system clock which involves adding a 47 ohm 1/4 watt resistor at U45 pin 8 on the solder side of the PCB. Earlier modifications did not have any insulation on the resistor leads which could cause the system clock to short to ground when the board was installed on the metal frame. Shorting the clock to ground will cause the unit to appear dead and in some cases will cause the speaker to squeal because the circuit has not been properly initialized.

PROCEDURE:

Install heat shrink or some other kind of insulating material on the exposed leads of the resistor.

DATE: November 30, 1984

REVISION DATE: November 30, 1984

BULLETIN NO.: 1000:3

PRODUCT: 25-1000 Tandy 1000

SUBASSEMBLY: AX-9580/9582 Memory Expansion boards

PURPOSE: To describe installation of Memory Expansion boards

DISCUSSION/PROCEDURE: Two expansion memory boards are available to bring the total memory in the Tandy 1000 up to 640K in 128K increments. These are the 25-1004 AX-9580 First memory board and the 25-1009 AX-9582 Second memory board. These boards have two jumper positions E1/E2 and E3/E4, the use of which is explained below.

The first board must contain a DMA chip and to indicate the presence of the DMA, jumper E3/E4 must be left open. Before installing the second memory board the first board must contain a full 256K of RAM. The RAM upgrade kit, Catalog # 26-5162, should be used for this upgrade. With 256K of RAM installed jumper plug E1/E2 must be installed (E1/E2 is left open to indicate 128K of RAM). The second board will not have a DMA and jumper E3/E4 must be installed to indicate this. E1/E2 should only be installed if the board has been upgraded to 256K. These two boards may not be used to replace one another due to DMA support circuitry not present on the second board.

DATE: December 12, 1984

REVISION DATE: December 12, 1984

BULLETIN NO.: 1ØØØ:4

PRODUCT: 25-1ØØØ Tandy 1ØØØ

SUBASSEMBLY: Teac and TPI 5 1/4" Disk Drives

PURPOSE: To outline test points on drives used in the Tandy 1ØØØ.

DISCUSSION/PROCEDURE: There are currently two types of floppy disk drives being used in the Tandy 1ØØØ. Both are 4Ø track double sided drives. Test points for these drives are listed below.

For the Teac FD-54B:

TP		PURPOSE
1	-	Track ØØ
2	-	Erase Gate
3	-	Stepper Motor Phase B
4	-	Index
5	-	Read Data
6	-	Write Protect
7	-	Head Pre-Amp
8	-	Head Pre-Amp
9	-	Head Differential Amp
1Ø	-	Head Differential Amp
G	-	Ground

Set-ups for alignments:

TEST	CH.A	CH.B	SYNC
Radial	TP9	TP1Ø	TP4
Index	TP9	TP1Ø	TP4
TRKØØ	TP1	High on track 1 Low on track Ø	
Speed	TP4	Adjust R1 on motor control board for 2ØØ msec.	
Raw Data	TP5	Adjust R5 if availiable	

For the TPI drive:

TP's		DESC.
1	-	GND
2	-	Head pre-amp
3	-	Head pre-amp
4	-	Head diff-amp
5	-	Head diff amp
6	-	GND
7	-	Index
8	-	Write protect
9	-	TKØØØ
1Ø	-	Raw data

Set-ups for alignments:

TEST	CH.A	CH.B	SYNC	
Speed	TP7	Ajust VR1 on servo board for 2ØØ msec.		
Index Timing	TP2	TP3	TP7	Adjust R37
Radial	TP2	TP3	TP7	
Amplitude	TP2	TP3	TP7	
Raw Data	TP1Ø	Adjust R36		
TKØØ	TP9			

DATE: December 7, 1984

REVISION DATE: December 7, 1984

BULLETIN NO.: 1000:5

PRODUCT: 25-1000

SUBASSEMBLY: AX-9578 Main Logic PCB

PURPOSE: Circuit change to printer port to enable use of IBM software and our printers.

DISCUSSION: To enable the use of IBM software on the Tandy 1000 with any of our IBM compatible printers, the SELECT line on the parallel port must be removed from the port and tied to +5V. Implement this change on request only.

PROCEDURE:

1.) On the solder side of the board, cut the trace going to U108 pin 16.

2.) Also on the solder side, jumper U108 pin 16 to U108 pin 40.

3.) Use both Radio Shack and IBM software to verify proper operation of the parallel port.

DATE: December 28, 1984

REVISION DATE: December 28, 1984

BULLETIN NO.: 1000:6

PRODUCT: 25-1000

SUBASSEMBLY: AX-9578 Main Logic

PURPOSE: To improve IBM PC compatibility.

DISCUSSION: In order to increase compatibility of the Tandy 1000 with the IBM PC the pull-down resistors on the interrupt request lines, IR2, IR3, and IR4, must be removed.

PROCEDURE:

1.) On resistor pack RP8, cut pins 4, 5, and 7 away from the PCB.

2.) Test the unit to verify proper operation.

DATE: December 28, 1984

REVISION DATE: December 28, 1984

BULLETIN NO.: 1ØØØ:7

PRODUCT: 25-1ØØØ Tandy 1ØØØ

SUBASSEMBLY: AX-9578 Main Logic

PURPOSE: To increase the intensity of the composite video output.

DISCUSSION: The following modification is necessary to increase the intensity of the composite video output.

PROCEDURE:

1.) Change resistor R55 from a 75Ø ohm 5% to a 1.2K ohm 5% resistor.

2.) Change resistor R59 from a 16Ø ohm 5% to a 27Ø ohm 5% resistor.

3.) Change resistor R61 from a 36Ø ohm 5% to a 62Ø ohm 5% resistor.

4.) Test the unit for proper operation.

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

1.2K ohm 5% 1/4W resistor	Part# N-Ø199EEC	Catalog# 26-9999R
27Ø ohm 5% 1/4W resistor	Part# N-Ø155EEC	Catalog# 26-9999R
62Ø ohm 5% 1/4W resistor	Part# N-Ø181EEC	Catalog# 26-9999R

DATE: January 12, 1985

REVISION DATE: January 12, 1985

BULLETIN NO.: 1000:8

PRODUCT: 25-1000 Tandy 1000

SUBASSEMBLY: AX-9578 Main Logic

PURPOSE: To eliminate FDC errors caused by ringing in FDC clock.

DISCUSSION: Some FDC errors on the Tandy 1000 have been found to be occurring due to excessive ringing being present on the FDC clock signal. In order to remedy this problem perform the modification below.

PROCEDURE:

1.) Solder one lead of a 220pfd ceramic capacitor into the feedthrough directly across from pin 4 of U29 (this feedthrough connects to pin 4 of U29).

2.) Solder the other lead of this capacitor to pin 7 of U29 (ground).

3.) Insure that the leads of the capacitor do not short against any other components and test the unit to verify proper operation.

220pfd ceramic capacitor Part# CF-2357 Catalog# 26-9999C

DATE: December 28, 1984

REVISION DATE: December 28, 1984

BULLETIN NO.: 1ØØØ:Ø9

PRODUCT: 25-1ØØØ Tandy 1ØØØ

SUBASSEMBLY: Keyboard

PURPOSE: To describe possible wiring problem of keyboard cable.

DISCUSSION/PROCEDURE:

The plug on the end of the keyboard cable which attaches to the keyboard may be wired incorrectly. This could cause the keyboard to appear dead. Below is a chart listing the pin numbers, as labeled on the keyboard, which should match the colored wire in the cable:

PIN	WIRE COLOR
1	White
2	Blue
3	Green
4	Yellow
5	Red
6	Black

DATE: January 23, 1985

REVISION DATE: April 15, 1985

BULLETIN NO.: 1ØØØ:1Ø

PRODUCT: 25-1ØØØ Tandy 1ØØØ

SUBASSEMBLY: AX-9578 Main Logic

PURPOSE: To improve the performance of the joystick port.

DISCUSSION: Due to some subtle component tolerance problems in the integrator circuit of the joystick ports, the joysticks may not be able to obtain their full range of voltages and therefore not be able to obtain their full range of motion. If this problem surfaces in a machine in for repair, change the component values indicated below.

PROCEDURE:

1.) Change R3 from a 82K ohm 5% 1/4W resistor to a 82.5K ohm 1% 1/4W.

2.) Check capacitor C6, it should be a .Ø22 ufd 63V 1Ø% film capacitor.

Parts needed for this modification can be obtained under the following part numbers:

82.5K ohm 1% 1/4W resistor	Part# N-Ø74ØBEE	Catalog# 26-9999R
.Ø22ufd 1ØØV 1Ø% capacitor	Part# CC-223JLHP	Catalog# 26-9999C

DATE: February 15, 1985

REVISION DATE: February 15, 1985

BULLETIN NO.: 1ØØØ:11

PRODUCT: 25-1ØØØ Tandy 1ØØØ

SUBASSEMBLY: AX-9578 Main Logic

PURPOSE: To explain ROM differences.

DISCUSSION/PROCEDURE: There are two different ROM configurations you may see in the Tandy 1ØØØ Main Logic boards.

Some boards contain two ROMs, one in position U1Ø and one in position U9. These two ROMs are 8K by 8 PROMs and will have a sticker on top which states its IC location and its date of programming. If these two PROMs are present, resistor R2 must be installed which ties off unused pin 27 from the IC. Resistor R1 should not be installed if this is the configuration.

If your system contains only one ROM in position U9, it is a 16K by 8 ROM (no sticker), and requires R2 to be removed and R1 to be installed which supplies address line A14 to pin 27.

For each different type of ROM there is a different programable array for address decoding (U53). The array for the 2 chip set has a pink colored sticker attached. The array for the newer one chip ROM has a white colored sticker attached. If you exchange boards in a machine, insure that your new board contains the proper configuration.

These two resistors, R1 and R2, have a value of Ø ohms and jumpers may be used in their place. The part numbers for the programable arrays are listed below.

Array for 2 chip set	Part# MX-2211	Catalog# 25-1ØØØ
Array for 1 chip set	Part# MX-6847	Catalog# 25-1ØØØ

DATE: January 15, 1985

REVISION DATE: January 15, 1985

BULLETIN NO.: 1000:12

PRODUCT: 25-1000 Tandy 1000

SUBASSEMBLY: AX-9578 Main Logic (Rev."blank" only)

PURPOSE: To correct missing negative 5 volt supply on expansion slots.

DISCUSSION: There is no -5V power supply to the expansion slots on the revision "blank" main logic board. Some expansion boards available may require this -5V supply. If a situation arises where this supply is needed and the logic board is a revision "blank" logic board, a satellite board modification is available which taps off the -12V power supply, regulates it to -5V, and routes it back to the expansion slots. Instructions for installing this modification are given below.

PROCEDURE:

1.) The satellite board has three wires connected to traces on the PCB. Locate these wires and verify that they are indeed conected, one each to the holes on the board marked -5V, -12V and GND.

2.) Using the double-sided tape supplied in the kit, mount the satellite board on the main logic board between the expansion slots and route the wires around to the solder side of the PCB.

3.) Solder the wires from the satellite board to the proper positions on the "B" side of the expansion slot J9 as listed below.

SIGNAL	CONNECT TO J9 PIN
-5V	B05
GND	B01
-12V	B07

4.) Test the unit for proper operation and check for proper voltages at each expansion slot.

This modification may be ordered under:
Part# AXX-7102 Catalog# 25-1000

DATE: March 13, 1985

REVISION DATE: March 13, 1985

BULLETIN NO.: 1ØØØ:13

PRODUCT: 25-1ØØØ Tandy 1ØØØ

SUBASSEMBLY: N/A

PURPOSE: Install grounding lug for Hard Disk upgrade.

DISCUSSION:

Early production Tandy 1ØØØ computers did not have a grounding lug for the Hard Disk upgrade. A three prong Faston must be added to the board to allow proper ground connections for the Hard Disk.

PROCEDURE:

Locate the screw near the right joy stick jack (below the speaker) that holds the main PCB to the chassis. Remove this screw and install a 3 prong Faston connector using a nylon washer between it and the PCB. Due to the added width of the connector a washer and a longer screw will be required. This Faston will allow ground connections for the Hard Drive controller board.

Parts Required

Faston Connector	AHC-Ø327
Nylon Washer	AHC-Ø645
Screw (6x32x5/16)	AHD-ØØ17

All parts are under catalog number 25-1ØØØ.

DATE: August 15, 1985

REVISION DATE: February 18, 1986

BULLETIN NO.: 1000:19

PRODUCT: 25-1011 AX-6003 Memory Combo Board

SUBASSEMBLY: 25-1011 AX-6003 Memory Combo Board

SUBASSEMBLY REVISION: REV A, B, and C

PURPOSE: To correct DMA timing errors with slow peripherals.

DISCUSSION: When performing a memory write, the DMA in the Tandy 1000 uses the extended write mode. This mode requires that data on the bus be valid faster than some I/O peripherals can supply it. In order to remedy this problem the DMA must be programmed for normal write mode. This will delay the time that the data has to be valid so that all I/O peripherals will have time to supply the data. This modification, along with the new BIOS ROM discussed in Technical Bulletin 1000:17 will correct this problem. This modification must be performed when used with the new BIOS ROM.

PROCEDURE: Check for the following modifications and modify those boards which do not already have the modifications completed.

REV. A ONLY (REV. B and C already have this modification implemented in the artwork)

1.) On the component side of the memory combo board cut the trace going from U13 pin 2 to U51 pin 2. See figure 1 below.

2.) Install a jumper wire from U51 pin 2 to U13 pin 3.

REV. A B and C

3.) On the component side of the memory combo board cut the trace going to U12 pin 13. See figure 1 below.

4.) Install a jumper wire from U12 pin 13 to U3 pin 3. Verify proper operation using MEMTST.EXE from your Tandy 1000 diagnostic diskette.

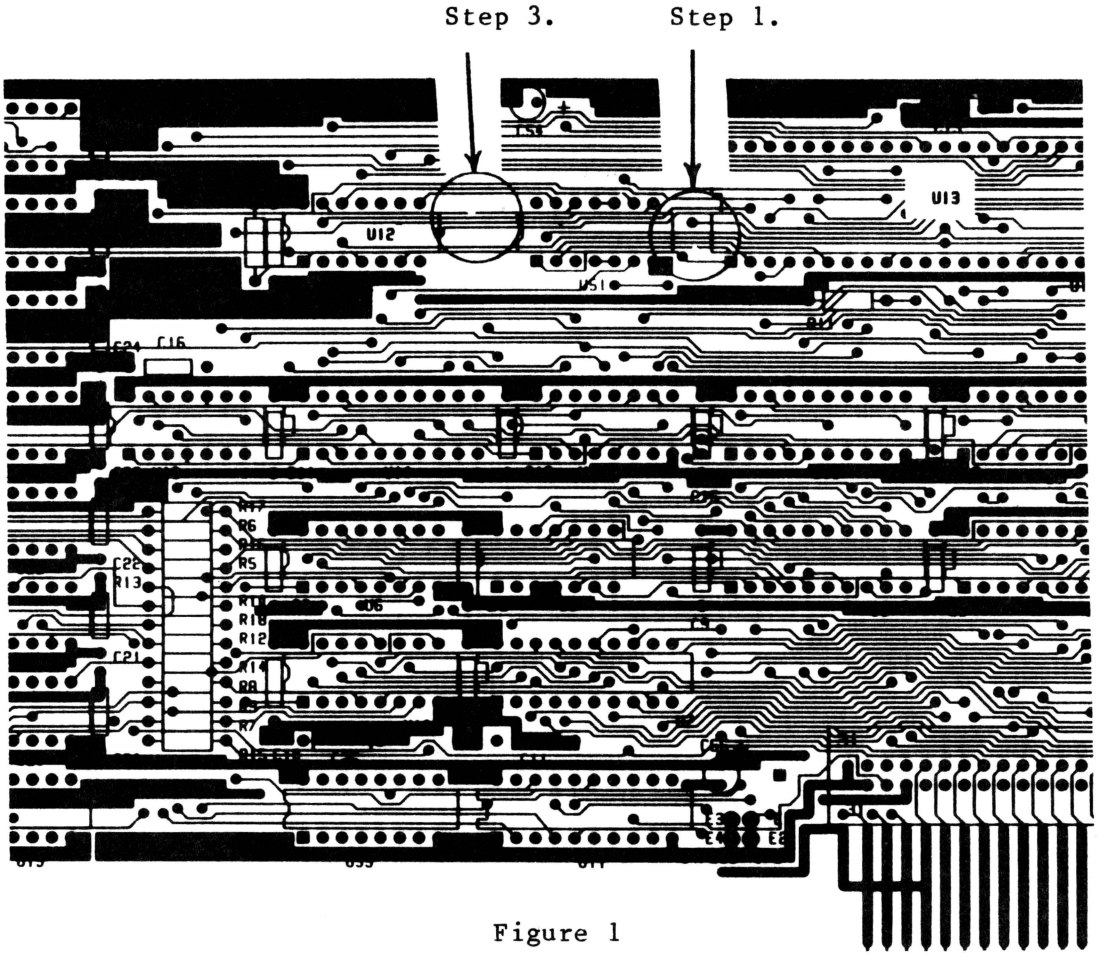

Figure 1

TRS-80 ®

DATE: October 9, 1985

REVISION DATE: October 9, 1985

BULLETIN NO: 1000:20

PRODUCT: 25-1000A/1A Tandy 1000A

SUBASSEMBLY: PCB part number is not available at this time.

PURPOSE: To correct or prevent system reset or poor sound level problems.

DISCUSSION:

It has been found that a few of the ceramic type capacitors, C11, C12, C55A, and C88, are breaking down under heat. These are bypass capacitors for the timing generator (U25) and the sound output (U70 and U7) IC's. If one of these were to break down, problems such as a system reset or a poor sound level could occur.

PROCEDURE:

Change C11, C12, C55A, and C88 from a ceramic capacitor to a 0.1 mfd monolithic capacitor. A 0.1 mfd monolithic capacitor is available from National Parts under part number CC-104JJLA, catalog number 26-9999C.

NOTE: The 25-1000A logic board can easily be identified by a square LSI chip (U64) near the expansion slots and a 40 pin coprocessor socket (U29) above the expansion slots.

TRS-80 ®

DATE: December 16, 1985

REVISION DATE: December 16, 1985

BULLETIN NO: 1000:21

PRODUCT: 25-1003 300 Baud Internal Modem

SUBASSEMBLY: AX-9579 Modem Board

PURPOSE: To increase amplitude of modem output.

DISCUSSION:

In order to increase the amplitude of the output of the internal 300 baud modem board, it is necessary to ground two unused input pins on U2.

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

PROCEDURE:

(1) Jumper U2, pin 5 to U2, pin 3 (ground).
(2) Jumper U2, pin 6 to U2, pin 3 (ground).

After implementing the modification, check the function of the modem board with the appropriate diagnostics.

TRS-80 ®

DATE: December 30, 1985

REVISION DATE: December 30, 1985

BULLETIN NO: 1000:22

PRODUCT: 25-1000A Tandy 1000

SUBASSEMBLY: AX-0105 Tandy 1000 Main Logic Gate Array

PURPOSE: To eliminate problem of fuzzy or missing video on RGB output.

DISCUSSION: Some Tandy 1000's with the gate array logic board may contain a resistor pack in location RP12 of a value greater than 33 ohms. This larger value may attenuate the video signal and cause the monitor to display fuzzy video or no video at all. For proper operation this resistor pack must be 33 ohms.

PROCEDURE:

1.) Check the resistor pack at location RP12. If it is any value other than 33 ohms, replace it with a 33 ohm resistor pack.

Part# ARX-0162 Catalog# 25-1000A

Radio Shack®

TRS-80®

DATE: December 30, 1985

REVISION DATE: December 30, 1985

BULLETIN NO: 1000:23

PRODUCT: 25-1000A Tandy 1000 Gate Array

SUBASSEMBLY: AX-0105 PCB, Tandy 1000 Gate Array

PURPOSE: To eliminate intermittant lockups due to timing problem

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DISCUSSION: Some Tandy 1000A's (Gate Array version board) have been experiencing lockups due to a timing problem in the TACO II timing array (U25). These lockups can occur anytime during operation. To remedy this problem a capacitor must be installed from a signal line to ground.

PROCEDURE:

1.) Solder a 100 pf capacitor from U16 pin 6 to U16 pin 7.

2.) Run all diagnostics to verify proper machine operation.

100pf capacitor Part# CC-101JJCP Catalog# 26-9999C

DATE: December 30, 1985

REVISION DATE: December 30, 1985

BULLETIN NO: 1000:24

PRODUCT: 25-1000A Tandy 1000

SUBASSEMBLY: AX-0105 PCB, Main Logic Gate Array (Rev. B)

PURPOSE: To correct an improperly installed component.

DISCUSSION: On the "Rev. B" Gate Array version of the main logic board the silkscreen for the voltage regulator VR1 is backwards. The silkscreen indicates that the flat side of the TO-92 case faces the composite video output jack. The voltage regulator should face the opposite direction. This 5 volt regulator is used to supply a bias voltage to the composite video mixer/output amplifier. Improper installation could cause this component to fail resulting in weak or no composite video output.

** **Compliance With This Bulletin Is Manditory** **

PROCEDURE:

1.) In troubleshooting a problem in the composite video output section of this board, or in replacement of this component (VR1), insure that the flat side of the TO-92 case faces away from the composite video output jack.

2.) If needed, a replacement for this part can be ordered as follows:
Part# AMX-4713 Catalog# 25-1000A

DATE: December 30, 1985

REVISION DATE: December 30, 1985

BULLETIN NO: 1000:25

PRODUCT: 25-1000A/1A Tandy 1000A

SUBASSEMBLY: AX-0105 Main Logic PCB

PURPOSE: To correct DMA timing problem.

DISCUSSION:

The 8088 CPU chip has it's data bus multiplexed with it's lower address lines. The data bus is buffered by a 74LS245 (U53). Because of the multiplexed lines, the timing to enable this data buffer becomes critical. The Data ENable (DEN*) signal is generated by the Timing Generator Array (U25) and is responsible for the enabling of this buffer. Under certain DMA conditions this signal may not change fast enough thus allowing the data bus to be active when it shouldn't be. This could cause a data error or lockup.

PROCEDURE:

1. Add a 4.7K ohm resistor from U53 pin 19 to U53 pin 20. This will add a pull-up to the DEN* signal.

2. Check for proper operation with system diagnostics.

A 4.7K ohm 1/4 watt resistor is available from National Parts under part number N-0247EEC and catalog 26-9999R.

DATE: January 8, 1986

REVISION DATE: January 8, 1986

BULLETIN NO.: 1000:26

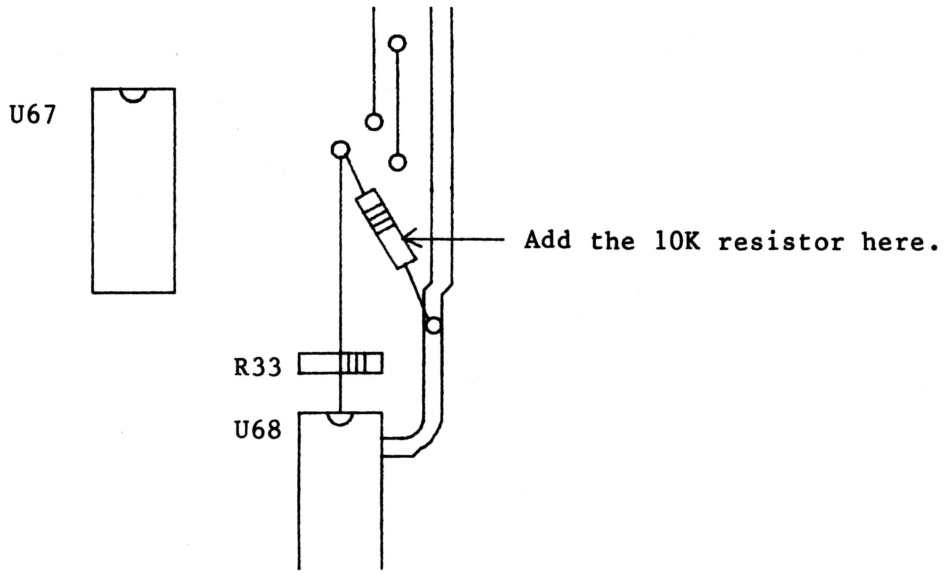
PRODUCT: 25-1000A Tandy 1000 Gate Array

SUBASSEMBLY: AX-0105 Main Logic Board

PURPOSE: To elimiate noise from the light pen circuitry when no light pen is connected.

DISCUSSION/PROCEDURE: The Tandy 1000 Gate Array Computer has a light pen port which can be programmed by the customer to work with a light pen. If there is no light pen connected while the program is being written, the light pen port may send back erroneous data due to noise on the light pen data line. In order to eliminate this problem of noise on the light pen date line, a 10K pullup resistor should be added to the feedthroughs indicated in the diagram below.

10K resistor Part # N-0281EEB Catalog # 26-9999R



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DATE: June 18, 1986

REVISION DATE: June 18, 1986

BULLETIN NO: 1ØØØ:27

PRODUCT: 25-1ØØ1 Tandy 1ØØØHD

SUBASSEMBLY: AX-9ØØ9 HD Controller PCB, WD

SUBASSEMBLY REVISION: All Revisions

PURPOSE: To allow use of Tape Cartridge with internal hard drive Tandy 1ØØØ.

DISCUSSION: When attempting to operate a Tape Cartridge in a Tandy 1ØØØ internal hard drive machine the computer may lock up at the "Memory Size" prompt. If this happens, the BIOS ROM (U14) in the internal hard drive controller should be checked. If it is a 24 pin (the socket is 28 pin) 2732 ROM, perform the modification below.

PROCEDURE:

1.) If you received a 28 pin ROM with the Tape Cartridge Interface (25-3Ø21), install it into position U14 on the hard drive controller. Test the system to insure proper operation.

If no ROM was received with the Tape Cartridge Interface, perform the modification in steps 2-4 below. Do not perform steps 2-4 on a 28 pin ROM.

2.) Remove the Hard Drive BIOS ROM from its socket U14 on the Hard Drive Controller. Bend pin 18 (CE) of the **ROM** up so that when the ROM is placed back in the socket this pin no longer makes contact.

3.) Using wire wrap wire, tie pin 18 (the pulled up pin) of the ROM to edge card connector P1 pin A19 (address line 12).

4.) Place the ROM back in the socket in the same manner as it was removed, insuring pin 1 of the 24 pin ROM goes into pin 3 of the 28 pin socket (see figure 1). Test the unit with both hard drive diagnostics and with the Tape Cartridge System to insure proper operation.

NOTE: If you receive a Tandy 1000HD for service which contains a 28 pin ROM in U14 of the hard drive controller, and you must swap out the controller, be sure to transfer the 28 pin ROM to the new controller.

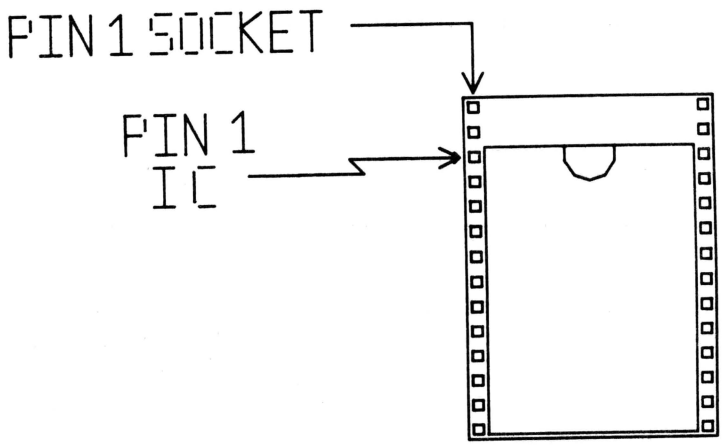

Figure 1

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DATE: June 16, 1986

REVISION DATE: June 16, 1986

BULLETIN NO: 1ØØØ:28

PRODUCT: 25-1ØØØA/1A Tandy 1ØØØ Gate Array

SUBASSEMBLY: AX-Ø1Ø5 Main Logic Board

SUBASSEMBLY REVISION: All revisions

PURPOSE: To change floating state of IR4 to allow Deskmate to boot.

DISCUSSION:

In order to increase compatibility of the Tandy 1ØØØA with the IBM PC the interrupt request lines, IR2, IR3, and IR4 have been left floating. Interrupt request line four (IR4) is used for the COM1 serial port. When booting up the current version of Deskmate looks at this line to see if a serial board is attached. If so, it tries to initialize the port for communications. With IR4 floating it is possible for Deskmate to think there is a serial board installed when in fact there isn't. This causes Deskmate to lock up when it tries to initialize this non-existent board.

PROCEDURE:

1. Connect a 4.7K pull-down resistor from U56 pin 13 to the ground pad next to R54.

2. Test for proper operation by booting Deskmate and appropriate diagnostics.

4.7K 5% 1/4W Resistor Part # N-Ø247EEC Catalog # 26-9999R

DATE: December 11, 1986

REVISION DATE: December 11, 1986

BULLETIN NO: 1ØØØ:29

PRODUCT:
25-1Ø5Ø Tandy 1ØØØEX
25-1Ø51 Tandy 1ØØØSX
25-1ØØØ/A Tandy 1ØØØ

SUBASSEMBLY:
AX-Ø16Ø Main Logic Board (Tandy 1ØØØEX)
AX-Ø151 Main Logic Board (Tandy 1ØØØSX)
AX-Ø1Ø5 Gate Array Main Logic Board (Tandy 1ØØØA)
AX-9578 Main Logic Board (Tandy 1ØØØ)

SUBASSEMBLY REVISION:
Rev. A, Rev. D (Tandy 1ØØØEX)
Rev. A, Rev. A1, Rev. E (Tandy 1ØØØSX)
All Revs. (Tandy 1ØØØ, 1ØØØA)

PURPOSE: To allow the NCR sound generator IC to be used as an alternate for the Texas Instruments sound generator IC.

DISCUSSION:

In order for the NCR sound generator IC to be used in the 1ØØØ/A/EX/SX, a resistor value in the support circuitry must be changed. This may also be an issue if the sound generator IC needs replacement, as the old part may be a Texas Instruments chip which uses a different resistance value.

PROCEDURE:

Tandy 1ØØØEX:

For Rev. A boards:

(1) If U15 is a Texas Instruments 76496, R1Ø must be a 2.7k ohm resistor.

(2) If U15 is a NCR 76496, R1Ø must be a 2k ohm resistor. On older units, R1Ø may consist of a 2.7k ohm resistor with a 7.5K ohm resistor paralleled across it. This creates an effective resistance of 1.985k, which is more than adequate for this use.

For Rev. D boards:

(1) If U18 is a Texas Instruments 76496, R1Ø must be a 2.7k ohm resistor.

(2) If U18 is a NCR 76496, R1Ø must be a 2k ohm resistor. On older units, R1Ø may consist of a 2.7k ohm resistor with a 7.5K ohm resistor paralleled across it. This creates an effective resistance of 1.985k, which is more than adequate for this use.

Tandy 1ØØØSX:

For Rev. A, A1, and E boards:

(1) If U37A is a Texas Instruments 76496, R7 must be a 2.7k ohm resistor.

(2) If U37A is a NCR 76496, R7 must be a 2k ohm resistor. On older units, R7 may consist of a 2.7k ohm resistor with a 7.5K ohm resistor paralleled across it. This creates an effective resistance of 1.985k, which is more than adequate for this use.

Tandy 1ØØØA (gate array main logic board):

For All Revision boards:

(1) If U7Ø is a Texas Instruments 76496, R42A must be a 2.7k ohm resistor.

(2) If U7Ø is a NCR 76496, R42A must be a 2k ohm resistor.

Tandy 1ØØØ (non-gate array main logic board):

For All Revision boards:

(1) If U96 is a Texas Instruments 76496, R63 must be a 2.7k ohm resistor.

(2) If U96 is a NCR 76496, R63 must be a 2k ohm resistor.

These resistors are available as:

2.7k 5% 1/4 watt: part # N-Ø224EEC, cat. # 26-9999R
2k 5% 1/4 watt: part # N-Ø213EEC, cat. # 26-9999R

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DATE: January 6, 1987

REVISION DATE: January 6, 1987

BULLETIN NO: 1ØØØ:3Ø

PRODUCT: 25-1ØØ1 Tandy 1ØØØHD
25-1Ø25 External 1Ø-meg Hard Disk Drive

SUBASSEMBLY: AXX-51Ø3

SUBASSEMBLY REVISION: A11

PURPOSE: Troubleshooting outline for AXX-5Ø13 bubbles that have startup problems.

DISCUSSION:

Some of the bubble assemblies in the Tandy 1ØØØHD's and the 1Ø Meg half-height drives have exhibited drive not ready and boot failure symptoms. The problem may be intermittent and difficult to find in the shop. The problem can be caused by "dead spots" on the motor which prevents it from starting. This can be verified by watching the spindle motor fail to turn when power is applied.

Normally, as the spindle turns it activates two hall effect sensors. These, along with the logic in U17 and the speed control U18 determine which of the darlington arrays in U2Ø that will complete the current path to the motor. When the motor fails to turn enough to reach the sensor, the logic continues to drive the same winding which causes U2Ø overheat.

PROCEDURE:

1. Check the mounting for Q3 on the drive logic board (MX-4944). This transistor determines the maximum current that the motor will get. The heat-sink might not be properly mounted on some of these causing the output voltage to decrease, and may cause the transistor to run hot enough to burn fingers. Do not run the drive with the drive logic board unbolted from the case. If there is any sign of overheating replace Q3.

   When correctly mounted Q3 will be bolted securely to an aluminum plate with thermally conductive pads between the transistor and the plate as well as between the plate and the PCB. The second pad insulates the plate from the traces on the board. If you do not have these pads then use mica insulators and heat sink grease. This plate is then bolted securely to the frame with the screws that hold the drive logic board in place. Use heat sink grease on the frame where the plate touches it.

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2. Change R42 to a Ø.39 ohm 2 watt resistor to increase current to the motor. This will give the motor the torque it needs to reach the next sensor.

3. Monitor the output on pins 3, 7, 11, and 15 of U2Ø. See Figure 1 channel A. The display will look like a chopped up square wave with a very sharp triangular wave pulse of about 12 volts in amplitude. Apply heat to U2Ø, then freeze spray U2Ø, while monitoring each pin. Do not heat over 1ØØ'F or cool below 32'F. If the amplitude of the triangular pulses drop, or if the pulses displayed vary in amplitude, replace U2Ø. On some drives U2Ø is a 16 pin SIP IC. If this is the type you have, the direct replacement is part number MX-4945.

4. If your unit has four transistors replace all four with MJE-33ØØ transistors. These have a higher current rating as well as higher gain than the MJE-27Ø's. Bend the base and collector pins down and the emitter pin up with the numbers on the transistor down (against the PCB) and the metal heat sink surface up. Place the base lead of the first transistor in pin 1 and the collector lead in pin 2 where U2Ø used to go. Pin 1 is the pin closest to the potentiometer. The second transistor's base and collector go in pins 5 and 6. The third transistor's leads go in pins 9 and 1Ø and the fourth transistor's leads go in pins 13 and 14 of U2Ø. Pins 3, 4, 7, 8, 11, 12, and 15 on the PCB are not connected.

   Using buss wire of at least 24 gauge, tie the emitters of the four transistors together making sure that you have insulated the wire between each emitter so that it will not short to other conductors. Finally, solder the end of this buss wire to the PCB where U2Ø pin 16 used to go. Do not use wire wrap for this step because of the considerable current involved.

5. Check U17, using an oscilloscope on pins 1Ø, 11, 12, and 13. If the motor is spinning, the display will look like a square wave pulse rounded at the top. See Figure 1 channel B. If any output is missing on pins 1Ø, 11, 12, or 13, replace U17. This is a hybrid IC that drives U2Ø. The replacement part has all components on one side, away from the heat generating U2Ø.

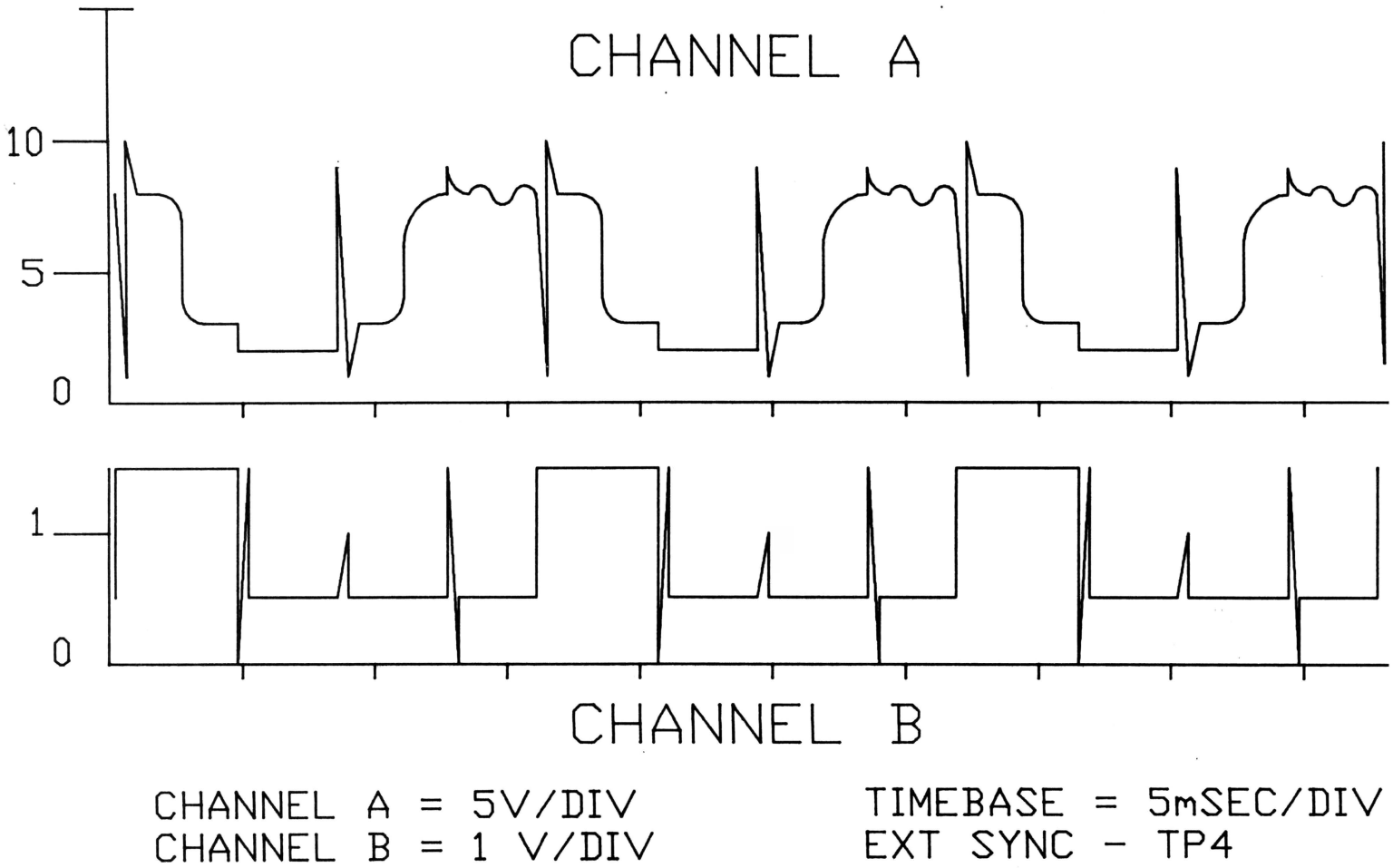
6. Adjust the motor speed to 36ØØ RPM. This can be measured with a frequency counter on TP4. The counter should indicate a period of 16.66 milliseconds. If it does not, adjust the motor speed with R3Ø. If the speed is not stable after adjustment, replace U17 and test. If it still fails, replace U18. U18 is the frequency to voltage converter that regulates motor speed.

7. If you still have problems the motor itself is probably at fault. Repairing motors requires special equipment. Replacing the entire Bubble assembly (AXX-51Ø3) is your only alternative.

Parts can be ordered from National Parts under:

Description	Part #	Catalog #
R42 Ø.39 ohm 2 watt 5% resistor	N-ØØØ6EHH	25-1Ø25
U17 hybrid IC chip	MX-7Ø37	25-1Ø25
U18 speed controller M5197Ø1	MX-4943	25-1Ø25
U2Ø transistor array (STK-66Ø7)	MX-4945	25-1Ø25
MJE-33ØØ transistors	MX-7596	25-1Ø25

Figure 1.



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DATE: January 29, 1987

REVISION DATE: January 29, 1987

BULLETIN NO: 1ØØØ:31

PRODUCT: 25-1Ø5Ø Tandy 1ØØØEX
25-1Ø51 Tandy 1ØØØSX
25-1Ø54 Tandy 1ØØØSX
25-1Ø55 Tandy 1ØØØSX
25-1Ø56 Tandy 1ØØØSX

SUBASSEMBLY: AX-1Ø6Ø Main logic board
AX-Ø151 Main logic board

SUBASSEMBLY REVISION: ALL

PURPOSE: To outline power supply adjustment procedures.

DISCUSSION:

The initial production run of video/memory interface chips needed slightly higher supply voltages than later production units. The earlier chips are marked 2684-ØØ1. The chips are located at U3Ø in the SX, U28 in the Revision A EX, and U27 on the Revision D EX. Tandy 1ØØØSX and EX's with this chip installed should have the power supply adjusted to 5.2Ø-5.25 volts.

The later chips are marked 2684-ØØ2. Units with these chips installed should have the power supplies adjusted to 5.ØØ-5.25 volts. This is how the factory adjusts them, however during shipping some units will fall out of tolerance and exibit a higher than 5.25 volt reading. These units should be adjusted for the type of chip used. Supply voltages higher than 5.25 volts will sometimes cause problems with other parts of the circuitry.

PROCEDURE:

The Tandy 1ØØØSX and EX power supplies have an adjustment pot, VR1, which will adjust both the 5 volt and 12 volt supplies. Adjust these for 5.ØØ-5.25 or 5.2Ø-5.25 volts at the DC connector ddepending on which video chip you have. Be careful not to let the 12 volt supply exceed 12.6 volts or let the 5 volt supply exceed 5.25 volts. If the supply cannot be adjusted within these specifications, replace the power supply and readjust the new supply.

model	type chip	location	voltage min	voltage max
1ØØØSX	2684-ØØ1	U3Ø	5.2Ø	5.25
1ØØØSX	2684-ØØ2	U3Ø	5.ØØ	5.25
1ØØØEX	2684-ØØ1	U27,28	5.2Ø	5.25
1ØØØEX	2684-ØØ2	U27,28	5.ØØ	5.25

The chip can be ordered under National Parts # MXP-ØØØ4, Catalog # 25-1Ø51