# IMMEDIATE SERVICE NOTICE

**NO.** 115 | DATE: 6/25/76

ITEM(S) / PRODUCT(S):

2200 #2
MODEL 2200E/F INFORMATION

1. *7052 ROMS*

The Preliminary SB for the 2200E/F described the ROM ICs required for an 80 x 24 CRT display. The ICs listed in the SB are now being loaded onto every 7052 PCB; however, unless a 7059 80 x 24 controller is also installed in the 2200F, the system will still initialize to 64 characters. When a 7059 80 x 24 controller is installed, the system will initialize to an 80 character line width and 24 character lines. Note that the LISTS function displays only 15 lines of text, with or without the 80 x 24 controller.

2. *INTERMITTENT ERROR 18*

2200E Units with serial numbers below EX1085 and 2200F units with serial numbers below EF1044 could possibly generate intermittent ERR 18. To correct this problem on those units, ECN #5658 must be incorporated. Proceed as follows:

a) Cut *etch* at L48 pin 3.
b) Cut *etch* at L41 pin 11.
c) Connect jumpers between L48 pin 3, L61 pin 13, and L51 pin 1.
d) Connect a jumper from L61 pin 12 to L51 pin 2.
e) Connect a jumper from L51 pin 3 to L41 pin 11.
f) Connect a 150Ω, 1/4 W, 5% (330-2016) between L61 pin 12 and +5V.
g) Connect a 470 pf mica capacitor (300-5005) between L51 pin 2 and ± 0V.
h) Change the E REV from 1 to 2.

729-0569

3. *2200E REGULATOR*

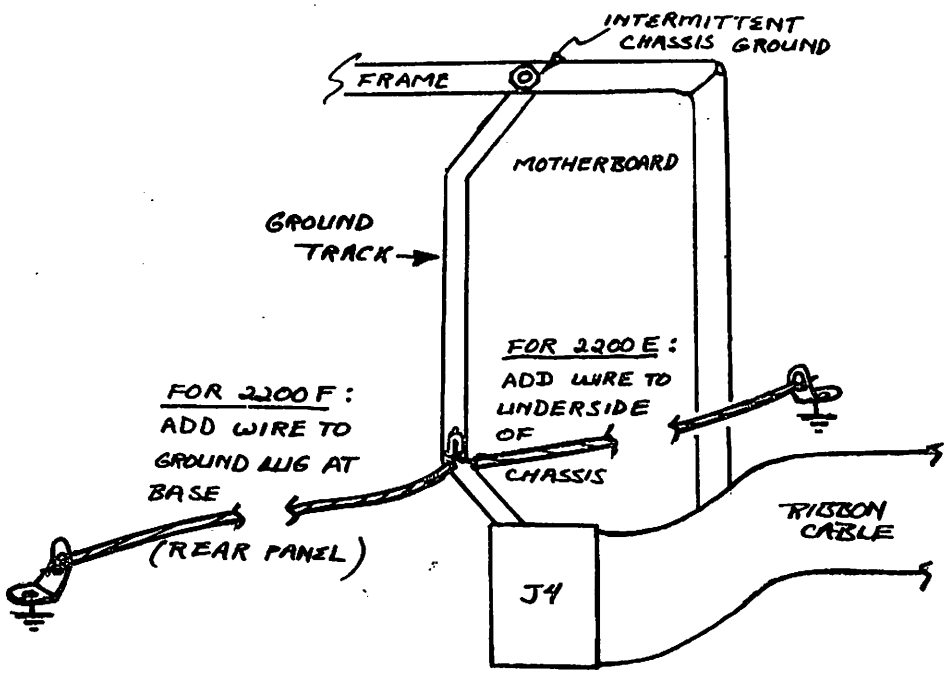
Exercise care when removing or installing the 7057 Regulator in the 2200E. The +12V Regulator potentiometer can be damaged by jamming the board against the Display Chassis frame.

4. *7051 CPU BOARD*

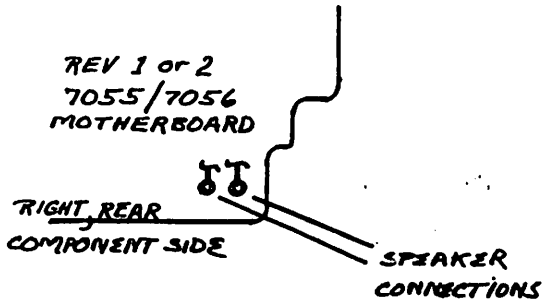
Many 7051 boards have a resistor installed incorrectly. The resistor is located near the upper left corner of the 7051 PCB at L12. On boards where the resistor is installed incorrectly, one lead is connected to pin 14 of L12. That resistor lead must be connected to L12 pin 13, not pin 14.

5a. *2200E/F MOTHERBOARDS*

2200E Units with serial numbers under 1053 and 2200F units with serial numbers under 1030 have a potential problem with chassis ground. The motherboard frame does not come in constant contact with the motherboard ground track. The only symptom reported thus far which appears to be caused by this grounding problem is that the EXECUTE Key intermittently will not function. The manufacturing solution adds a #18 Ga. green/yellow ground wire from the motherboard ground track (see Figure below) to a chassis ground stud.

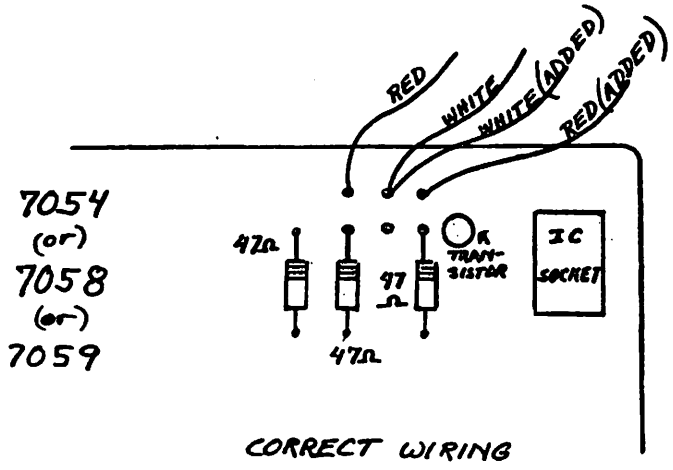


5b. In reference to installations of Option 60 (Key "clicker", Audio Alarm and Auxiliary BNC) on the same serial number units mentioned in item (5a.) above, the motherboard frame was occasionally found to be attached to the motherboard incorrectly. The result was that two eyelets (see Figure below, Rev. 1 or Rev. 2 7055/7056 motherboard only; not Rev. 0) used for the OP-60 speaker connections were covered over by the wide flange of the motherboard frame. The solution is to remove the motherboard frame and four pem nuts, reinstall the frame onto the motherboard with the narrow flange of the frame mounted on the connector side of the motherboard. Using the same screws just removed, resecure the frame with 4-40 hex nuts.




6. *7054/7058/7059 EXTERNAL CRT CONNECTIONS FOR OPTION 60*

Several 2200E/Fs were shipped with Option 60 incorrectly installed on the 7054, 7058, or 7059 I/O controller. The external CRT wires should be installed as shown below. Incorrectly installed units have the wires placed in parallel.



7. *7054 CHARACTER GENERATORS*

The following units have been shipped with PROMS (378-2000) in CRT Controllers 7054/7058 in lieu of the 377-0323 I.C. There is no difference in the function or loading between ROM or PROM versions. The above is intended as "information only".

2200E Serial #EX1056 to and including EX1095.
2200F Serial #EF1031 to and including EF1053.

# Service Newsletter

NO. 110C

MARCH 12, 1979

2200/2600 #22C

## 2230 MXA/MXB HARDWARE CHANGES

This Newsletter supersedes the information contained in Service Newsletters 110, 110A and 110B.

The new set of multiplexer boards which has been phased into production will resolve the intermittent problems which were common to most previous mux boards. The new mux system is still referred to as the 2230 MXA/MXB, and it remains composed of the master and various combinations of the three slave PBC's. In addition to eliminating intermittent errors, the new boards are compatible with all 2200 systems(B/C/S/T/VP/MVP), and may be interchanged without modifications.

The new mux boards may not function properly unless all of the ECNs concerning them have been performed. Care should be taken to check the boards before updating to ensure that a particular ECN has not already been performed. Because of confusion concerning the different types of mux boards, the E-REV level stickers and the dash numbers may not reflect the actual structures of the boards. Refer to the tables on the following page to determine the relationships between the various E-REV LEVELS and DASH NUMBERS. All of the PCB's in all mux systems must be replaced or updated to conform to the DASH NUMBERS and E-REV levels listed in the table below.

2230 MXA/MXB SYSTEM PCB's

| PCB | MASTER | SLAVE | E-REV |
|---|---|---|---|
| 7287 | MXA | | 7 |
| 6786-1 | | MXB | 4 |
| 7054-2 | | MXB | 6 |
| 7054-3 | | MXB 50 Hz | 6 |
| 7059-2 | | MXB | 7 |
| 7059-3 | | MXB 50 Hz | 7 |

Either the 7054-2 or the 7059-2 may be used for the 2200F or PCS IIA.

Following are ECN tables, descriptions and diagrams of the circutry changes that each ECN introduced. These will aid in determining if the ECNs were performed correctly and show the changes that must be made to incorporate those ECNs. Included at the end of this Newsletter are the latest schematics for each board.



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Listed below are four tables, each of which summarizes the ECN development of the PCB indicated. These tables should aid in correlating the ECN and the E-REV level with the DASH numbered versions of each PCB.

| ECN: | 08401 | 08666 | 09010 | 09515 | 09651 | 09997 | 10266 | 10518 |
|---|---|---|---|---|---|---|---|---|
| 7287: | 1 | 2 | 3 | 4 | 5 | 6 | X | 7 |
| 7287-1: | 1 | 2 | 3 | 4 | 5 | 6 | 7 | X |

NOTE: This PCB was 6785, which cannot be updated to conform to the new mux.

| ECN: | 05319 | 05720 | 06622 | 08450 | 09256 | 09650 | 09998 |
|---|---|---|---|---|---|---|---|
| 6786: | 1 | 2 | X | X | X | X | * |
| 6786-1: | X | X | 0 | 1 | 2 | 3 | 4 |

* ECN #09998 was appliied to the 6786 PC as E-REV 3 in error. The 6786 PC exists up to E-REV 2 only.

| ECN: | 05550 | 05624 | 05624A | 05719 | 06624 | 06859 | 07190 | 07190A | 07456 | 07456A | 08448 | 08454 | 10224 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7054: | 1 | 2 | 3 | 4 | X | 5 | 6 | 7 | 8 | 9 | 10 | X | X |
| 7054-1: | 1 | 2 | 3 | 4 | X | 5 | 6 | 7 | 8 | X | 9 | X | X |
| 7054-2/-3: | X | X | X | X | 0 | 1 | 2 | 3 | X | 4 | X | 5 | 6 |

| ECN: | 06287 | 06625 | 06860 | 07113 | 07189 | 07457 | 07758 | 08449 | 09075 | 10225 |
|---|---|---|---|---|---|---|---|---|---|---|
| 7059: | 1 | X | 2 | 3 | 4 | 5 | 6 | 7 | 8 | X |
| 7059-1: | 1 | X | 2 | 3 | 4 | 5 | 6 | X | 7 | X |
| 7059-2/-3: | X | 0 | 1 | (1) | 2 | 3 | 4 | 5 | 6 | 7 |

210-6786-1 Curent E REV is 4

NOTE:

The 6786 must be at E REV 2 or higher before converting to a 6786-1. Reference the current Technical Procedure Manual pages 55 and 57.

ECN #6622 Rev 0

1. Remove the fifteen 47 ohm resistors R12 through R26 and replace them with jumper wires.

   This ECN creates the 6786-1 from a 6786, therefore, the board should be marked with a "-1".

   The E REV level after performing this ECN is Rev 0.

ECN #8450 Rev 1

1. Change L11 & L15 from 74367 to 8T97 (376-0189).

2. Insert a 7403 (376-0028) into location L9A. Pin 1 should be located toward the bottom of the board. Connect pin 7 to ±0V and pin 14 to +5V.

3. Cut the etch between connector $3_3$ and L10 pin 5.

4. Cut the etch between connector $A_3$ and L11 pin 2.

5. Cut the etch between connector $4_3$ and L13 pin 10.

6. Cut the etch coming from connector $8_3$ at a point before it connects to any IC pins.

7. Isolate L2-1 from its existing etch by lifting pin 1 so that the etch remains intact.

8. NOTE: The following step is deleted by ECN #9256 and is included for reference only: Jumper L10-10 to L2-1.

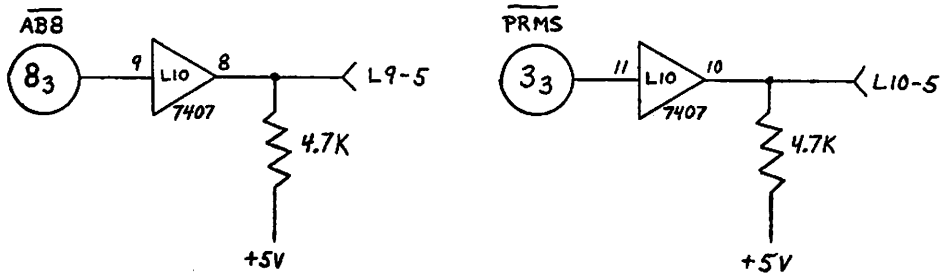
Add five 4.7K ohm resistors (330-3047).

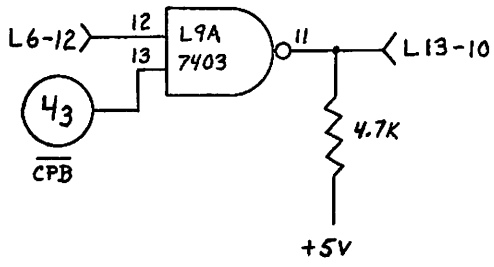
Add the following circutry:

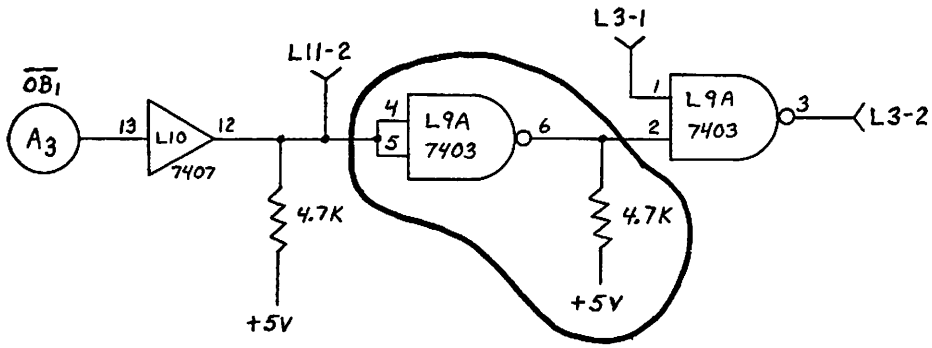
NOTE:

The encircled circuitry (L9A-4, 5 6 and the 4.7K pull up) is changed by ECN #9998 and is included in the figure for reference only!

The E REV level after performing this ECN is Rev 1.



ECN #9256 Rev 2

1. Insert a 7400 (376-0002) into location L1A. CAUTION: Some boards may have this 7400 located above L6. Pin 1 should be located toward the bottom of the board. Connect pin 7 to ±0V and pin 14 to +5V.

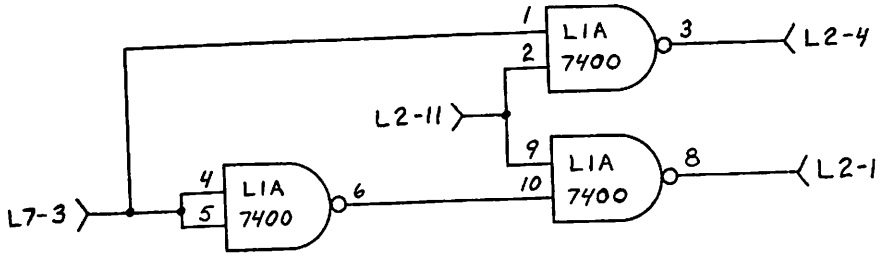
2. Isolate pin 2 of L2 from the existing etch. Ensure that the etch is left intact to connect to all other components on that line. Do this by lifting pin 2.

3. Remove the wire connecting L10-10 to L2-1, and ensure that the 4.7K ohm pull-up resistor that is attached to this line connects to L10-10..

4. Cut the etch between L2 pin 3 and L2 pin 11.

5. Connect L2 pin 2 to ±0V.

Add the following circutry:


The E REV level after performing this ECN is Rev 2.

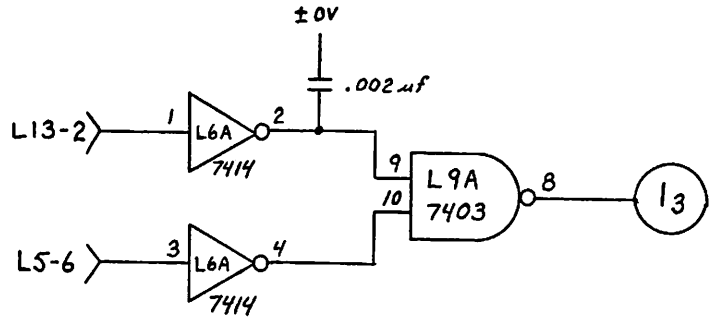
ECN #9650 Rev 3

1. Insert a 7414 (376-0139) into the location above L6 (referred to as L6A). CAUTION: Some boards may have this 7414 in location L1A. Pin 1 should be located toward the bottom of the board. Connect pin 7 to ±0V and pin 14 to +5V.

2. Cut the etch between connector $1_3$ and L13 pin 3.

   Add one 0.002 uf cap (300-1913).

   Add the following circuitry:




   The E REV level after performing this ECN is Rev 3.

ECN #9998 Rev 4

1. Cut the etch connected to L14 pin 7 at pin 7.

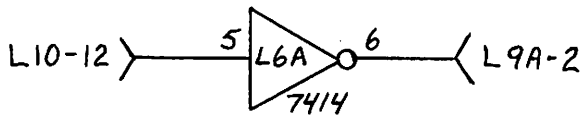
2. Remove the 4.7K pull up resistor that connects to L9A pin 6.

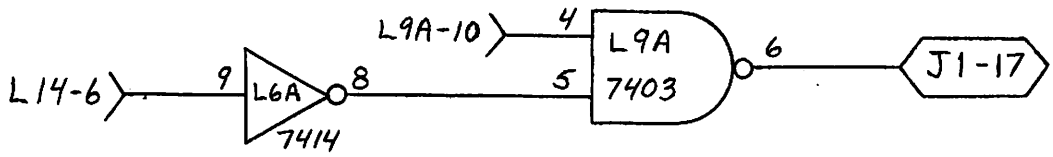
3. On R4 boards, cut the etch between L9A pins 4 and 5. On boards with artwork R3 and below, remove the jumper wire that connects L9A pins 4 and 5.

4. On R4 boards, cut the etch connected to L9A pin 4 at pin 4. On boards with artwork R3 and below, disconnect L10 pin 12 from L9A pin 4 or 5 (pins 4 and 5 were tied together). Ensure that L10 pin 12 is still connected to L11 pin 2 and that the 4.7K pull up resistor that was tied to L10 pin 12 remains so.

5. On R4 boards, cut the etch between L9A pins 2 and 6. On boards with artwork R3 and below, remove the jumper wire connecting L9A pins 2 and 6.

Add the following circuitry:




The E REV level after performing this ECN is Rev 4.

210-7287 Current E Rev is Rev 7

ECN #8401 Rev 1

1. Insert a 7407 (376-0056) into location L15A. Pin 1 should be located toward the bottom of the board. Connect pin 7 to ±0V and pin 14 to +5V. CAUTION: On R1 boards this 7407 was most likely placed in location L17.

2. Change C11 to 1000 pf mica (300-5006) (schematic coordinates J2).

3. Change R12 to 330 ohm (330-2033-4B) (schematic coordinates K3).

4. Change R13 to 220 ohm (330-2022-4B) (schematic coordinates K3.)

5. Change C13 to .02 uf (300-1904) (schematic coordinates I4).

6. Change L4, L30, L31, L34 and L35 from 74LS367 to 8T97 (376-0189).

7. Isolate L22 pin 4 from existing etch. Ensure etch is left intact to connect to all other components on that line. Do this by lifting pin 4.

8. Cut the etch between connector $4_3$ and L35 pin 10.

9. Cut the etch coming from connector $E_3$ at the connector.

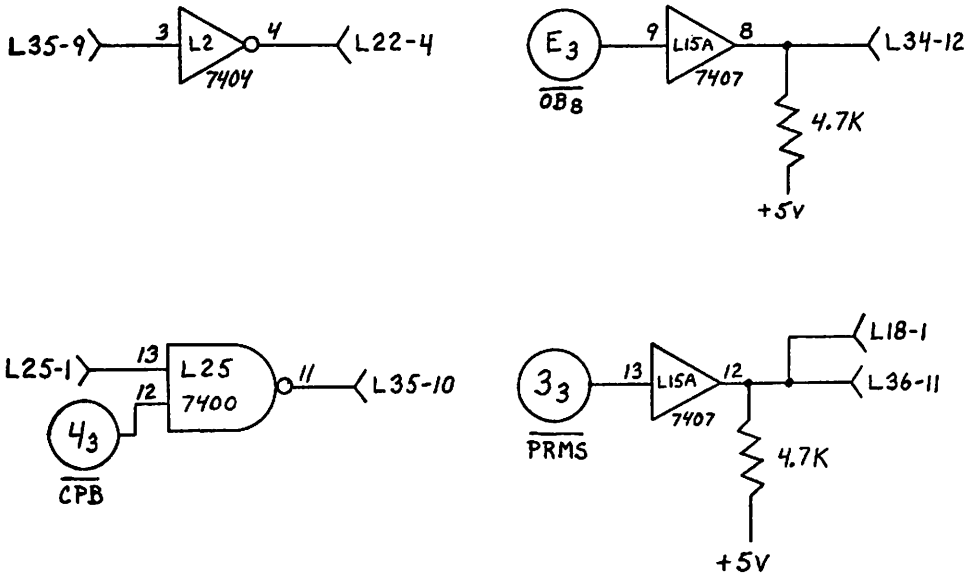
10. Cut the etch between connector $A_3$ and L30 pin 2.

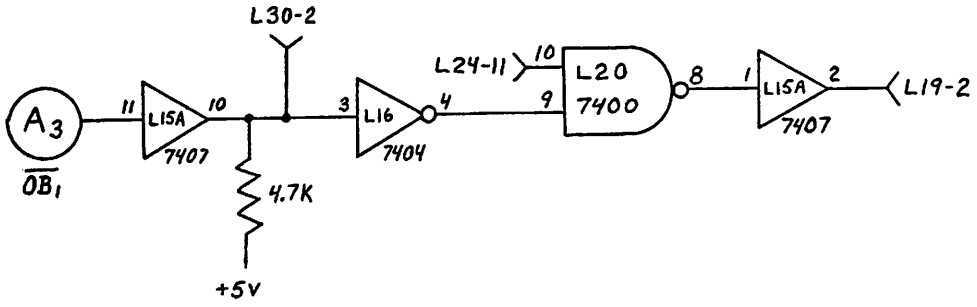
11. Cut the etch between connector $3_3$ and L36 pin 11.

12. Isolate L18 pin 1 from existing etch. Ensure that the etch is left intact to connect to all other components on that line. Do this by lifting pin 1.

Add three 4.7K ohm resistors (330-3047-4B).

Add the following circuitry:




The E REV level after performing this ECN is Rev. 1

ECN #8666 Rev 2

1. R15 should be 10K ohm (330-4011-4B). If it is not, change it. (schematic coordinates J3).

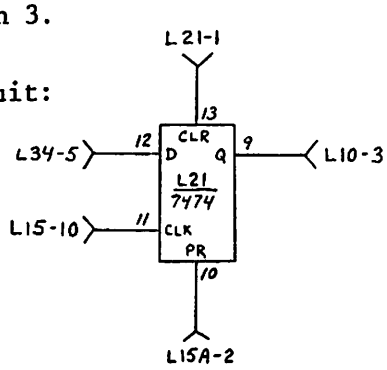
2. C13 should be 0.02 uf (300-1904). If it is not, change it. (schematic coordinates I4).

The E REV level after performing this ECN is Rev 2.

ECN #9010 Rev 3

1. Isolate L10 pin 3 from exiting etch. Ensure that the etch is left intact to connect to all other components on that line. Do this by lifting pin 3.

Add the following circuit:




The E REV level after performing this ECN is Rev 3.

ECN #9515 Rev 4

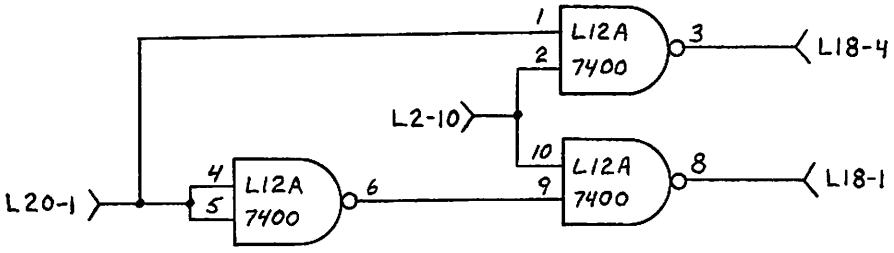
1. Isolate L18 pins 1 and 3 from existing etches. Ensure that the etches are left intact to connect to all other components on those lines. Do this by lifting pins 1 and 3.

2. Insert a 7400 (376-0002) into location L12A. Pin 1 should be located toward the bottom of the board. Connect pin 7 to $\pm$0V and pin 14 to +5V.

3. Change C17 to 0.1 uf (300-1901) (schematic coordinates F9).

4. Change R24 to 47K (330-4047-4B) (schematic coordinates F9).

Add the following circuitry:


The E REV level after performing this ECN is Rev 4.

CAUTION: This ECN had one other change which created a 7287-2. If this change has been implemented and/or the board is marked with a "-2", the modification has to be removed.

The change was to isolate L12 pins 2 and 13 from the existing etches, and then jumper L12 pins 1, 2 and 13 together. The pins should not be jumpered and pins 2 and 13 must be reconnected to the etches that were connected to them.

ECN #9651 Rev 5

1. Insert a 7403 (376-0028) into location L17 (may be referred to as L16A or L17A on some schematics. New schematics will refer to it as L17.) Pin 1 should be located toward the bottom of the board. CAUTION: On R1 boards, this 7403 may have to be inserted into location L15A.

2. Change C16 to 470 pf (300-5005) (schematic coordinates F9).

3. Cut the etch between connector $1_3$ and L35 pin 3 at the connector.

4. Cut the etch between L16 pin 8 and L5 pin 1.

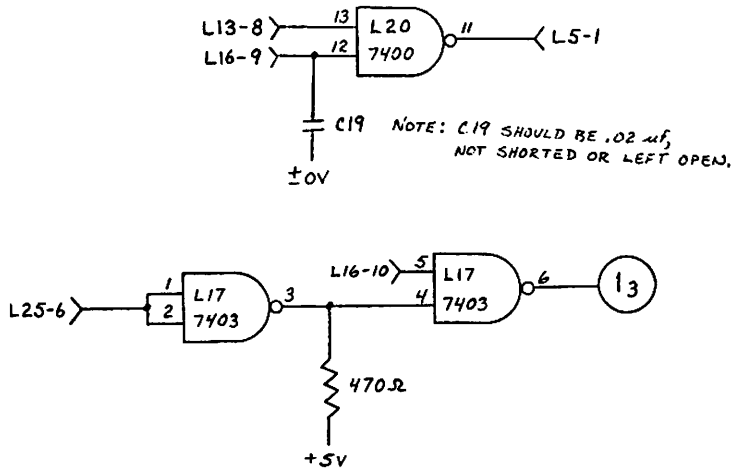
5. Add a 0.001 uf cap (300-1906) between L14 pin 4 and ±0V.

6. NOTE: The following wire is removed by ECN #9997. It is included here for reference only. This wire should not be added!
   Add a jumper wire from L12 pin 1 to L14 pin 3.

7. C19 should be loaded with a 0.02 uf cap (300-1904) (schematic coordinates I9). Location C19 may be open or shorted on previous boards.

   Add one 470 ohm resistor (330-2047-4B).

   Add the following circuitry:




The E REV level after performing this ECN is Rev 5.

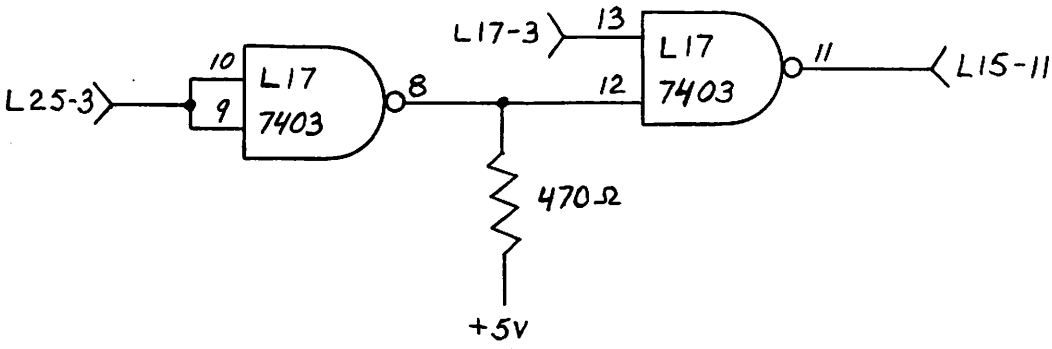
NOTE: This ECN also changes some of the wiring installed by ECN #9515 to create the 7287-2. Refer to the note on page 10 for details.

ECN #9997 Rev 6

1. Cut the etch connected to L34 pin 7 at pin 7. Add one 470 ohm resistor (330-2047-4B).

2. Remove the wire connecting L12-1 to L14-3.

Add the following circuitry:




The E REV level after performing this ECN is Rev 6.

ECN #10518 Rev. 7

1. Change C15 to 0.22 uf(schematic coordinates G11).
2. Change R20 to 47 K(schematic coordinates G11).

The E REV level after after performing this ECN is Rev 7.

## 210-7054-2(-3) Current E Rev is Rev 6

NOTE:

The 7054 P.C. board must be at E REV-4 or higher before its conversion to a 7054-2. Reference Technical Procedure Manual, pages 14A, 54 and 57 if this is not so.

ECN #6624 Rev 0

1. Remove the fourteen 47 ohm resistors R5-R7, R34, R36 - R45, R62 and R63, and insert jumper wires in their places.

   This ECN creates the 7054-2 from a 7054, therefore, the board should be marked with a "-2".

   The E REV level after performing this ECN is Rev 0.

ECN #6859 Rev 1

See Technical Procedure Manual, page 68

ECN #7190 Rev 2

See Technical Procedure Manual, page 71

ECN #7190A Rev 3

See Technical Procedure Manual, page 71

ECN #7456A Rev 4

See Technical Procedure Manual, page 75.

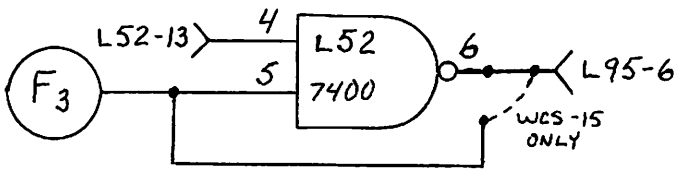
NOTE:

ECN #7456 is the ECN that is described in the TPM, however, 7456A is the same except it applies to the 7054-2.

ECN #8454 Rev 5

1. Cut the etch between connector $F_3$ and L95 pin 6.

   Add the following circuitry:




The E REV level after performing this ECN is Rev 5.

NOTE:

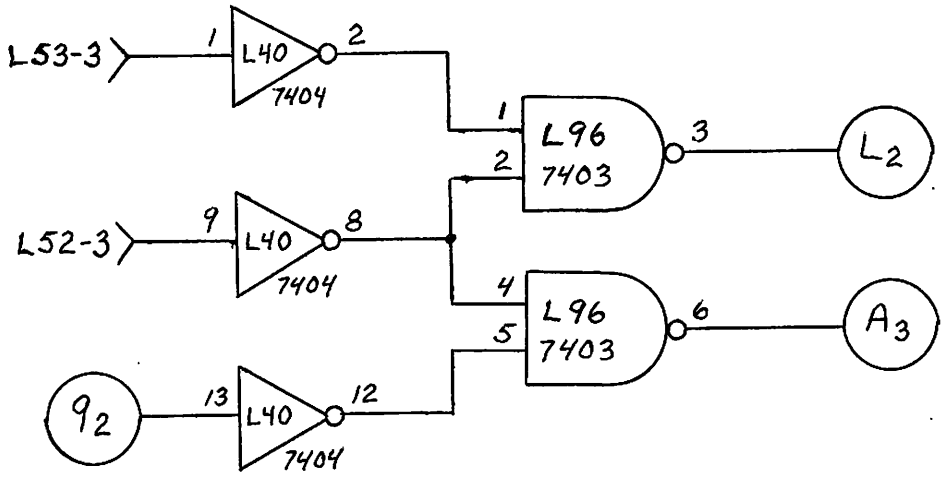
To allow the 7054-2 to operate in a WCS-15 configuration, remove the end of the wire that is connected to L52 pin 6 and connect it to L52 pin 5. On future boards a jumper location will be provided for this.

1. Insert a 7403 (376-0028) in location L96. Pin 1 should be located toward the bottom of the board. Connect pin 7 to ±0V and pin 14 to +5V.

2. Cut the etch between connector $L_2$ and L95 pin 9.

3. Cut the etch between connector $A_3$ and L83 pin 13.

Add the following circuitry:




The E REV level after performing this ECN is Rev 6.

## 210-7059-2(-3) Current E REV is Rev 7

NOTE:

The 7059 must be at E REV 1 or higher before its conversion to a 7059-2. Refer to Technical procedure Manual, page 66 if this is not so.

ECN #6625 Rev 0

1. Remove the fourteen 47 ohm resistors R6, R7, R10-R17, R43, R47, R48 and R50, and insert jumper wires in their places.

   This ECN creates the 7059-2 from a 7059, therefore, the board should be marked with a "-2".

   The E REV level after performing this ECN is Rev 0.

ECN #6860 Rev 1

See Technical Procedure Manual, page 69.

ECN #7113 Remains at Rev 1

See Technical Procedure Manual, page 70.

ECN #7189 Rev 2

See Technical Procedure Manual, page 71.

ECN #7457 Rev 3

See Technical Procedure Manual, page 75.

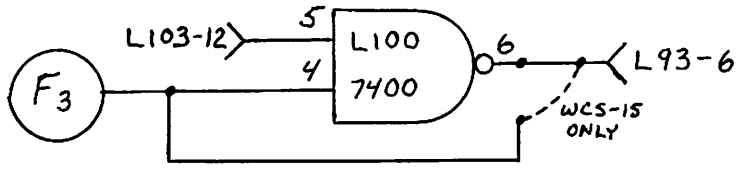
ECN #7758 Rev 4

See Technical Procedure Manual, page 77

ECN #8449 Rev 5

1. Cut the etch between connector $F_3$ and L93 pin 6.

   Add the following circuitry:




The E REV level after performing this ECN is Rev 5.

NOTE:
To allow the 7059-2 to operate in a WCS-15 configuration, remove the end of the wire that is connected to L100 pin 6 and connect it to L100 pin 4. On future boards a jumper location will be provided.

ECN #9075 Rev 6

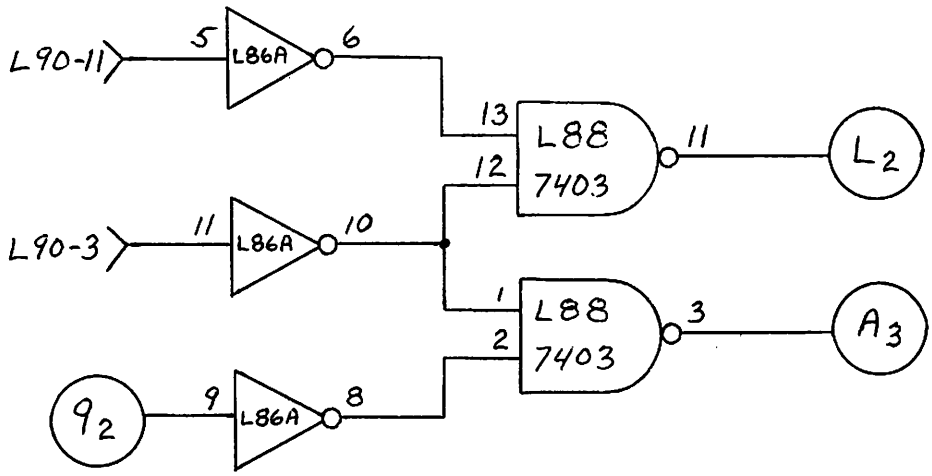
1. Add a 390 pf cap. (300-1390) between L40 pin 1 and +5V.

The E REV level after performing this ECN is Rev 6.

1. Cut the etch between L94 pin 13 and connector $A_3$.

2. Cut the etch between L93 pin 9 and connector $L_2$.

Add the following circuitry:




The E REV level after performing this ECN is Rev 7.

NOTES:

DO NOT SCALE

HOLE LEGEND

| (DRILLED OR PUNCHED HOLE TOLERANCES) | HOLE DIA. | TOL. |
|---|---|---|
| | .0135 to .125 | ± .002 |
| | .126 to .250 | ± .003 |
| | .251 to .500 | ± .004 |

| KEY PT | DESCRIPTION | QTY |
|---|---|---|
| A | | |

| LOCATION | W.L. PART NO. | TERM. NO. 10V | TERM. NO. Vcc +5VR |
|---|---|---|---|
| L1 | 376-0051 | 7 | 14 |
| L2 | 376-0006 | 7 | 14 |
| L3 | 376-0005 | 11 | 4 |
| L4, 6 | 376-0081 | 7 | 14 |
| L5, L5 | 376-0502 | 7 | 14 |
| L7, 8 | 376-0148 | 7 | 14 |
| L9 | 376-0010 | 7 | 14 |
| L10 | 376-0056 | 7 | 14 |
| L11-15 | 376-0159 | | |
| L9A | 376-0228 | 7 | 14 |
| L6A | 376-0139 | 7 | 14 |

| COMPONENT | W.L. PART NO. |
|---|---|
| SW1 | 325-1503 |
| | |
| J2 | 350-2097 |
| J1 | 350-2096 |
| | |
| R1-R3, 22, 27-29 | 330-3047 |
| R11 | 333-0017 |
| R12-R22, 24-26 | 330-1047 |
| | |
| C1 | 300-5006 |
| C2-5 | 300-1903 |
| C6, 7 | 300-4022 |
| C8 | 300-1913 |
| D1-4 | 380-0000 |
| D5, 6 | 380-1001 |
| | |
| RLY 1, 2 | 320-0047 |
| | |

CONN. 1

| | | |
|---|---|---|
| +5VR | A 1 | +5VR |
| ±0V | B 2 | ±0V |
| $\overline{AB1}$ | C 3 | |
| $\overline{AB4}$ | D 4 | |
| $\overline{AB5}$ | E 5 | $\overline{AB2}$ |
| $\overline{OBS}$ | F 6 | $\overline{AB3}$ |
| $\overline{AB5}$ | N 7 | |
| | J 8 | |
| $\overline{IB7}$ | K 9 | |
| $\overline{IB8}$ | L 10 | |
| $\overline{IB5}$ | M 11 | |
| $\overline{IB6}$ | N 12 | |
| $\overline{IB4}$ | P 13 | $\overline{IB3}$ |
| $\overline{IB2}$ | R 14 | $\overline{IB1}$ |

SIGNAL - TERMINAL DESIGNATIONS, VIEW FROM BOTTOM (WIRING) SIDE OF CONNECTOR

CONN. 3

| | | |
|---|---|---|
| $\overline{OB1}$ | A 1 | $\overline{IB5}$ |
| $\overline{OB2}$ | B 2 | |
| $\overline{OB3}$ | C 3 | PRMS |
| $\overline{OB4}$ | D 4 | CPB |
| $\overline{OB8}$ | E 5 | $\overline{CBS}$ |
| $\overline{OB7}$ | F 6 | $\overline{AB6}$ |
| $\overline{OB6}$ | H 7 | $\overline{AB7}$ |
| $\overline{OB5}$ | J 8 | $\overline{AB8}$ |
| RB | K 9 | |
| | L 10 | |
| | M 11 | |
| | N 12 | |
| ±0V | P 13 | ±0V |
| +5VR | R 14 | +5VR |
| +12V | S 15 | +12V |

COMP. SIDE — WIRING SIDE

| SPARES | | |
|---|---|---|
| TYPE | LOC. | SP |
| 7408 | E6 | 1 |
| 7414 | E6A | 2 |

J1 J2

6786 R6

COMPONENT LAYOUT

NOTE: * FOR 6786-1 ONLY. DELETE R12 THRU R26 AND REPLACE THEM WITH JUMPERS.

| REV | DESCRIPTION | DATE | APPROVED BY |
|---|---|---|---|
| A | NO PCB CHANGE | 6/10 | |
| B | REVISED PER ECN 9998 | 6/10 | |
| C | REVISED PER ECN 9998 | 6/10 | |
| D | REVISED PER ECN 9998 | 6/10 | |
| E | REVISED PER ECN 9998 | 6/10 | |
| F | REVISED PER ECN 9998 | 6/10 | |
| G | REVISED PER ECN 9998 | 6/10 | |
| H | REVISED PER ECN 9998 | 6/10 | |
| I | REVISED PER ECN 9998 | 6/10 | |
| J | REVISED PER ECN 9998 | 6/10 | |

| WANG PART NO | ITEM | QTY | NAME | MATERIAL | DESCRIPTION |
|---|---|---|---|---|---|
| PC TYP | EARLY LEAD ON | ASSY LOCATION | | | |

WANG LABORATORIES, INC. TEWKSBURY MASS. U.S.A.

| | BY | DATE | APPROVED BY | DATE |
|---|---|---|---|---|
| DWN | | | ENGR | |
| CHK | | | MFGR | |
| E.C. CONTROL | | | MFGR | |

MATERIAL

MODEL NO 2230 MVB

ME ENGRG SPECIFICATIONS

FINISH

TOL EX AS NOTED
XX ± .010 FRAC ± 1/64
XXX ± .005 ANG. ± 1/2° FINISH

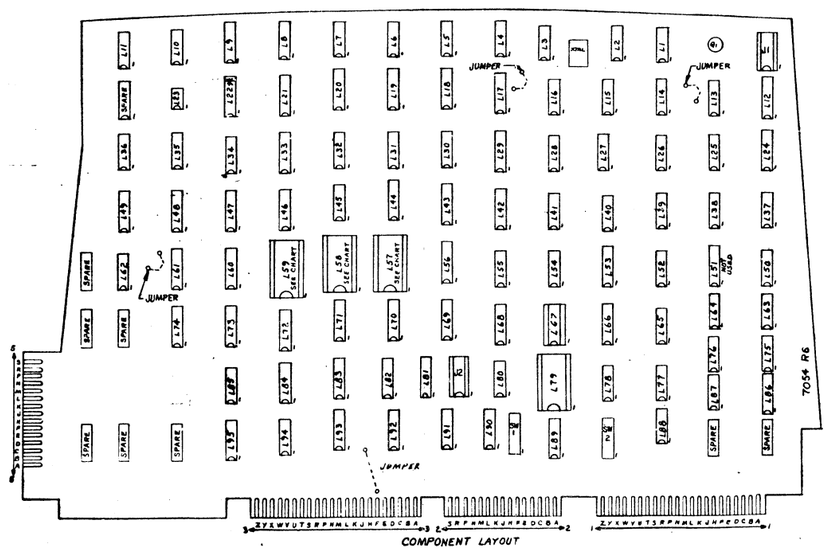
SCALE — SHT — OF

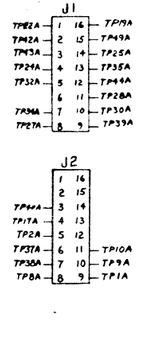
TITLE: DAISY CHAIN MUX SLAVE

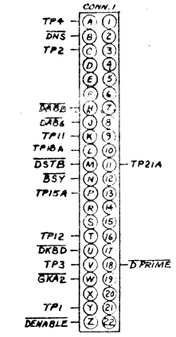
WANG PART NO. 210-6786 | SIZE E | DRAWING NO. 6786 | REV 11

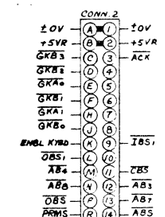
6786-1 E-REV 4

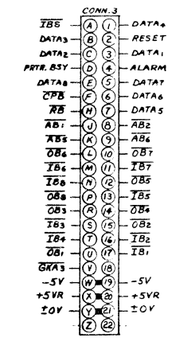
6786 E-REV 2

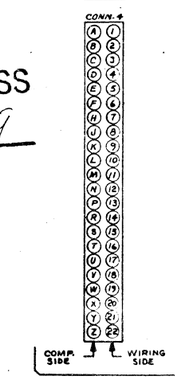


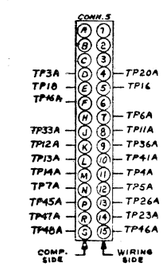


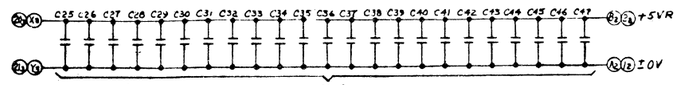












SPARES

| I.C. TYPE | LOCATION | SPARES |
|---|---|---|
| 7404 | L3 | 1 |
| 7404 | L25 | 1 |
| 7400 | L6 | 1 |
| 7404 | L11 | 4 |
| 7432 | L13 | 2 |
| 7404 | L36 | 2 |
| 7420 | L37 | 1 |
| 7400 | L52 | 2 |
| 7400 | L51 | 1 |
| 7403 | L65 | 1 |
| | | |
| 7408 | L85 | 1 |
| 7432 | L87 | 1 |
| | | |
| 7404 | L40 | 3 |
| 7474 | L50 | 1 |
| | | |
| 7410 | L62 | 1 |
| | | |
| 7420 | L94 | 1 |

JUMPER VARIATION CHART

| | 7054 60HZ | 7054-1 50HZ | 7054-2 60HZ | 7054-3 50HZ |
|---|---|---|---|---|
| L10-2 | V128 | V256 | V128 | V256 |
| L10-12 | V64 | L10-2 | V64 | L10-2 |
| L10-4 | V8 | L10-11 | V8 | L10-11 |
| L10-5 | V4 | L10-4 | V4 | L10-4 |
| L10-6 | V2 | V1 | V2 | V1 |
| L9-3 | V32 | V32 | V32 | V32 |
| L9-4 | V16 | V16 | V16 | V16 |
| L9-9 | HIGH | HIGH | HIGH | HIGH |
| | | | | |
| L9-12 | ±0V | HIGH | ±0V | HIGH |
| | | | | |
| L8-9 | HIGH | ±0V | HIGH | ±0V |
| L8-10 | ±0V | HIGH | ±0V | HIGH |
| L8-13 | HIGH | ±0V | HIGH | ±0V |
| | | | | |
| L49-9 | L48-6 | L48-7 | L48-6 | L48-7 |
| R5, 6 R36-45 R62, 63 | LOAD 47Ω RESISTORS | LOAD 47Ω RESISTORS | LOAD JUMPERS | LOAD JUMPERS |

| COMPONENT | W.L. PART NO. |
|---|---|
| R54 | 330-3010 |
| R8,9,24 | 330-2047 |
| R1-4,10-16,26-28,32,33,35,46,47,48,50,51,58,59,60,61,68,67,56 | 330-3022 |
| R5-7,34,38-45,62,63 | 330-1047 |
| R29 | 333-0017 |
| R17,18 | 331-1047 |
| R22, | 331-2047 |
| R20,21,65 | 330-2022 |
| R23 | 330-2010 |
| R36,37,57 | 330-2039 |
| R53,64, | 330-3047 |
| R19 | 331-1015 |
| R52 | 330-4018 |
| R30,49 | 330-4033 |
| R55 | 330-3082 |
| R31 | 330-4047 |
| R66 | 330-2015 |
| C1,10,48 | 300-1470 |
| C2,5,25-47 | 300-1903 |
| C4 | 300-1100 |
| C9,11,49 | 300-1220 |
| C3,6,12,15 | 300-5006 |
| C13 | 300-1906 |
| C7,14 | 300-5004 |
| C16 | 300-4018 |
| C17 | 300-4002 |
| C18 | 300-4020 |
| C19-22,24 | 300-4022 |
| C8 | 300-5007 |
| C23 | 300-1390 |
| | |
| SW.1,2 | 325-1503 |
| SW. CAP 1,2 | 325-9047 |
| | |
| XTAL | 321-0019 |
| J1,2 | 376-9002T |
| Q1 | 375-1021 |
| L57-59 | 376-9003 |
| B.N.C. CONN. | 350-2064 REF. |

| LOCATION | W.L. PART NO. | TERM. NO ±0V | TERM. NO Vcc+5VR |
|---|---|---|---|
| L1,7,15,27,35,50,75 | 376-0006 | 7 | 14 |
| L2,4,6,51,52,55 | 376-0002 | 7 | 14 |
| L3,11,16,25,36,40,77 | 376-0010 | 7 | 14 |
| L5,14,28,64,76,80,85 | 376-0081 | 7 | 14 |
| L8,9,47 | 376-0120 | 8 | 16 |
| L10 | 376-0031 | 7 | 14 |
| L12 | 376-0108 | 8 | 16 |
| L13,26,87 | 376-0093 | 7 | 14 |
| L17-21,49 | 376-0094 | 8 | 16 |
| L23 | 376-0126 | 1 | 8 |
| L24,86 | 376-0104 | 8 | 16 |
| L29,33,42 | 376-0053 | 8 | 16 |
| L30,31,32 | 376-0148 | 7 | 14 |
| L34,45 | 376-0011 | 10 | 5 |
| L38,39,88 | 376-0016 | 7 | 14 |
| L37,94 | 376-0004 | 7 | 14 |
| L43,44,46 | 376-0082 | 8 | 16 |
| L48 | 376-0008 | 8 | 16 |
| L67 | 376-9002 | | |
| L53 | 376-0051 | 7 | 14 |
| L54 | 376-0056 | 7 | 14 |
| L56,61,81,84,92,93 | 376-0119 | 8 | 16 |
| L57,58,59 | SEE CHART (SH.4) | 12 | 24 |
| L60 | 376-0105 | 8 | 16 |
| L41,62 | 376-0003 | 7 | 14 |
| L63 | 376-0005 | 11 | 4 |
| L65 | 376-0028 | 7 | 14 |
| L66 | 376-0098 | 8 | 16 |
| L67-74 | 377-0069 | 9 | 10 |
| L79 | 376-0090 | 12 | 24 |
| L82,83,91,95 | 376-0189 | 8 | 16 |
| L78 | 376-0125 | 7 | 14 |
| L89,90 | 376-0069 | 8 | 16 |
| L22 (SEE NOTE 1) | 376-0094 | 8 | 16 |

NOTE 1: L22 LOADED ON 7054-1 ONLY

~~SIGNAL~~- TERMINAL DESIGNATIONS, VIEW FROM BOTTOM (WIRING) SIDE OF CONNECTOR

COMPONENT LAYOUT

LOADING CHART

| MODEL | P.C. BOARD | L57 | L58 | L59 |
|---|---|---|---|---|
| 210-7054-1B KATA KANA<br>210-7054-3B | 209-7054-1<br>209-7054-3 | 378-2044 | NOT LOADED | NOT LOADED |
| 210-7054-1C CYRRILIC<br>210-7054-3C | 209-7054-1<br>209-7054-3 | 378-2024 | NOT LOADED | NOT LOADED |
| 210-7054-1A<br>210-7054-3A | 209-7054-1<br>209-7054-3 | 377-0323 | NOT LOADED | NOT LOADED |
| 210-7054A<br>210-7054-2A | 209-7054<br>209-7054-2 | 377-0323 | NOT LOADED | NOT LOADED |
| 2200F | 209-7054-28 | 378-2044 | | |

CHANGE IN PROCESS
PER ECN 9659
DATE OCT 26 1978

HOLE LEGEND

| IDENT | DESCRIPTION | QTY |
|---|---|---|
| A | | |

REVISION

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| AK | AP | CAB | COA | AP | DO | BB | DT | |
| 8-2-77 | 8-2-77 | 9-7-77 | 10-24-77 | 1-11-78 | 6-21-78 | 6-21-78 | 7-3-78 | |
| REVISED PER ECN 6959 APP'D 8-3-77 | REVISED PER ECN 7190 APP'D 8-3-77 | REVISED PER ECN 7190-A APP'D | REVISED PER ECN 7456 & 7456A APP'D | REVISED PER ECN 7739 APP'D 2-21-78 | REVISED PER ECN 8040 APP'D 7-22-78 | REVISED PER ECN 8054 APP'D 7-22-78 | REVISED PER ECN 9168 APP'D 7-22-78 | |
| 10/5 | 11/6 | 13/7 | 14/8 | 14/8 | 15/3 | 16/9 | 17 | |

| WANG PART NO | | | ITEM | QTY | NAME | MATERIAL | DESCRIPTION | |
|---|---|---|---|---|---|---|---|---|
| | FIRST USED ON | ASSY USED ON | | | WANG LABORATORIES, INC. TEWKSBURY MASS. U.S.A. | BY | DATE | APPROVED BY |
| | | | | | | DWN | | E ENGR |
| | | | | | | CHK | | M ENGR |
| | | | | | | E C CONTROL | | MFG ENGR |

MATERIAL

MODEL NO 2200 E&F

SEE ENGRG SPECIFICATIONS No

FINISH

TOL EX AS NOTED XX ± .010 FRAC ± 1/64 XXX ± .005 ANG ± 1°30' FINISH 125 √

SCALE SHT OF

TITLE CRT FLOPPY & PRINTER CONTROL

| WANG PART NUMBER | SIZE | DRAWING NUMBER | REV |
|---|---|---|---|
| SEE CHART | E | 7054 | 17 |

DO NOT SCALE

CHANGE IN PROCESS
PER ECO 2,59
DATE OCT 26 1978

| QTY | NAME | MATERIAL | DESCRIPTION |
|---|---|---|---|

WANG LABORATORIES, INC. TEWKSBURY, MASS. U.S.A.

| BY | DATE | APPROVED BY | DATE |
|---|---|---|---|
| DWN | | ENGR | |
| CHK | | M ENGR | |
| E C CONTROL | | MFG ENGR | |

MATERIAL — MODEL NO. 2200 E/F — SEE SYSTEM SPECIFICATIONS — FINISH — TOL EX AS NOTED XX ± 010 FRAC ± 1/64 XXX ± 005 ANG ± 1/2° FINISH — SCALE — SHT — OF —

TITLE: SCHEMATIC LOGIC DIAGRAM CRT FLOPPY & PRINTER CONTROL

SEE CHART — WANG PART NUMBER — E — SIZE — 7054 — DRAWING NUMBER — 17 — REV

| REVISION | BY | DATE | APPROVED |
|---|---|---|---|
| C | DRAFTED OWR 7054 | | |
| D | ADDED J2 PIN 9 | | |
| E | PER ECO 2,59 | | |
| F | CHANGED L67 TO 2102A-4 | | |
| G | ADDED L74 | | |
| H | REVISED PER ECN M-5618 | | |
| J | REVISED PER ECN M-5618 | | |
| K | REVISED PER ECN M-5618 | | |

SEE SHEET 2

DO NOT SCALE

HOLE LEGEND

| | HOLE DIA | TOL |
|---|---|---|
| DRILLED ER | .0135 to .135 | ±.003 |
| PUNCHED HOLE | .136 to .250 | ±.005 |
| TOLERANCES | .251 to .500 | ±.007 |

| IDENT | DESCRIPTION | QTY |
|---|---|---|
| A | | |

NOTE
1. FOR 7059-2 VERSION, DELETE R8, 7, 10-12, 67, 69 AND 80 (10 RESISTOR 47.5Ω) AND REPLACE WITH JUMPERS.
2. ALL I.C.S ARE 7400 SERIES EXCEPT AS NOTED

| REVISION | DWN | CHK | APP'D | ECN | DATE |
|---|---|---|---|---|---|
| ADDED R69 | EBH | | | 7713 | 10-24-77 |
| REVISED PER ECO 7713 | EBH | | | 7713 | 10-31-77 |
| REVISED PER ECO 7713 | EBH | | | 7713 | 11-7-77 |
| REVISED PER ECO 7713 | EBH | | | 7713 | 11-14-77 |
| REVISED PER ECO 7713 | EBH | | | 7713 | 11-21-77 |
| REVISED PER ECO 7713 | EBH | | | 7713 | 11-28-77 |
| REVISED PER ECO 7713 | EBH | | | 7713 | 12-5-77 |
| REVISED PER ECO 7713 | EBH | | | 7713 | 12-12-77 |
| REVISED PER ECO 7713 | EBH | | | 7713 | 12-19-77 |
| REVISED PER ECO 7713 | EBH | | | 7713 | 12-26-77 |
| REVISED PER ECO 7713 | EBH | | | 7713 | 1-2-78 |
| REVISED PER ECO 7713 | EBH | | | 7713 | 1-9-78 |
| REVISED PER ECO 7713 | EBH | | | 7713 | 1-16-78 |
| REVISED PER ECO 7713 | EBH | | | 7713 | 1-23-78 |
| REVISED PER ECO 7713 | EBH | | | 7713 | 1-30-78 |
| REVISED PER ECO 7713 | EBH | | | 7713 | 2-6-78 |
| REVISED PER ECO 7713 | EBH | | | 7713 | 2-13-78 |
| REVISED PER ECO 7713 | EBH | | | 7713 | 2-20-78 |
| REVISED PER ECO 7713 | EBH | | | 7713 | 2-27-78 |
| REVISED PER ECO 7713 | EBH | | | 7713 | 3-6-78 |
| REVISED PER ECO 7713 | EBH | | | 7713 | 3-13-78 |
| REVISED PER ECO 7713 | EBH | | | 7713 | 3-20-78 |
| REVISED PER ECO 7713 | EBH | | | 7713 | 3-27-78 |
| REVISED PER ECO 7713 | EBH | | | 7713 | 4-3-78 |
| REVISED PER ECO 7713 | EBH | | | 7713 | 4-10-78 |
| REVISED PER ECO 7713 | EBH | | | 7713 | 4-17-78 |
| REVISED PER ECO 7713 | EBH | | | 7713 | 4-24-78 |
| REVISED PER ECO 7713 | EBH | | | 7713 | 5-1-78 |
| REVISED PER ECO 7713 | EBH | | | 7713 | 5-8-78 |
| REVISED PER ECO 7713 | EBH | | | 7713 | 5-15-78 |
| REVISED PER ECO 7713 | EBH | | | 7713 | 5-22-78 |
| REVISED PER ECO 7713 | EBH | | | 7713 | 5-29-78 |
| REVISED PER ECO 7713 | EBH | | | 7713 | 6-5-78 |
| REVISED PER ECO 7713 | EBH | | | 7713 | 6-12-78 |
| REVISED PER ECO 7713 | EBH | | | 7713 | 6-19-78 |
| REVISED PER ECO 7713 | EBH | | | 7713 | 6-26-78 |
| REVISED PER ECO 7713 | EBH | | | 7713 | 7-3-78 |
| REVISED PER ECO 7713 | EBH | | | 7713 | 7-10-78 |
| REVISED PER ECO 7713 | EBH | | | 7713 | 7-17-78 |
| REVISED PER ECO 7713 | EBH | | | 7713 | 7-24-78 |
| REVISED PER ECO 7713 | EBH | | | 7713 | 7-31-78 |
| REVISED PER ECO 7713 | EBH | | | 7713 | 8-7-78 |
| REVISED PER ECO 7713 | EBH | | | 7713 | 8-14-78 |
| REVISED PER ECO 7713 | EBH | | | 7713 | 8-21-78 |
| REVISED PER ECO 7713 | EBH | | | 7713 | 8-28-78 |

| WANG PART NO | ITEM | QTY | NAME | MATERIAL | DESCRIPTION |
|---|---|---|---|---|---|
| FIRST USED ON | ASSY USED ON | | | | |

WANG LABORATORIES, INC. TEWKSBURY, MASS. U.S.A.

| | BY | DATE | APPROVED BY | DATE |
|---|---|---|---|---|
| DWN EBH | | 11-1-76 | E ENGR | |
| CHK G.D. | | 1-29-77 | M ENGR | |
| E C CONTROL | | | MFG ENGR | |

MATERIAL

MODEL NO 2200 F

NO SHRINK SPECIFICATIONS No.

FINISH

TOL EX AS NOTED
XX ± .015 FRAC ± 1/64
XXX ± .005 ANG ± 1° 30' FINISH √

SCALE ½ SHT 1 OF 1

TITLE
I/O, 80X24 CRT, PRINTER, DISK BD

210-7059 | E | 7059 | 12

WANG PART NUMBER 5-73 | DRAWING NUMBER | REV

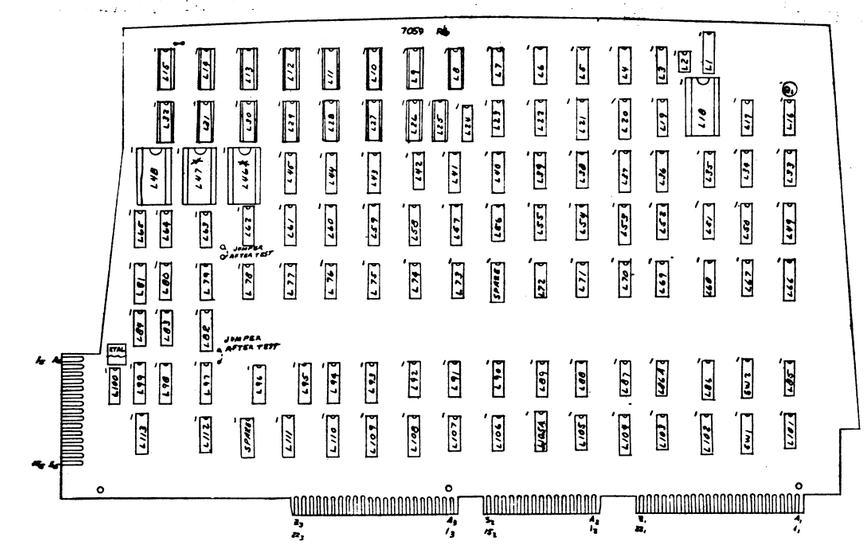
DO NOT SCALE

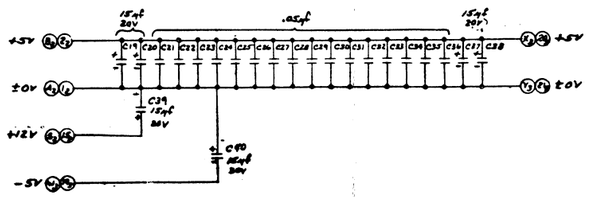
| LOCATION | WL. PT. NO. | VCC | GND |
|---|---|---|---|
| L1, 108 | 376 - 0104 | 16 | 8 |
| L2 | 376 - 0124 | 8 | 1 |
| L3, 33, 63, 69, 98, 100 | 376 - 0002 | 14 | 7 |
| L4 | 376 - 0184 | 14 | 7 |
| L5 | 376 - 0199 | 14 | 7 |
| L6, 7, 34, 72, 79 80, 86, 105 | 376 - 0081 | 14 | 7 |
| L8-15, 25-32 | 377 - 0069 | 10 | 9 |
| L16, 17, 42, 71, 72 78, 83, 107 | 376 - 0006 | 14 | 7 |
| L18 | 376 - 0090 | 24 | 12 |
| L19, 35 | 376 - 0004 | 14 | 7 |
| L20, 21, 44, 45 110, 111 | 376 - 0119 | 16 | 8 |
| L22, 76 | 376 - 0003 | 16 | 7 |
| L23, 24, 88, 89, 108 | 376 - 0010 | 16 | 7 |
| L26 | 376 - 0202 | 14 | 7 |
| L36, | 376 - 0190 | 16 | 8 |
| L38, 39, 52 | 376 - 0148 | 14 | 7 |
| L40 | 376 - 0008 | 16 | 8 |
| L41, 97, 98, 99 | 376 - 0094 | 16 | 8 |
| L43 | 376 - 0105 | 16 | 8 |
| L48 | 377 - 8323 | 24 | 12 |
| L37, 49, 88 | 376 - 0053 | 16 | 8 |
| L50, 96, 113 | 376 - 0120 | 16 | 8 |
| L51, 70, 105 | 376 - 0016 | 14 | 7 |
| L55, 68, 92, 105A | 376 - 0093 | 14 | 7 |
| L56, 67, 73, 74 | 376 - 0011 | 5 | 10 |
| L57, 58, 87, 66 | 376 - 0082 | 16 | 8 |
| L60, 61, 82 | 376 - 0191 | 16 | 8 |
| L62 | 376 - 0162 | 16 | 8 |
| L64, 65 | 376 - 0055 | 14 | 7 |
| L75, 88 | 376 - 0038 | 14 | 7 |
| L84 | 376 - 0197 | 14 | 7 |
| L85 | 376 - 0005 | 9 | 11 |
| L86, 102 | 376 - 0069 | 16 | 8 |
| L87 | 376 - 0128 | 14 | 7 |
| L91 | 376 - 0051 | 14 | 7 |
| L93, 94, 95 109 | 376 - 0189 | 16 | 8 |
| L100 | 376 - 0098 | 16 | 8 |
| L104, | 376 - 0056 | 14 | 7 |
| L112 | 376 - 0031 | 14 | 7 |

* L46, 47 NOT LOADED

| SAMERS | | |
|---|---|---|
| LOCATION | TYPE | QTY |
| L3 | 7400 | 1 |
| L22 | 7410 | 1 |
| L23 | 7406 | 1 |
| L24 | 74S74 | 1 |
| L51 | 7404 | 1 |
| L66 | 7406 | 1 |
| L65 | 7404 | 3 |
| L72 | 7408 | 1 |
| L79 | 7408 | 1 |
| L81 | 7405 | 1 |
| L84 | 74S65 | 1 |
| L86A | 7406 | 6 |
| L88 | 7403 | 2 |
| L90 | 7408 | 1 |
| L92 | 7432 | 1 |
| L100 | 7400 | 3 |
| L103 | 7408 | 1 |
| L106 | 7407 | 2 |
| L105A | 7432 | 3 |

| VARIATION CHART | | | | | |
|---|---|---|---|---|---|
| | 210=209+377 OR 378 | | | | |
| MODEL | 209 | 210 | L46 | L47 | L48 |
| | 7059 | 7095-A | | | 377-0323 |
| ASCII | 7059-1 | 7059-1A | | | 377-0323 |
| KATAKANA | 7059-1 | 7059-1B | | | 378-0244-R1 |
| CYRILLIC | 7059-1 | 7059-1C | | | 378-2024 |
| 2200F | 7059-2 | 7059-2A | | | 377-0323 |
| KATAKANA | 7059-2 | 7059-2B | | | 378-2044-R1 |
| ASCII | 7059-3 | 7059-3A | | | 377-0323 |
| KATAKANA | 7059-3 | 7059-3B | | | 378-2044-R1 |
| CYRILLIC | 7059-3 | 7059-3C | | | 378-2024 |
| HEBREW | 7059-3 | 7059-3D | | | 378-2073 |
| SWEDISH | 7059-3 | 7059-3E | | | 378-2231 |
| GERMAN | 7059-3 | 7059-3F | | | 378-2232-R2 |




| COMPONENTS | LIST |
|---|---|
| COMPONENT | WL. PT. NO. |
| R1, 2, 3, 4, 5, 6, 35, 37, 39, 40, 41, 43, 44, 45, 46, 49, 54, 58, 59, 86 | 330 - 3022 |
| R8, 52, 53 | 330 - 3039 |
| R9, 7, 10-17, 33, 47 48, 50 | 330 - 1097 SEE NOTE 1 |
| R9 | 333 - 0017 |
| R18, 19, 20, 21, 22, 40, 51, 42, 55, 56, 57, 72, 73, 75, 76, 77, 78, 82, 83 | 330 - 3047 |
| R 24, | 330 - 4018 |
| R 26, 62, 38, 63 | 330 - 3010 |
| R 27 | 330 - 3082 |
| R28, 29, 32, 34 | 330 - 2022 |
| R30, 44, 67 | 330 - 2047 |
| R31 | 331 - 1015 |
| R33, 36, | 331 - 1074 |
| R35 | 331 - 2047 |
| R 61, 87 | 330 - 4033 |
| R64 | 330 - 2010 |
| R68 | 330 - 4047 |
| L 69 | 376 - 9003 |
| SW1, 2 | 325 - 1508 |
| | |
| Q1 | 375 - 1021 |
| | |
| XTAL | 321 - 0018 |
| C4, 7, 14 | 300 - 5007 |
| C1, 11, 13 | 300 - 5004 |
| C5 | 300 - 4002 |
| C17, 18 | 300 - 1903 |
| C16 | 300 - 2033 |
| C8 | 300 - 1220 |
| C9 | 300 - 6020 |
| C19, 20, 37, 38, 39 40, 48, 3 | 300 - 4022 |
| 643 | 300 - 1390 |
| | |
| C2, 9, 10, 12 | 300 - 5006 |
| | |
| C15 | 300 - 1670 |
| C41 | 300 - 1930 |
| C 21 - 36 | 300 - 1960 |
| | |

| JUMPER CHART | | | |
|---|---|---|---|
| COMMON | 50Hz | 60Hz | |
| | | | |

| LOADING VARIATIONS | | | | |
|---|---|---|---|---|
| | 7059 | 7059-1 | 7059-2 | 7059-3 |
| 50Hz JUMPERS | LOAD | DO NOT LOAD | LOAD | DO NOT LOAD |
| 60Hz JUMPERS | DO NOT LOAD | LOAD | DO NOT LOAD | LOAD |
| COMMON JUMPERS | LOAD | LOAD | LOAD | LOAD |
| R47, 10-17, 48, 49, 46 | LOAD R47 Ω | LOAD R47 Ω | LOAD JUMPERS | LOAD JUMPERS |

HOLE LEGEND

| | HOLE DIA. | TOL. |
|---|---|---|
| DRILLED OR PUNCHED HOLE TOLERANCES | .0135 to .125 | ±.007 |
| | .126 to .250 | ±.007 |
| | .251 to .500 | ±.007 |

| IDENT. | DESCRIPTION | QTY |
|---|---|---|
| A | | |

CONN-1

| | | |
|---|---|---|
| TP19 | A1 | TP3 |
| DW3 | B2 | TP12 |
| | C3 | |
| TP9 | D4 | TP16 |
| TP22 | E5 | TP24 |
| TP7 | F6 | |
| DRB2 | H7 | TP4 |
| DRB1 | J8 | TP23 |
| TP5 | K9 | |
| TP8 | L10 | |
| DRTB | M11 | TP28 |
| BS1 | N12 | |
| TP29 | P13 | |
| | R14 | TP22 |
| TP6 | S15 | TP21 |
| DRB0 | T16 | |
| TP26 | U17 | DS PRIME |
| GRA2 | V18 | |
| TP25 | W19 | TP31 |
| | X20 | TP21 |
| ENABLE | Y21 | TP9 |

CONN-2

| | | |
|---|---|---|
| +5V | A1 | +5V |
| +5V | B2 | +5V |
| GRB3 | C3 | ACK |
| GRB2 | D4 | |
| GRA3 | E5 | |
| GRB1 | F6 | |
| GRA1 | H7 | WTR |
| GRB0 | J8 | |
| SPARE FOR 120 | K9 | IBS1 |
| DBI1 | L10 | |
| AB4 | M11 | CBS |
| AB3 | N12 | AB3 |
| DBS | P13 | AB7 |
| PFMS | R14 | AB2 |
| +12V | S15 | +12V |

CONN-3

| | | |
|---|---|---|
| IB3 | A1 | DATA4 |
| DATA3 | B2 | DATA8 |
| DATA2 | C3 | DATA |
| PTR BUSY | D4 | TP4 |
| DATA6 | E5 | DATA1 |
| CPB | F6 | DATA6 |
| RS | H7 | DATA5 |
| AB1 | J8 | AB6 |
| IAB5 | K9 | AB0 |
| DBL | L10 | DB1 |
| IB6 | M11 | IB1 |
| IB8 | N12 | DB2 |
| DBS | P13 | IB5 |
| DB3 | R14 | DB4 |
| IB4 | S15 | DB1 |
| DB1 | T16 | IB1 |
| GRA3 | V18 | |
| -5V | W19 | -5V |
| +5V | X20 | +5V |
| ±0V | Y21 | ±0V |
| | Z22 | |

CONN-5

| | | |
|---|---|---|
| | A1 | |
| TP6 | B2 | |
| TP7 | C3 | |
| | D4 | |
| | E5 | |
| | F6 | |
| | H7 | |
| | J8 | |
| TP27 | K9 | |
| | L10 | |
| | M11 | TP20 |
| TP2 | N12 | TP18 |
| | P13 | |
| TP3 | R14 | |
| TP1 | S15 | TP17 |

E-REV

| 7059 | 7059-1 | 7059-2 | 7095-3 |
|---|---|---|---|
| 7 | 7 | 6 | 6 |

| WANG PART NO | ITEM | QTY | NAME | MATERIAL | DESCRIPTION |
|---|---|---|---|---|---|
| | | | WANG LABORATORIES, INC. | BY | DATE / APPROVED BY / DATE |
| | | | | Drwn LEA | E ENGR |
| | | | | CHK | M ENGR |
| | | | MODEL NO 2200 F | E. C. CONTROL | MFG ENGR |
| | | | MATERIAL | TITLE IO, BOARD CRT, PRINTER, DISK BD | |
| | | | FINISH | 210-7059 | E 7059 12 |
| | | | | SCALE 2/1 SHT 2 OF 2 | WANG PART NUMBER / SIZE / DRAWING NUMBER / REV |

DO NOT SCALE

HOLE LEGEND

| HOLE DESCRIPTION | HOLE DIA. | TOL. |
|---|---|---|
| DRILLED OR PUNCHED HOLE TOLERANCES: | .0135 to .125 | ±.003 |
| | .126 to .350 | ±.005 |
| | .351 to .500 | ±.010 |

| IDENT. | DESCRIPTION | QTY. |
|---|---|---|
| A | | |

NOTE: LCUT TRACK AS SHOWN AND ADD JUMPERS FOR 2260C ONLY.

SIGNAL TERMINATION DESIGNATIONS, VIEW FROM BOTTOM (WIRING) SIDE OF CONNECTOR

| LOCATION | W. L. PART NO. |
|---|---|
| R1-11,18,19,21,22,23,30 | 330-3647 |
| R20,24 | 330-4047 |
| R13 | 330-2022 |
| R15 | 330-4011 |
| R16,17,25 | 330-4023 |
| R23 | 330-4028 |
| R 14,26,31 | 330-2047 |
| R12 | 330-2033 |
| C11,20,21,22 | 180-1703 |
| C16,16 | 180-1605 |
| C13,3 | 180-1904 |
| C 17 | 180-1906 |
| C4,9,23-27 | 180-1903 |
| C17 | 180-1901 |
| J1 | 350-0316 |
| J2 | 350-2097 |
| SW1 | 326-1501 |
| C15 | 180-1902 |
| SIP4-6 | 330-0807 |
| C2,3 | 180-1605 |
| SIP1-3 | 330-0808 |
| J1 | 350-1096 |

| LOCATION | TYPE | STAND. |
|---|---|---|
| L1 | 7416 | 1 |
| L2 | 7426 | 1 |
| L16 | 7414 | 1 |
| L3 | 8797 | 4 |
| L4 | 8797 | 4 |
| L5 | 8797 | 4 |
| L6 | 8T10 | 2 |
| L7 | 8T10 | 2 |
| L8 | 8797 | 4 |
| L9 | 8797 | 4 |
| L10 | 8797 | 4 |
| L11 | 8797 | 4 |
| L12 | 8797 | 4 |
| L13 | 8797 | 4 |
| L14 | 9602 | 2 |
| L15 | 9602 | 2 |
| L17 | 8T97 | 2 |
| L18 | 8T97 | 2 |
| L19 | 8T97 | 2 |
| L20 | 8T97 | 2 |
| L21 | 8T97 | 2 |
| L22 | 8T97 | 2 |
| L23 | 8T97 | 2 |
| L24 | 8T97 | 2 |
| L25 | 8T97 | 2 |
| L26 | 8T97 | 2 |
| L27 | 8T97 | 2 |
| L28 | 8T97 | 2 |
| L29 | 8T97 | 2 |
| L30 | 8T97 | 2 |
| L31 | 8T97 | 2 |
| L32 | 9602 | 2 |
| L33 | 8T97 | 2 |
| L34 | 8T97 | 2 |
| L35 | 8T97 | 2 |
| L36 | 8T97 | 2 |
| L37 | 8T97 | 2 |
| L38 | 8T97 | 2 |
| L39 | 8T97 | 2 |
| L40 | 8T97 | 2 |
| L41 | 8T97 | 2 |
| L42 | 8T97 | 2 |
| L43 | 8T97 | 2 |
| L44 | 8T97 | 2 |
| L45 | 8T97 | 2 |
| L46 | 8T97 | 2 |
| L47 | 8T97 | 2 |
| L48 | 8T97 | 2 |
| L49 | 8T97 | 2 |
| L50 | 8T97 | 2 |
| L51 | 8T97 | 2 |
| L52 | 8T97 | 2 |
| L53 | 8T97 | 2 |
| L54 | 8T97 | 2 |
| L55 | 8T97 | 2 |
| L56 | 8T97 | 2 |
| L57 | 8T97 | 2 |
| L58 | 8T97 | 2 |
| L59 | 8T97 | 2 |
| L60 | 8T97 | 2 |
| L61 | 8T97 | 2 |
| L62 | 8T97 | 2 |
| L63 | 8T97 | 2 |
| L64 | 8T97 | 2 |
| L65 | 8T97 | 2 |
| L66 | 8T97 | 2 |
| L67 | 8T97 | 2 |
| L68 | 8T97 | 2 |
| L69 | 8T97 | 2 |
| L70 | 8T97 | 2 |
| L71 | 8T97 | 2 |
| L72 | 8T97 | 2 |
| L73 | 8T97 | 2 |
| L74 | 8T97 | 2 |
| L75 | 8T97 | 2 |
| L76 | 8T97 | 2 |
| L77 | 8T97 | 2 |
| L78 | 8T97 | 2 |
| L79 | 8T97 | 2 |
| L80 | 8T97 | 2 |
| L81 | 8T97 | 2 |
| L82 | 8T97 | 2 |
| L83 | 8T97 | 2 |
| L84 | 8T97 | 2 |
| L85 | 8T97 | 2 |
| L86 | 8T97 | 2 |
| L87 | 8T97 | 2 |
| L88 | 8T97 | 2 |
| L89 | 8T97 | 2 |
| L90 | 8T97 | 2 |
| L91 | 8T97 | 2 |
| L92 | 8T97 | 2 |
| L93 | 8T97 | 2 |
| L94 | 8T97 | 2 |
| L95 | 8T97 | 2 |
| L96 | 8T97 | 2 |
| L97 | 8T97 | 2 |
| L98 | 8T97 | 2 |
| L99 | 8T97 | 2 |
| L100 | 8T97 | 2 |

| LOCATION | W. L. PART NO. | TERM. NO. ±5V | TERM. NO. +5VR |
|---|---|---|---|
| L1,16 | 376-1130 | 7 | 14 |
| L2,26 | 376-0010 | 7 | 14 |
| L3 | 376-0048 | 8 | 16 |
| L4,5,8,30,31,34,35 | 376-0189 | 8 | 16 |
| L5 | 376-0043 | 8 | 16 |
| L6,7 | 376-0137 | 7 | 14 |
| L10,36,15A | 376-0056 | 7 | 14 |
| L11,18,21 | 376-0006 | 7 | 14 |
| L12 | 376-0053 | 7 | 14 |
| L13 | 376-0125 | 7 | 14 |
| L14,15,32 | 376-0178 | 8 | 16 |
| L19,33 | 376-0058 | 11 | 4 |
| L20,35,12A | 376-0072 | 7 | 14 |
| L22,24,33 | 376-0081 | 7 | 14 |
| L23 | 376-0060 | 8 | 16 |
| L27 | 376-0148 | 7 | 14 |
| L17 | 376-0124 | 7 | 14 |

| REVISION | BY | DATE |
|---|---|---|
| A | ORIGINATED PER ECN #10131 | 7-28-70 |
| B | REVISED PER ECN #10244 | 9-30-70 |
| C | REVISED PER ECN #10258 | 10-28-70 |
| D | REVISED PER ECN #10344 | 1-5-71 |
| E | REVISED PER ECN #10400 | 2-5-71 |
| F | REVISED PER ECN #10400 | 2-5-71 |
| G | REVISED PER ECN #10400 | 2-5-71 |
| H | REVISED PER ECN #10400 | 2-5-71 |
| J | REVISED PER ECN #10400 | 2-5-71 |
| K | REVISED PER ECN #10400 | 2-5-71 |

| WANG PART NO. | ITEM | QTY. | NAME | MATERIAL | DESCRIPTION |
|---|---|---|---|---|---|

WANG LABORATORIES, INC. TEWKSBURY, MASS. U.S.A.

| | BY | DATE | APPROVED BY | DATE |
|---|---|---|---|---|
| DWN | | | E ENGR | |
| CHK | | | M ENGR | |
| E C CONTROL | | | MFG ENGR | |

MATERIAL — MODEL NO. 9016A

FINISH — SEE ENGG SPEC NO.

SCALE — NEXT ASSY

TITLE: MASTER DISK MUX

210-7287 | E | 7287 | 10

ASSEMBLY NUMBER | SIZE | DRAWING NUMBER | REV.

7287-1 E-REV 7

26

# Service Newsletter NO. 110

April 4, 1978

2200/2600 #22

2230 MXA/MXB HARDWARE CHANGES

A new 2230 MXA Multiplexer will soon be phased-in to production. The new multiplexer will still be designated the 2230 MXA, but will be a 210-7287 board instead of the 210-6785 board.

The new 7287 board eliminates many of the problems associated with the 6785, such as intermittent disk errors or 'hang-ups' caused by cable noise and/or interference.

The 210-7287, however, is NOT directly compatible with the existing 2230 MXB (210-6786 board) and 2200F (210-7054 or 210-7059 boards).

To use the 7287 board as a replacement for the 6785, the following slave multiplexers must be used:

210-6786-1 for 2230 MXB
210-7054-2 for 2200F, 64 x 16 CRT, 60 Hz
210-7054-3 for 2200F, 64 x 16 CRT, 50 Hz
210-7059-2 for 2200F, 80 x 24 CRT, 60 Hz
210-7059-3 for 2200F, 80 x 24 CRT, 50 Hz.

These slave multiplexers will be phased-in to production at the same time the 210-7287 is phased-in. When replacing the 210-6785 in the field, however, the existing slave multiplexers will have to be modified to create the new version slave multiplexer board. This can be accomplished very easily by performing the following:

1. 210-6786 to 210-6786-1 conversion (ECN 6622):
   a) Remove the fifteen 47 ohm resistors R12 through R26.
   b) Replace with jumper wires.
   c) Change the board designation to 6786-1.

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2. 210-7054 to 210-7054-2 (or 210-7054-3) conversion (ECN 6624):
   a) Remove the fourteen 47 ohm resistors R5, R6, R34, ~~R50~~ R38 through R45, R62, R63. R7
   b) Replace with jumper wires.
   c) Change the board designation to 7054-2 (or 7054-3 for 50 Hz).

   210-7054-2 is E-REV ∅ AT THIS POINT.

3. 210-7059 to 210-7059-2 (or 210-7059-3) conversion (ECN 6625):
   a) Remove the fourteen 47 ohm resistors R6, R7, R10 through R17, R43, R47, R48, R50.
   b) Replace with jumper wires.
   c) Change the board designation to 7059-2 (or 7059-3 for 50 Hz).

Once the new versions of the multiplexer slave boards have been created, they can be used with either the new or old version of the 2230 MXA, but the new multiplexer slaves must ALWAYS be used with the 210-7287.

# Service Newsletter

No. 110A

2200/2600 #22A

May 1, 1978

Service Newsletter 110 described the new 2230 MXA multiplexer now being phased-in to production. The newsletter stated the only change required to existing 2230 MXB's and 2200F workstations was the removal of the 47 ohm series resistors. HOWEVER, ONE ADDITIONAL CHANGE IS ALSO REQUIRED.

MUX B

1. For 6786
   a) Insert a 7403 IC between L9 and L10 (L9A).
   b) Connect ± 0V and +5 to pins 7 and 14 of the IC.
   c) Cut etch at L13 pin 10.
   d) Add a wire from L9A pin 11 to L13 pin 10.
   e) Add a wire from L9A pin 13 to connector 3 pin 43.
   f) Add a wire from L9A pin 12 to L6 pin 12.
   g) Add a 4.7K ohm resistor between L9A pin 11 and + 5V.
   h) Increment E-Rev from 2 to 3.

This 210-6786 can now be used with the 210-7287. To use the 6786 with a 210-6785 (old style 2230 MXA), remove the wire from L9A pin 11 and connect it to L9A pin 13.

This change will be incorporated into future artwork revisions of the 6786 with a jumper provided for switching between 6785 and 7287.

2. 210-7054 and 7054-1
   a) Cut etch near L95 pin 6.
   b) Add a wire from L52 pin 6 to L95 pin 6.
   c) Add a wire from L52 pin 5 to connector 3 pin F3.
   d) Add a wire from L52 pin 4 to L52 pin 13.
   e) Increment the E-Rev from 8 to 9.

This 210-7054 will now operate with the 210-7287. To use this board with a 210-6785 (old style 2230 MXA) remove the wire from L52 pin 6 and connect it to L52 pin 5.

This change will be incorporated into future artwork revisions of the 7054 with a jumper provided for switching between 6785 and 7287.

3. 210-7059 and 7059-1
   a) Cut etch near L93 pin 6.
   b) Add a wire from L100 pin 6 to L93 pin 6.
   c) Add a wire from L100 pin 5 to L103 pin 12.
   d) Add a wire from L100 pin 4 to connector 3 pin F3.
   e) Increment the E-Rev from 6 to 7.

The 210-7059 can now be used with the 210-7287. To use this board with a 210-6785 (old style 2230 MXA) remove the wire from L100 pin 6 and connect it to L100 pin 4.

This change will be incorporated into future artwork revisions of the 7059 with a jumper provided for switching between 6785 and 7287.

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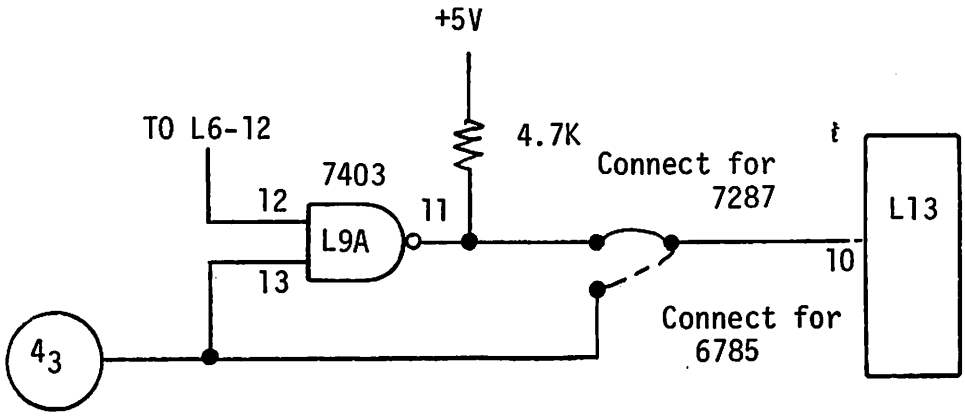
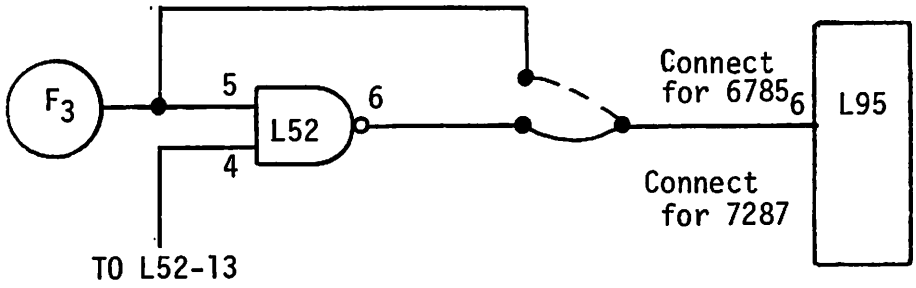
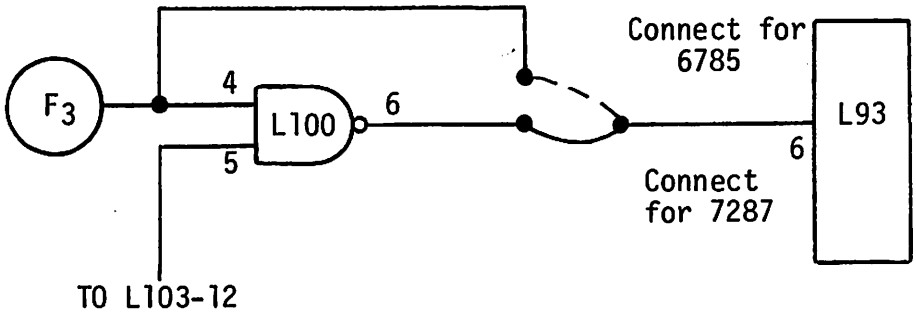



1. See above for 6786




2. See above for 7054 and 7054-1




3. See above for 7059 and 7059-1

# Service Newsletter No. 110B

2200/2600 #22B June 8, 1978

CORRECTION/AMPLIFICATION OF SN 110/110A

A. SN 110 page 2, item 2 a) is incorrect. Change item 2 a) to read: Remove the fourteen 47 ohm resistor R5, R6, R7, R34, R38 - R45, R62, and R63.

B. Questions have arisen concerning the compatability/non-compatability of the new 2230 MXA Multiplexer (210-7287 board). To eliminate confusion, keep the following notes handy:

1. The 210-7287 will operate in any 2200 CPU (2200B/C/S/T/VP/-MVP)

2. A 2230 MXB modified as described is Service Newsletters 110 and 110A MUST be used with the 210-7287.

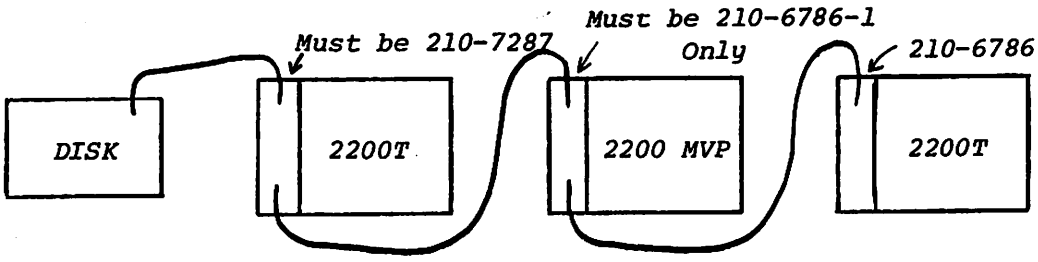
3. A 210-6786-1 (2230 MXB) is the ONLY slave multiplexer that can be installed in a 2200 MVP, but it may also be installed in ANY 2200 CPU.

4. A 210-7287 (2230 MXA) is the ONLY master multiplexer that can be used in a 2200 MVP System.

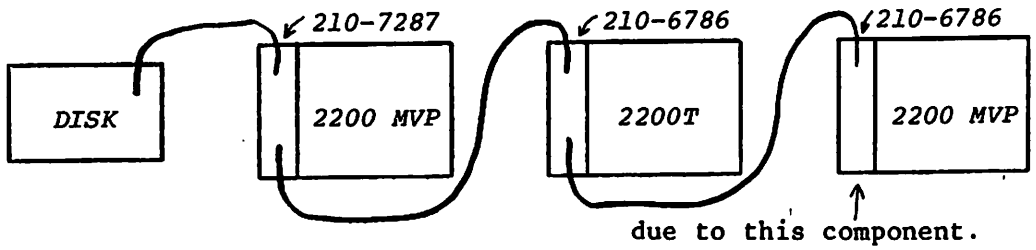
5. The 210-6786-1 can ONLY be used with the 210-7287.

6. Present 210-6786 (not 210-6786-1) can be used with either the 210-7287 or the 210-6785 if the jumper change described in S.N. #110A is implemented. However, even when the 210-6786 is modified to accomodate the 210-7287, it CANNOT be installed in a 2200 MVP CPU chassis. It CAN be a slave controller in any other 2200 CPU that is used with a 2200 MVP System.

7. The following configuration is legal:




8. The following configuration is NOT legal




WANG LABORATORIES, INC
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13-266

9. The 210-7287 MUST be at E-Rev 3 to allow use of the 2260-2 Disk System with the 2200 MVP. All other CPUs will operate properly with the 7287 E-Rev at 2.

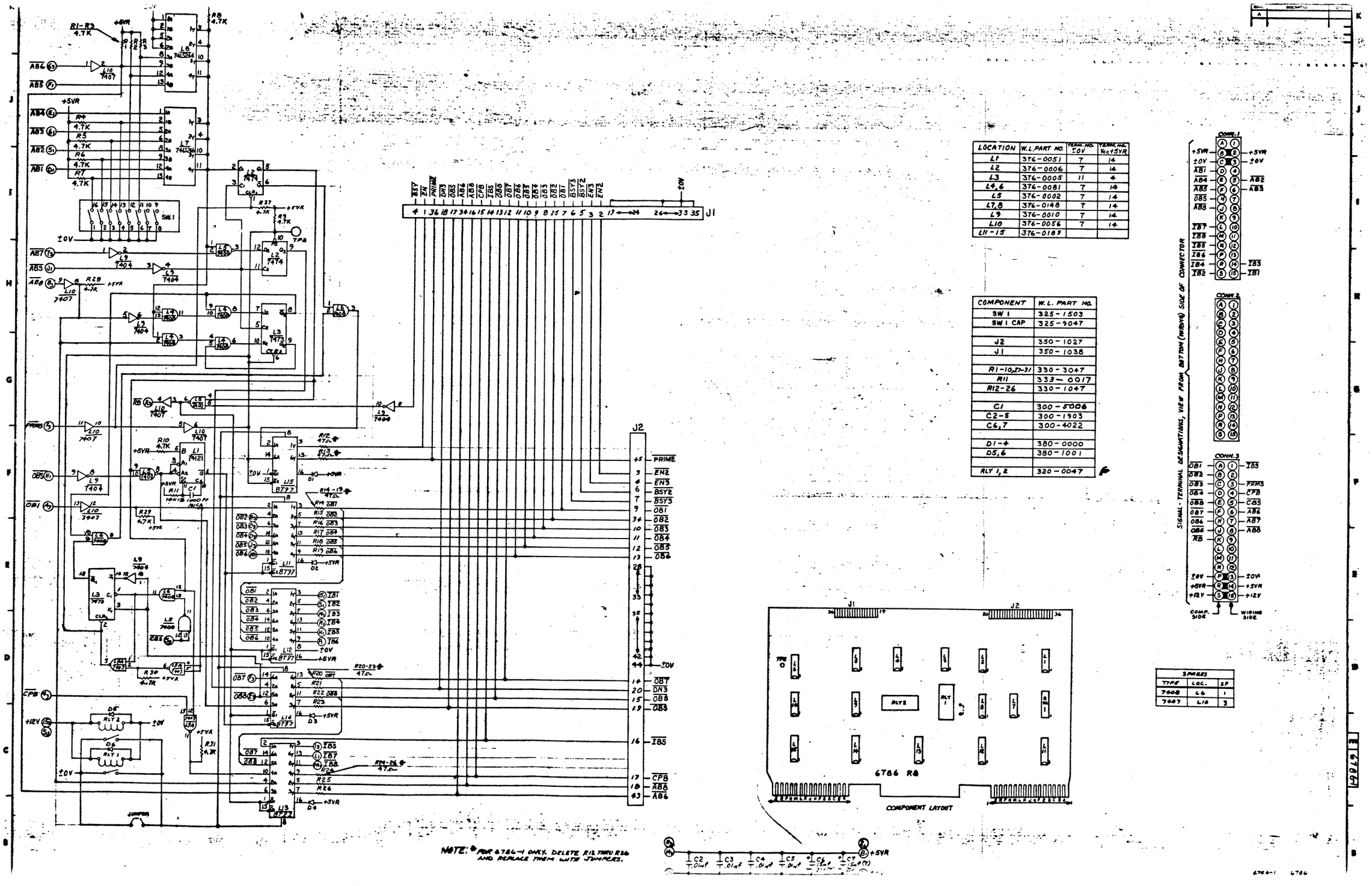
10. 210-6786 boards with ARTWORK revision R4 have all changes incorporated for use with the 2200 MVP, and in fact are 210-6786-1 boards. To make the 210-6786-1 ARTWORK revision R4 universal for use with the 210-6785 or 210-7287, perform the following:

    a) On the etch side of the board, cut etch near L9A pin 11.

    b) Insert one end of a six inch wire into the platethrough near L9 to which L9A pin 11 was connected to.

    c) For use with 6785, connect loose end of wire to L9A pin 13.

    d) For use with 7287, connect loose end of wire to L9A pin 11.




| LOCATION | W.L. PART NO. | TERM. NO. ±0V | TERM. NO. Vcc +5VR |
|---|---|---|---|
| L1 | 376-0051 | 7 | 14 |
| L2 | 376-0006 | 7 | 14 |
| L3 | 376-0005 | 11 | 4 |
| L4,6 | 376-0081 | 7 | 14 |
| L5 | 376-0002 | 7 | 14 |
| L7,8 | 376-0148 | 7 | 14 |
| L9 | 376-0010 | 7 | 14 |
| L10 | 376-0056 | 7 | 14 |
| L11-15 | 376-0189 | | |

| COMPONENT | W. L. PART NO. |
|---|---|
| SW 1 | 325-1503 |
| SW 1 CAP | 325-9047 |
| | |
| J2 | 350-1027 |
| J1 | 350-1038 |
| | |
| R1-10,27-31 | 330-3047 |
| R11 | 333-0017 |
| R12-26 | 330-1047 |
| | |
| C1 | 300-5006 |
| C2-5 | 300-1903 |
| C6,7 | 300-4022 |
| | |
| D1-4 | 380-0000 |
| D5,6 | 380-1001 |
| | |
| RLY 1,2 | 320-0047 |

| SPARES | | |
|---|---|---|
| TYPE | LOC. | SP |
| 7408 | L6 | 1 |
| 7407 | L10 | 3 |

6784-1 6784

7054

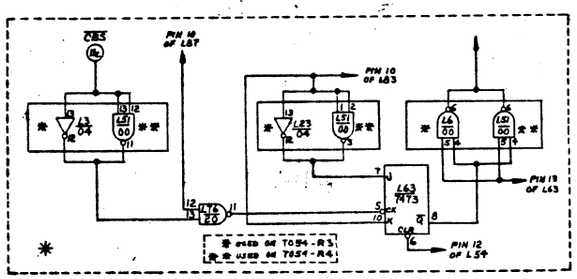
| COMPONENT | W.L. PART NO. |
|---|---|
| R54 | 330-3010 |
| R8,9,24 | 330-8047 |
| R1-6,10-16,26-28, 32,33,35-44,47-49, 50,51,58,59(54), 61, 66,67,76 | 330-3022 |
| R7,34,36-45,62,63 | 330-1047 |
| R29 | 333-0017 |
| R17,18 | 331-1047 |
| R22, | 331-2047 |
| R20,21,65 | 330-2022 |
| R83 | 330-2010 |
| R34,37,57 | 330-2039 |
| R53,64, | 330-3047 |
| R19 | 331-1015 |
| R52 | 330-4018 |
| R30,49 | 330-4033 |
| R55 | 330-3082 |
| R31 | 330-4047 |
| R66 | 330-2015 |
| C1,10,98 | 300-1470 |
| C2,5,25-47 | 300-1903 |
| C4 | 300-1100 |
| C9,11,99 | 300-1220 |
| C3,6,12,15 | 300-5006 |
| C13 | 300-1906 |
| C7,14 | 300-5004 |
| C16 | 300-4018 |
| C17 | 300-4002 |
| C18 | 300-4020 |
| C19-22,24 | 300-4022 |
| C8 | 300-5007 |
| C23 | 300-1390 |
| | |
| SW.1,2 | 325-1503 |
| SW. CAP 1,2 | 325-9047 |
| | |
| XTAL | 321-0019 |
| J1,2 | 376-9002T |
| Q1 | 375-1021 |
| L57-59 | 376-9003 |
| B.N.C. CONN. | 350-2064 REF. |

SPARES

| I.C. TYPE | LOCATION | SPARES |
|---|---|---|
| 7404 | L3 | 1 |
| 7404 | L25 | 1 |
| 7400 | L6 | 1 |
| 7404 | L11 | 4 |
| 7432 | L13 | 2 |
| 7404 | L36 | 2 |
| 7420 | L37 | 1 |
| 7400 | L52 | 2 |
| 7409 | L51 | 1 |
| 7403 | L65 | 1 |
| | | |
| 7408 | L85 | 1 |
| 7432 | L87 | 1 |
| | | |
| 7404 | L40 | 3 |
| 7474 | L50 | 1 |
| | | |
| 7410 | L62 | 1 |
| | | |
| 7420 | L94 | 1 |

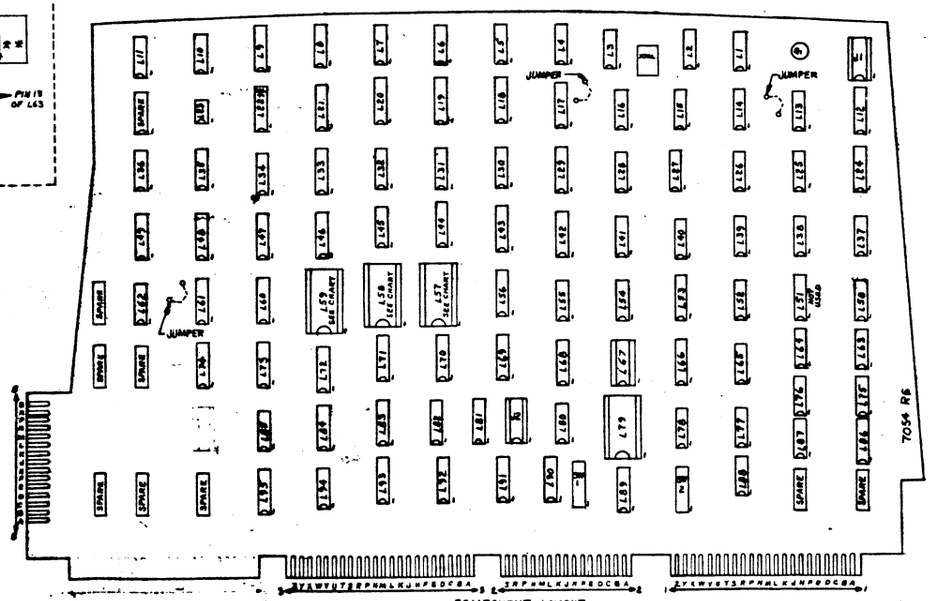
| LOCATION | W.L. PART NO. | TERM. NO. -5V | TERM. NO. +5V & +12V |
|---|---|---|---|
| L1,7,15,27,35,36,75 | 376-0006 | 7 | 14 |
| L2,4,91,92,65 | 376-0002 | 7 | 14 |
| L3,11,16,25,34,44,77 | 376-0010 | 7 | 14 |
| L5,12,24,43,78,86,88 | 376-0081 | 7 | 14 |
| L89,97 | 376-0120 | 8 | 16 |
| L10 | 376-0031 | 7 | 14 |
| L18 | 376-0108 | 8 | 16 |
| L33,26,87 | 376-0093 | 7 | 14 |
| L17-21,69 | 376-0094 | 8 | 16 |
| L23 | 376-0126 | 1 | 8 |
| L24,96 | 376-0104 | 8 | 16 |
| L89,98,42 | 376-0053 | 8 | 16 |
| L30,31,32 | 376-0148 | 7 | 14 |
| L39,45 | 376-0011 | 10 | 5 |
| L38,99,88 | 376-0016 | 7 | 14 |
| L37,94 | 376-0004 | 7 | 14 |
| L43,49,46 | 376-0082 | 8 | 16 |
| L48 | 376-0008 | 8 | 16 |
| L67 | 376-9002 | | |
| L83 | 376-0051 | 7 | 14 |
| L54 | 376-0056 | 7 | 14 |
| L55,61,81,89,92,93 | 376-0119 | 8 | 16 |
| L57,58,59 | SEE CHART (SH.4) | 12 | 24 |
| L60 | 376-0105 | 8 | 16 |
| L41,62 | 376-0003 | 7 | 14 |
| L63 | 376-0005 | 11 | 4 |
| L65 | 376-0028 | 7 | 14 |
| L66 | 376-0098 | 8 | 16 |
| L67-74 | 377-0069 | 9 | 10 |
| L79 | 376-0090 | 12 | 24 |
| L82,83,91,95 | 376-0176 | 8 | 16 |
| L78 | 376-0125 | 7 | 14 |
| L89,90 | 376-0069 | 8 | 16 |
| L22 (SEE NOTE 1) | 376-0094 | 8 | 16 |

NOTE 1: L22 LOADED ON 7054-4 ONLY

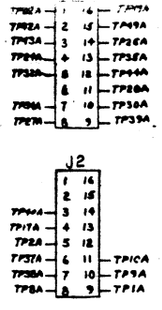


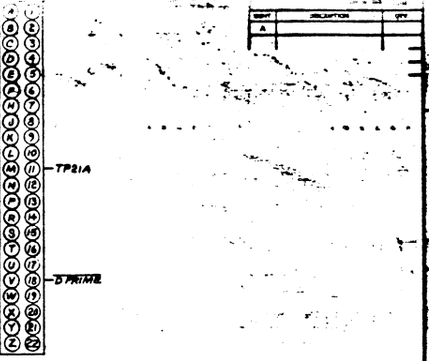

LOADING CHART

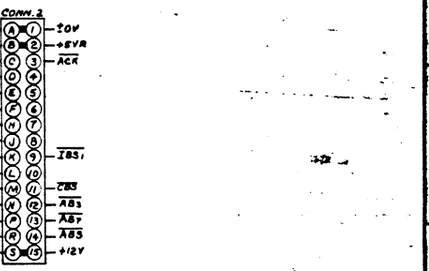
| MODEL | PC. BOARD | L57 | L |
|---|---|---|---|
| 218-7054-18 KATA KANA | 209-7054-1 | 378-2044 | |
| 218-7054-16 CYRILLIC | 209-7054-1 | 378-2024 | |

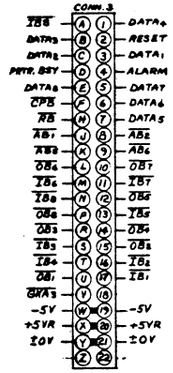


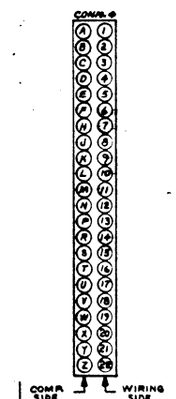

COMPONENT LAYOUT

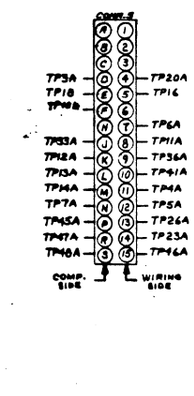



SIGNAL- TERMINAL DESIGNATIONS, VIEW FROM BOTTOM (WIRING) SIDE OF CONNECTOR

7059

| LOCATION | TYPE | QTY |
|---|---|---|
| L1, 88 | 376 - 0109 | 14 8 |
| L2 | 376 - 0126 | 8 1 |
| L3, 33, 63, 93 GROUND | 376 - 0002 | 14 7 |
| L4 | 376 - 0186 | 14 7 |
| L5 | 376 - 0199 | 14 7 |
| L6, 7, 36, 72, 73 90, 96, 106 | 376 - 0001 | 14 7 |
| L8-15, 25-32 | 373 - 0089 | 18 9 |
| L16, 18, 34, 71, 74, 83, 103 | 376 - 0006 | 14 7 |
| L20 | 378 - 0090 | 24 12 |
| L17, 35 | 376 - 0004 | 14 7 |
| L38, 51, 64, 65 100, 101 | 376 - 0119 | 14 8 |
| L39, 76 | 376 - 0003 | 14 7 |
| L40, 41, 42, 43, 44, 45 | 376 - 0010 | 14 7 |
| L46 | 376 - 0202 | 14 7 |
| L48, | 376 - 0190 | 14 8 |
| L50, 75, 82 | 376 - 0108 | 14 7 |
| L60 | 376 - 0008 | 14 8 |
| L91, 92, 98, 99 | 376 - 0099 | 14 8 |
| L63 | 376 - 0185 | 14 8 |
| L68 | 377 - 8323 | 24 12 |
| L87, 89, 90 | 376 - L053 | 14 8 |
| L 58, 96, 113 | 376 - 0120 | 14 8 |
| L51, 70, 105 | 376 - 0014 | 14 7 |
| L52, 56, 57, 100A | 376 - 0092 | 14 7 |
| L59, 61, 77, 78 | 376 - 0011 | 5 10 |
| L 54, 69, 97, 66 | 376 - 0082 | 14 8 |
| L 60, 81, 82 | 376 - 0191 | 14 8 |
| L 62 | 376 - 0162 | 14 8 |
| L 64, 65 | 376 - 0055 | 14 7 |
| L 76, 80 | 376 - 0028 | 14 7 |
| L 84 | 376 - 0197 | 14 7 |
| L 85 | 376 - 0005 | 4 11 |
| L 86, 102 | 376 - 0069 | 14 8 |
| L 87 | 376 - 0135 | 14 7 |
| L 91 | 376 - 8081 | 14 7 |
| L 93, 94, 95 109 | 376 - 0189 | 14 8 |
| L 106 | 376 - 0098 | 14 8 |
| L 104 | 376 - 0056 | 14 7 |
| L 112 | 376 - 0031 | 14 7 |

L 46, 47 NOT LOADED

| LOCATION | TYPE | QTY |
|---|---|---|
| L2 | 7400 | 1 |
| L22 | 7410 | 1 |
| L23 | 7405 | 1 |
| L26 | 74S74 | 1 |
| L27 | 7402 | 1 |
| L66 | 7404 | 1 |
| L67 | 7406 | 3 |
| L72 | 7408 | 1 |
| L79 | 7408 | 1 |
| L81 | 7416 | 1 |
| L85 | 74S05 | 3 |
| L86A | 7486 | 4 |
| L88 | 7403 | 2 |
| L99 | 7408 | 1 |
| L 94 | 7428 | 1 |
| L100 | 7400 | 3 |
| L103 | 7408 | 1 |
| L105 | 7407 | 2 |
| L107A | 7432 | 3 |

| VARIATION CHART | | | |
|---|---|---|---|
| MODEL | P.C. BOARD | L 48 | L |
| 7059-1B KATA KANA | 209-7059-1 | 378-2044 | |
| 7059-1C CYRILLIC | 209-7059-1 | 378-2024 | |

| COMPONENTS LIST | | |
|---|---|---|
| COMPONENT | W.L. PT.NO. | |
| R1,2,3,40,88,27, 28,46,44,45,64,65, 66,66,56,58,59,60 | 320-3022 | |
| R5,52,53 | 320-3039 | |
| R6,7,10-17,43,47, 48,49 | 321-1097 | SEE NOTE 1 |
| R9 | 353-0017 | |
| R18,19,24,26,35, 64,66,67,68,70, 71,74,75,76,77,78, 79,80 | 330-3047 | |
| R 22, | 320-4018 | |
| R 20,21,38,63 | 320-3018 | |
| R 23 | 320-3082 | |
| R29,31,32,36 | 320-2022 | |
| R30,64,67 | 320-2047 | |
| R31 | 321-1015 | |
| R33,34, | 321-1074 | |
| R35 | 321-2047 | |
| R37,69 | 320-4033 | |
| R39, | 320-2018 | |
| R42 | 320-4067 | |
| L 43 | 376-9003 | |
| SW1,2 | 325-1508 | |
| | | |
| Q1 | 378-1021 | |
| | | |
| 2716L | 321-6018 | |
| C4,7,14 | 300-5007 | |
| C1,5,13 | 300-5006 | |
| C5 | 300-4082 | |
| C17,18 | 300-1903 | |
| C16 | 300-2033 | |
| C8 | 300-1220 | |
| C6 | 300-4020 | |
| C19,20,37,38,39 C40,43 | 300-4022 | |
| | | |
| | | |
| C9,10,11,12 | 300-5006 | |
| | | |
| C15 | 300-1470 | |
| C41 | 300-1930 | |
| C21-36 | 300-1906 | |
| | | |

| JUMPER CHART | | |
|---|---|---|
| COMMON | TONE | GAIN |
| — | ⌒ | ⌒ |

CONN-1

CONN-2

CONN-3

CONN-5

1 RESISTORS

# IMMEDIATE SERVICE NOTICE

| NO. 141B | DATE: 1/25/78 |
|---|---|
| CATEGORY: 2200/2600 #7B | |
| SUBJECT: NEW REGULATOR - 7156 WITH CURRENT FOLDBACK | |

This information is an addition to that contained in ISN #141A.

Changes have recently been made to the PCS-II, 928WS, 2200F, 2210 and 2236 power supplies.

The 7067, 7067-1 or 7067-2 regulators used in these products have all been (or will soon be) replaced by the 7156, 7156-1 or 7056-2 regulator. The 7156 has current foldback, which prevents component "burn-up" associated with the 7067 when a short circuit exists. If an overload or short circuit on one of the regulated supplies is present, such as can happen when a RAM IC has a +5VR to 0V short, the 7156 output will drop to 0V. This prevents the power supply components from overheating and eventually destroying the regulator board.

To accomplish the current foldback, sensing resistors are placed on the heat sink assembly. Without the sensing resistors, current foldback cannot occur when an overcurrent condition exists. Therefore, if the 7156 is used in one of the above products without the heat sink changes, it will have the same limitations the 7067 does.

In all cases, the 7067 series and the 7156 series are interchangeable. For example, a 7156-2 in a PCS-II can be replaced with a 7067-2, but no current foldback protection is provided. Also, if the PCS-II has a 7067-2 it can be replaced with a 7156-2, but no current foldback protection is provided in this case either because the chassis was not modified to accept current foldback. Always try to replace 7067 with 7067, and 7156 with 7156, but it is not absolutely necessary.

**CAUTION:**

If a product was initially designed to use the 7156 regulator and a 7067 regulator is to be substituted, BE SURE no short exists on the regulated voltage suspected to be bad. A short can exist on a board in the product which will cause the 7156 to APPEAR to be bad, but if a 7067 is installed in place of the 7156 before the short is removed, the 7067 will be destroyed.

729-0571

WANG LABORATORIES, INC.
1 INDUSTRIAL AVENUE, LOWELL, MASSACHUSETTS 01851, TEL. (617) 851-4111, TWX 710 343-6769, TELEX 94-7421

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10-76-30

The following is a list of Serial Numbers of the units which were shipped with the 7156 Regulator Card:

**928 Workstations**

1. FA5067
2. FA5068
3. FA5069
4. FA5070
5. FA5071
6. FA5072
7. FA4960
8. FA4961
9. FA4962
10. FA4963
11. FA4964
12. FA4965
13. FA4966
14. FA4941
15. FA4942
16. FA4943
17. FA4944
18. FA4945

**PCS II Systems**

1. GM2285
2. GM2287
3. GM2330
4. GM2331
5. GM2530
6. GM2539
7. GM2547
8. GM2544
9. GM2563
10. GM2562

**2236 B Terminals**

1. GJ1255
2. GJ1256
3. GJ1257
4. GJ1258
5. GJ1259
6. GJ1260
7. GJ1264
8. GJ1265
9. GJ1266
10. GJ1272
11. GJ1273
12. GJ1274

**2200F Workstations**

1. EF2570
2. EF2569
3. EF2575
4. EF2574
5. EF2571
6. EF2611
7. EF2610
8. EF2608
9. EF2606
10. EF2602
11. EF2601
12. EF2600
13. EF2592
14. EF2586
15. EF2585
16. EF2580

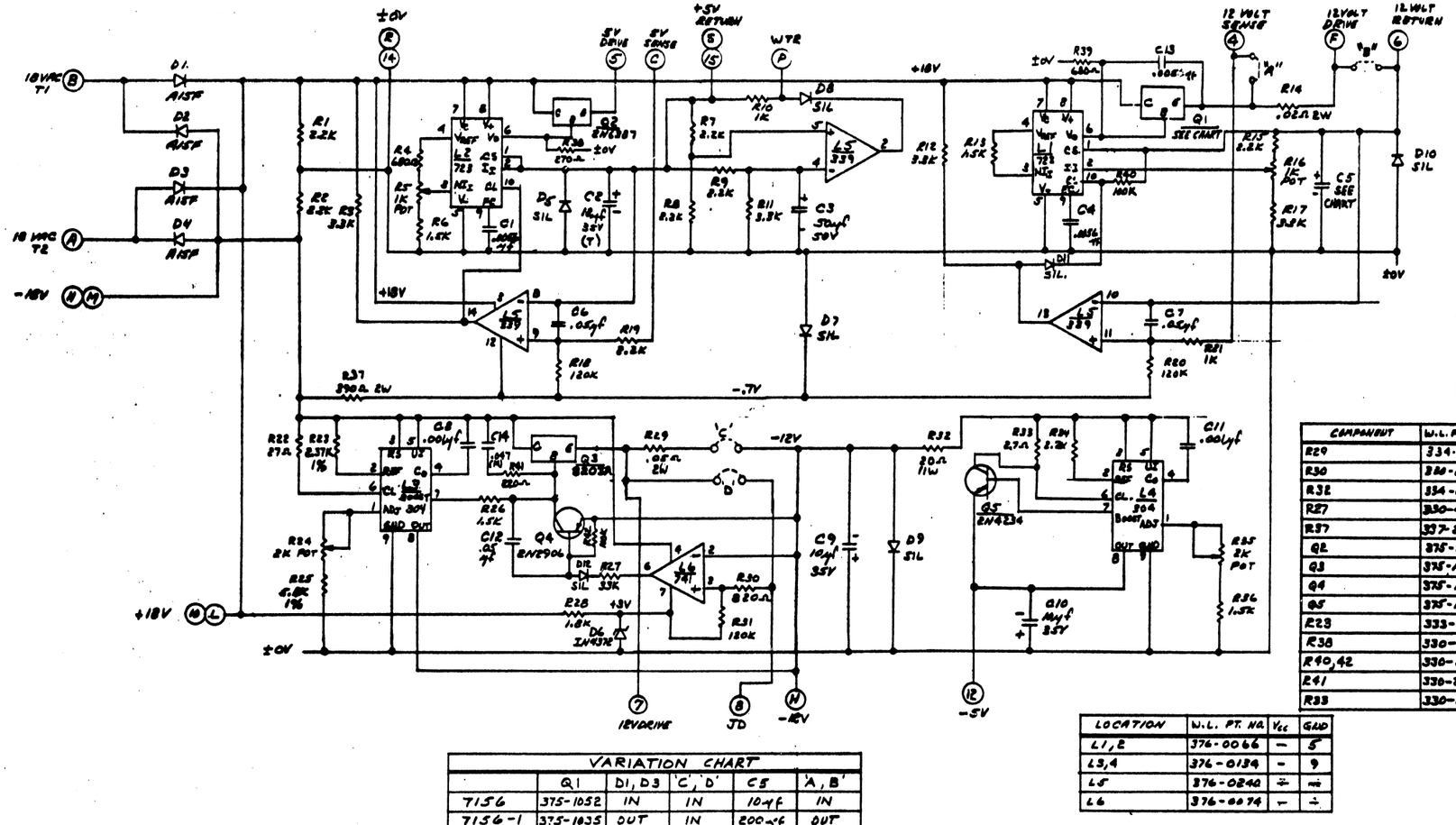
MILLIMETERS IN PARENTHESIS. TOLERANCES TO BE EQUIVALENT TO INCH DIMENSIONS.

DO NOT SCALE

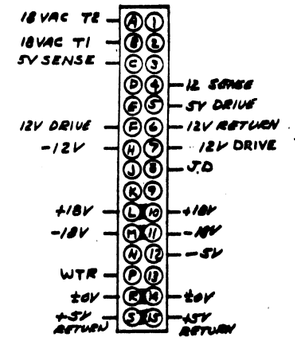
HOLE LEGEND & TOLERANCES

| HOLE DIA | TOLERANCE |
|---|---|
| .0135 - .125 | +.003 -.001 |
| .126 - .250 | +.004 -.001 |
| .251 - .500 | +.005 -.001 |

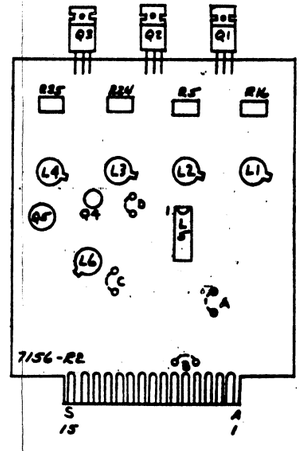
| SYM | DESCRIPTION | QTY |
|---|---|---|
| A | | |




| COMPONENTS | W.L. PT NO |
|---|---|
| C6,7,12 | 300-1960 |
| C2, | 300-4018 |
| C3, | 300-3010 |
| C9,10 | 300-4032 |
| C8,11 | 300-1906 |
| C1, 4, 13 | 300-1918 |
| C14 | 300-2147 |
| D1,2,3,4 | 380-3008 |
| D5,7,8,9,10,11,12 | 380-1001 |
| D6 | 380-2129 |
| R1,2,7,8,9,15,19,34 | 330-3682 |
| R3,11,18,17, | 330-3033 |
| R4,39 | 330-2068 |
| R5,16 | 336-1014 |
| R6,18,26,36 | 330-3015 |
| R10,21 | 330-3010 |
| R14, | 334-0032 |
| R18,20,21 | 336-5012 |
| R22 | 330-1027 |
| R24,35 | 336-1022 |
| R25 | 330-3042 |
| R28 | 330-2018 |




| COMPONENT | W.L. PTNO |
|---|---|
| R29 | 334-0033 |
| R30 | 330-2082 |
| R32 | 334-0003 |
| R27 | 330-4023 |
| R37 | 337-2039 |
| Q2 | 375-1052 |
| Q3 | 375-1053 |
| Q4 | 375-1017 |
| Q5 | 375-1054 |
| R23 | 333-0093 |
| R38 | 330-2027 |
| R40,42 | 330-5010 |
| R41 | 330-2032 |
| R33 | 330-2027 |




| LOCATION | W.L. PT. NO. | $V_{cc}$ | GND |
|---|---|---|---|
| L1,2 | 376-0066 | — | 5 |
| L3,4 | 376-0134 | — | 9 |
| L5 | 376-0240 | — | — |
| L6 | 376-0074 | — | — |

| VARIATION CHART | Q1 | D1, D3 | 'C, D' | C5 | 'A, B' |
|---|---|---|---|---|---|
| 7156 | 375-1052 | IN | IN | 10µf | IN |
| 7156-1 | 375-1035 | OUT | IN | 200µf | OUT |
| 7156-2 | 375-1035 | OUT | OUT | 200µf | OUT |

NOTE: FOR USE WITH WANG MONITOR, REMOVE JUMPERS 'A','B' AND DIODE 1N3.

E-REV 0

| REVISIONS | ZONE | BY | DATE |
|---|---|---|---|
| A | C-5 | ORIGINAL RELEASE PER DCO 7156 | 4-28-77 |
| B | | REVISED PER ECN# 7156 APPD 11-11-77 | 11-11-77 |
| C | | REVISED PER ECN# 7157 | 12-14-77 |
| D | | REVISED PER ECN # 7165 APPD 4-19-78 | 4-19-78 |

| QTY. | ITEM NEXT ASSY. | WANG PART NO. | DRAWING NO. | DESCRIPTION |
|---|---|---|---|---|
| | | | | |

WANG LABORATORIES, INC. TEWKSBURY, MASS. U.S.A.

| | BY | DATE | APPROVED BY | DATE |
|---|---|---|---|---|
| DWN | EBA | 5-9-77 | E ENGR | S.L.L. 4-9-77 |
| CHK | | | M ENGR | |
| | | | MFG ENGR | |

MATERIAL

MODEL NO. 928,2240F, 2210, 2236

SEE ENGR. SPECIFICATIONS No.

FINISH

TOL. EX. AS NOTED .XX ± FRAC ± .XXX ± ANG. ± FINISH √

SCALE NONE | SHT | OF

TITLE: P.S. REGULATOR WITH FOLD BACK

| 210-7156 | D | 7156 | 3 |
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| WANG PART NUMBER | SIZE | DRAWING NUMBER | REV. |

WANG LABORATORIES, INC.

MEMO TO: SAM GAGLIANO, PAUL RICKER

FROM: JOHN THIBAULT

SUBJECT: PCS III

DATE: JULY 14, 1980

The following outlines the recent specification change made to the PCS III.

1. There are now two separate model numbers.

   - 2200 PCS III-8.
   - 2200 PCS IIIA-8.

   This reflects the addition of the PCS IIIA which includes the disk multiplexor option.

2. Both PCS III and PCS IIIA will now be standard with the 80 x 24 U/L CRT and Audio Alarm. In making this feature standard, Op-60 and Op-60A will not be available for either unit. They will continue to remain available as options for PCS II and PCS IIA. This change will be implemented without any change in list price.

3. The additional 140K single sided double minidiskette for the PCS III and PCS IIIA will be changed to Op-101. This deletes Op-103.

4. Op-105, the disk multiplexor option, is no longer available. This is due to the availability of the PCS IIIA.

The documentation is already in the process of being updated to reflect these changes. If there are any questions please contact me.

JT:pn:0511E

cc: Bob Saulnier
Jon Newman
Kip Eaton
Rick Jones
Jerry Sevigny
Dick Butler

JUL 14 1980