

PCS II / PCS IIA



NOTICE:

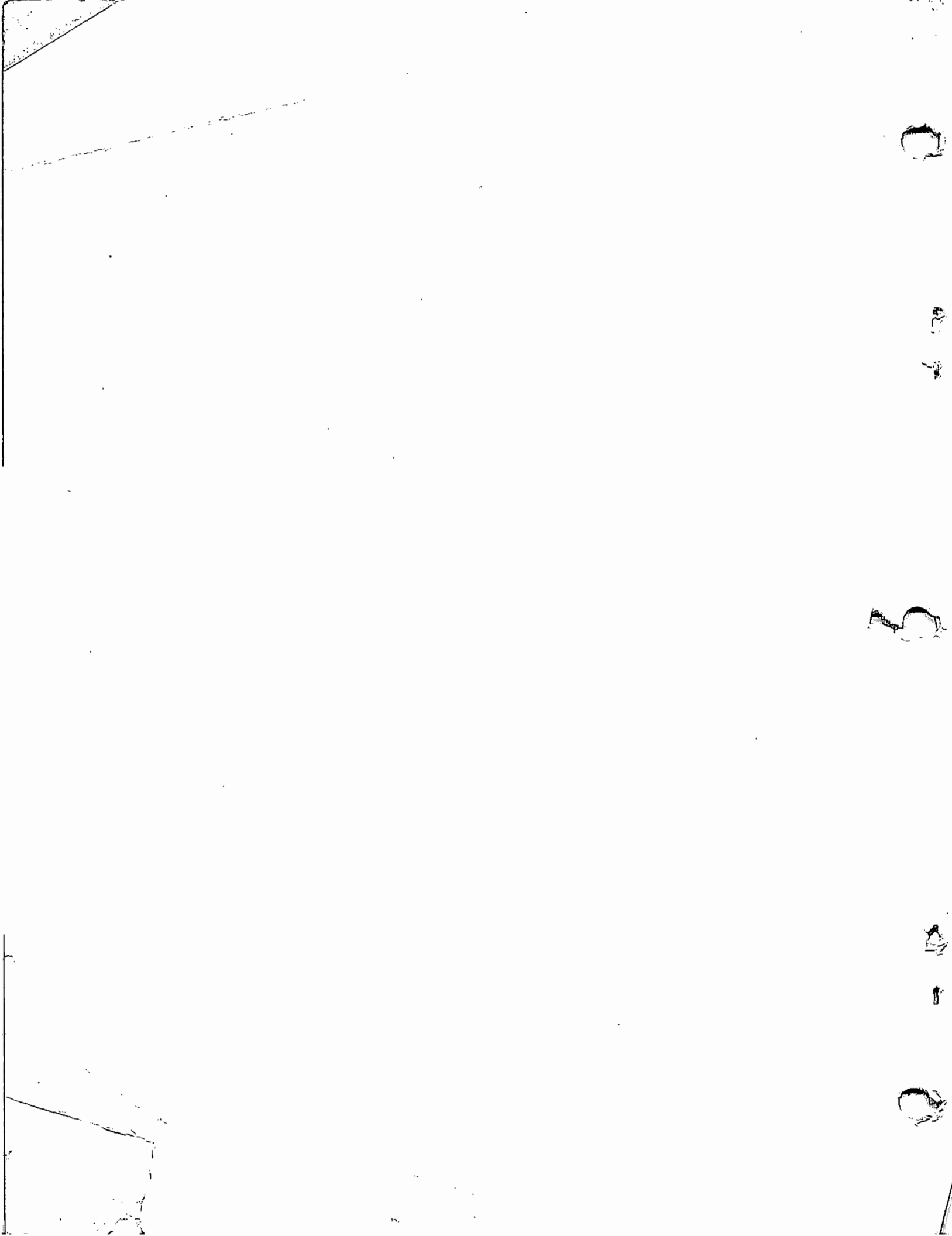
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1 INDUSTRIAL AVENUE, LOWELL, MASSACHUSETTS 01851. TEL. (617) 851-4111, TWX 710 343-6769. TELEX 94-7421

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****NOTE****

This document is a combination of SB #75, SB #75A,
and SB #75B, and will be distributed in place of
the individual documents.

*Keyboard = 271-1125
325-2407
325-2413*

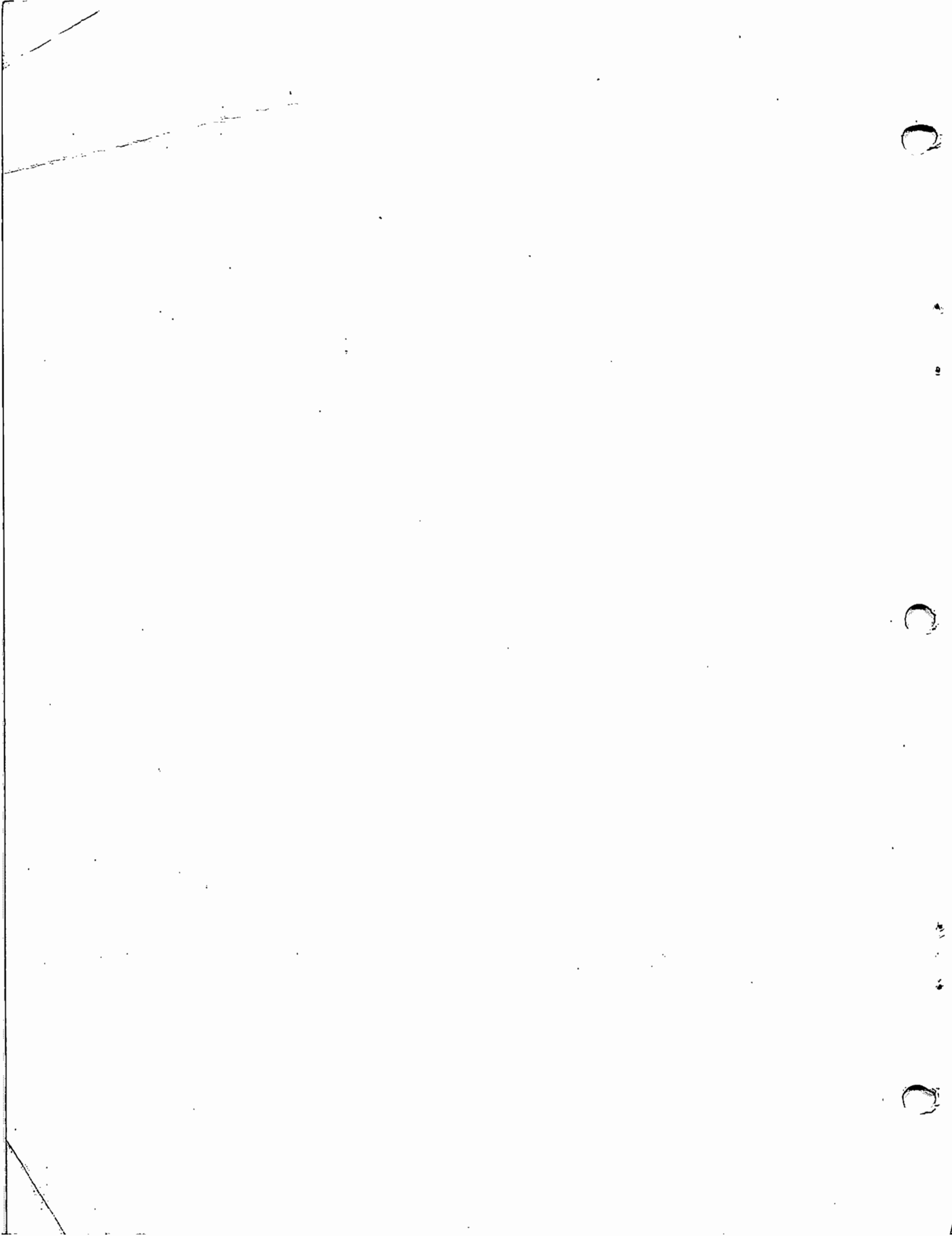


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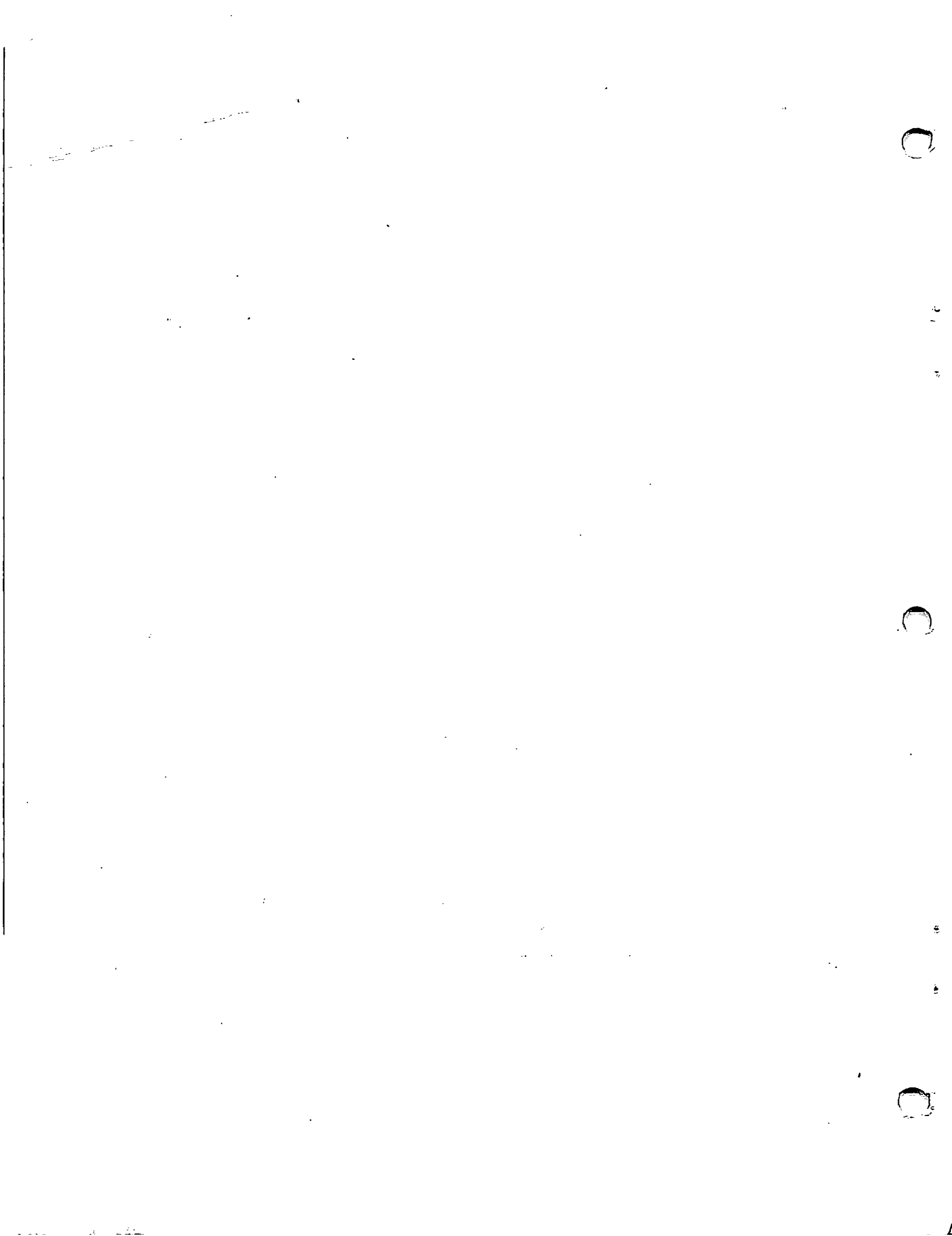
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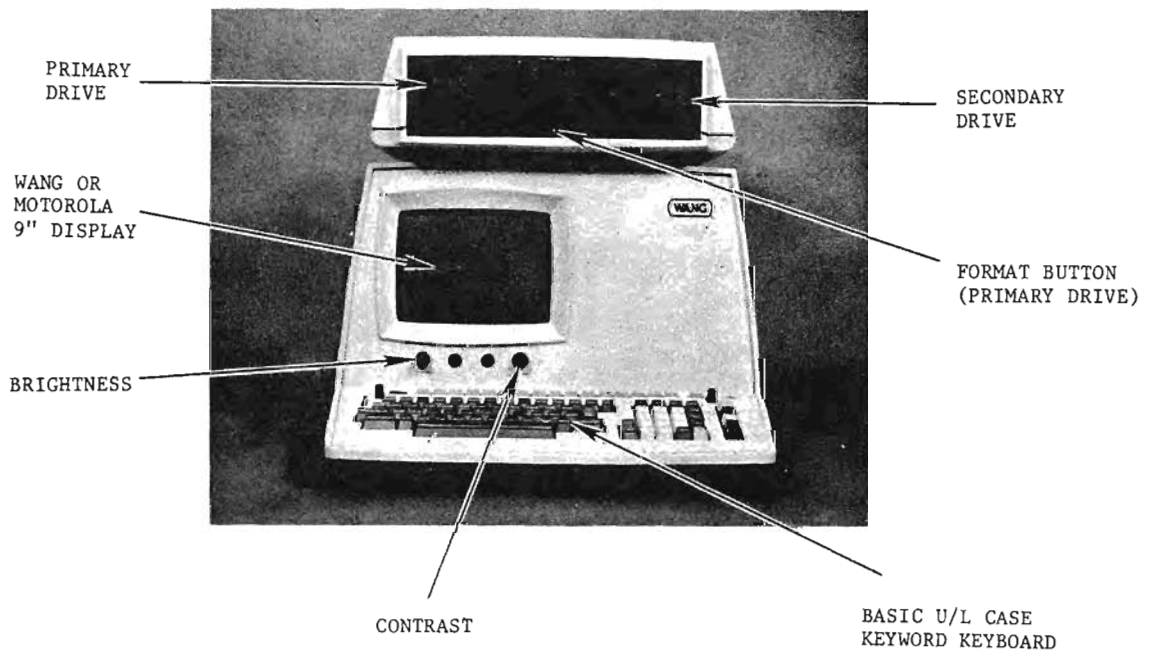


SECTION 1
DESCRIPTION

1.1 GENERAL

The PCS II, marketed as a 2200 Portable/Personal Computing System, is a self-contained unit with CPU, BASIC Keyword Keyboard, 9 Inch Wang Video Display, and Mini Diskette Drive. This unit is intended to be a stand-alone, single-user computer with provisions for two output writing peripherals and the following options:

<u>OPTION #</u>	<u>DESCRIPTION</u>
60	Auxiliary display connector audio and KB clicker
60A	80 x 24 CRT display
61	2201 Output Writer
62	Async Telecommunications Interface
62B	Bi-sync Telecommunications Interface
65	IEEE-488 Interface
67	8 Bit Parallel I/O Interface
-	Memory Upgrades
-	Upgrade to Dual Disks



PCS-II - FRONT VIEW

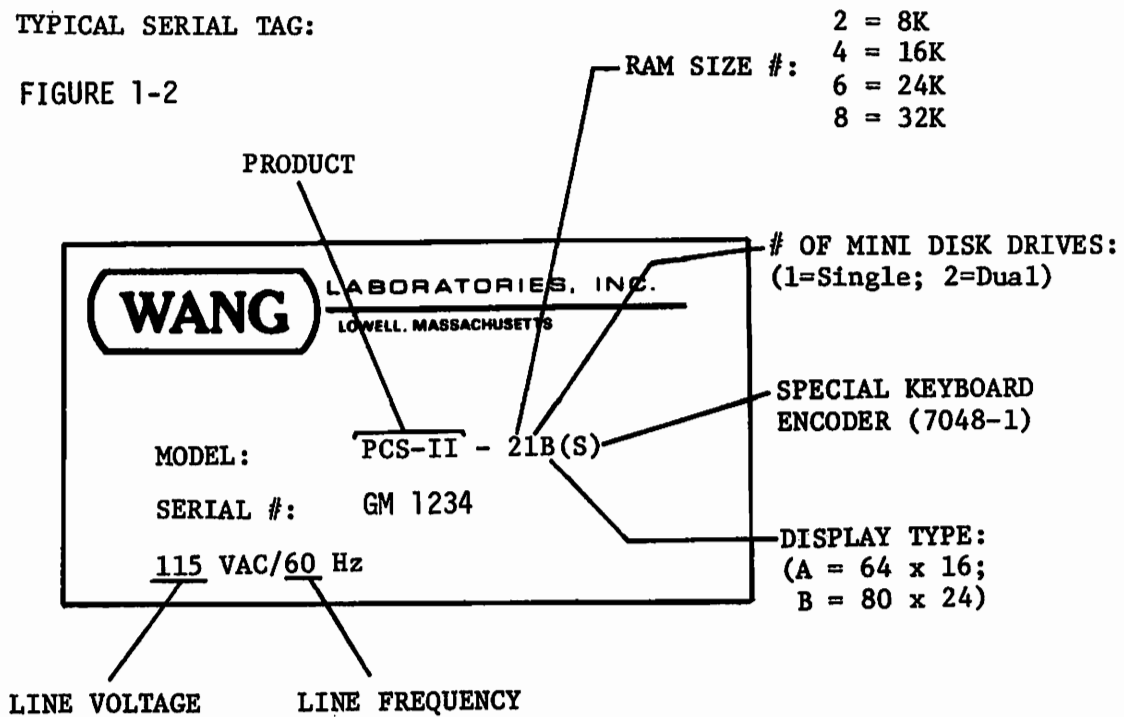
FIGURE 1-1

The PCS II has the programming capabilities of the present 2200T CPU. RAM may be expanded in 8,192 (8K) byte increments to 32,768 (32K) bytes. PCS-II supports the following printers and plotters: 2221W Line Printer, 2231W or 2231W-2 Line Printer, 2251 Line Printer, 2261W Line Printer, 2263-1 or 2263-2 Line Printer, 2271 Impact Character Printer, 2281 Line Printer, 2202 Output Writer/Plotter*, 2212 Flatbed Plotter*, 2232 Flatbed Plotter* and 2273 Digital Drum Plotter* (single or triple pen, English or Metric system).

1.2 MODEL INFORMATION

TYPICAL SERIAL TAG:

FIGURE 1-2

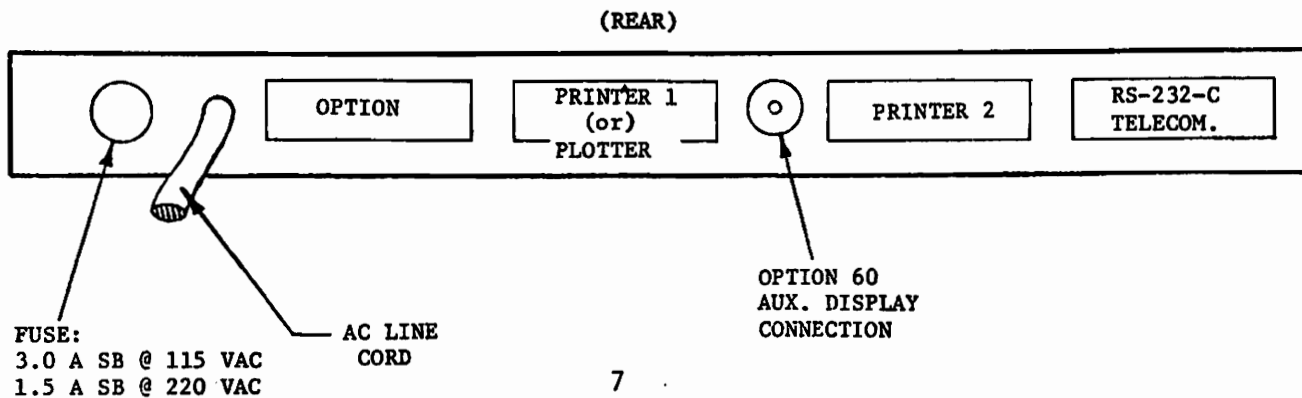
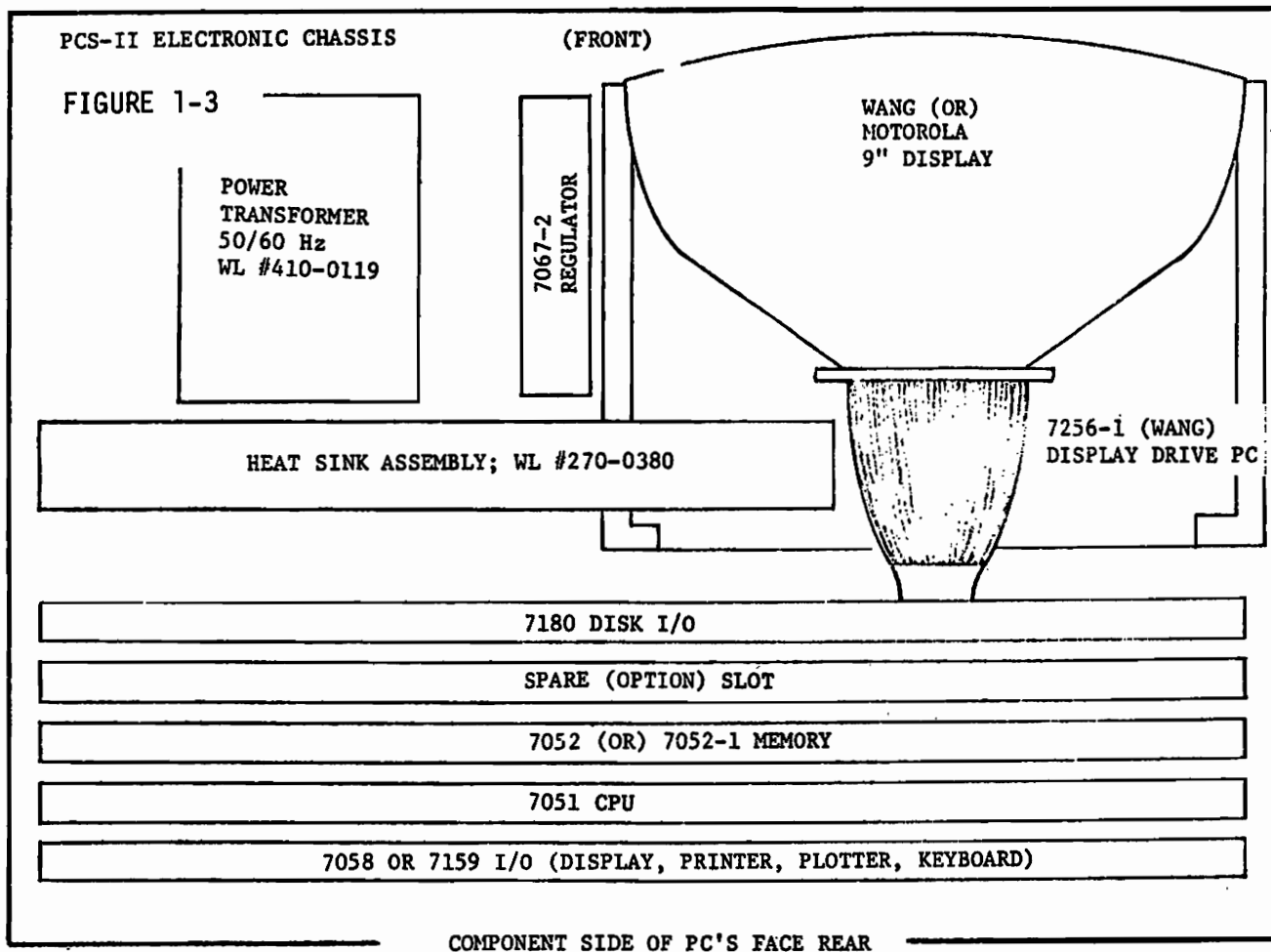


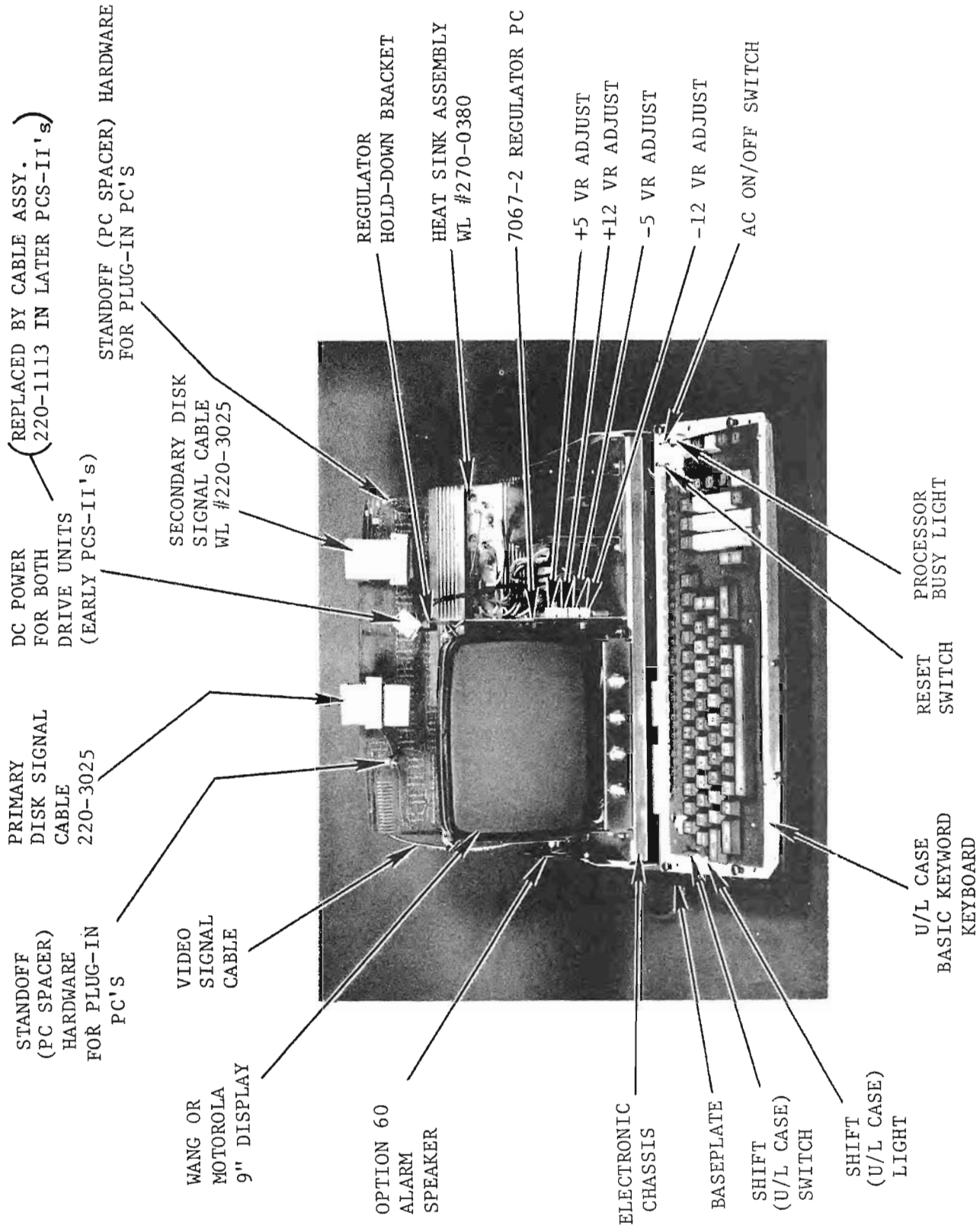
RAM Size	64 x 16 Display Single Minidiskette BASIC Keyword Keyboard	64 x 16 Display Dual Minidiskette BASIC Keyword Keyboard
	Serial: WL #:	Serial: WL #:
8K	PCSII-21A/177-2EE2-1A	PCSII-22A/177-2EE2-2A
16K	PCSII-41A/177-2EE4-1A	PCSII-42A/177-2EE4-2A
24K	PCSII-61A/177-2EE6-1A	PCSII-62A/177-2EE6-2A
32K	PCSII-81A/177-2EE8-1A	PCSII-82A/177-2EE8-2A

*Only with Option 61

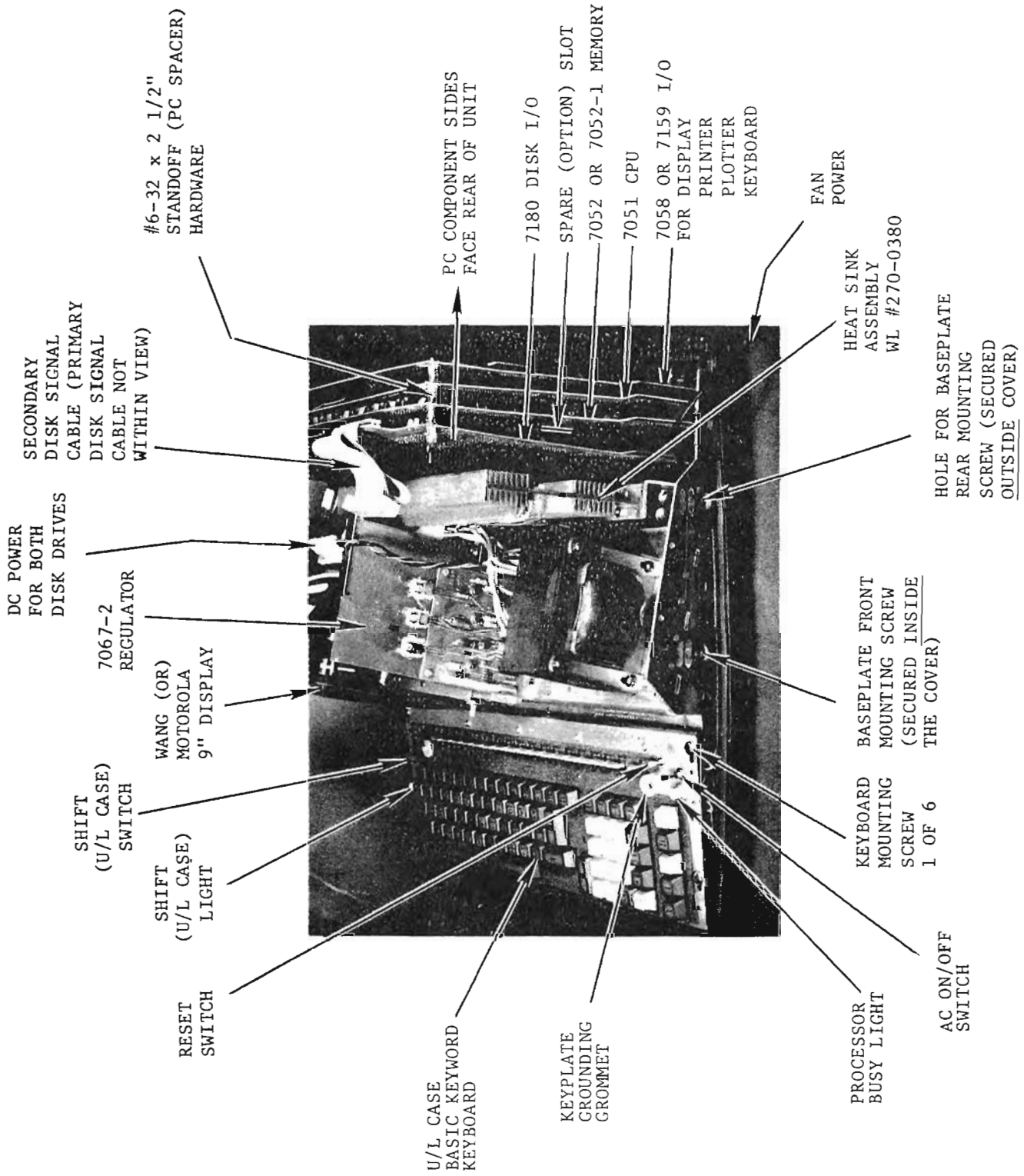
<u>RAM Size</u>	<u>80 x 24 Display Single Minidiskette BASIC Keyword Keyboard</u>	<u>80 x 24 Display Dual Minidiskette BASIC Keyword Keyboard</u>
	Serial: WL #:	Serial: WL #:
8K	PCSII-21B/177-2EE2-1B	PCSII-22B/177-2EE2-2B
16K	PCSII-41B/177-2EE4-1B	PCSII-42B/177-2EE4-2B
24K	PCSII-61B/177-2EE6-1B	PCSII-62B/177-2EE6-2B
32K	PCSII-81B/177-2EE8-1B	PCSII-82B/177-2EE8-2B

1.3 CHASSIS LAYOUTS





PCS-II - FRONT VIEW; COVERS & MINI DISK UNITS REMOVED FIGURE 1-4



PCS-II - RIGHT SIDE VIEW; MINI FLOPPY & COVERS REMOVED FIGURE 1-5

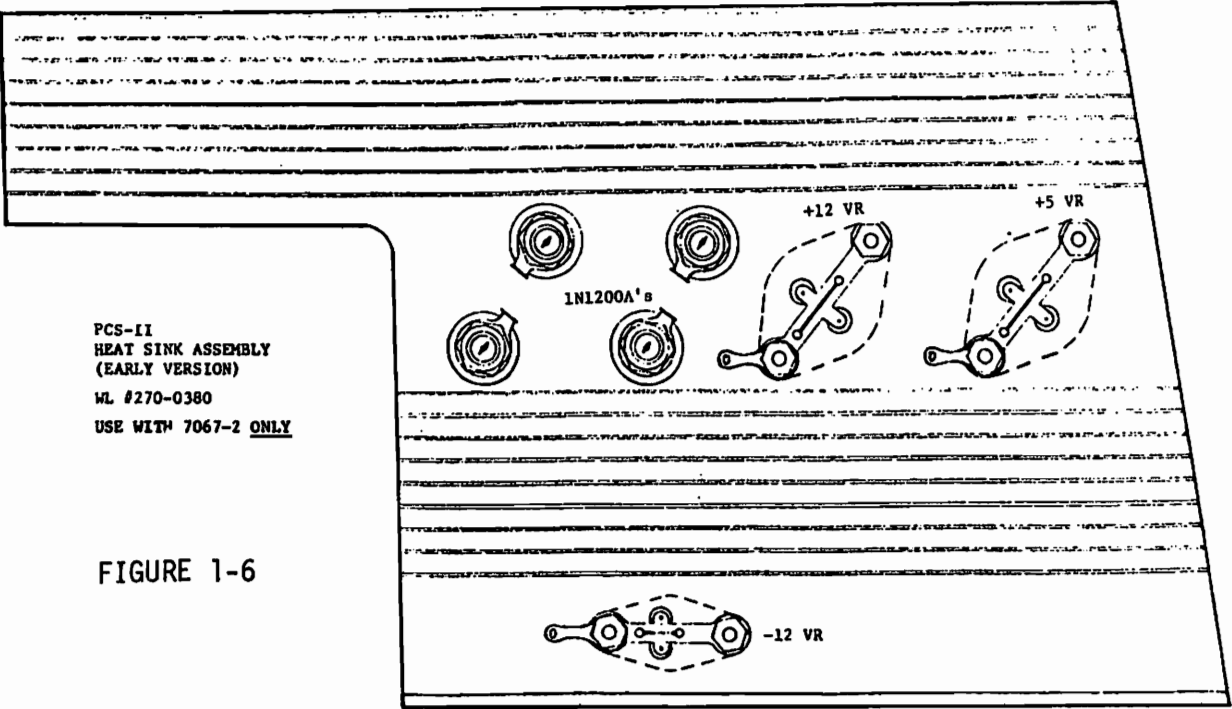


FIGURE 1-6

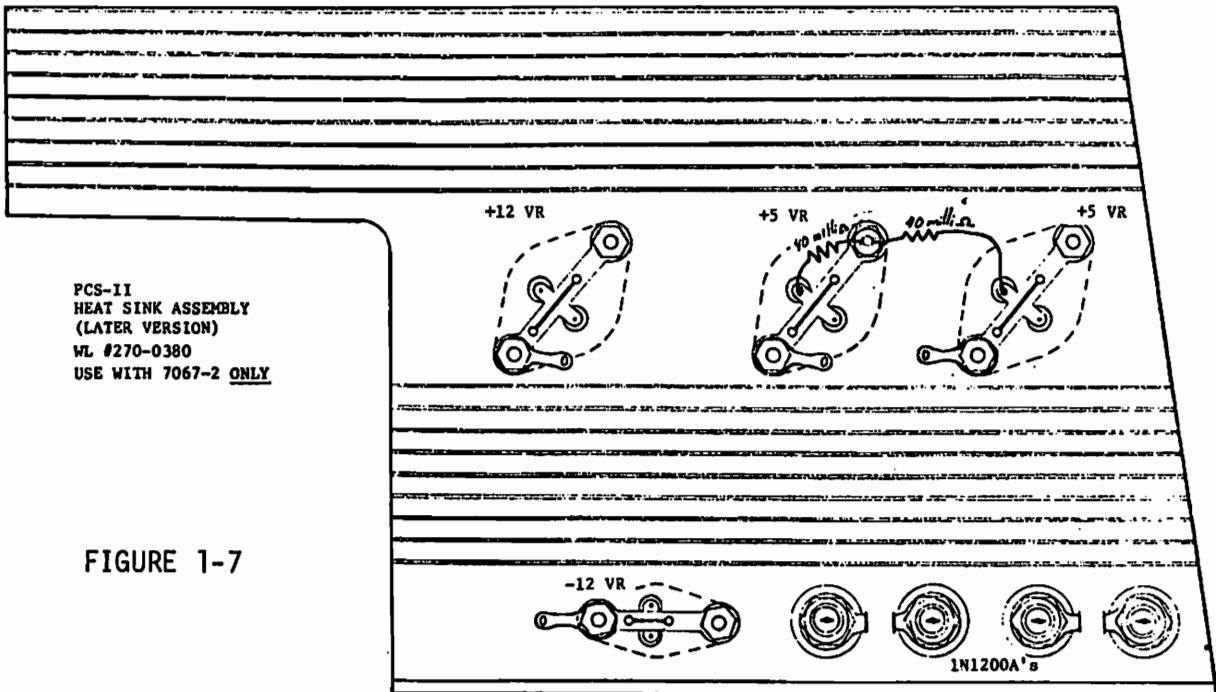


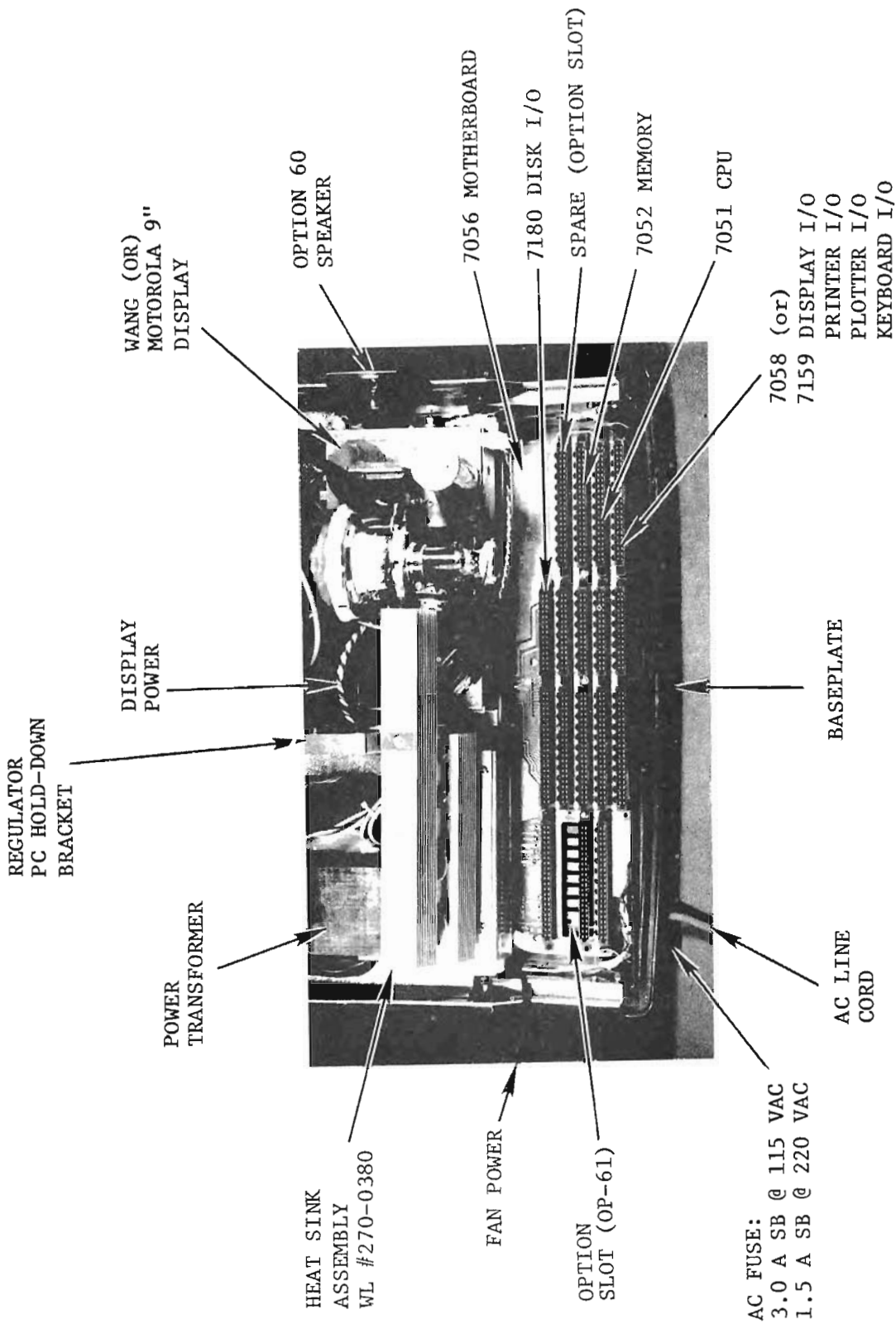
FIGURE 1-7

-CAUTION-

Up to 100 PCS-IIs were produced with a heat sink assembly which has four diodes, a +12V pass transistor, a -12V pass transistor and a +5V pass transistor. A new heat sink assembly was produced with all of the above, plus an additional +5V pass transistor and two 40 milliohm resistors (17 & 1/2" of #24 wire). See Figures 1-6 and 1-7.

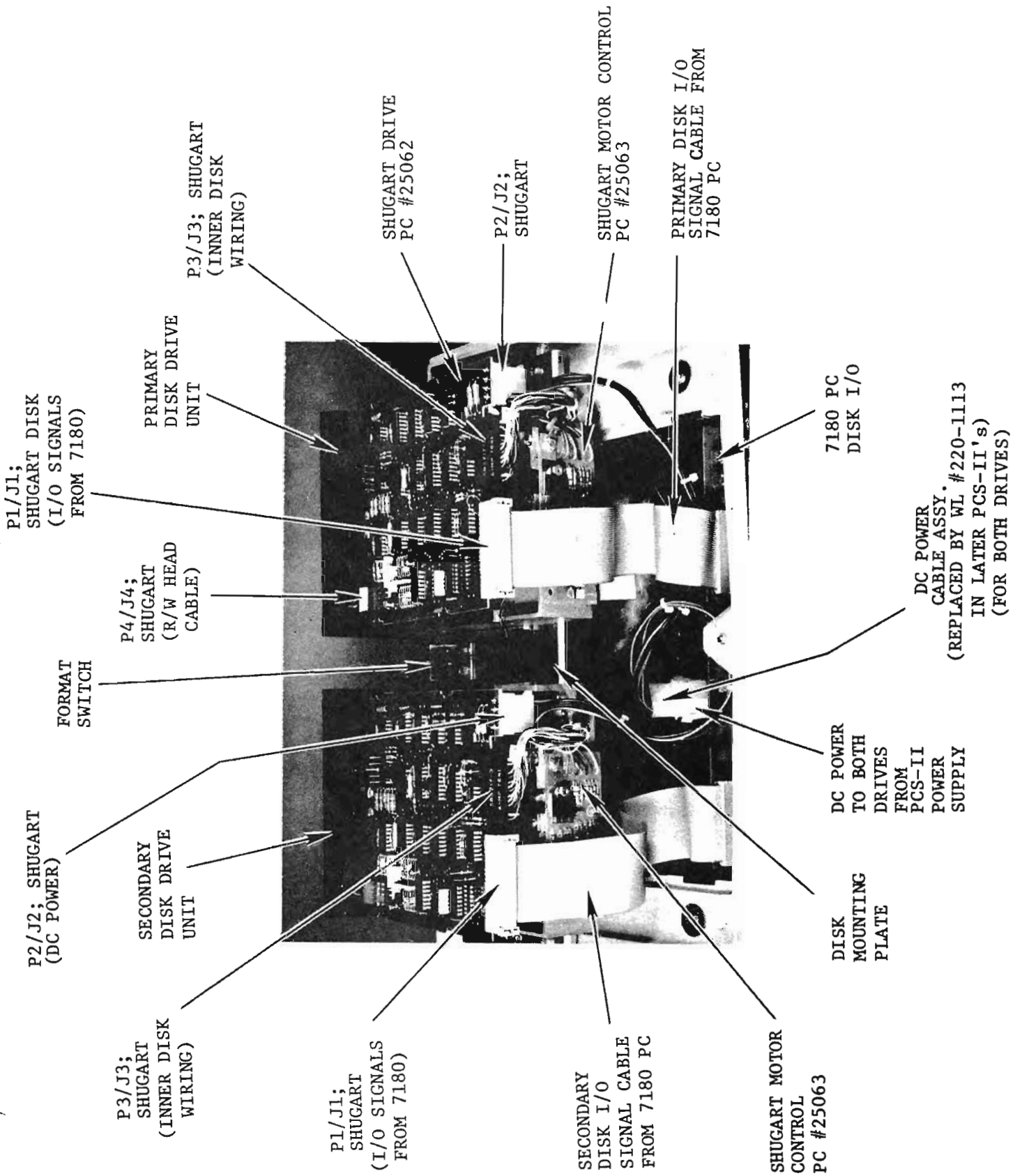
The additional +5V pass transistor was added because the single transistor became very hot (+150°C; operating within specification). The single transistor configuration works properly, and does not cause any problems as long as the airflow is not restricted in any way. Also, if any options are added to the PCS-II, the transistor becomes hotter, but still within specification. If the airflow is restricted, a power supply failure will definitely occur.

The most important problem with the single transistor is one of safety. If the cover is removed for any period of time, there is no airflow over the heat sink, and the +5V transistor will become very hot. If someone were to touch the transistor, a severe burn would result. Therefore, it is recommended that the PCS-II only be operated with the cover in place. There is no need to remove the cover for power supply adjustments, since they are accessible through the top cover near the minidiskettes, and the adjustment pots are accessible by removing the front panel.

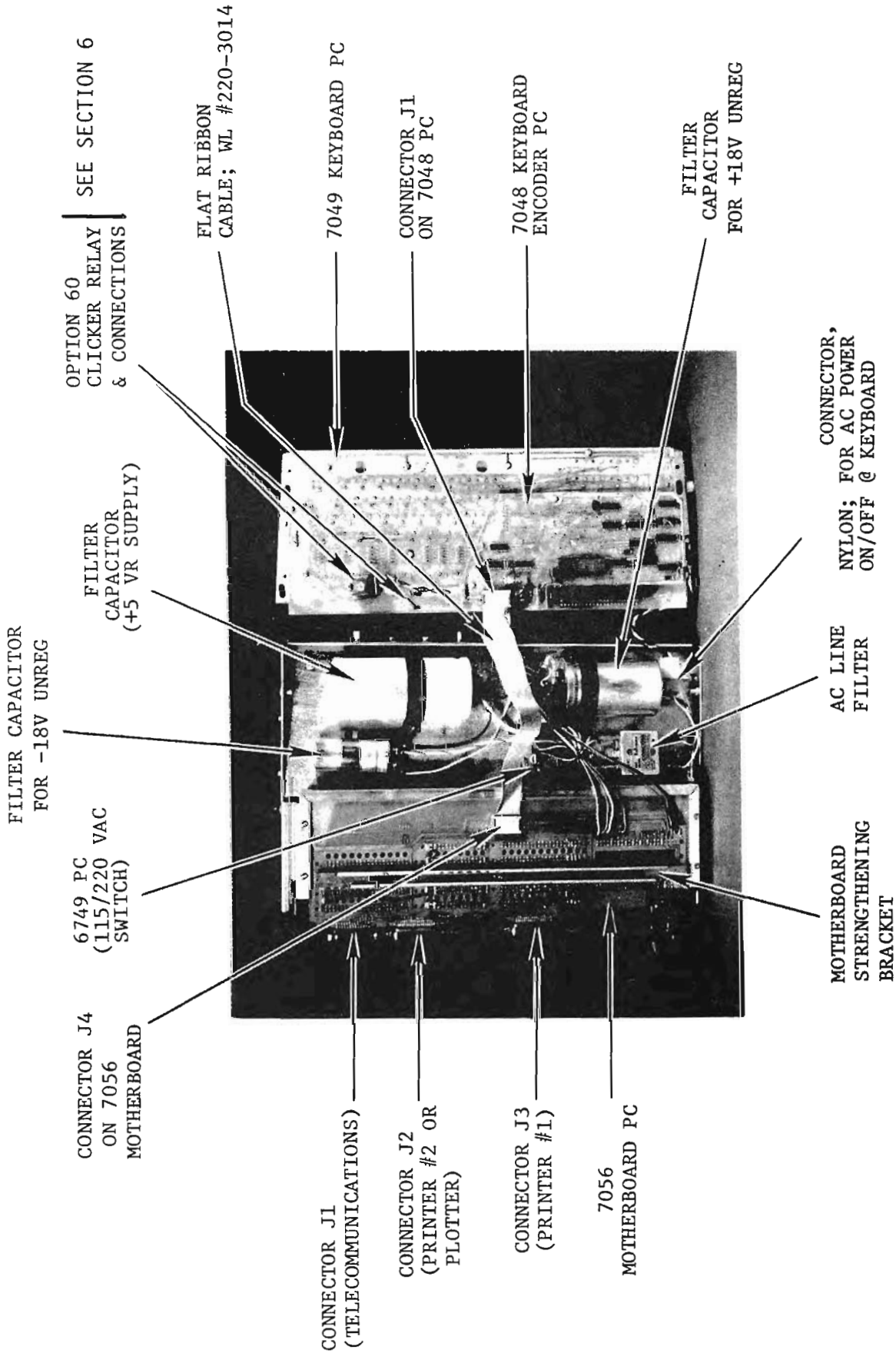


PCS-II - REAR/TOP VIEW; PC'S, MINI FLOPPY, & COVERS REMOVED

FIGURE 1-8



PCS-II - TOP/REAR VIEW; MINI DISK COVER REMOVED FIGURE 1-9



PCS-II - UNDERSIDE VIEW; BASEPLATE REMOVED FIGURE 1-10

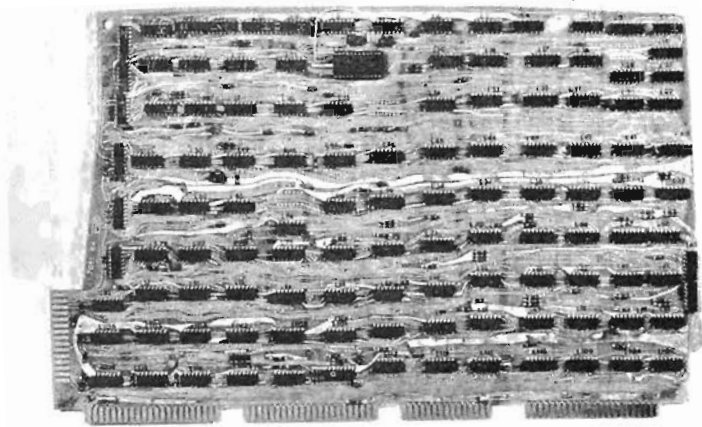


FIGURE 1-11
7051 CPU

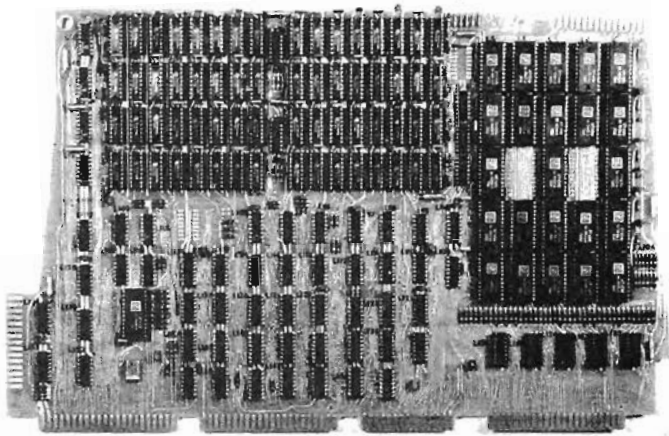


FIGURE 1-12
7052/52-1 MEMORY

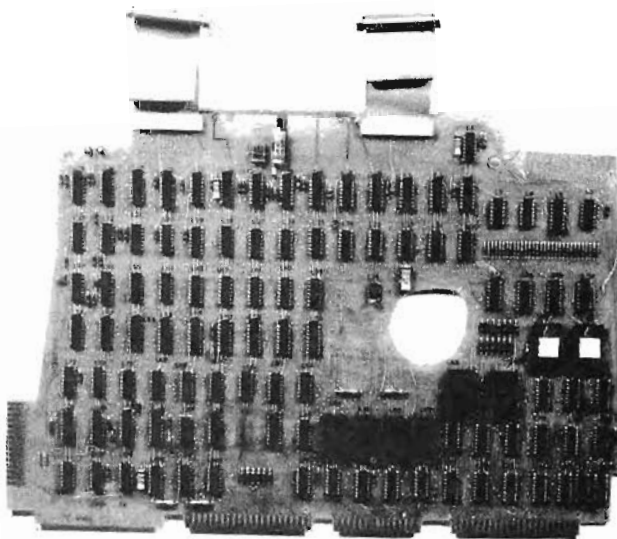
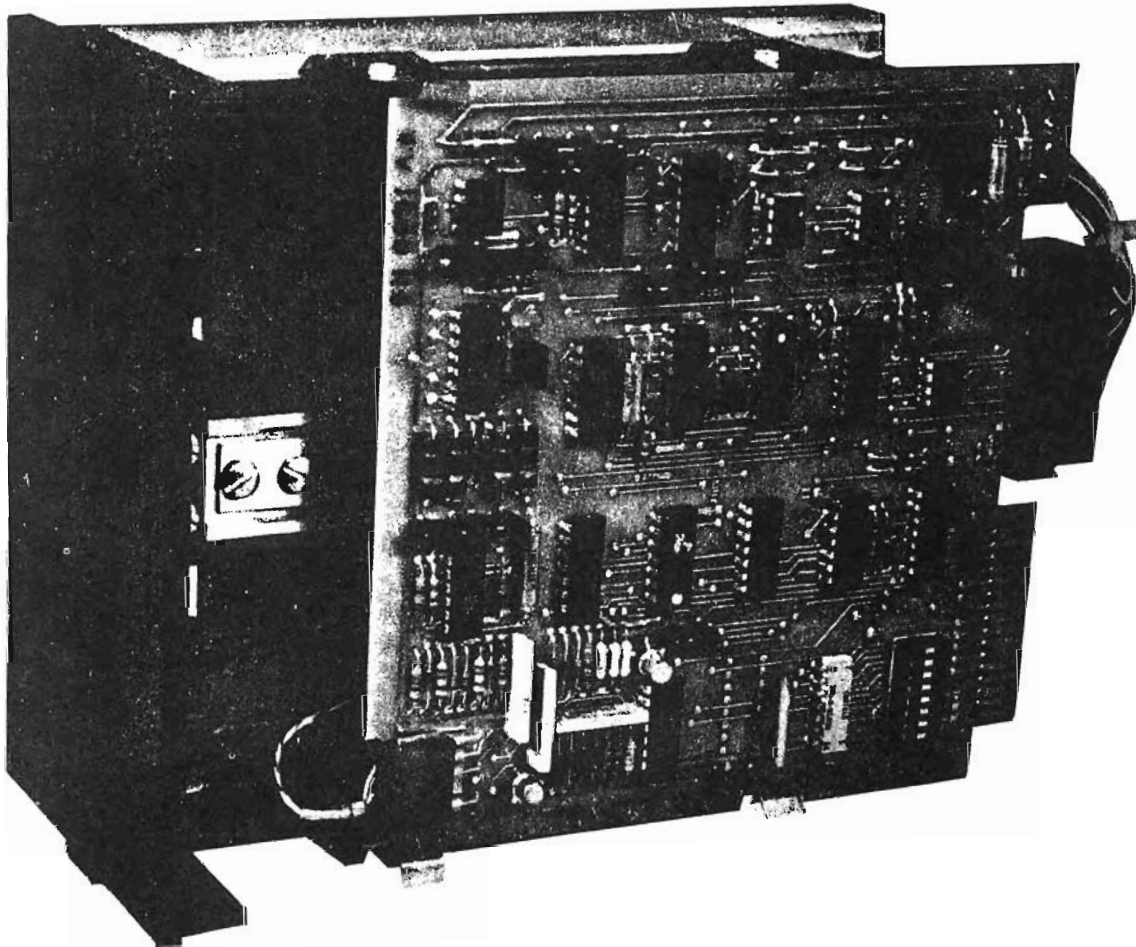


FIGURE 1-13
7180 DISK I/O



SA 400 MINI DISK DRIVE UNIT

FIGURE 1-14

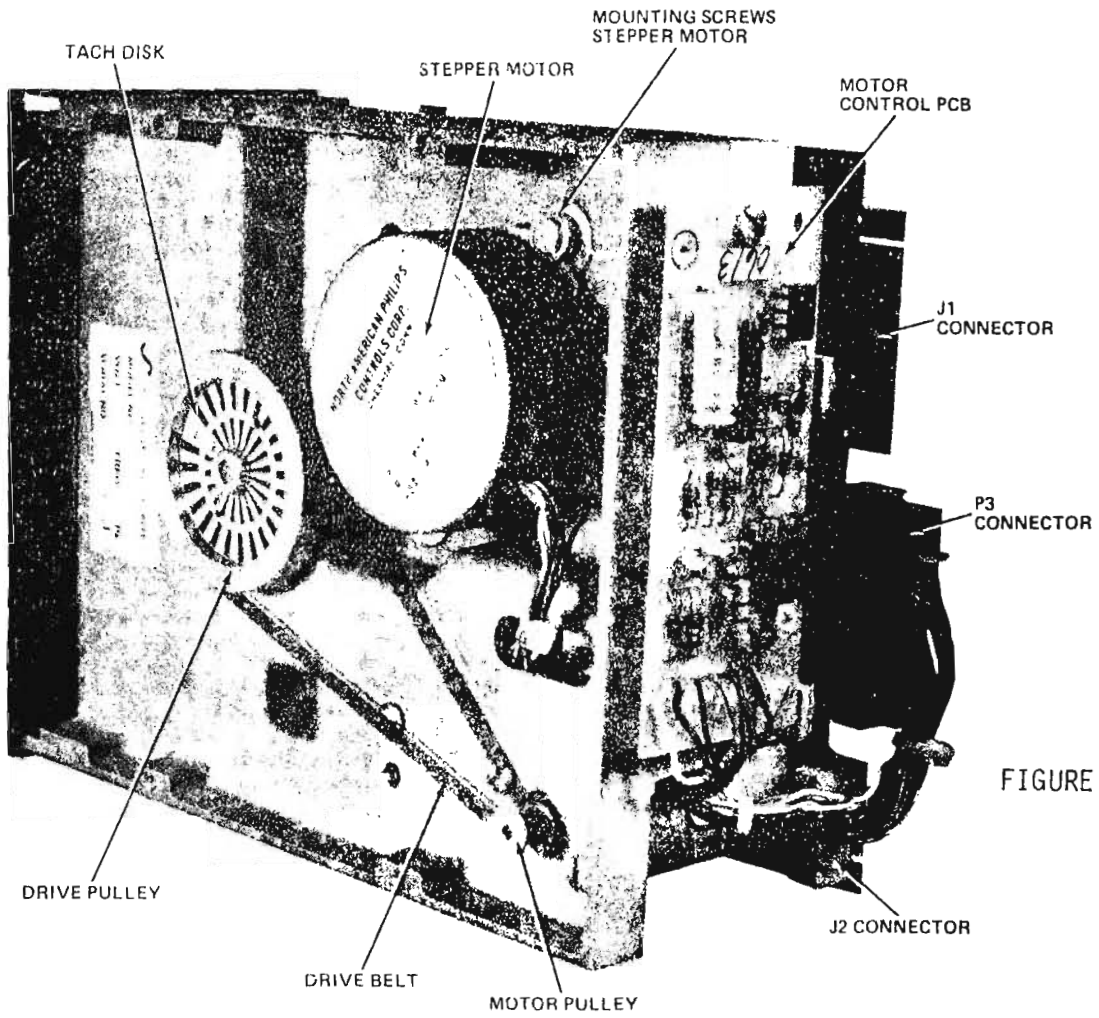


FIGURE 1-15

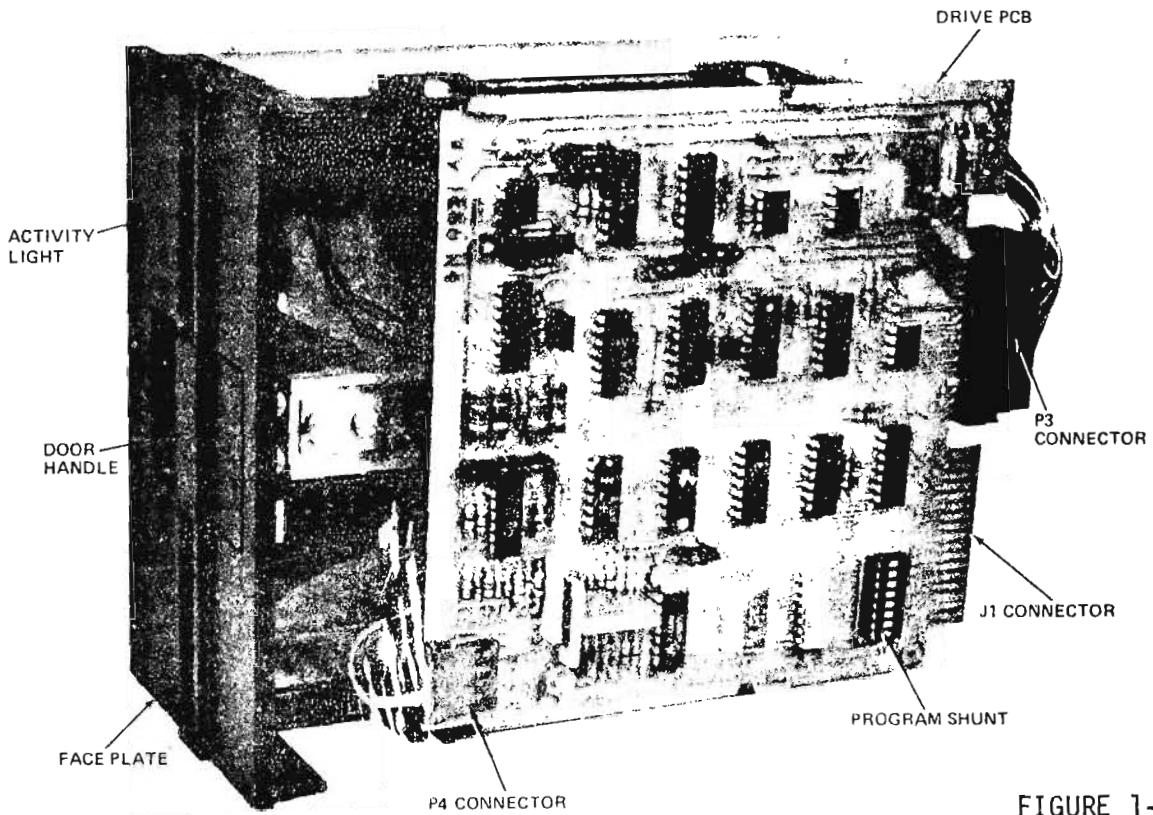


FIGURE 1-16

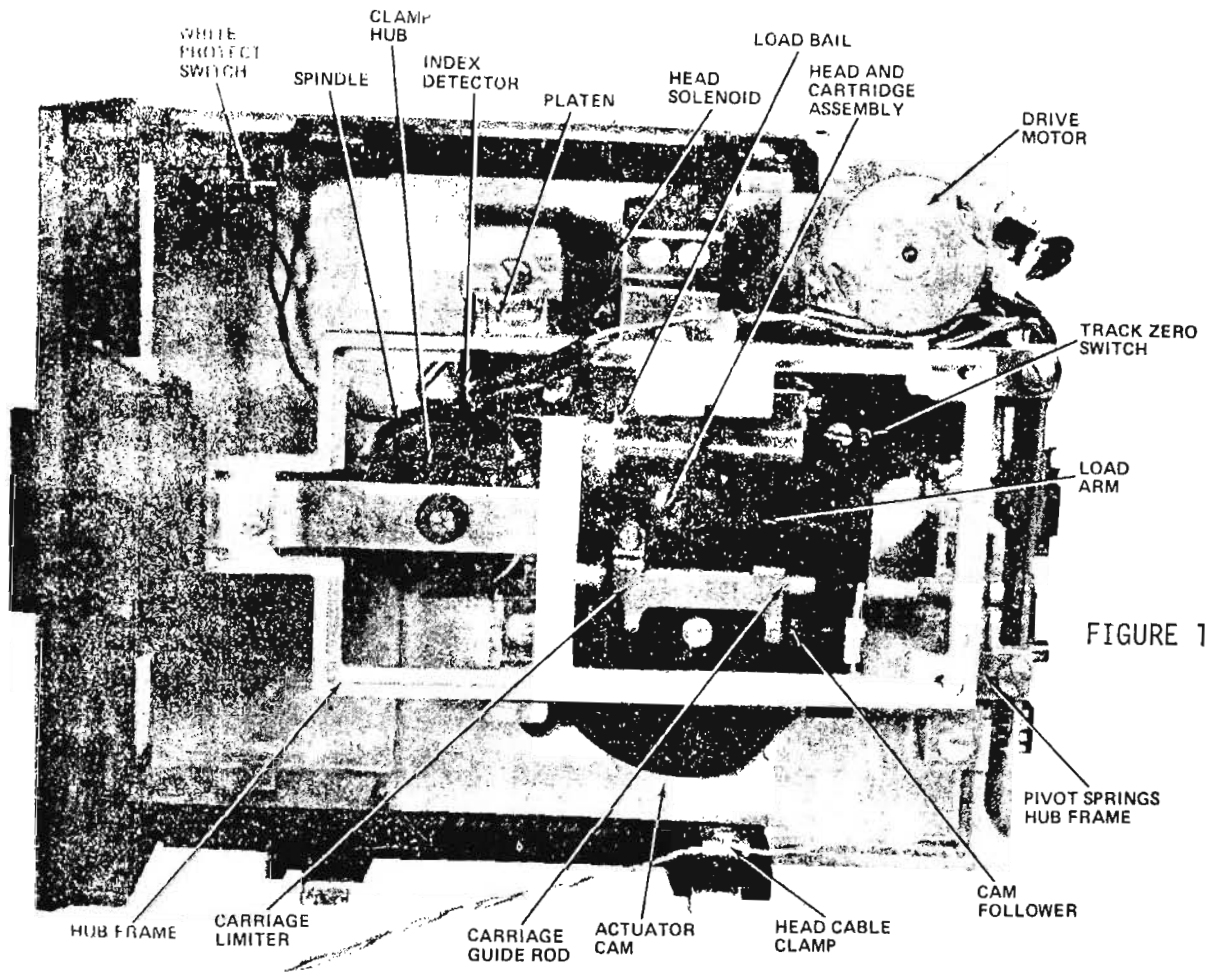


FIGURE 1-17

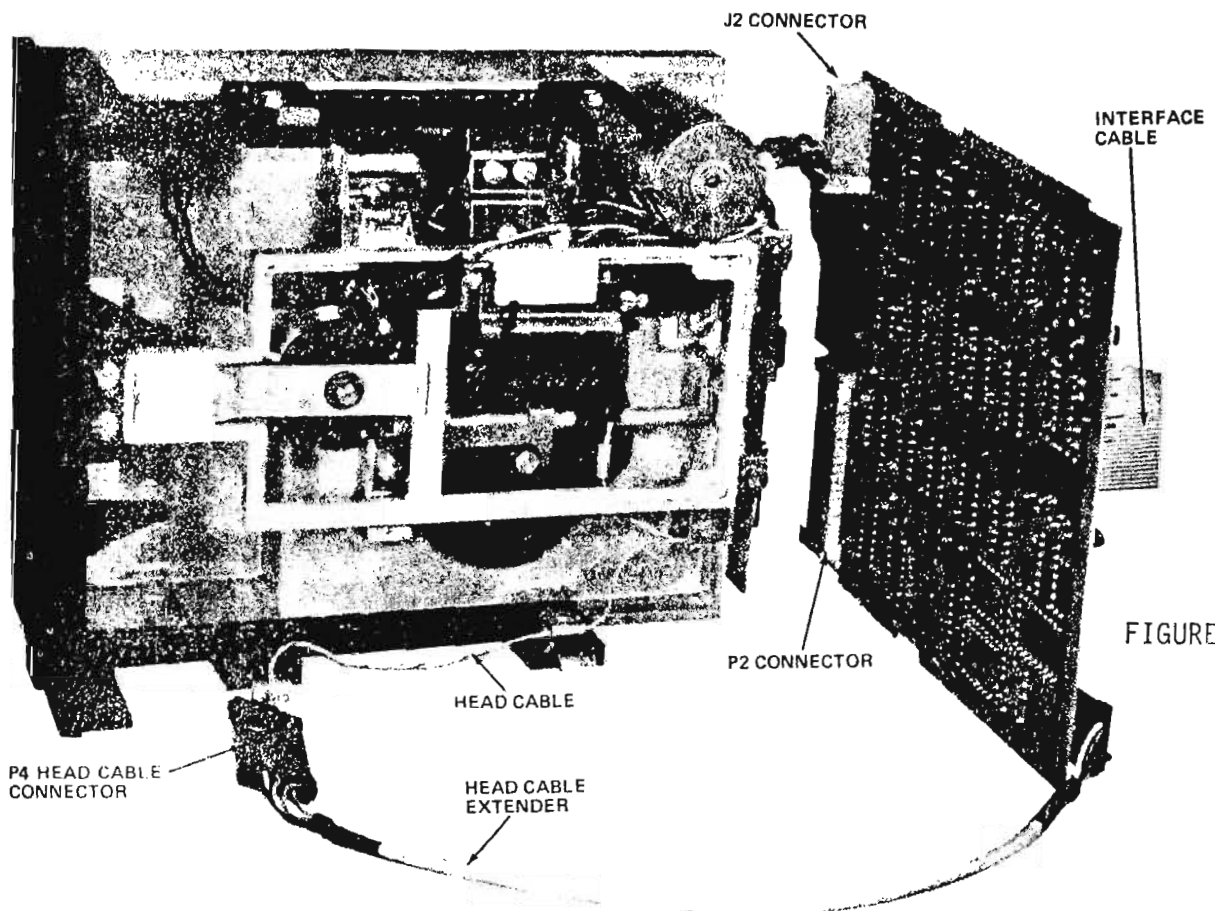
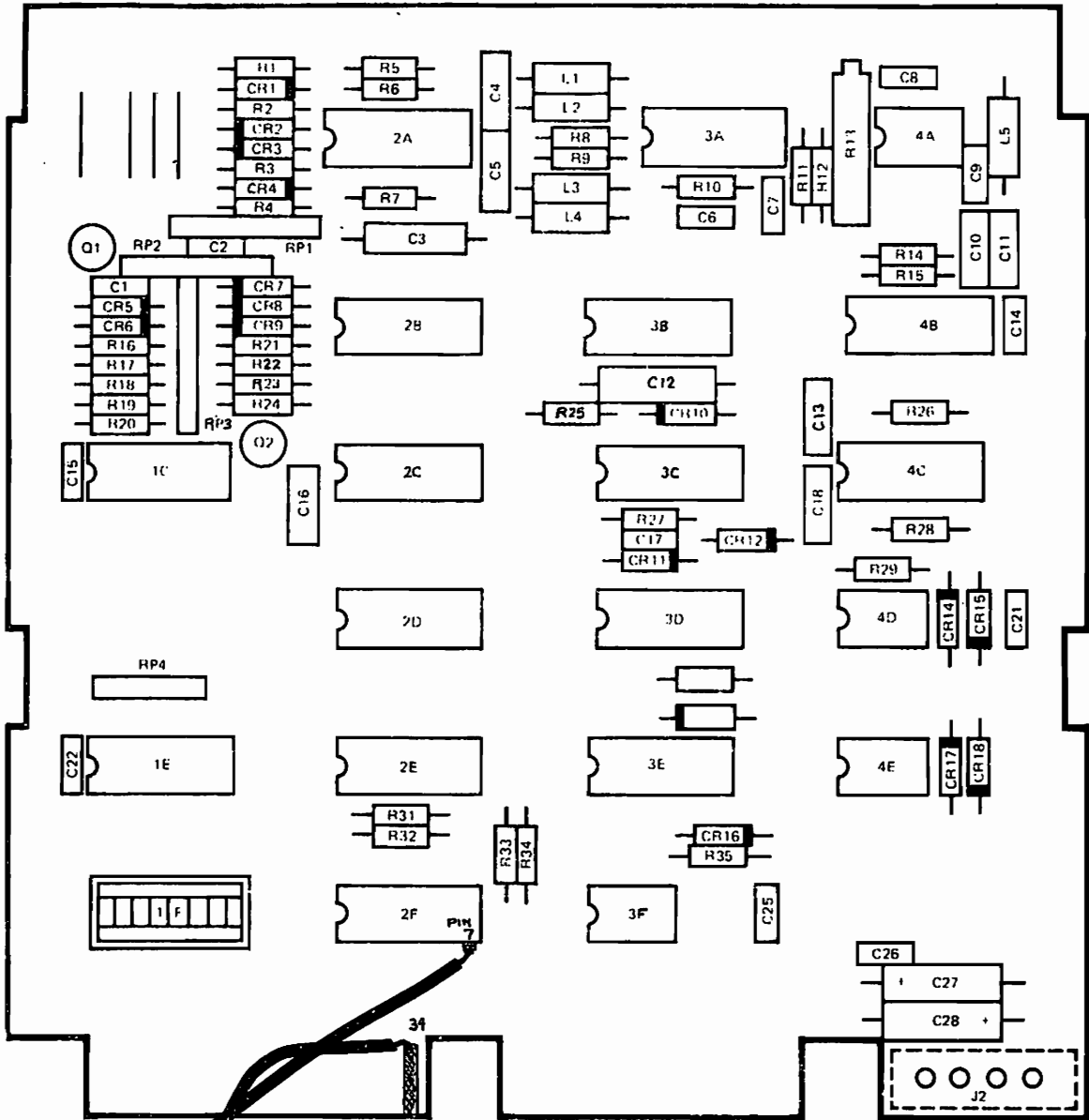


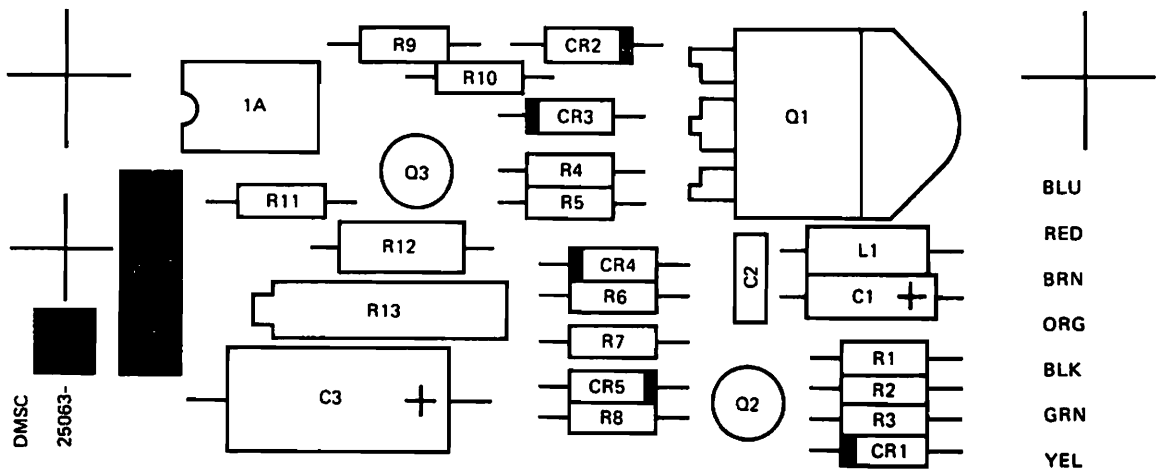
FIGURE 1-18



FROM FORMAT SWITCH
SEE FIGURE 1-9

SHUGART DRIVE PC #25062

FIGURE 1-19



SHUGART MOTOR CONTROL PC #25063

FIGURE 1-20

1.3.1 CIRCUIT BOARD SUMMARY

<u>CIRCUIT BOARDS</u>	<u>DESCRIPTION</u>	2200 USAGE		
		<u>PCS-2</u>	<u>E</u>	<u>F</u>
WL#210-6749	115/220 AC Switch PC	X	X	X
210-7048	Keyboard Encoder	X	X	X
210-7049	Keyboard	X	X	X
210-7051	CPU	X	X	X
210-7052	RAM/ROM (8K or 16K RAM)	X	X	X
210-7052-1	RAM/ROM (24K or 32K RAM)	X	X	X
210-7056	Motherboard	X		X
210-7058	64 x 16 Video/Printer/Plotter Controller	X		
210-7061	OP 61 Output Writer Controller	X	X	X
210-7067-2	Voltage Regulator	X		
210-7153	OP 62 Async Telecommunications Interface (4K RAM)	X	X	
210-7153-1	OP 62B Bisync Telecommunications Interface (8K RAM)	X	X	
210-7154	OP 65 IEEE Interface	X	X	
210-7155	OP 67 8-Bit Parallel I/O	X	X	
210-7159	OP 60A 80 x 24 CRT, Printer, Plotter Controller	X		
210-7180	Mini Diskette Controller	X		
210-7256-1	Wang 9" Display Electronics	X	X	
726-1062	Shugart Mini-Disk Logic (Shugart #25060)	X		
726-1063	Shugart Mini-Disk Motor Control (Shugart #25063)	X		

1.4 SPECIFICATIONS

1.4.1 GENERAL SPECIFICATIONS

Unit Size

Height	18 3/4 in. (47.7 cm)
Depth	20 1/2 in. (52 cm)
Width	19 3/4 in. (50.2 cm)

Weight

62 lbs. (28 kg)

Display Size

9 in. diagonal (22.9 cm)

Display Capacity

16 lines, 64 char/line (Std.)

24 lines, 80 char/line (Optional)

Character Size

Height .125 in. (.32 cm)

Width .125 in. (.32 cm)

Power Requirements

115 or 230 VAC \pm 10%

50 or 60 Hz \pm 1/2 Hz

Wattage

260W (8,840 BTU/Hr.)

External Fuses (One)

3a @ 115V/60 Hz

1.5a @ 230V/50 Hz

Internal Fuses (Two)

Display Chassis; 2/10 amps @ 250V each; see Figure 10

Operating Environment

50°F to 90°F (10°C to 32°C)

20% to 80% relative humidity, allowable

35% to 65% relative humidity, recommended

Memory

8K, 16K, 24K, 32K

Subroutine Stacking

44 (approx.)

1.4.2 MINI DISKETTE DRIVE PERFORMANCE SPECIFICATIONS

Capacity

Unformatted

per disk 109.4K bytes

per track 3125 bytes

Formatted (Reference Section 7.0)

Hard Sectoring:

per disk 8 9.6K bytes

per track 2560 bytes

per sector 256 bytes

sectors per track 10

Transfer Rate	125K bits/sec.
Latency (average)	100 ms
Access Time	
track to track	40 ms
average	533 ms
settling time	10 ms
Head Load Time	75 ms
Disc Motor Start Time	1 sec.

1.4.3 *MINI DISKETTE DRIVE FUNCTIONAL SPECIFICATIONS*

Rotational Speed	300 RPM
Recording Density (inside track)	2581 BPI
Flux Density	5162 FCI
Track Density	48 TPI
Tracks	35
Inside Track Radius	1.542 in. (3.916 cm)
Outside Track Radius	2.250 in. (5.715 cm)
Index	1
Encoding Method	FM
Media Requirements	SA105 (Hard Sectored)

1.4.4 *MINI DISKETTE DRIVE PHYSICAL SPECIFICATIONS*

Environmental Limits:

Ambient Temperature=		
Operating	Shipping	Storage
40°F to 115°F	-40°F to 144°F	-8°F to 117°F
(4°C to 46°C)	(-40°C to 62°C)	(-22°C to 47°C)

Relative Humidity=		
20% to 80%	1% to 95%	1% to 95%

DC Voltage Requirements:

+12 VDC \pm 5%	0.9 amp	1.8 amp
	(typical)	(maximum)
+5 VDC \pm 5%	0.5 amp	0.7 amp
	(typical)	(maximum)

supplied by host unit

Mechanical Dimensions:

Width	5.75 in. (14.60 cm)
Height	3.25 in. (8.25 cm)
Depth	8.00 in. (20.32 cm)
Weight	3 lbs. (1.36 kg)

Power Dissipation=

15 watts (51 BTU/Hr) Operating (typical)
7.5 watts (26 BTU/Hr) Standby (typical)

1.4.5 *MINI DISKETTE DRIVE RELIABILITY SPECIFICATIONS*

*MTBF (Mean Time Between Failures)	8,000 Power on Hours (Typical Usage)
PM (Preventive Maintenance)	Clean Read/Write head
MTTR (Mean Time to Repair)	30 Minutes
Error Rates	
Soft Errors	1 per 10^8 bits read
Hard Errors	1 per 10^{11} bits read
Seek Errors	1 per 10^6 seeks
Component Design	
Life	5 years
Media Life	3.0×10^6 passes per track

*MTBF assumes duty cycle of spindle drive motor to be 25% of Power-On Hours.

1.4.6 MINI FLOPPY EXECUTION TIMES

BASIC operation performed:	Approximate Timing:
PRINT HEX(07): VERIFY F(0, 349):PRINT HEX(07)	28-29 sec.
SAVE DCF (program of 82 sectors)	12-13 sec.
LOAD DCF (program of 82 sectors)	9 sec.
LIST DCF (12 files)	5 sec.
MOVE FR (12 files at sectors 4-174)	48 sec.
COPY FR (0, 349)	70 sec.
DATASAVE BAF () A\$ () of sectors 0-349	28 sec.
DATALOAD BAF () A\$ () of sectors 0-349	29 sec.
FOR I = 1 TO 5: DATASAVE DC C\$,A\$(),B\$(),E\$,G\$() NEXT I (occupies 7 sectors per each save)	3-4 sec.
Same as example above except DATALOAD replaced DATASAVE	3 sec.
FOR I = 1 TO 5: DATASAVE DC C\$,A\$(),B\$(),E\$,G\$(),X\$() NEXT I	8 sec.
Same as example above except DATALOAD replaced DATASAVE	7 sec.
FOR I = 1 TO 20: DATASAVE DC C\$,A\$(),B\$(),E\$,G\$(),X\$() NEXT I	27 sec.
Same as example above except DATALOAD replaced DATASAVE	26 sec.

NOTE: Dimensions of variables used are as follows:

C\$1, A\$(4)64, B\$(4)64, E\$16, G\$(5,5)32, X\$(64)32

1.5 PCS IIA ADDENDUM

1.5.1 GENERAL

The PCS IIA, marketed as a 2200 Portable Computing System, is a self-contained unit with CPU, BASIC Keyword Keyboard, 9 inch Wang Video Display, and Mini Diskette Drive(s). This unit is intended to be a stand-alone, single-user computer with provisions made for one output writer and disk workstation capability.

The PCS IIA can be attached to an existing 2200 CPU by connecting the multiplexer slave portion of the PCS IIA to the MXA (master mux) installed in the 2200 CPU. This will allow the PCS IIA to have access to the disk that is part of the 2200 system. Up to three PCS IIA's can be connected to the MXA. Configuration guidelines are provided in section 2.5.2.

The options available for the PCS IIA are the same as those offered for the PCS II. A few new products have been added to the list of available printers and plotters. Following is an updated list:

PRINTERS	PLOTTERS
*2201	*2202
2201L	*2212
2221W	*2232
2231W-1, -2, -6	2272
2251	2281P
2261W	2282
2263-1, -2	
2271	
2281	

*Opt. 61 Required

1.5.2 MODEL INFORMATION

Part numbers (60 Hz):

(64 X 16 CRT)

<u>Memory</u>	<u>Single Mini Diskette</u>	<u>Dual Mini Diskette</u>
8K	177-2AE2-1A	177-2AE2-2A
16K	177-2AE4-1A	177-2AE4-2A
24K	177-2AE6-1A	177-2AE6-2A
32K	177-2AE8-1A	177-2AE8-2A

(80 X 24 CRT)

<u>Memory</u>	<u>Single Mini Diskette</u>	<u>Dual Mini Diskette</u>
8K	177-2AE2-1B	177-2AE2-2B
16K	177-2AE4-1B	177-2AE4-2B
24K	177-2AE6-1B	177-2AE6-2B
32K	177-2AE8-1B	177-2AE8-2B

1.5.3 CHASSIS LAYOUT

The chassis layout for the PCS IIA is identical to that of the PCS II with two exceptions: 1) The I/O board is a 7054 or 7059 (Video, Printer, Disk Controller), 2) The printer #2 connector is now the MXB (Mux Slave) connector.

1.5.4 CIRCUIT BOARD SUMMARY

210-7054	64 X 16 Video/Printer/Disk Controller
210-7059	60 X 24 Video/Printer/Disk Controller

The remaining boards are the same as for the PCS II except the 210-7058 and 210-7159 are not used.

SECTION 2 INSTALLATION

2.1 AC POWER REQUIREMENTS

For most Wang Systems, a 20 ampere/115 VAC or 10 ampere/220 VAC power line is adequate. Further system requirements dictate that this line amplitude must be regulated to within $\pm 10\%$, must be noise free, and line frequency should not vary more than $\pm 1/2$ cycle. Wherever feasible, the system should have its own AC power line.

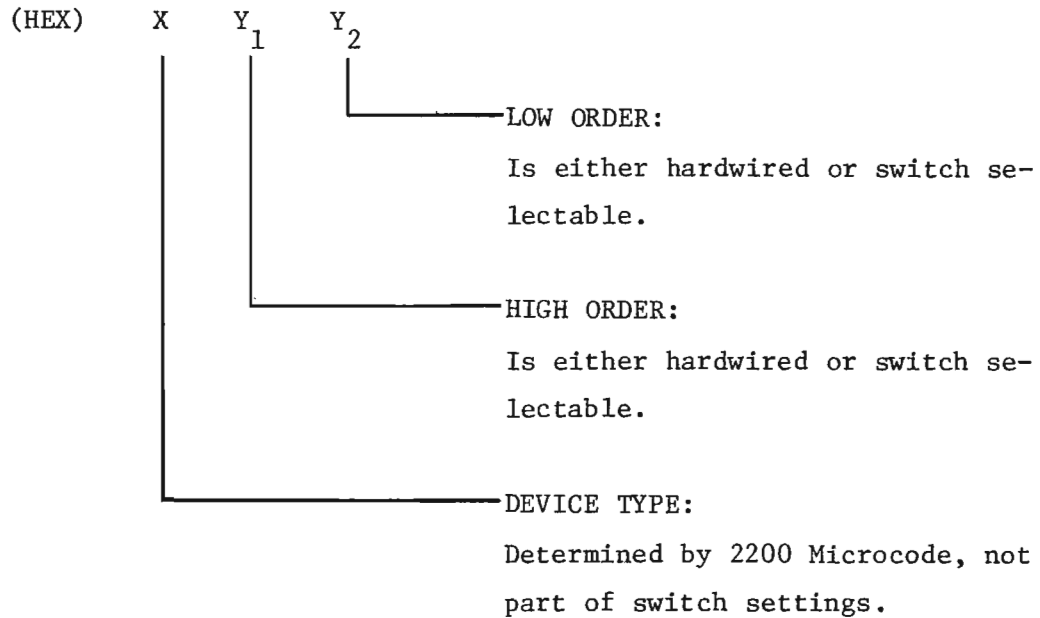
If the line is not sufficiently regulated to the limits indicated above, a constant voltage transformer should be installed. If the line is noisy, however, a detailed analysis of the problem must be performed to insure a correct solution.

Since computers and peripheral equipments are extremely susceptible to Electromagnetic Interference (EMI), the source of the EMI must be determined before a solution is proposed. EMI can enter the System by conduction along wiring and cabling or by direct radiation. If sources of EMI, which include office machines, air conditioning units, electric motors, machinery and arc welders, are in close proximity to the System, EMI will enter by direct radiation. The noise generating device should be relocated, repaired or filtered to prevent it from interfering with the System. If the source of the noise cannot be found, an EMI filter with a cut-off frequency near 10 kHz should be installed on the System's AC power line. In all cases, be sure that the AC power line has been properly installed in steel conduit and that the conduit is properly connected to junction boxes. Also, insure that other devices including fluorescent lighting, are not connected to the AC power line. In extreme cases, such as where arc welders are used in the vicinity, it may also be necessary to shield the peripheral cables.

The ground pin of the AC line cord is connected to the chassis of the 2200, as recommended by the National Electrical Manufacturer's Association, and protects operating personnel from electrical shock. Always connect the 2200 to a grounded outlet to insure safety from electrical shock.

2.2 DEVICE ADDRESS ASSIGNMENTS

Device Address Settings in 2200 PCS-2 (Excluding 7061 PC):



Note that only addresses HEX 001 and 005 are available for primary console devices; these two addresses are hardwired. The disk controller 7180 is also hardwired (to HEX 10), no switch settings necessary.

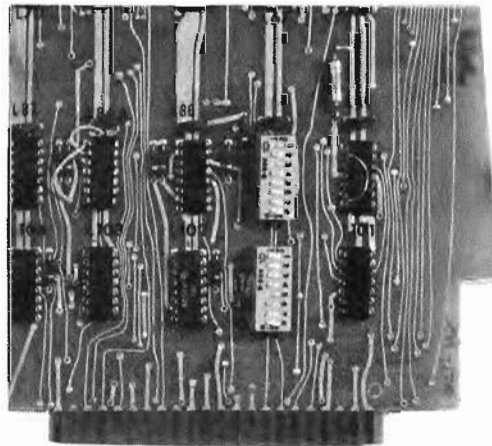


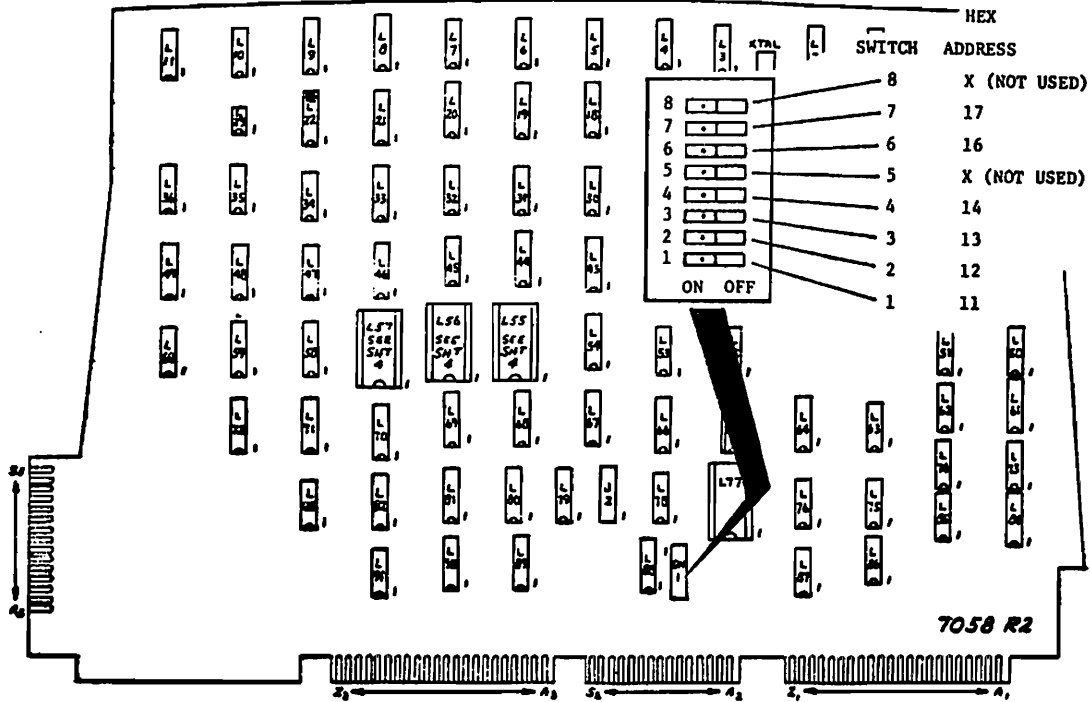
FIGURE 2-1

<u>I/O BOARD</u>	<u>OPTION</u>	<u>CONTROLLER DESCRIPTION</u>	<u>DEVICE HEX ADDRESSES</u>	<u>COMMENTS</u>
7058	STANDARD	KEYBOARD 64 x 16 DISPLAY PRINTER #1 PRINTER #2/PLOTTER	*X01 X05 X15 X11 thru X17 (Excluding X15)	KEYBOARD ENABLE HARDWIRED INTO CONTROLLER DISPLAY ADDRESS HARDWIRED INTO CONTROLLER PRINTER #1 ADDRESS HARDWIRED INTO CONTROLLER PRINTER #2/PLOTTER ADDRESS SELECTABLE
7061	OP-61	OUTPUT WRITER	X11 (Standard) X00 thru XFF (Available)	SELECTABLE ADDRESSES
7153	OP-62	ASYNC TC	X1C (Standard) X00 thru XFF (Available)	SELECTABLE ADDRESSES
7153-1	OP-62B	BI-SYNC TC	X1C (Standard) X00 thru XFF (Available)	SELECTABLE ADDRESSES
7154	OP-65	IEEE 488 I/O	X4C thru X4F (Standard) X00 thru XFF (Available)	SELECTABLE ADDRESSES
7155	OP-67	8-BIT PARALLEL I/O	X3A & X3B (Standard) X00 thru XFF (Available)	SET ONLY EVEN ADDRESS; ODD ADDRESS IS HARDWIRED ON THE CONTROLLER
7159	OP-60A	KEYBOARD 80 x 24 DISPLAY PRINTER #1 PRINTER #2/PLOTTER	X01 X05 X15 X11 thru X17 (Excluding X15)	KEYBOARD ENABLE HARDWIRED INTO CONTROLLER DISPLAY ADDRESS HARDWIRED INTO CONTROLLER PRINTER #1 ADDRESS HARDWIRED INTO CONTROLLER PLOTTER/PRINTER #2 ADDRESS SELECTABLE
7180	STANDARD	MINIDISKETTE I/O	X10	HARDWIRED INTO CONTROLLER

*X = Device Type Digit

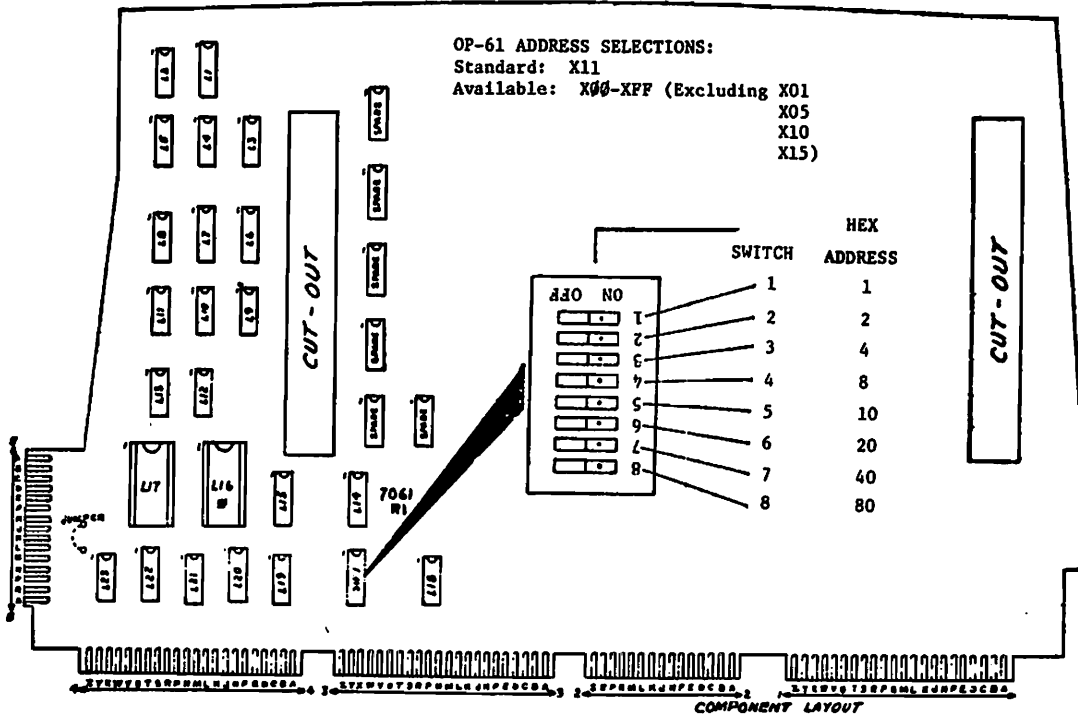
The following figures specify device address settings for all PCS-II controllers (including optional controllers 7153, 7154, and 7155).

PRINTER #2/PLOTTER ADDRESS SELECTIONS: X11, 12, 13, 14, 16, 17
 (PRINTER #1, DISPLAY & KEYBOARD ADDRESSES HARDWIRED)



7058 I/O BOARD
 (KEYBOARD, PRINTER 1, PRINTER 2/PLOTTER, DISPLAY)

FIGURE 2-2



7061 OPTION 61 BOARD
 (OUTPUT WRITER)

FIGURE 2-3

OP-62, 62B ADDRESS SELECTIONS:
 Standard: X1C
 Available: X00-XFF (Excluding X01, X05, X10, X15)

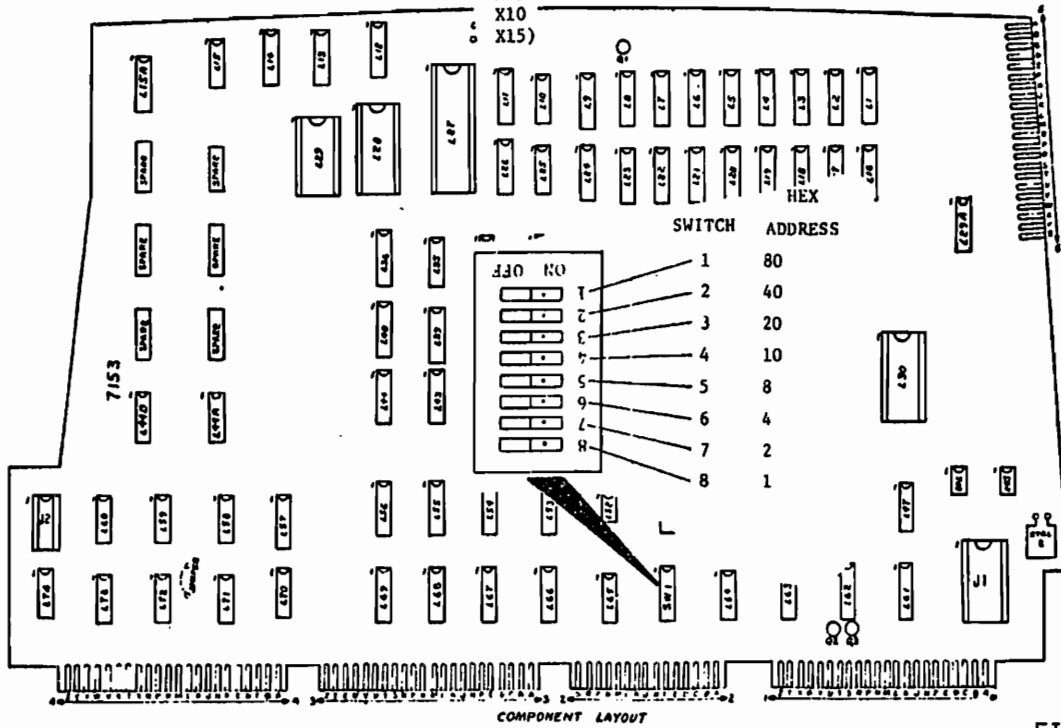


FIGURE 2-4

7153/53-1 OPTION 62, 62B BOARD
 (TELECOMMUNICATIONS)

OP-65 DEVICE ADDRESS SELECTIONS:
 Standard: X4C-X4F
 Available: X00-XFF (Excluding X01, X05, X10, X15)

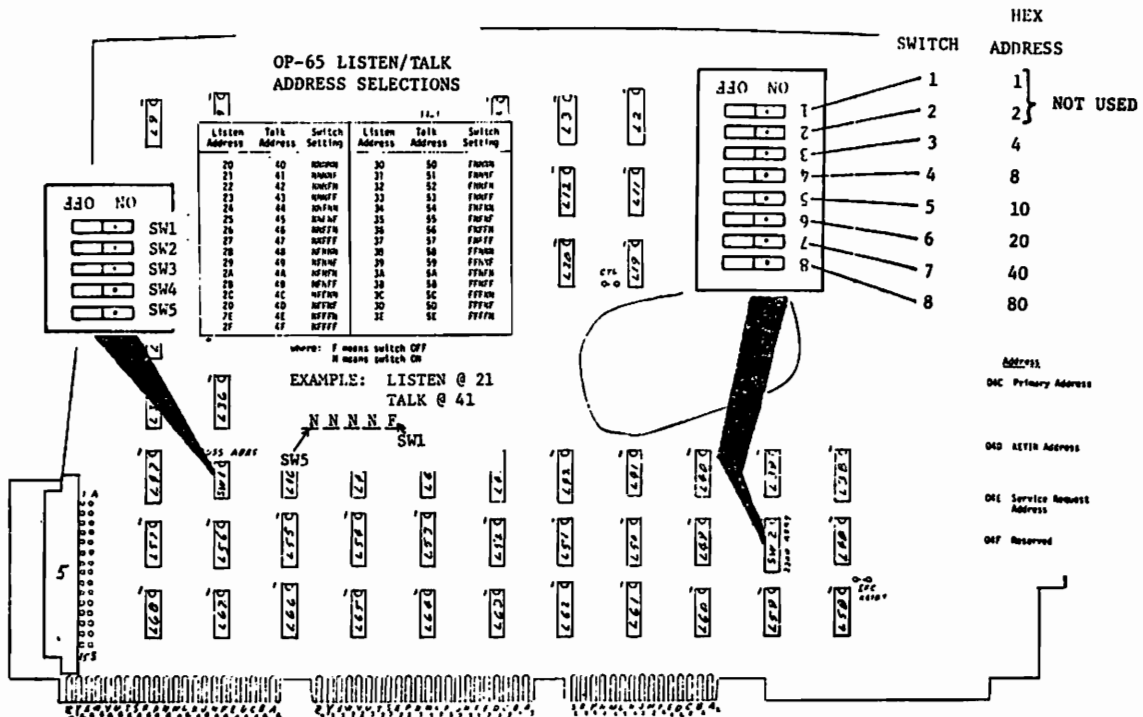


FIGURE 2-5

7154 OPTION 65 BOARD
 (IEEE 488 STANDARD INTERFACE)

OP-67 ADDRESS SWITCH SELECTIONS: Standard: X3A
 Available: X00-XFF (Excluding
 X01, X05
 X10, X15)

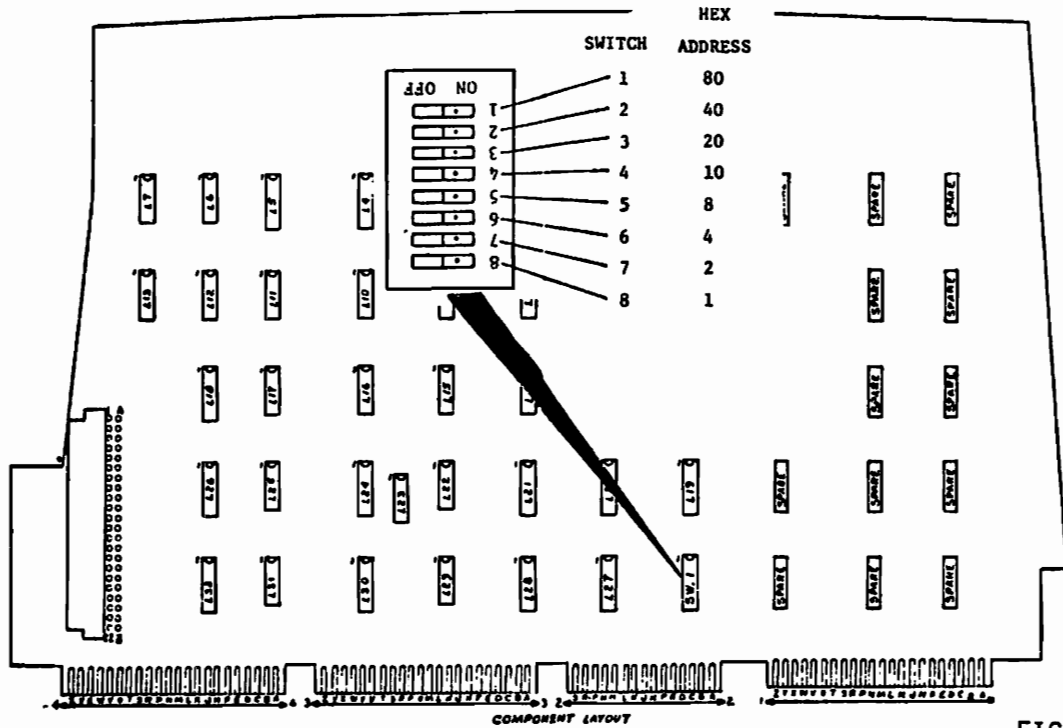


FIGURE 2-6

7155 OPTION 67 BOARD
 (8-BIT PARALLEL I/O)

PRINTER #2/PLOTTER ADDRESS SELECTIONS: X11, 12, 13, 14, 16, 17
 (PRINTER #1, DISPLAY & KEYBOARD ADDRESSES HARDWIRED)

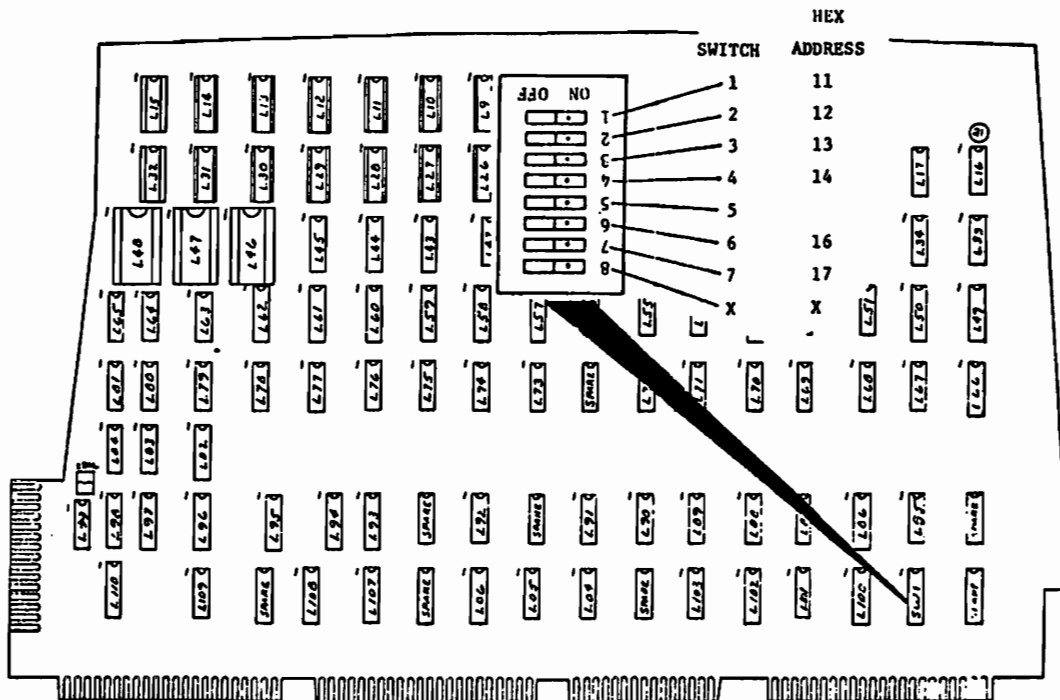


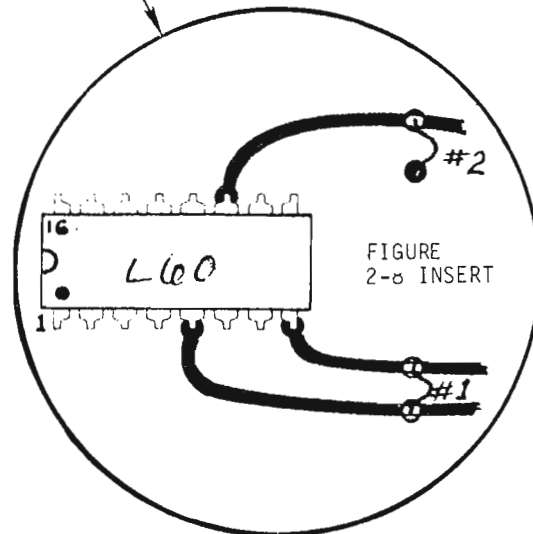
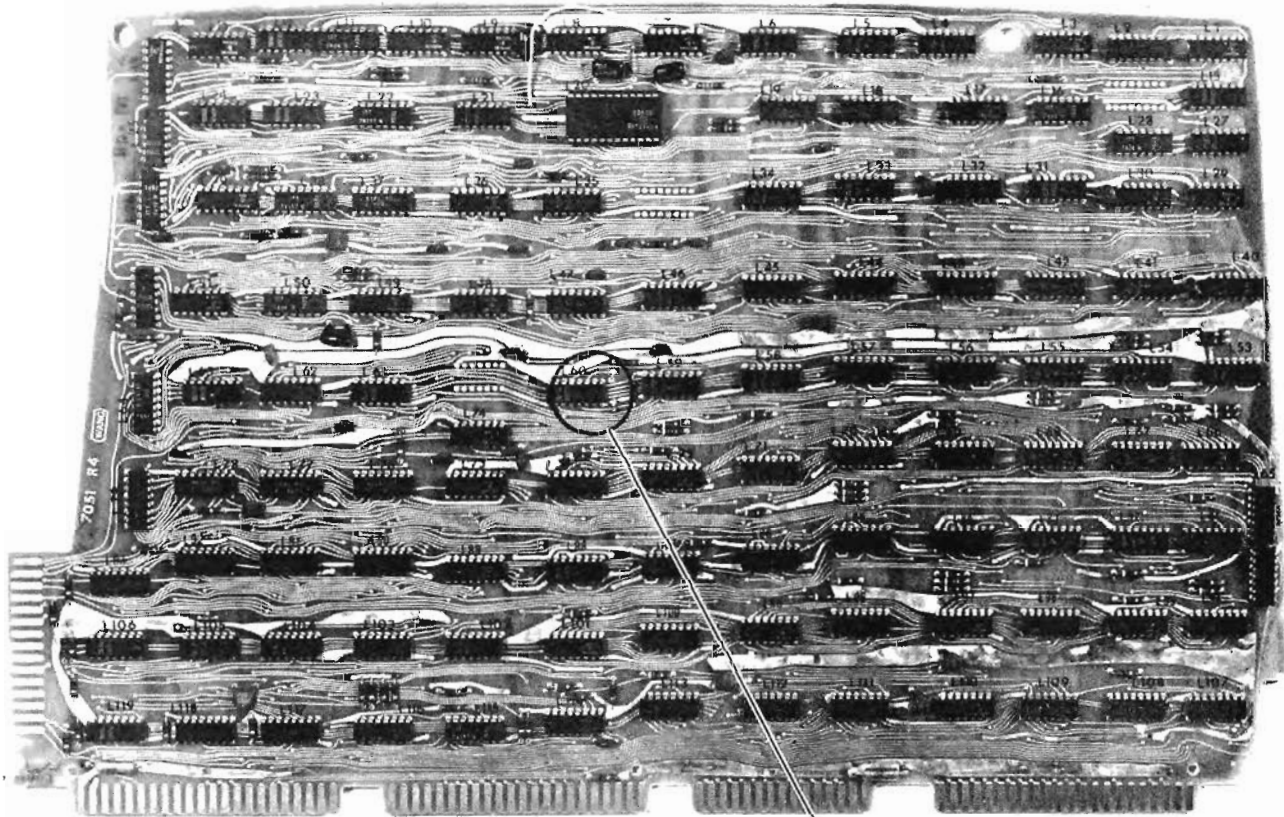
FIGURE 2-7

7159 OPTION 60A BOARD
 (KEYBOARD, PRINTER 1, PRINTER 2/PLOTTER, DISPLAY)

2.3 RAM SIZE SELECTION

RAM size selection in the PCS-II is very similar to that used in previous 2200 CPU's, and is identical to 2200 E/F; jumper wires are installed on the 7051 CPU board (see Figure 2-8 below) for the four RAM size variations available. No other variations are possible.

FIGURE 2-8
7051 RAM SIZE SELECTION



7052/52-1
MEMORY SIZE

7051
JUMPER(S) INSTALLED

8K

Neither

16K

'1' only

24K

'2' only

32K

Both

2.4 INCOMING INSPECTION & INSTALLATION

Refer to Section 2.1 for description of appropriate environment, temperature, etc. Until further notice, PCS-II's are being shipped with logic boards removed from the chassis/motherboard.

When a PCS-II shipment arrives, partially disassemble the Display/Disk/Keyboard as described in steps a) and b), paragraph 7.2.2.

These separate logic boards, transported in the same shipping container, must now be carefully inserted into the PCS-II motherboard.

1. If there is an option with the system, refer to Section 6 and follow the appropriate option installation procedure first.

Insert circuit boards according to the following procedure (Ref: Figures 1-3 and 1-5):

2. 7180 - Disk Controller

Place the 7180 into its motherboard connector with the 7180 component side facing rear, and with the plastic stand offs (in upper corners of each PC) also facing rear. Press firmly downward on alternate ends of the board until it is firmly seated. Upon assembly of the cover, the two 34-pin ribbon cables will be routed up to the male connector(s) located on the mini diskette drive circuit board.

3. 7052/7052-1 PC RAM/ROM

With component side facing rear, and with plastic board standoffs facing front, insert 7052/7052-1 into the correct motherboard slot. Press firmly downward on alternate ends of the board until it becomes firmly seated in its motherboard connector.

4. 7051 PC CPU

Same procedure as for 7052 PC. Check that the jumpers for memory are selected as explained in Section 2.3.

5. 7058/7159 PC Display/Printer/Plotter

Check that the switch addressing is selected properly as explained in Section 2.2.1, then insert the board in the same manner as the 7052 PC. The 7058/7159 video connector mates to the Wang display chassis video signal input via red/white twisted pair and a nylon polarized connector.

6. Plastic Standoffs

Insert one 6-32 x 3" screw through each of the plastic standoffs on one side of the PC boards. Repeat same for opposite side of PC boards. Secure each of the two 6-32 standoff screws with a 6-32 hex nut (one hex nut for each standoff screw). Do not over-tighten 6-32 nuts in order to prevent breakage of plastic standoffs for each PC board.

7. REASSEMBLY: (After all PCBs have been inserted and secured)

A. Replace cover, remembering to:

- 1) Check power supply voltages; adjust if necessary.
- 2) Be careful of disk drives, and ensure that the disk power cable and the ribbon cables are routed towards the mini disk drives.
- 3) Attach fan cable.
- 4) If OP 65 and 67 were installed, be careful connecting and routing cables (see Figure 6-1).
- 5) Connect power cable to disk drives.

B. Replace the cover face plate. Place top in first, then bring bottom over S.F. keys. Put on brightness and contrast knobs. It may be necessary to pry face plate up slightly for installation of knobs.

C. When replacing the keyboard cover, install nylon spacers with brass eyelet grounding rivets. Put the base of the cover in first then fit the cover over the keys.

D. Put the screws in the sides of the cover (one each side). Put screws in keyboard cover (one each side).

- E. Attach Special Function strip.
 - F. Connect cables to disk drive. Connect ribbon cables from the 7180 pc to J1 (pins 2-34 up) of each mini disk PCB #25060. Connect mini disk power cable (nylon connectors) to J2 underneath each mini PCB #25062 (see Figure 1-9).
 - G. Put disk cover on. Tighten the screw in the rear of the mini diskette cover.
8. Do not connect any peripherals to the rear panel connector at this time.
 9. Plug the AC power cord into an AC outlet.

CAUTION:

Do not apply power without the fan connected and the cover in place. The airflow provided by the cover is essential for proper operation of the PCS-II. See Figure 2-9 below.



FIGURE 2-9

Air Flow Through Unit

10. Turn power on with the power switch on the keyboard. After a short period of time, READY should appear on video display; if not, perform routine troubleshooting procedures.
11. For initial installation checkout, execute all appropriate diagnostic tests for display, disk, CPU, Memory, and Keyboard described in Section 5.
12. When all diagnostics for the PCS II run properly, connect peripherals to the appropriate rear apron connector(s). See Figures 1-3 and 2-10.
13. Execute all appropriate peripheral diagnostics. In case of trouble, refer to Sections 7 and 5.

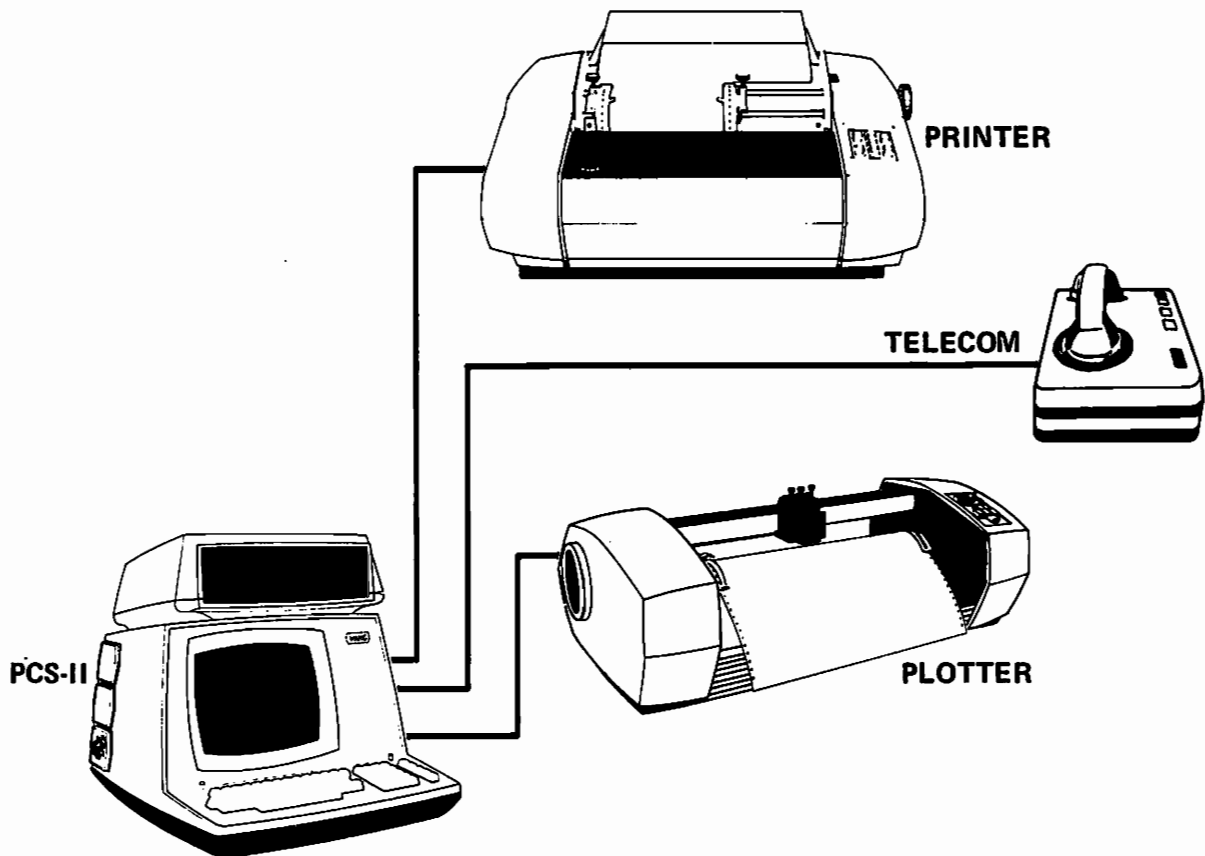


FIGURE 2-10 INSTALLATION CONFIGURATION

2.5 PCS IIA ADDENDUM

2.5.1 DEVICE ADDRESS ASSIGNMENTS

On the 7054/7059, only "one" rocker in an eight-rocker address switch bank is set on for the desired device address. Each rocker, when set ON, represents a unique HEX address. Rocker switch 8 is not used on the 7054/7059.

There are two address switches on the 7054/7059 I/O controller. SW1 is used to set the printer address and SW2 to set the disk address. The KBD and CRT are hardwired to X01 and X05 respectively. To set the printer address:

SWITCH 1	HEX ADDRESS (X, Y ₁ , Y ₂)		NOTE: Y ₁ = Hardwired Y ₂ = Switch Selectable
	Y ₁	Y ₂	
1	1	1	
2	1	2	
3	1	3	
4	1	4	
5	1	5	
6	1	6	
7	1	7	
8		X	

To select the disk address for the PCS IIA:

SWITCH 2	HEX ADDRESS (X, Y ₁ , Y ₂)		NOTE: Y ₁ = Switch Selectable Y ₂ = Hardwired
	Y ₁	Y ₂	
8		X	
7	4	0	
6	7	0	
5	3	0	
4	6	0	
3	2	0	
2	2	0	
1	1	0	

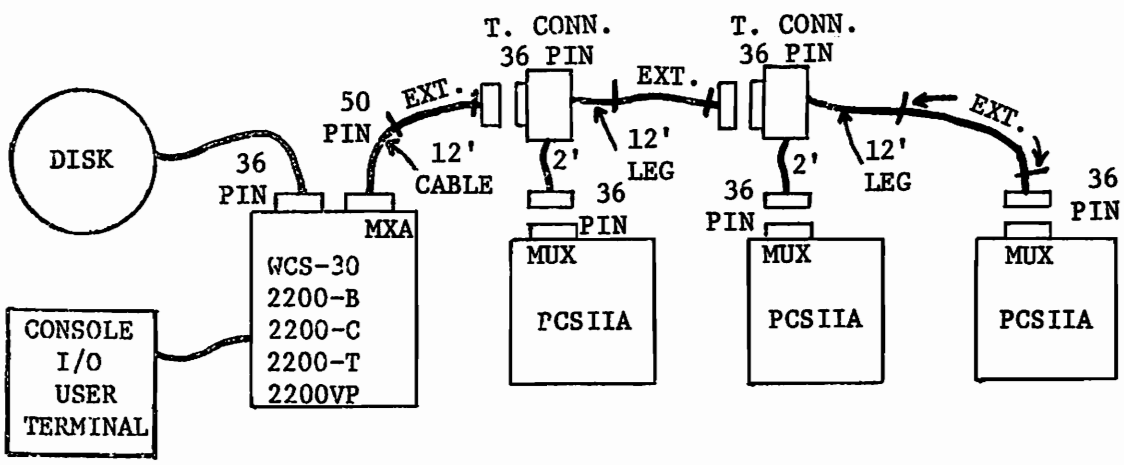
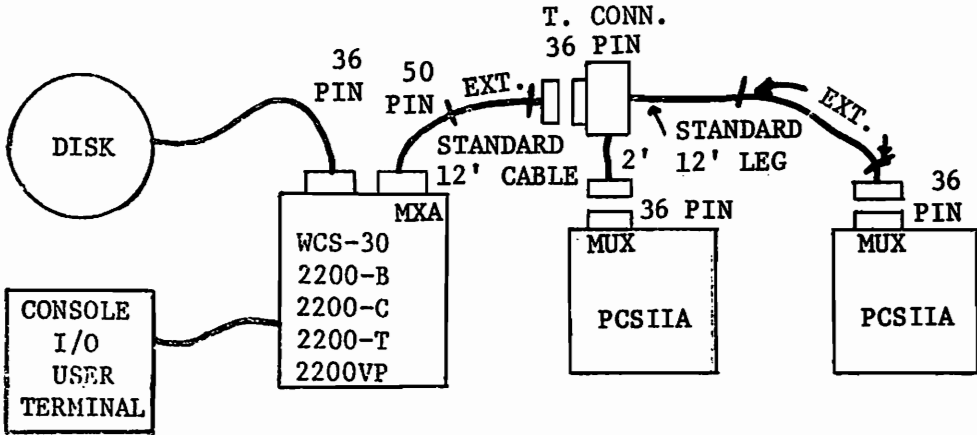
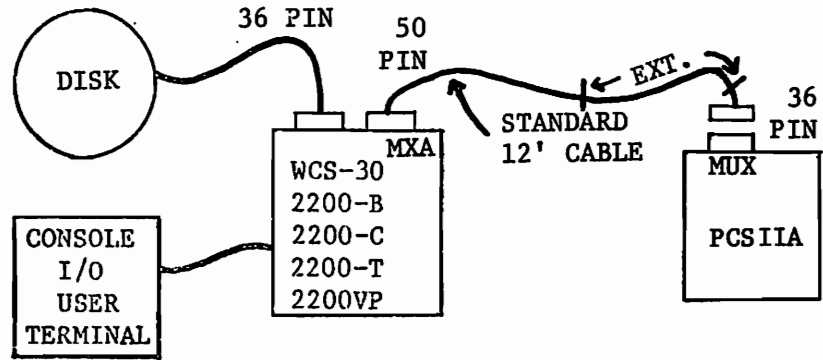
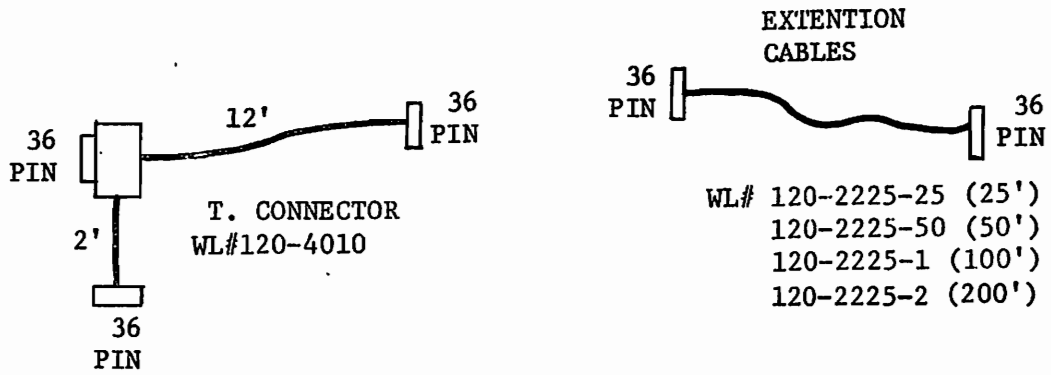
All other I/O addresses are set as in the PCS II.

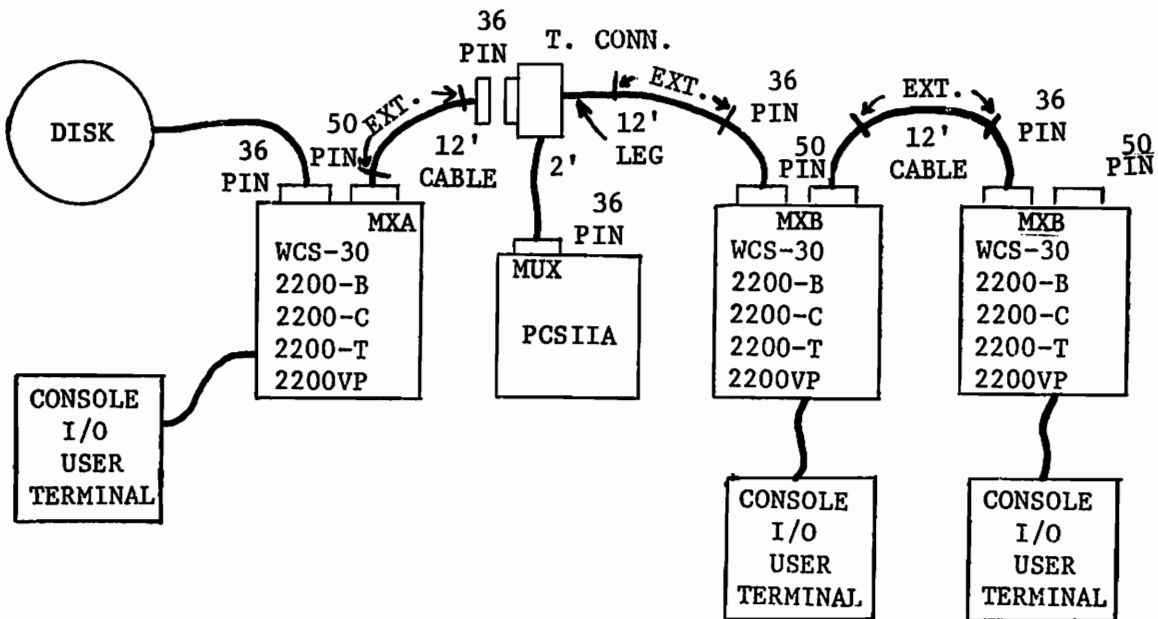
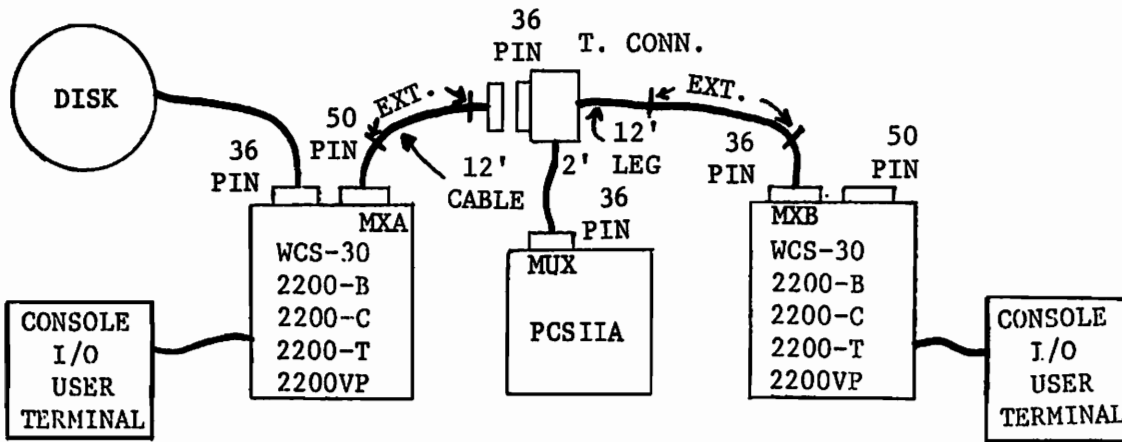
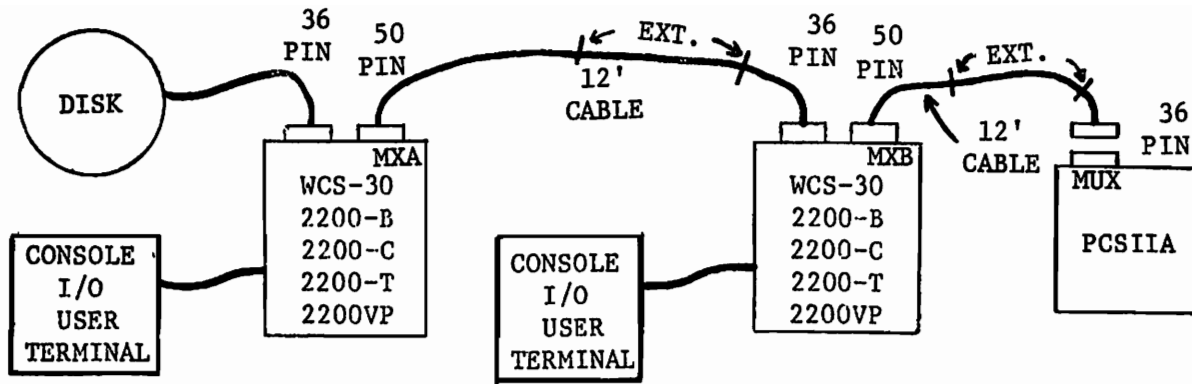
2.5.2 DISK WORKSTATION INSTALLATION

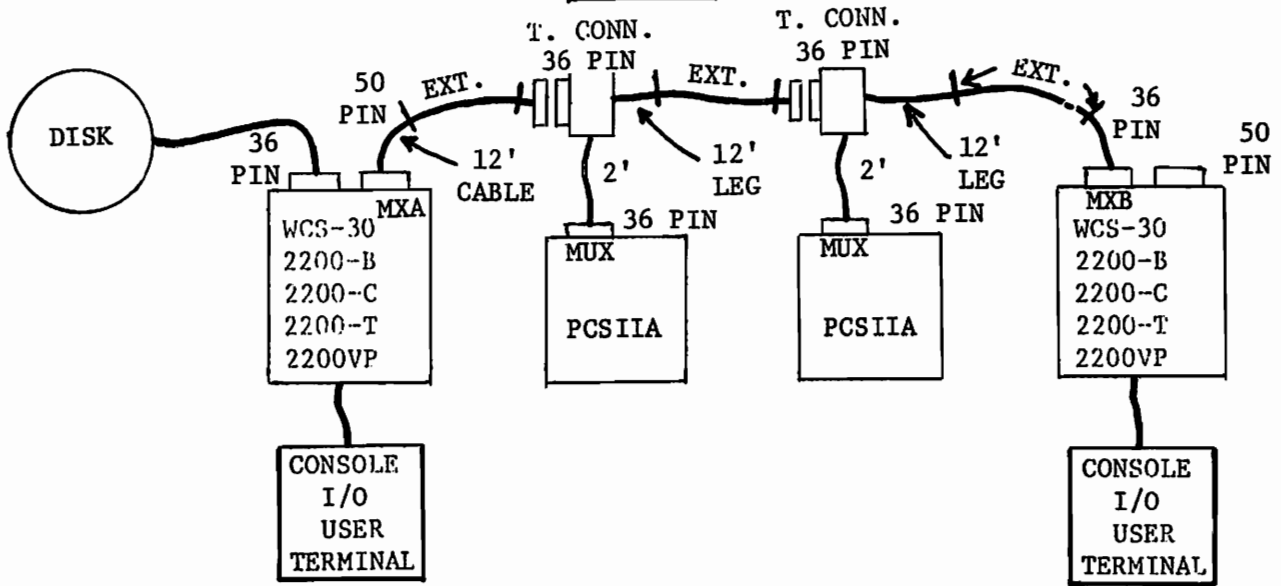
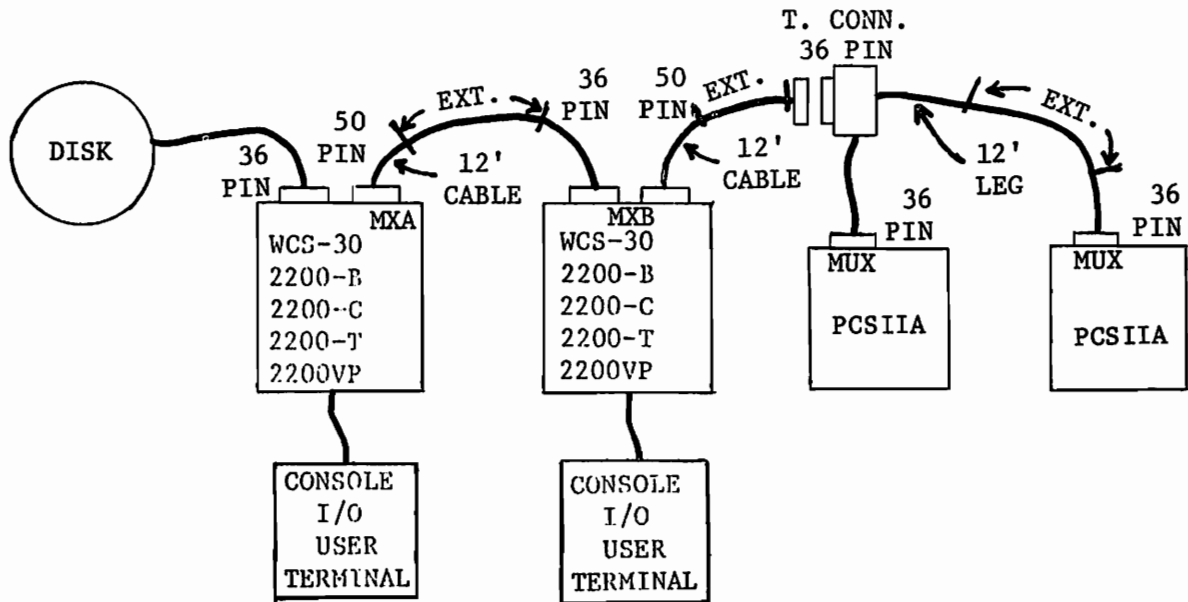
The following diagrams show some configuration guidelines to follow when installing a PCS IIA as a disk workstation. It should be noted that the last diagram is that of an ILLEGAL CONFIGURATION. The reason for this is that each PCS IIA is actually a self contained CPU and no more than four CPU's are allowed in a single system. The last diagram shows 5 CPU's (two 2200's and three PCS IIAs), therefore, the set up is illegal.

NOTE:

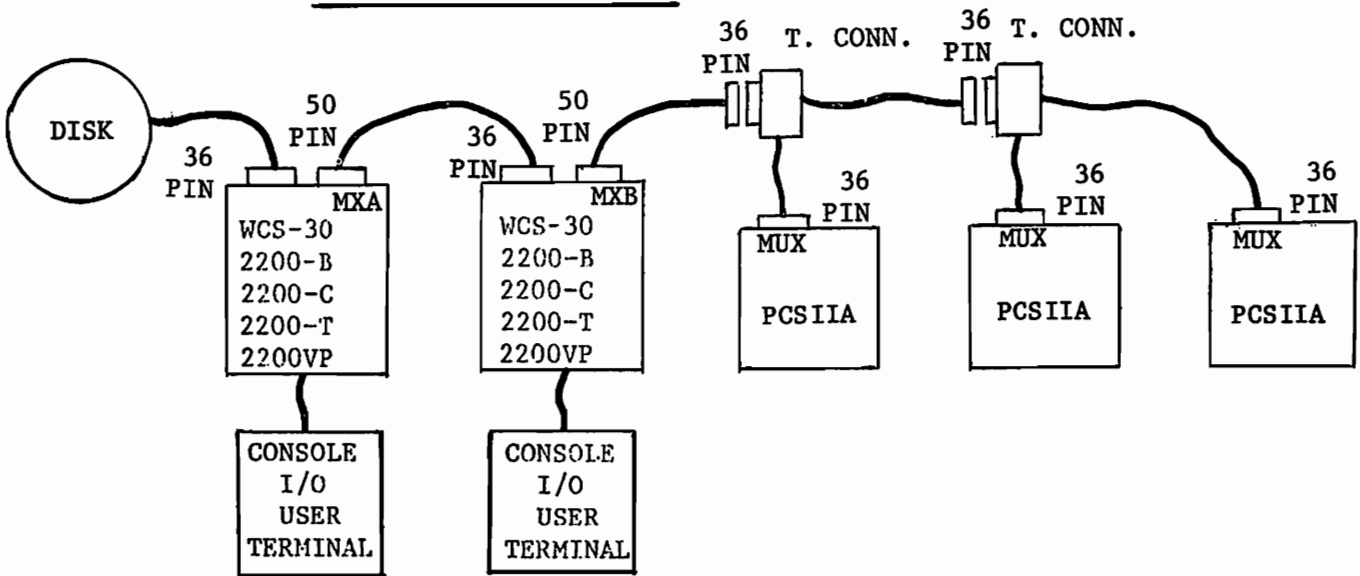
1. Do not exchange connections shown for the 12' and 2' cable legs from a "T" connector; the 12' cables must always be in the location illustrated in the configurations.
2. Extension cables are available in lengths of 25 (WL #120-2225-25), 50 (WL #120-2225-50), 100 (WL #120-2225-1) and 200 (WL #120-2225-2) feet. The extension cable is coupled with a standard 12 foot connector cable to permit an increased distance between successive systems in the chain. Extension cables may be coupled together; the maximum distance between a pair of systems in the multiplexer chain is 512 feet. The maximum distance between CPU #1 and CPU #4 in a four - station configuration is 536 feet. The disk I/O cable connecting the disk to CPU #1 (the CPU containing the 2230 MXA master board) cannot be extended; the maximum distance between CPU #1 and the disk is 12 feet.

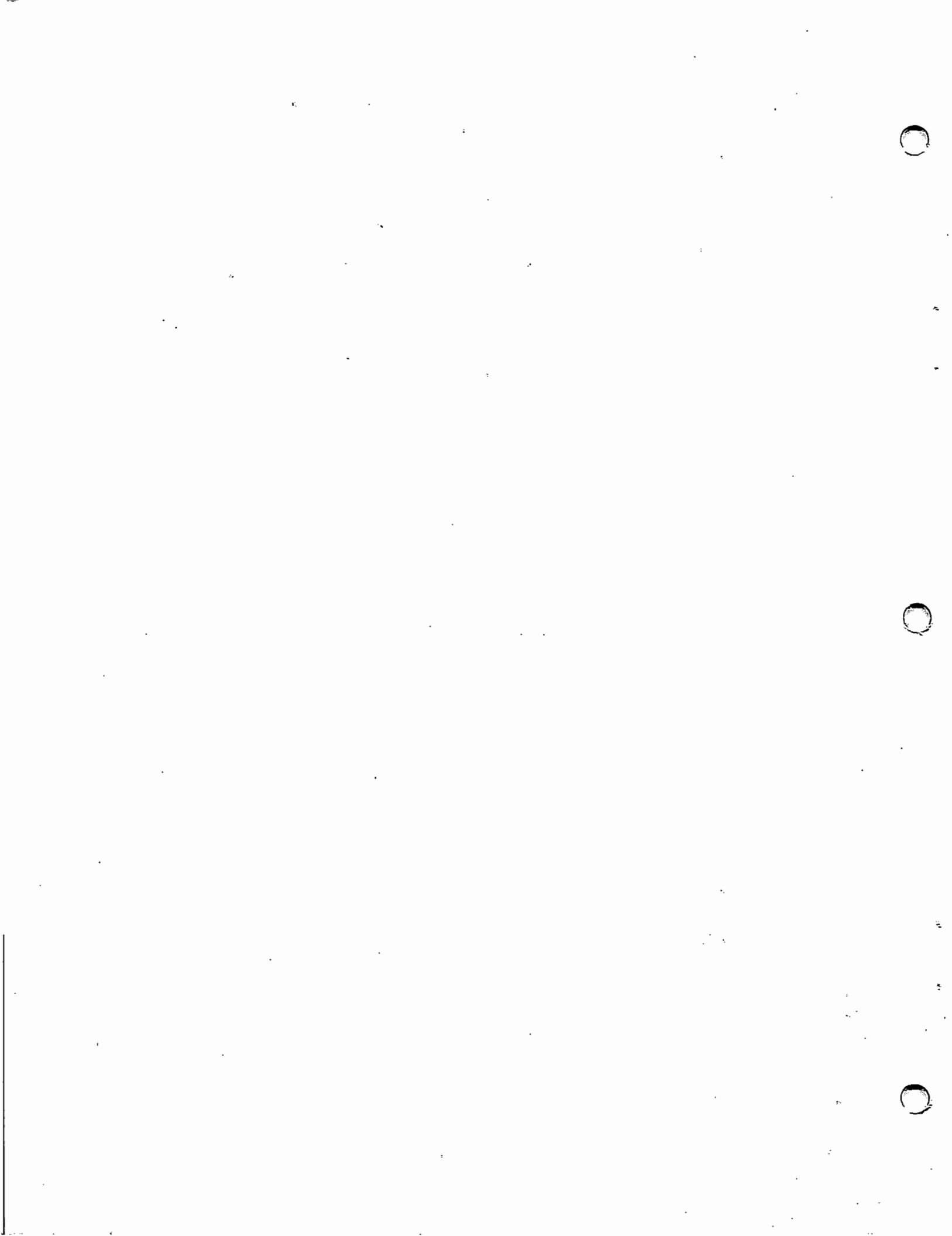






ILLEGAL CONFIGURATION





SECTION 3

OPERATION

3.1 GENERAL

Refer to the latest editions of the following publications for standard and optional software operations of the PCS-II:

<u>PUBLICATION:</u>	<u>WL #:</u>
2200 BASIC Programming Manual	700-3231
2200 BASIC Language Reference Manual	700-3038
2200 BASIC Language Reference Manual Addendum	700-2022
2200 BASIC Language Pocket Guide	700-3030
2200 System Summary Guide	700-3500
PCS-II Introduction	700-4255
2200 Disk Memory Reference Manual	700-3159
2200 Matrix Statements Manual	700-3332
2200 General I/O Instruction Set	700-3514 and 700-3782
2200 Sort Statements Manual	700-3559

See other pertinent reference manuals for peripheral unit operations.

For Device Address assignments, see paragraph 2.2.

3.2 MINI-DISKETTE DRIVE OPERATION

The following is a guide for the handling procedures on the mini-diskette and SA400 minifloppy drive.

3.2.1 MINIDISKETTE LOADING

Figure 3-1 shows the proper method of loading a minidiskette in the SA400. To load the diskette, open the door on the front panel, insert

the diskette with label towards the door handle and close handle. A mechanical interlock prevents door closure without proper media insertion.

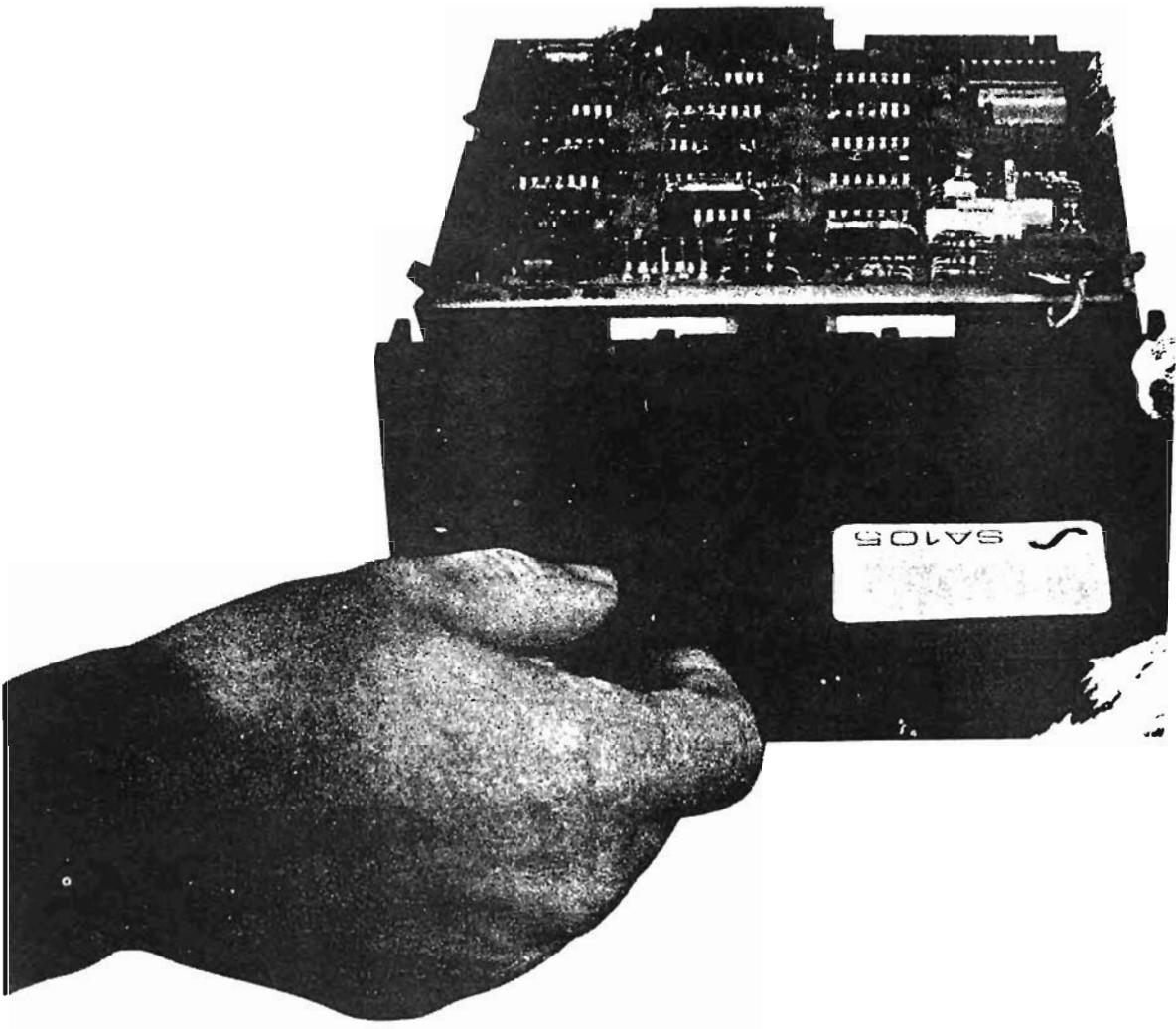


FIGURE 3-1
DISKETTE LOADING

3.2.2 *MINIDISKETTE HANDLING*

To protect the diskette, the same care and handling procedures specified for computer magnetic tape apply. These precautionary procedures are as follows:

1. Return the diskette to its storage envelope whenever it is removed from file.

2. Keep cartridges away from magnetic fields and from ferromagnetic materials which might become magnetized. Magnetic fields can distort recorded data on the disk.
3. Replace storage envelopes when they become worn, cracked or distorted. Envelopes are designed to protect the disk.
4. Do not write on the plastic jacket with a lead pencil or ball-point pen. Use a felt tip pen.
5. Heat and contamination from a carelessly dropped ash can damage the disk.
6. Do not expose diskette to heat or sunlight.
7. Do not touch or attempt to clean the disk surface. Abrasions may cause loss of stored data.

3.2.3 WRITE PROTECT FEATURE

The SA104 minidiskettes have the capability of being write protected. A write protect notch is located on the diskette jacket. When the notch is open, writing is inhibited. When the notch is covered with a tab, writing is allowed. Figure 3-2 illustrates the SA104 minidiskette write protected and unprotected.

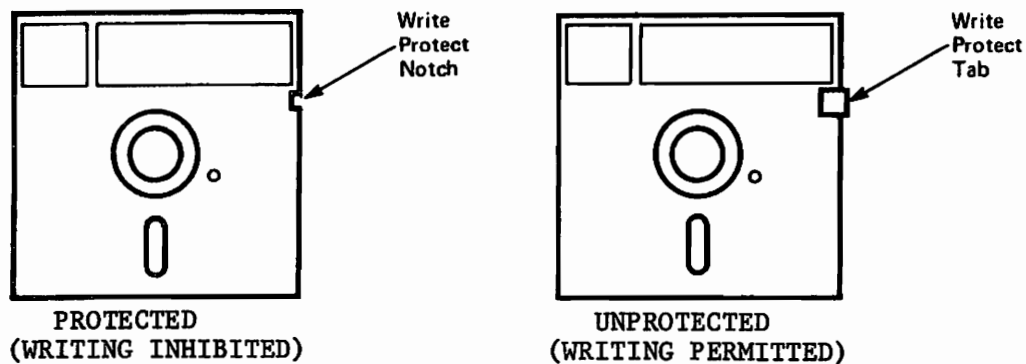


FIGURE 3-2 WRITE PROTECT

3.3 SYSTEM INITIALIZATION

If a 7058 64 x 16 controller is also installed in the PCS-II, the system will initialize to 64 characters. When a 7159 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.

SECTION 4
THEORY OF HARDWARE OPERATION

4.1 INTRODUCTION

The PCS-II uses basically the same internal logic configurations as the other 2200 CPU's. Previously (2200 A,B,C,S,T) there were 6 (or more) CPU cards and four (or more) I/O controllers. The PCS-II has repacked the hardware onto 4 large circuit boards. Boards 7051 and 7052/7052-1 contain the CPU and memory respectively, while the 7058 PCB contains I/O control for the CRT, Keyboard, and Output Writers. The fourth major circuit board which comes in the standard PCS-II package is the 7180 board, which is the mini diskette drive controller. Another slot is available for one of several options.

4.2 CPU & MEMORY

Although the component layout and numbers have been changed, the register structure, ROM, memory addressing and I/O are the same as described in Section 4 of the 2200 Maintenance Manual. Block diagrams of the CPU and memory boards follow.

4.3 I/O CONTROLLERS

The Wang Monitor, Printer and Plotter controllers for the PCS-II, contained on the 7058 PC, perform the same functions as the earlier 2200 system 6312A/6313 and 6350A/6313 video display controllers. The 7159 performs the same function as the 7058, with one exception: The 7058 is for a 64 x 16 display, while the 7159 is for the 80 x 24 (OP 60A).

4.4 POWER SUPPLY

The PCS-II uses the 7067-2 PCB for a voltage regulator. This board is the same voltage regulator (7067) used in the 2200F with 3 changes:

1. Diodes D1 & D3 have been removed from the board and replaced by larger diodes now mounted on the large heat sink.

2. The etch (or jumper) between pins 6 & F is removed on the 7067-2 to provide a drive voltage for the +12V regulator transistor mounted on the large heat sink (Heat Sink Assembly WL #270-0380).
3. The etch (or jumper) between pins 7 & H is removed to provide a drive voltage for the -12V regulator transistor mounted on the same heat sink.
4. Transistor Q3 on the 7067 heat sink is changed from 2N6387 to 2N6103.

See paragraph 7.3 for a more detailed description of 7067-2.

- BLOCK DIAGRAMS -

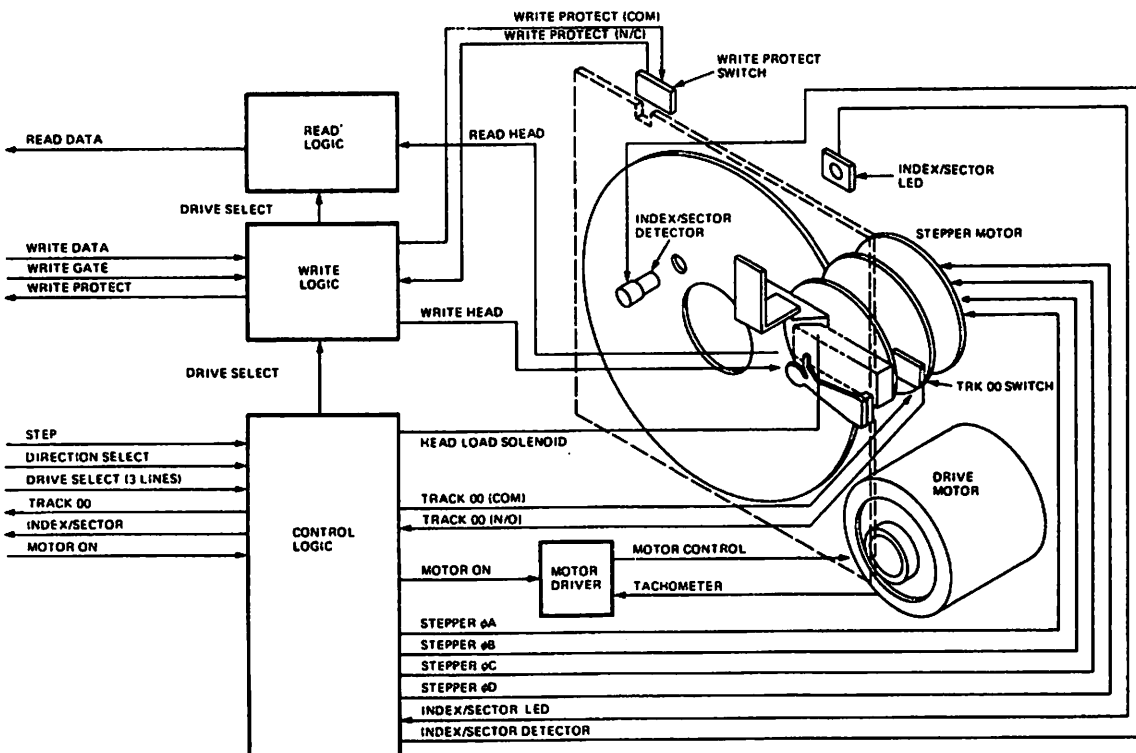


FIGURE 4-1
SA400 FUNCTIONAL DIAGRAM

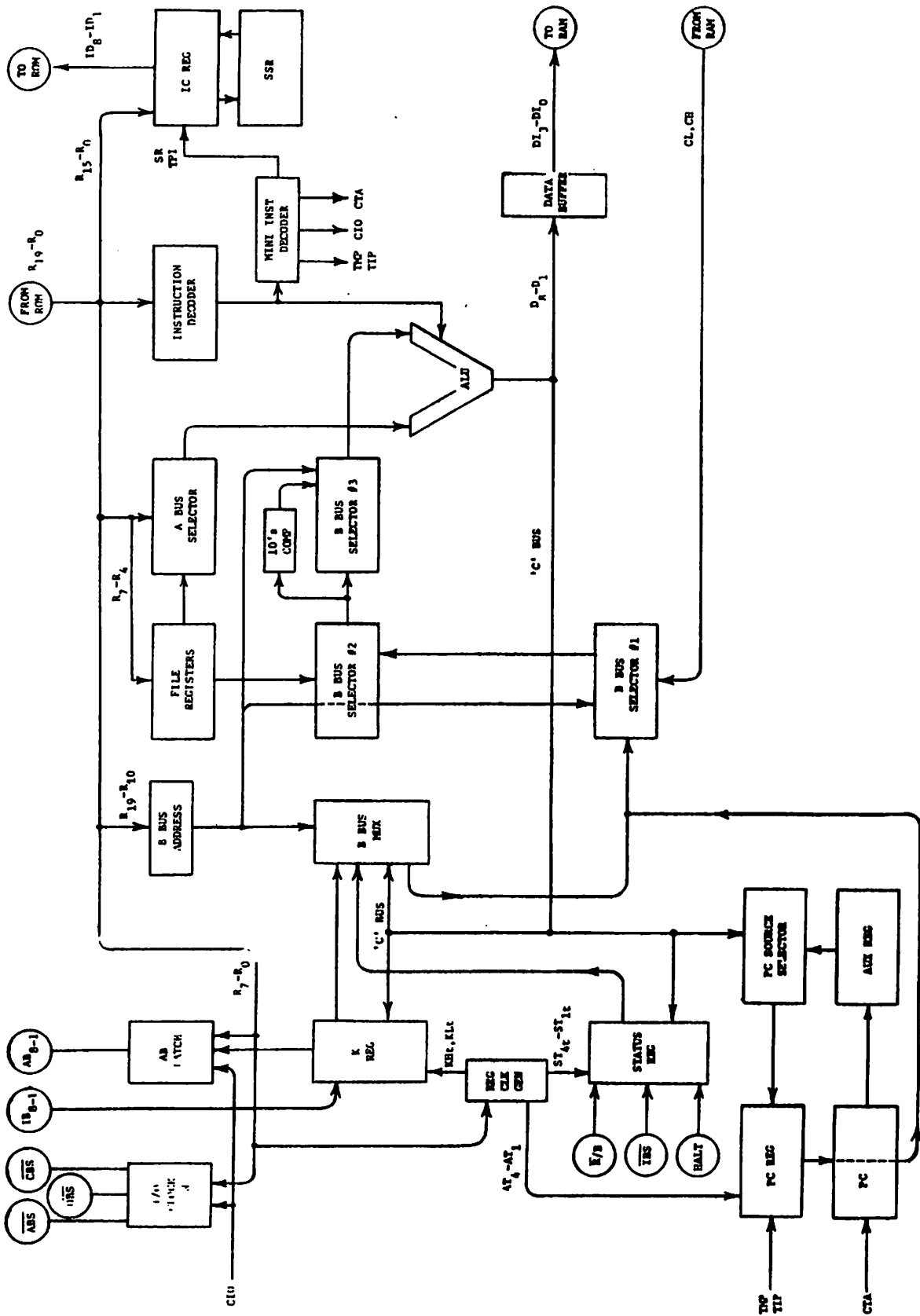


FIGURE 4-2
7051 BLOCK DIAGRAM

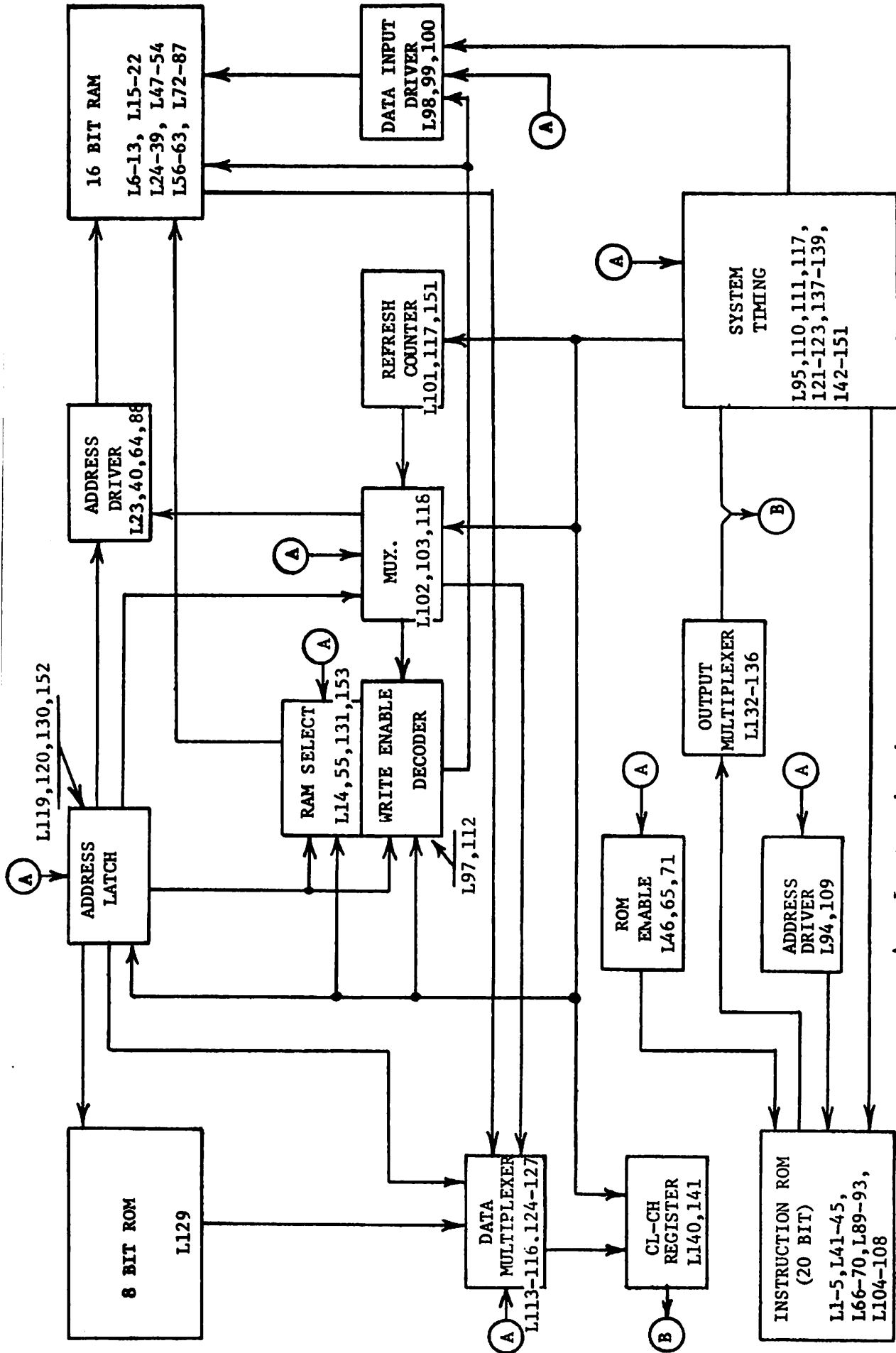
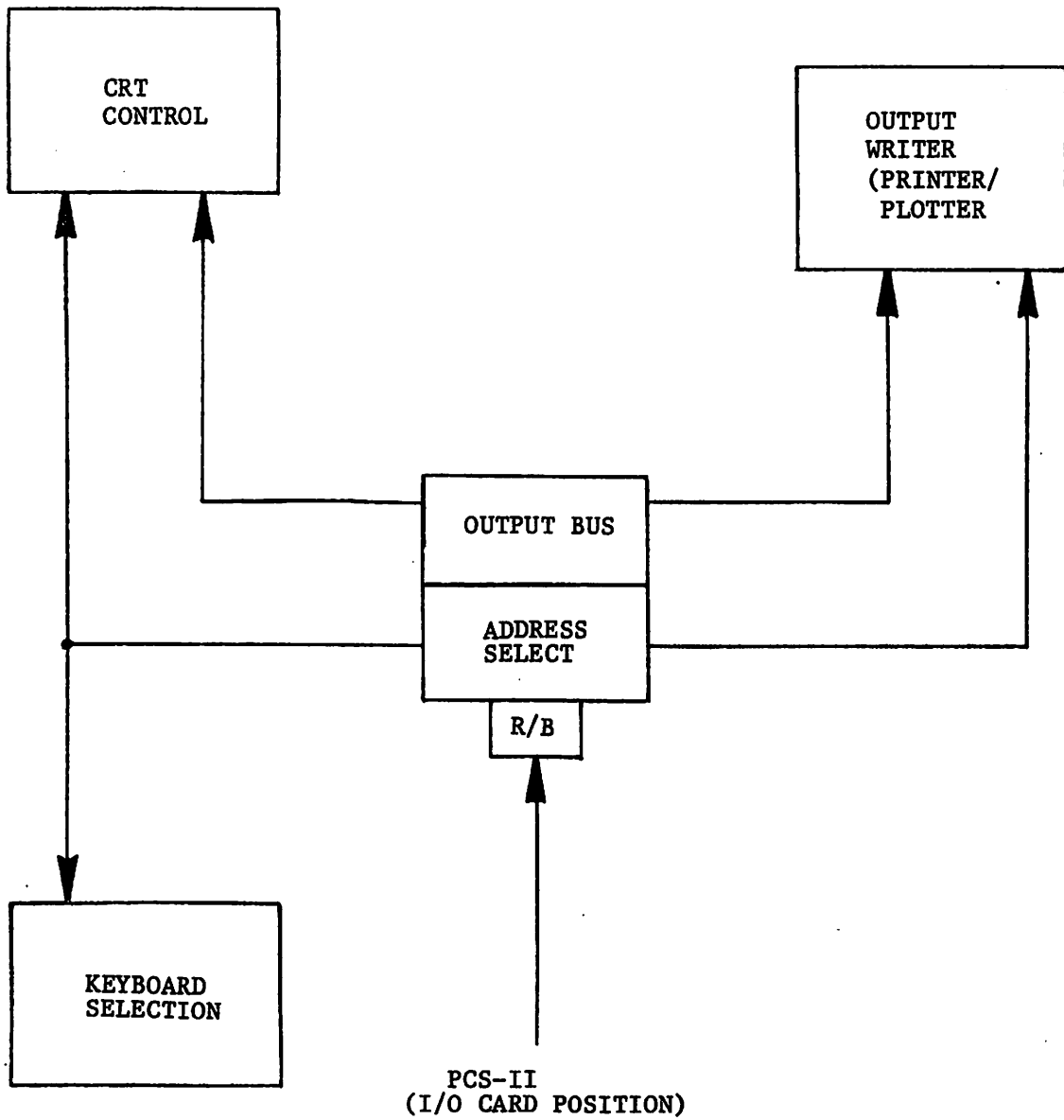


FIGURE 4-3
7052 BOARD BLOCK DIAGRAM

FIGURE 4-4

7058 & 7159
BLOCK DIAGRAM



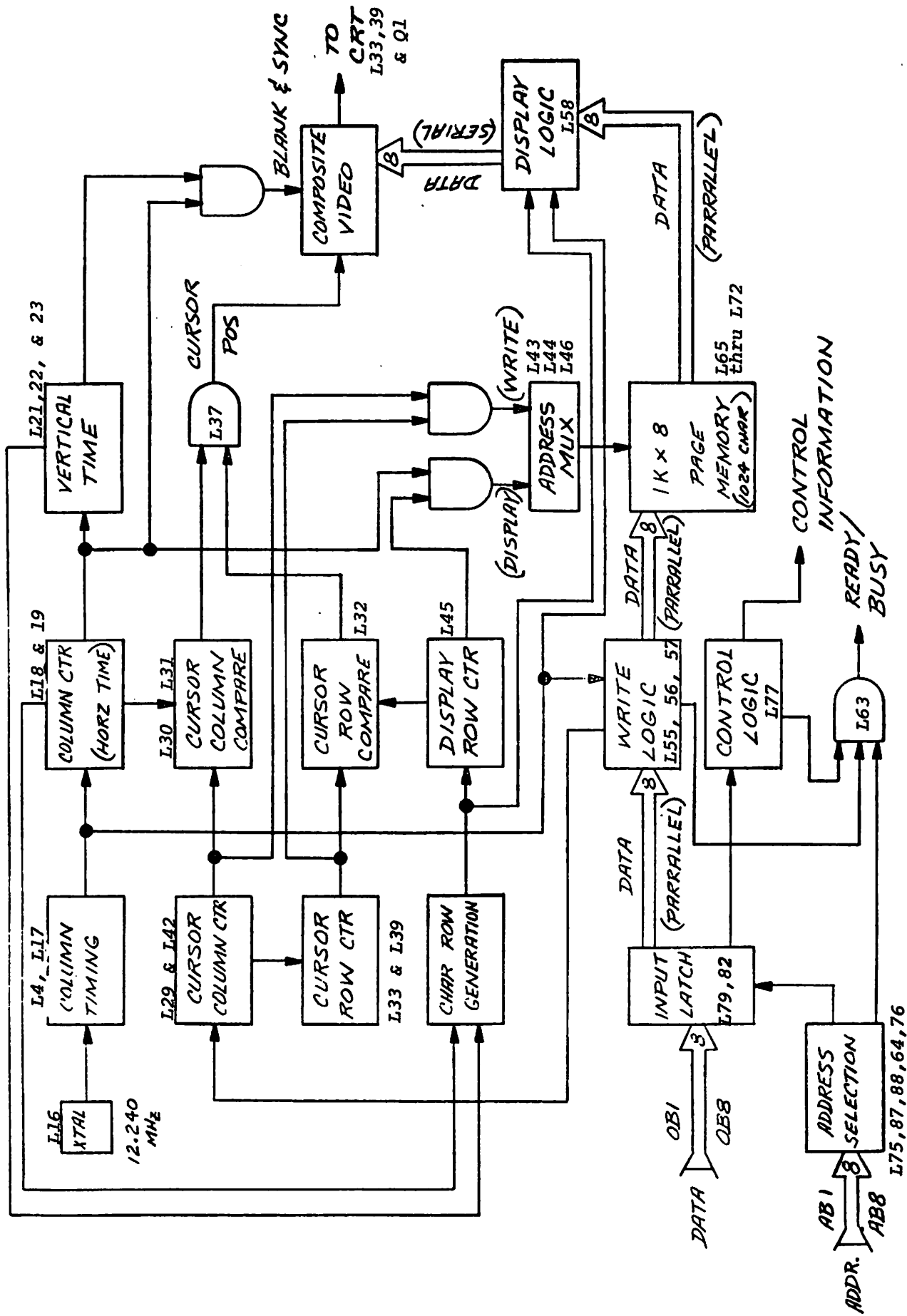
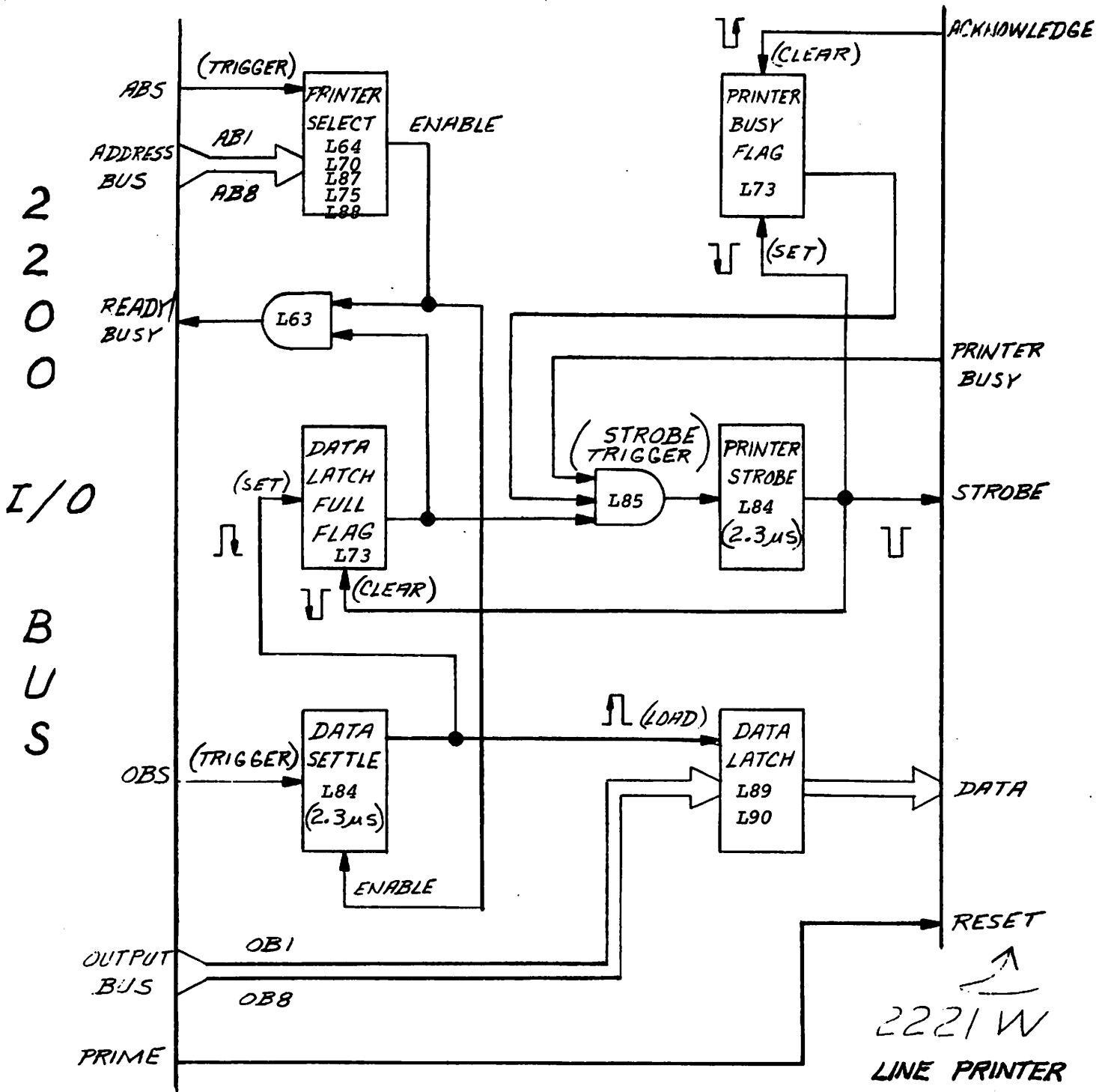


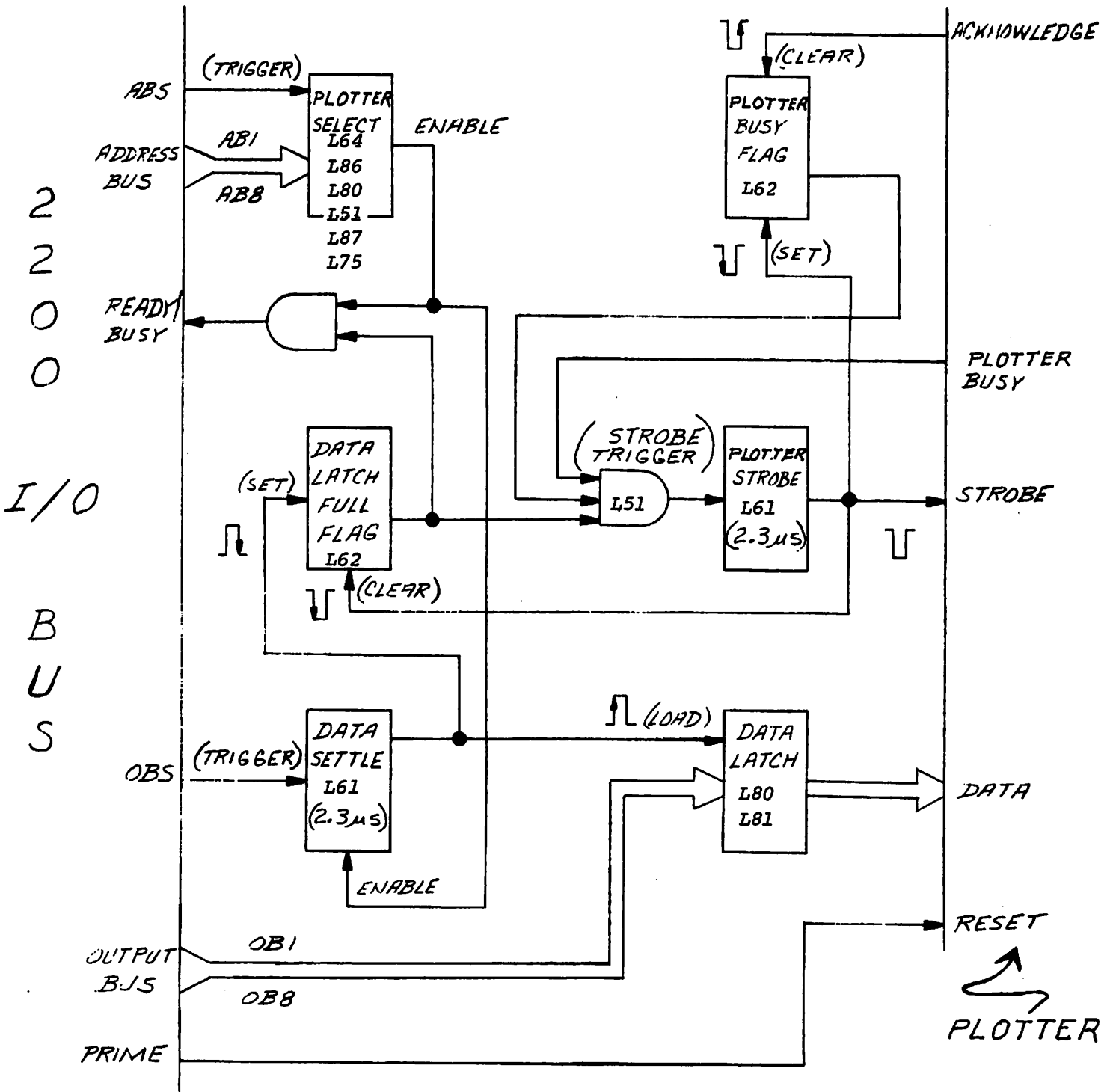
FIGURE 4-5
DISPLAY CONTROL

FIGURE 4-6

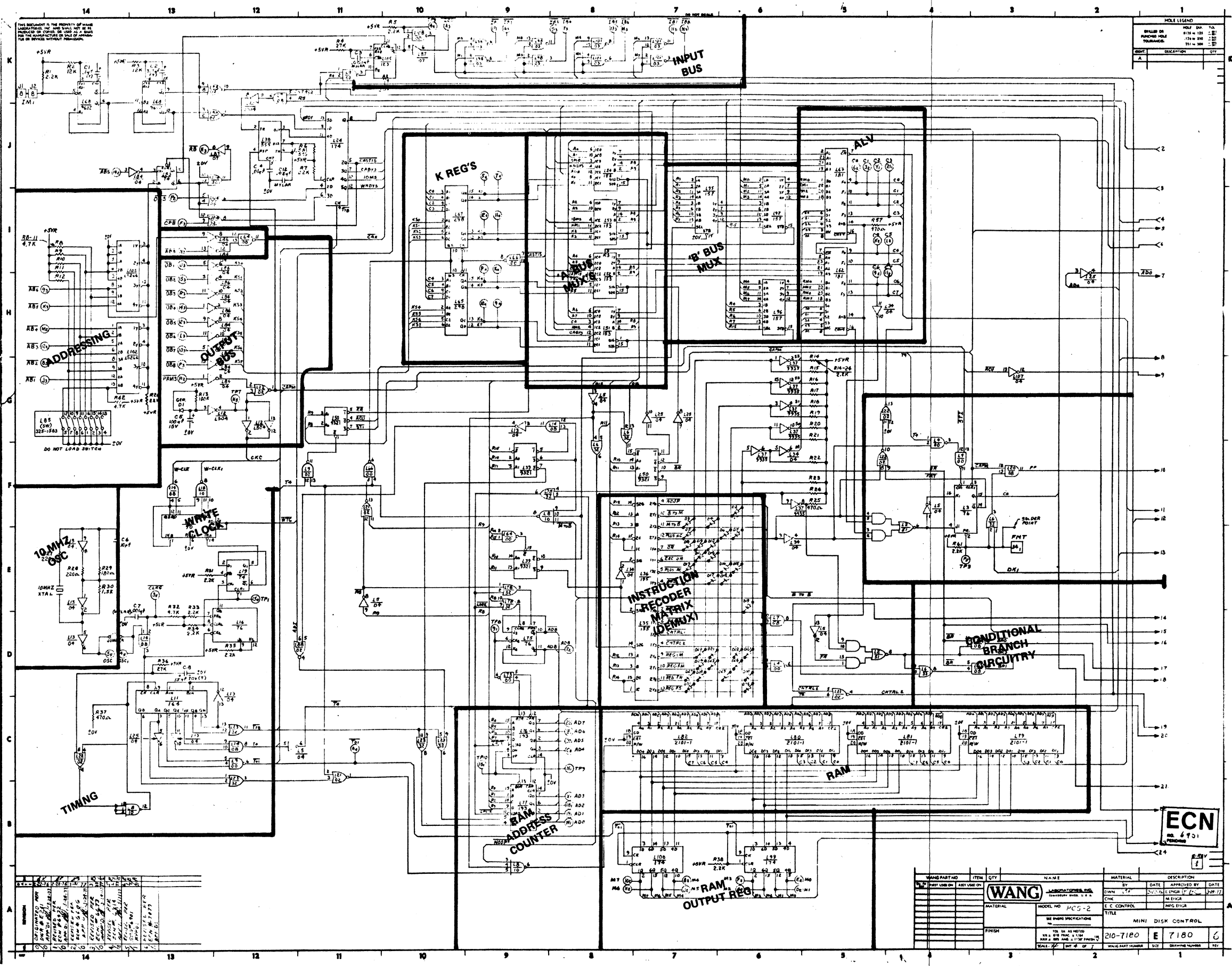


PRINTER CONTROL
-BLOCK DIAGRAM-

FIGURE 4-7

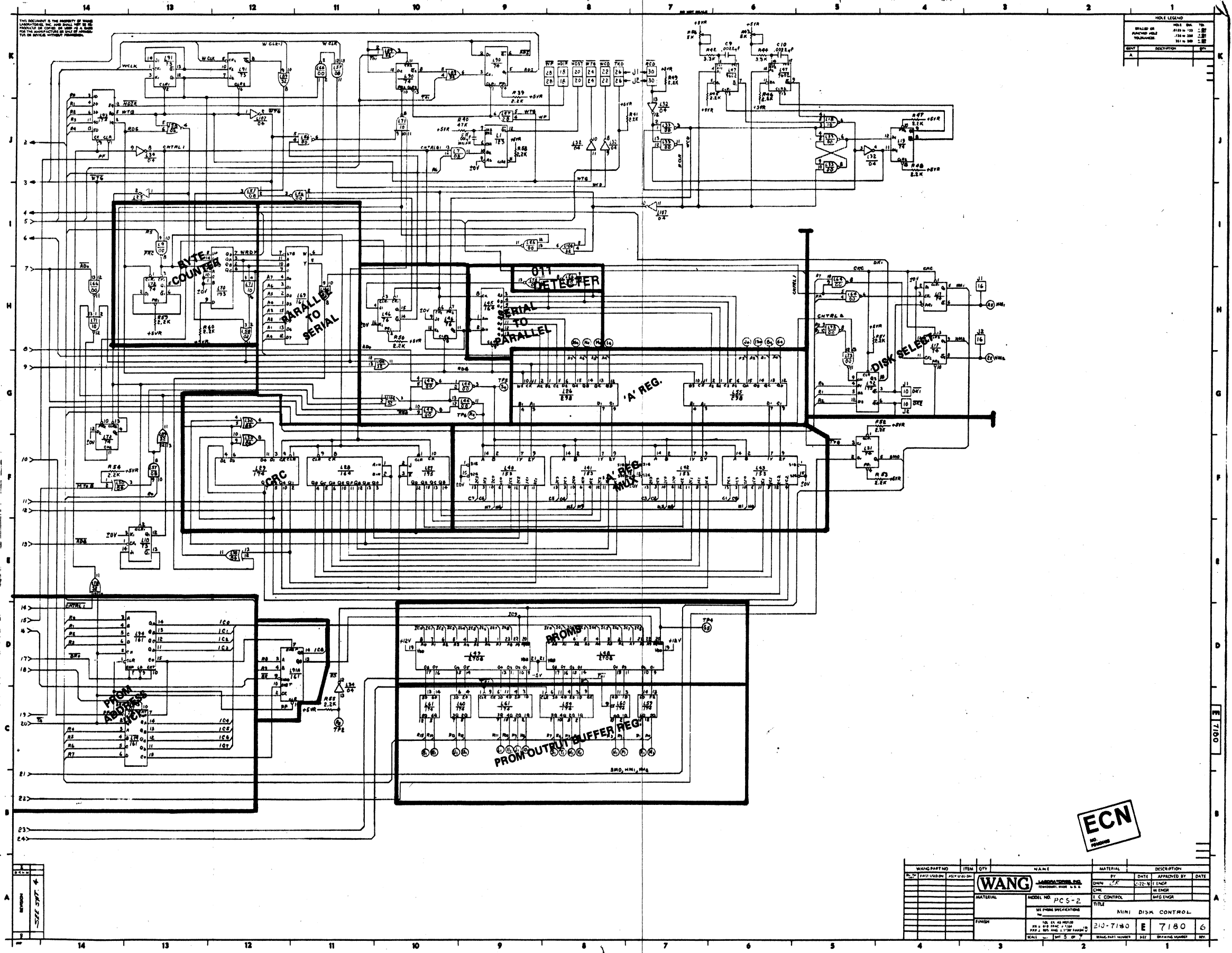


PLOTTER CONTROL BLOCK DIAGM



REV	DESCRIPTION	DATE	BY
1	INITIAL DESIGN	11/15/77	...
2
3
4
5
6
7
8
9
10
11
12
13
14

WANG PART NO	ITEM	QTY	NAME	MATERIAL	DESCRIPTION	DATE	APPROVED BY	DATE
...
WANG MODEL NO: PCS-2 TITLE: MINI DISK CONTROL				210-7180 E 7180 6				



HOLE LEGEND		
NO.	DESCRIPTION	QTY.

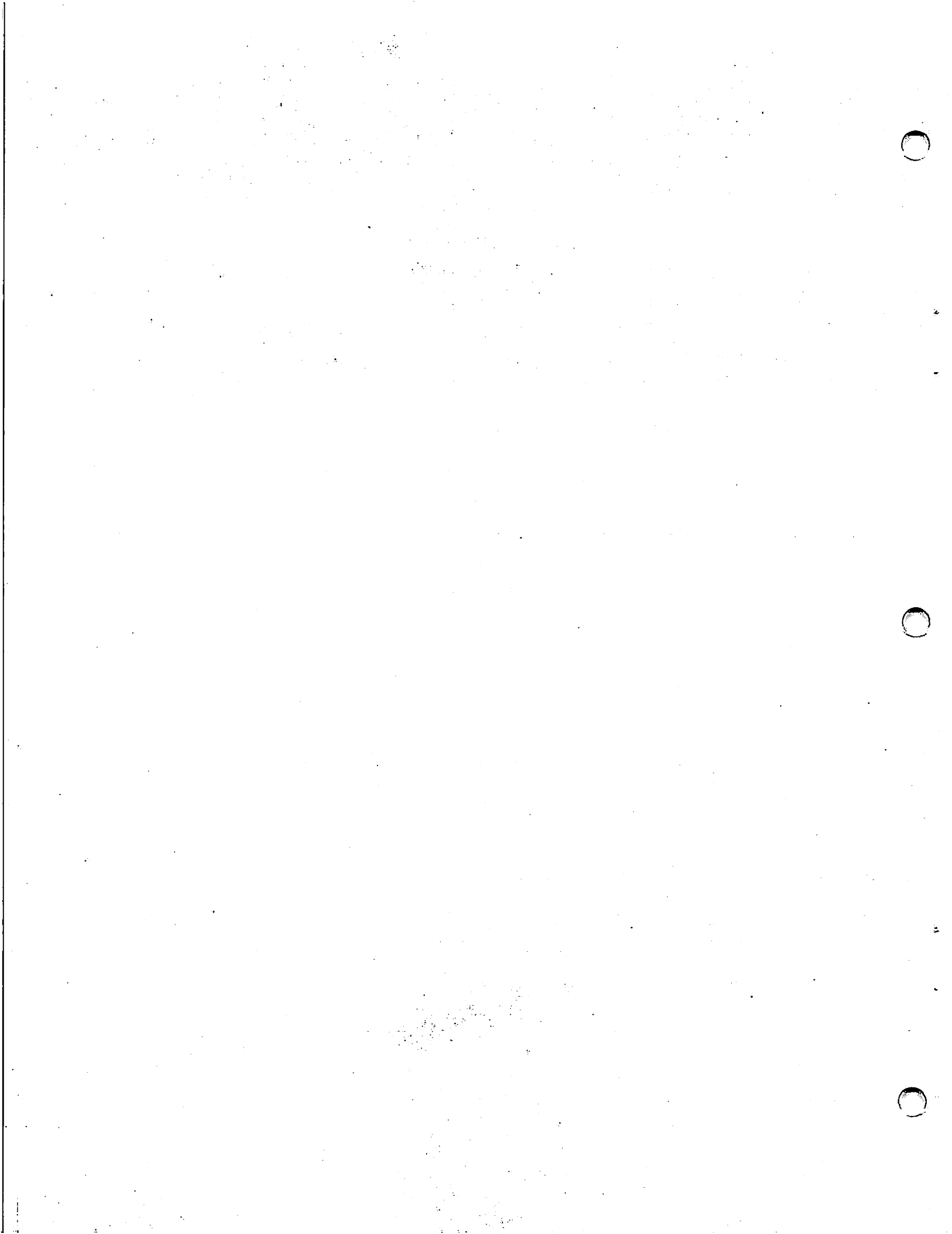
ECN
Engineering Change Notice

WANG PART NO.	ITEM	QTY.	NAME	MATERIAL	DESCRIPTION

4.5 PCS IIA ADDENDUM

4.5.1 I/O CONTROLLERS

The CRT, Printer and Disk I/O controllers for the PCS IIA are contained on the 7054. The 7054 and 7059 perform the same functions as the 6312A/6313, 6350A/6313 Video Display Controllers, the 6786 Multiplexer and the 7079 Printer Controller. (Reference 2200 Systems Maintenance Manual). The 7054 is for a 64 X 16 display, while the 7059 is for the 80 X 24 display (Opt. 60A).



SECTION 5
DIAGNOSTICS

5.1 INTRODUCTION

PCS-II diagnostics are available on mini-diskettes as follows:

<u>WL#:</u>	<u>ITEMS TESTED:</u>
DIAGNOSTIC DISKETTE #1 WL #701-8000	a) CPU Hardware/Software b) CPU Memory c) Display (16 x 64 & 24 x 80) d) Disk (Mini-Diskette Drives)
DIAGNOSTIC DISKETTE #2 WL #701-8001	a) Option 61 b) Option 62 & 62B (off-line test) c) Option 65 d) Option 67 e) Printers: 2221W, 31W, 51, 63, 71, 81

Tests for Option 60 and 62/62B 'on-line' were not available on mini-diskettes at this printing.

5.2 DIAGNOSTIC DISKETTE #1; WL #701-8000 - GENERAL DESCRIPTION AND OPERATION

Each test on diskette #1 can be accessed from either mini-floppy drive.

- a) Insert the diagnostic diskette in either drive.
- b) CLEAR system; key in LOAD DC F or R, "START", EXEC.
- c) State which drive the program is being loaded from. Either 1. (at address 310; the left drive) or 2. (at address B10; the right drive).

- d) Key Return EXECUTE.
- e) The next question displayed asks which test is to be run:

PCS2 DIAGNOSTIC MENU

- 1. CPU 2. MEMORY 3. DISK
- 4. 80X24 CRT 5. 64X16 CRT

CHOOSE THE DIAGNOSTIC YOU WANT, BY SELECTING 1,2,3,4 OR 5

- f) Key EXECUTE.
- g) The procedures for running and interpreting tests are explained in subsequent text.

5.2.1 CPU DIAGNOSTIC

The standard 2200 CPU diagnostic will be used to test PCS-II, which is equivalent to the 2200T CPU. This mini-diskette also tests BASIC option software (Matrix, GIO, Sort). Included are tests for:

LET, IF THEN, IF/THEN, FOR/NEXT, DIM, DIM (STRING ARRAYS), DATA/READ/RESTORE, DEFFN, DEFFN', STR(), ON (GO TO/GOSUB), CONVERT, VAL, NUM, RETURN CLEAR, INIT, AND, OR, XOR, ROTATE, ADD, VAL, BIN, BOOL, POS, PACK, UNPACK, ON ERROR GOTO, COM CLEAR, MAT EQUALITY, MAT ADDITION SUBTRACTION, MAT CON ZER, IDN, MAT SCALAR MULTIPLICATION, MAT TRN, MAT MULTIPLICATION, MAT INV, MAT REDIM, MAT READ, \$IF ON, \$TRAN, ALPHA ARRAY MODIFIERS, \$GIO (), (SORT) MAT CONVERT, MAT MOVE, MAT SORT #1, MAT SORT #2, MAT MERGE #1, MAT MERGE #2, MAT MERGE #3, MAT COPY, MAT SEARCH #1, MAT SEARCH #2, MAT SEARCH #3.

All tests are continuous and require no operator involvement, once executed.

After executing "START", and after responding to screen prompts:

- a) The user will be asked if a hard copy of test results is desired.
- b) Answer 'Y' for "Yes" (Ensure that the printer is selected).

- c) Answer 'N' for "No".
- d) Key EXECUTE.

At the end of each complete pass, test results are either displayed on the CRT or printed on an output writer, as selected. Each test pass displays an OK or ERROR indication on the CRT; the END OF PASS results display only cumulative errors from each section.

The approximate execution time for a PCS-II (2200T) CPU diagnostic is 11.5 minutes. The minimum RAM required for testing is 8K bytes; a printer is optional.

5.2.2 MEMORY DIAGNOSTICS

The PCS-II memory diagnostic will check out all of RAM except the first 700 bytes (approx.) where the diagnostic program resides. The program will write and read a specific pattern of "1's" and "0's" through each loop.

After LOAD/RUN and "START", await prompts from display.

- a) State how much memory (in K).
- b) Key either 8, 16, 24, or 32 depending on RAM size and the jumper selection on the CPU board (7051). See Section 2.3.
- c) Key EXECUTE.
- d) The number of loops passed will be displayed (25 sec/loop).
- e) Allow the program to run until a failure occurs, or until satisfied that there is no memory problem

Upon failure:

- a) The program will display on the CRT an "ER" signifying that a failure has been encountered at a certain address.
- b) There are two types of failures detected by the program:
 - 1. Hard Failure
 - 2. Intermittent Failure
- c) For hard failure the program will jump to a separate routine which will print out, among other items, the row and column numbers of the chip which may have caused the failure.

(Ref: Figure 5-1)

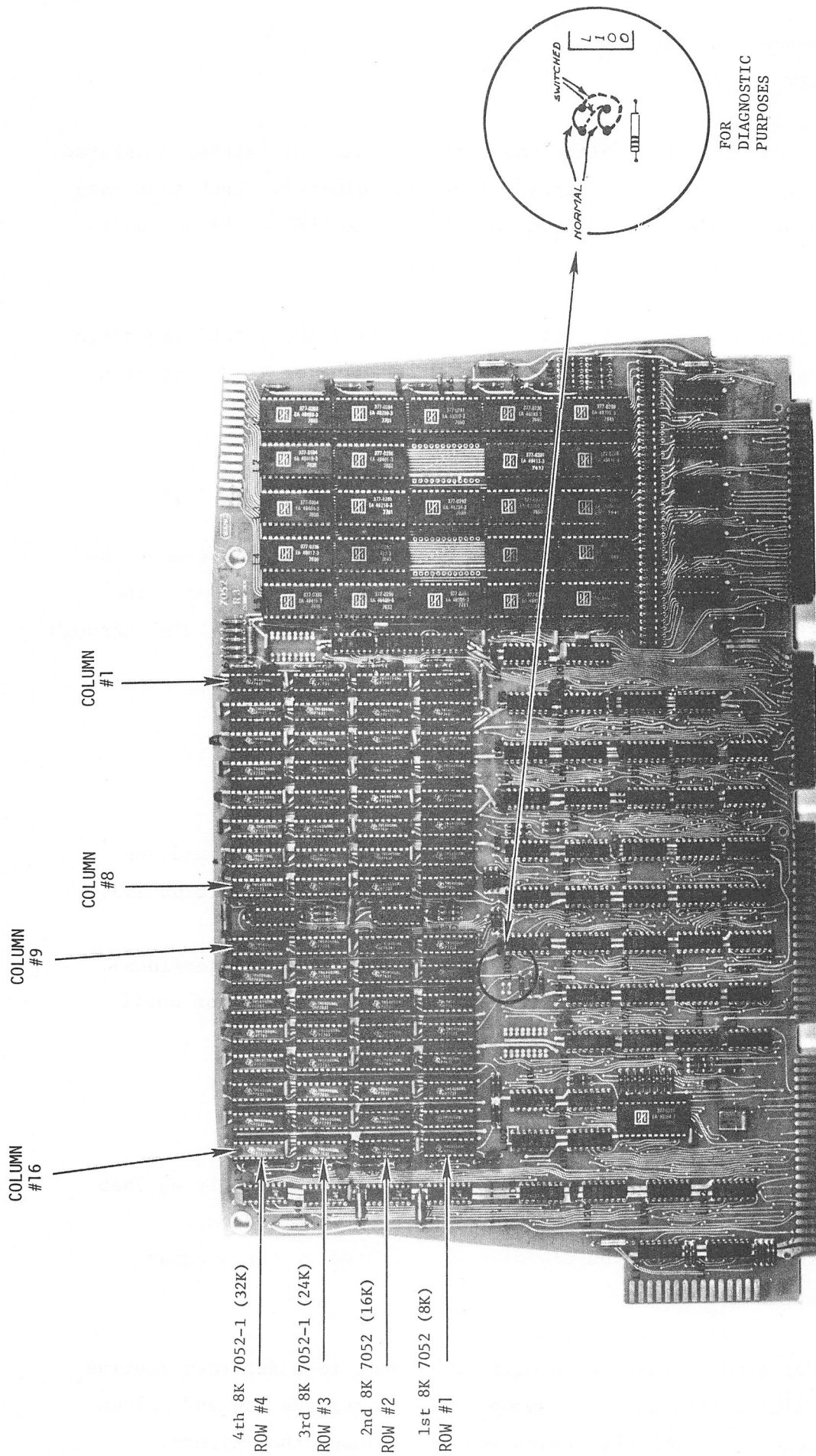


FIGURE 5-1
7052 RAM LOADING

- d) Replace the suspected bad chip and rerun memory diagnostics.
- e) The second type of failure (intermittent) also causes the program to jump to a routine. This routine will designate 8 RAM chips which might be causing the problem. The description will read: "Nth 8K PROBABLE PROBLEM FROM CHIP (X TO Y)". X & Y will correspond with the suspected bad row and column of eight chips on the 7052 board and N corresponds to the 1st, 2nd, 3rd, or 4th 8K of RAM. If known good chips are available, try replacing the defective ones and rerun the diagnostic.

The PCS-II has only one memory board, one cannot change the position of the boards in the chassis as with other 2200 CPUs. However, to simulate this, two jumpers on the 7052 can be changed to alter the addressing of the RAM ICs. Refer to Figure 5-1 (insert).

These jumpers allow one to switch the 1st and 2nd 8K of RAM. The RAM ICs that occupy the bottom row are now the second 8K and the next row up is now the first 8K. The purpose of this is to allow the memory diagnostic to be loaded into memory if one of the RAM ICs in the first 8K is bad. The program, when loaded, will reside in the second row of RAM, and the bottom row (1st row) can be tested. If a problem exists in the RAM data path, it will not be possible to load the diagnostic. One must use other troubleshooting means to repair the board. After testing is complete, be sure that the jumpers are installed in their normal position (Ref: Figure 5-1).

5.2.3 DISPLAY DIAGNOSTICS

The display diagnostics for 80 x 24 and 64 x 16 units fill the screen; alternate characters are the same. The program repeats a full screen of two characters at a time until all characters are eventually displayed.

Watch the display for any changes in pattern, i.e., part way through the screen. (Note: If the display test is too fast, HALT/STEP through and watch the screen.) If such problem exists, replace the 7058 or 7159 controller, If only one character portion of the display is missing, replace 7058/7159 board RAM IC's.

5.2.4 DISK DIAGNOSTICS

The mini-diskette drive diagnostic will test all disk hardware, plus the following disk statements:

1. DATASAVE/DATA LOAD BA
2. SCRATCH DISK
3. DATASAVE DC OPEN/END
4. DATASAVE/DATA LOAD DC
5. DATASAVE/DC OPEN TEMP/DATASAVE DC
6. DATASAVE/DATA LOAD DA
7. COPY & MOVE (Included when testing both drives)

NOTE:

If PCS-II diagnostics cannot be loaded via mini-floppy, one may load the diagnostics from cassette. A Model 2217 or 2218 cassette drive and 7068 cassette drive interface pc are required. If these are available, turn PCS-II power OFF, remove the PCS-II cover per 7.2.2 a) and b), and temporarily remove any board occupying the optional I/O slot (Figure 1-3). Insert the 7068 pc into the vacant slot and place the cable at a convenient position to connect the cassette drive unit. Connect fan, replace cover, connect disk power and ribbon cables, turn power ON, and load appropriate diagnostics from cassette.

The time required for one entire pass is 5 minutes when testing one mini diskette drive; 13.5 minutes is required when testing both drives (if no errors are encountered).

TO RUN:

- a) A screen prompt will ask the user to select which drive(s) are to be tested. One must select *Fixed, Removeable or both*, depending on the particular model PCS II. Key the appropriate response asked for on the screen.

PCS-2 HARDWARE DIAGNOSTIC TEST - MINI DISK - - - - -

1. FIXED (LEFT)
2. REMOVABLE (RIGHT)
3. FIXED AND REMOVABLE

ENTER 1, 2, OR 3 TO TEST FIXED, REMOVABLE OR BOTH DRIVES? 1

- b) THIS NEXT STEP IS VERY IMPORTANT. Remove the diagnostic diskette from the disk drive and replace it with a formatted diskette which is either blank or the information on the diskette is not important. Any data on the formatted disk will be destroyed.

MOUNT SCRATCH PLATTERS AND KEY 'EXEC'
DATA ON PLATTER(S) WILL BE DESTROYED

- c) Put a formatted disk in both drives if the unit has dual drives.
- d) Key EXECUTE.
- e) Program now tests various operations described previously. The number of passes is counted, along with the number of errors and the last system error encountered. The disk diagnostic program can run indefinitely.

Upon Error:

An error # message will appear to the right of the function that failed. The program will then continue on to the next operation. When an error is encountered, besides displaying the error # message, the total number of errors encountered is displayed along with the last system error. This system error number corresponds to standard 2200 System errors.

5.3 DIAGNOSTIC DISKETTE #2; WL #701-8001 - GENERAL DESCRIPTION AND OPERATION

Diagnostic diskette #2 tests the options and peripherals listed in paragraph 5.1. Note that Option 60 (Keyboard Clicker, Alarm, Aux. Video Output) is tested manually (paragraph 5.4), and that tests for Options 62/62B (off-line) and Option 67 require hardwired test connectors to be attached to the appropriate PCS-II rear panel connector.

Each test can be accessed from either mini-floppy drive.

- a) Insert the diagnostic diskette in either drive.
- b) CLEAR system; key in LOAD DC F or R, "START", EXEC.
- c) Manually key SELECT DISK 31Ø or SELECT DISK B1Ø, where 31Ø is the primary (left) drive and B1Ø is the secondary (right) drive unit.
- d) Key EXECUTE.
- e) Key RUN, EXECUTE.
- f) The next question display asks which test is to be run:

START-UP MENU (DIAGNOSTIC DISKETTE #2)

PCS AND/OR WS OPTIONS DISK CATALOG
TO LOAD AND RUN, PRESS S.F. KEY CORRESPONDING TO CATEGORY.

S.F. ' 1 FOR OPT.61	S.F. ' 2 FOR PRNTRS & PLTTERS
S.F. ' 3 FOR OPT.65	S.F. ' 4 FOR OPT.67
S.F. ' 5 FOR OPT.62 & 62B	S.F. '31 FOR SYSTEM MENU

5.3.1 *OPTION 61 DIAGNOSTICS*

Keying SF'Ø1 from the START-UP menu of Diagnostic Diskette #2 will result in the following screen prompt:

OPTION 61 TESTS

OPTION 61 DISK CATALOG
TO LOAD AND RUN, PRESS S.F. KEY CORRESPONDING TO CATEGORY.

S.F. ' 1 FOR 2201 DIAG	S.F. ' 2 FOR 2202 DIAG
S.F. ' 3 FOR 2212 DIAG	S.F. ' 4 FOR 2232 DIAG
S.F. '31 FOR SYSTEM MENU	

5.3.2 *PRINTER/PLOTTER DIAGNOSTICS*

Keying SF'Ø2 from the START-UP menu of Diagnostic Diskette #2 will result in the following screen prompt:

PRINTER & PLOTTER TESTS

Wang Printers & Plotters DISK CATALOG
TO LOAD AND RUN, PRESS S.F. KEY CORRESPONDING TO CATEGORY.

S.F. ' 1 FOR 2221W DIAG	S.F. ' 2 FOR 2231W 10 PITCH
S.F. ' 3 FOR 2231W 12 PITCH	S.F. ' 4 FOR 2281 DIAG
S.F. ' 5 FOR 2272 1 PEN	S.F. ' 6 FOR 2272 3 PEN
S.F. '31 FOR SYSTEM MENU	

5.3.3 OPTION 65 DIAGNOSTICS

Keying SF'03 from the START-UP menu of Diagnostic Diskette #2 will result in the following screen prompt:

OPTION 65 TESTS

2200 HARDWARE DIAGNOSTIC TEST - IEEE INTERFACE - - - - -

THIS DIAGNOSTIC WILL FUNCTIONALLY CHECK OUT MOST OF A 2254
WITHOUT ANY EXTERNAL CONNECTOR OR ADDITIONAL CPU CONNECTED.

MOUNT THE BOARD, PREFERABLY ON AN EXTENDER, WITH NO CONNECTIONS
TO THE BUS CONNECTOR. DEVICE ADDRESS MUST BE SET TO /04C.
WHAT CONFIGURATION DOES THE BOARD HAVE?

C - CONTROLLER
N - NON-CONTROLLER
? - YOU TELL ME

TO DISPLAY SYSTEM MENU KEY HALT/STEP & SF'31

Instructions for using "D2254A" diagnostic for Option 65.

- a) Set board address to HEX 4C

SW #	1	2	3	4	5	6	7	8	
SETTING	0	1	0	0	1	1	0	0	— 1=ON 0=OFF

- b) Mount the IEEE 488 Interface board in a PCS-II with 8K minimum RAM. The board should be on an extender for easy access to switches and jumpers.
- c) Set the 5-bit Talk/Listen (MLA/MTA) switches ON.
- d) Remove the Non-Controller jumper.
- e) Remove the Parallel Poll jumpers.
- f) Install the RESET/IFC jumper.

- g) After reading initial instructions per OP-65 screen prompt (above), type either C if the board is used as a controller (it should be for this test), N if not, or ? if not sure. If the board is set up to be used as a controller, the program may display:

"please press RESET, followed by SF'0"

- h) Perform the screen prompt instructions. If the system does not 'hang-up', the address switch setting is correct.

The top of the display will now present three field-settable options:

CONTROLLER - C
PARALLEL POLL XX
RESET CAUSES IFC - N or Y

The first indicates the board is a controller. The second shows the Parallel Poll response (one of 8 jumpers). The third indicates (Yes or No) whether RESET will cause IFC (also a jumper).

Under this screen prompt is the IEEE test menu. These are four options to be tested in any order desired. Type the number of the desired option:

Options:

1. SRQ/PP test. This tests the SRQ and PP functions. It also continuously displays the current PP jumper settings. These may be changed while the program runs to ensure that all eight lines work.
2. TAB/LAD test. This tests the talker/listener address functions. It also continuously displays the current bus address setting. These may be changed while the program runs to ensure that all 5 switches work.
3. IFC/DVC/SRQ. This tests interaction between these functions. No manual action is needed.

4. BUF/UNBUF/EOI. This checks all the modes of actual data transfer. No manual action needed.

To stop any option and return to the menu, simply press (EXEC). (It can take up to 5 seconds to jump.) If the board fails any of the specified tests, a reference to a certain error (#) will be given. Error descriptions are listed below.

5.3.4 OPTION 67 DIAGNOSTICS

There are two tests for Option 67. Test #1 outputs and inputs all 256 possible bytes 100 times via OB and IB lines. Test 2 outputs and inputs all 16 possible half-bytes via CO lines and checks $\overline{\text{DORB}}$, $\overline{\text{CPB}}$, $\overline{\text{IRB}}$, and $\overline{\text{PRMS}}$ 100 times. Error indications are self-explanatory on screen.

Refer to 2200 Maintenance Manual Diagnostics for 2250; the two connectors used in those tests will also be used for the OP-67 test.

Keying SF'04 from the START-UP menu of Diagnostic Diskette #2 will result in the following screen prompt:

```
2200 HARDWARE DIAGNOSTICS - 2250 OR OPT 67
SET ADDRESS SWITCHES TO X3A
```

```
SF'00 FOR TEST 1 (USE CONNECTOR #1) OBS TEST
SF'01 FOR TEST 2 (USE CONNECTOR #2) CBS TEST
```

```
FOR SYSTEM MENU; KEY 'RESET' AND SF'31
```

The test connectors are constructed as follows:

CONNECTOR #1

Put jumpers between Pin # (output) and Pin # (input) as listed on the next page for Amphenol connector.

OUTPUT SIGNAL TERM	PIN # OUTPUT	PIN # INPUT	INPUT SIGNAL TERM
\overline{OBS}_0	31	9, 18, 19	\overline{IBS} , \overline{ACK} , \overline{RBI}
\overline{OBI}_1	20	5	$\overline{IB1}_I$
$\overline{OB2}_0$	21	6	$\overline{IB2}_I$
$\overline{OB3}_0$	22	7	$\overline{IB3}_I$
$\overline{OB4}_0$	23	8	$\overline{IB4}_I$
$\overline{OB5}_0$	24	1	$\overline{IB5}_I$
$\overline{OB6}_0$	25	2	$\overline{IB6}_I$
$\overline{OB7}_0$	26	3	$\overline{IB7}_I$
$\overline{OB8}_0$	27	4	$\overline{IB8}_I$

PARTS REQUIRED:

36 Pin Amphenol connector (male). WL #350-2049 or 350-2051.

USE:

Attach this connector to OP-67 controller card and run OP-67 diagnostics for connector #1.

CONNECT #2

Put jumpers between Pin # (output) and Pin # (input) as listed below for Amphenol connector.

OUTPUT SIGNAL TERM	PIN # OUTPUT	PIN # INPUT	INPUT SIGNAL TERM
\overline{CBS}_0	16	9, 18, 19	\overline{IBS} , \overline{ACK} , \overline{RBI}
\overline{COB}_1	12	5	$\overline{IB1}_I$
\overline{COB}_2	13	6	$\overline{IB2}_I$
\overline{COB}_4	14	7	$\overline{IB3}_I$
\overline{COB}_8	15	8	$\overline{IB4}_I$
\overline{CPB}_0	32	1	$\overline{IB5}_I$
\overline{CRMS}_0	10	2	$\overline{IB6}_I$
\overline{IRB}	17	3	$\overline{IB7}_I$
\overline{DORB}	28	4	$\overline{IB8}_I$
OV	34	11	\overline{END}_I

PARTS REQUIRED:

36 Pin amphenol connector (male). WL #350-2049 or 350-2051.

USE:

Attach this connector to OP-67 controller card and run OP-67 diagnostic for connector #2.

5.3.5 OPTION 62, 62B - OFF-LINE DIAGNOSTICS

Keying SF'05 from the START-UP menu will result in the following screen prompt:

OPTION 62/62B OFF-LINE TEST

```
WANG SYSTEM 2200 TC CONTROLLER DIAGNOSTIC
KEY A NUMBER AND (EXEC) TO SELECT CONTROLLER TYPE
1 = 2227B
2 = 2228B
3 = OPTION 62
4 = OPTION 62 B
KEY SF' 31 FOR SYSTEM MENU
```

- a) Connect a 25-pin Amphenol connector (WL #350-1030), wired as follows, to the PCS-II rear panel telecommunications jack.

Add jumper wires between: pins 2 & 3
pins 4 & 5
pins 6, 8, & 20
pins 11, 12, 15, & 17

- b) Insert mini-diskette #2 in the fixed (left-hand) drive and key , .

The following should appear is display:

Key SF'3 or '4 and EXECUTE.

If an error occurs, the following should appear is display:

This test is continuous; to stop the test, key RESET. The diagnostic menu should be restored to the screen.

5.4 OPERATION OF DIAGNOSTICS NOT ON DISKETTE

5.4.1 OPTION 60 - KEYBOARD CLICKER, AUDIO ALARM, AND AUXILIARY DISPLAY CONNECTOR

Keyboard Clicker Test:

- a) Turn system ON.
- b) Depress every key on keyboard including special function keys. Listen for click and check for entry on CRT.

NOTE:

The RESET, HALT/STEP, SHIFT and SHIFT LOCK keys do not produce a click.

Audio Alarm Test:

PRINT HEX (07) will cause a "BEEP" from the speaker.

```
10 FOR I=1 to 5
20 FOR J=1 to 50
30 NEXT J
40 PRINT HEX (07)
50 NEXT I
60 STOP
```

RUN, EXECUTE causes five BEEPS and stop.

Auxiliary Display & Display Connector Test:

Run standard Display Diagnostics (80 x 24 or 64 x 16) from Diagnostic Diskette #1.

5.4.2 OPTION 62, 62B - ON LINE TESTS

These procedures are being modified, standardized, documented in a new publication.

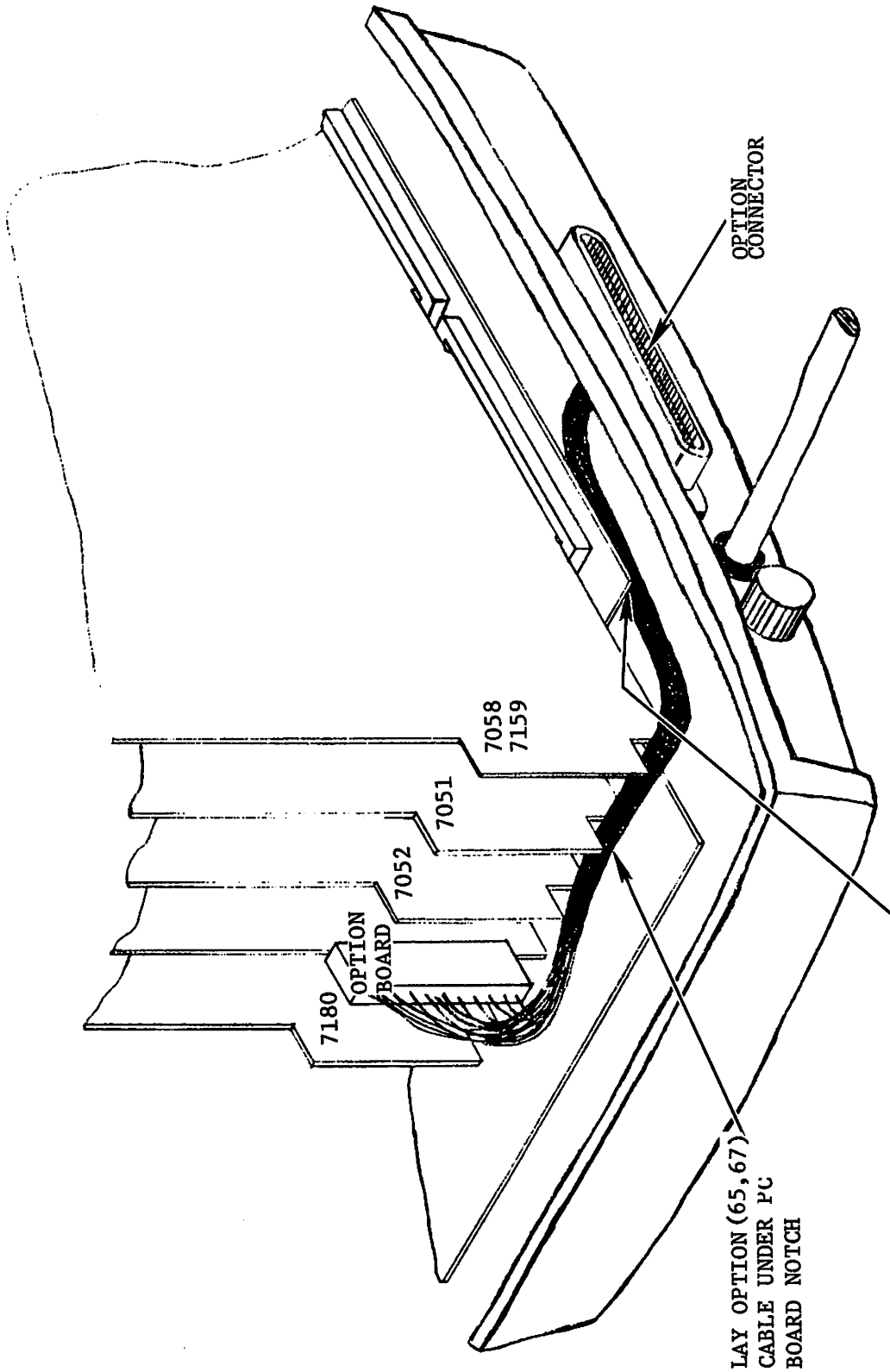
SECTION 6
CONVERSIONS & UPGRADES

6.1 GENERAL

<u>OPTION #</u>	<u>STOCK #</u>	<u>DESCRIPTION</u>
60	177-22EF-60	Auxiliary display connector audio and KB clicker
60A	177-22EA-60	80 x 24 CRT display
61	177-22EF-61	2201 Output Writer
62	177-22EE-62	Async Telecommunications Interface
62B	177-22EA-62	Bi-sync Telecommunications Interface
65	177-22EE-65	IEEE-488 Interface
67	177-22EE-67	8 Bit Parallel I/O Interface
-	200-EF08-16	8K to 16K
-	200-EF08-24	8K to 24K
-	200-EF08-32	8K to 32K
-	200-EF16-24	16K to 24K
-	200-EF16-32	16K to 32K
-	200-EF24-32	24K to 32K
-	200-0055	Upgrade from Single to Dual Mini Disks
-	-	50/60 Hz Display Wiring

TABLE 6-1

For options requiring the addition of a cable and a rear panel connector on the PCS-II, two mounting plates are available (for adaptation to either 24 pin or 36 pin connectors); this plate (451-4420 for 24 pin; 451-4421 for 36 pin connectors) replaces the blank plate in the optional I/O slot on the rear panel. See Figure 6-1 for option cable routing.



LAY OPTION (65, 67)
CABLE UNDER PC
BOARD NOTCH

OPTION CABLE (OP-65, 67)
SHOULD BE ROUTED
DOWN THROUGH THE REAR/LEFT
RECESS OF THE 7056 MOTHERBOARD

FIGURE 6-1
OPTIONAL CABLE ROUTING

6.2 RAM UPGRADES

Turn the PCS-II power OFF and remove the cover(s).

When increasing memory by 8K bytes (from 8K to 16K or from 24K to 32K), add only the necessary ICs to the existing memory board and change the memory size jumpers on the 7051 (see Figure 2-8). When increasing memory from 8K to 24K or 32K or from 16K to 24K or 32K, it is also necessary to exchange the 7052 Memory for a 7052-1. Again, be sure to change the memory size jumpers on the 7051. Change the unit serial number to reflect new RAM size according to paragraph 1.2. With PCS-II mini disk cover still removed, briefly turn the unit ON and check regulated voltages (Ref: paragraph 7.3.1). Turn power off if proper levels are verified. Reassemble the remainder of the unit and run all appropriate diagnostics from Section 5.

TABLE 6-2 RAM UPGRADES

To Go From	To	Kit WL #200-	Remove	Add	Jumper Per Fig. 2-8	Change Serial Tag	
						FROM PCS-II-	TO PCS-II-
8K	16K	EF08-16	----	-----; L47-54, L56-63	Install 1	-2XY*	-4XY
8K	24K	EF08-24	7052	7052-1	Install 2	-2XY	-6XY
8K	32K	EF08-32	7052	7052-1	Add 1 & 2	-2XY	-8XY
16K	24K	EF16-24	7052	7052-1	Add 2 Remove 1	-4XY	-6XY
16K	32K	EF16-32	7052	7052-1	Add 2	-4XY	-8XY
24K	32K	EF24-32	----	-----; L6-13, L15-22	Add 1	-6XY	-8XY

RAM Part No. = 377-0314; Quantity = 16 for each 8K

*where X = A number:
1 = Single Mini
2 = Dual Mini

and Y = A letter:
'A' = 64 x 16 Display
'B' = 80 x 24 Display

6.3 UPGRADE TO DUAL DISK DRIVES; KIT WL #200-0055

1. Remove the molded mini-floppy cover and dummy panel (one screw @ rear of mini-floppy cover; see item 1, Figure 6-2).
2. Remove the four screws which secure the disk mounting plate to the molded mini-floppy base (see item 4, Figure 6-2).
3. Disconnect the flat ribbon cable from the primary mini-floppy circuit board (see Figure 1-9).
4. Disconnect the nylon mini-floppy power connector from the primary mini-floppy drive (see Figure 1-9).
5. Lift out the disk mounting plate with standard (primary) mini-floppy mounted.
6. Install the optional mini-floppy in the empty mounting slot on the disk mounting plate with four screws (item 7, Figure 6-2).
7. Replace the disk mounting plate with two mini-floppy drives into the molded mini-floppy base; resecure with four screws (item 4, Figure 6-2).
8. Remove nylon tie wraps from 2nd disk ribbon cable and power cable.
9. Install both flat ribbon cables from the 7180 board to their respective mini-floppy drive, as shown in Figure 1-9.
10. Install both nylon mini-floppy power connectors as shown in Figure 1-9.
11. Turn PCS-II power on and check voltages (access test points via opening in mini-floppy base; refer to Figure 7-1).
12. Look for 'READY' on display; run disk diagnostic for both drives.

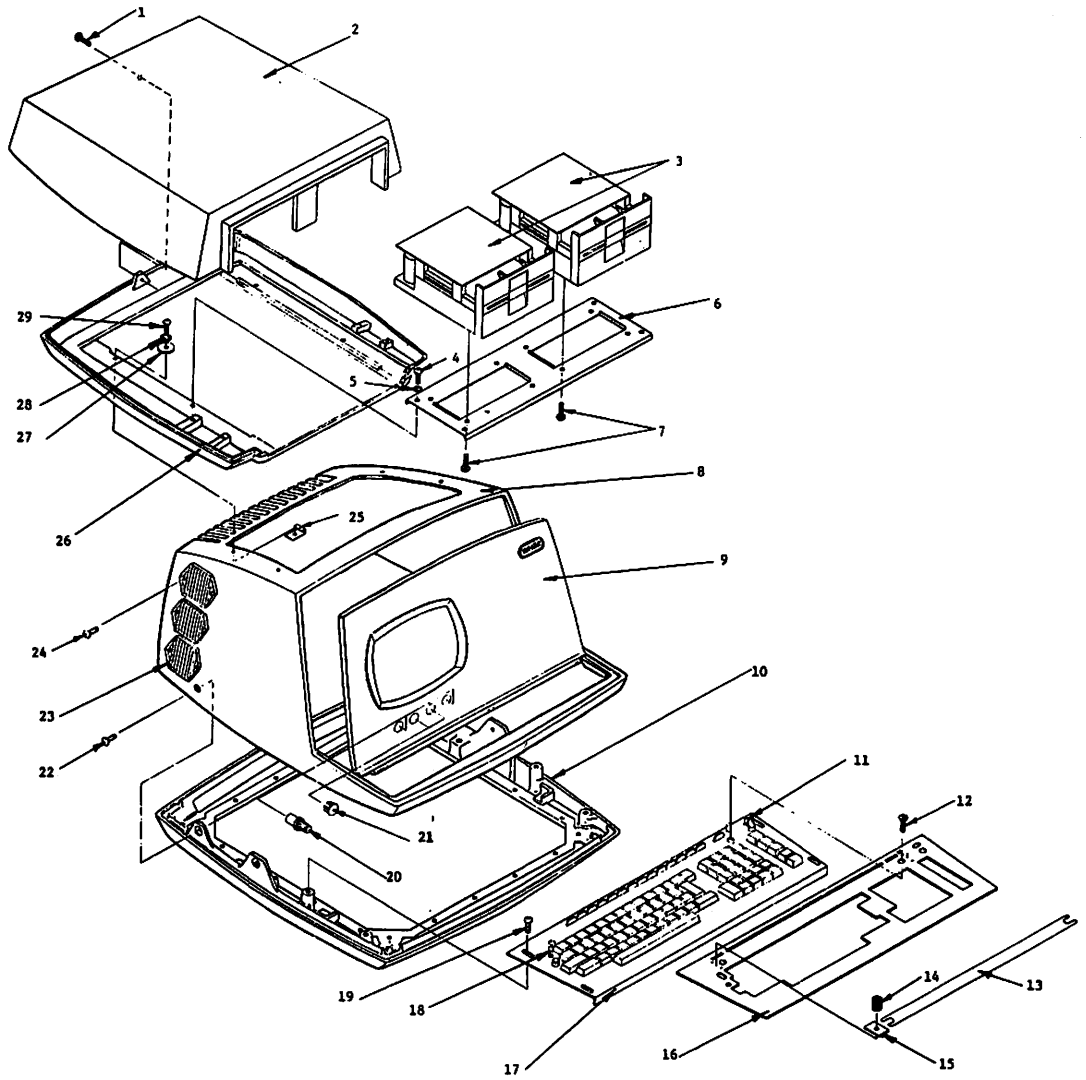


FIGURE 6-2
CHASSIS ASSEMBLY

13. Turn power off and complete reassembly of the PCS-II. Turn power back on after reassembly and run the disk diagnostic (Ref: Section 5) on both mini disk drives.
14. Change serial tag information to correspond with the models listed in paragraph 1.2.

6.4 OPTION 60 - AUX. DISPLAY CONNECTOR, AUDIO ALARM, KB CLICKER;
KIT #177-22EF-60

1. Completely disassemble unit per paragraph 7.2.2.
2. Proceed as follows for key "clicker" relay installation (Ref: Figures 6-3, 4).

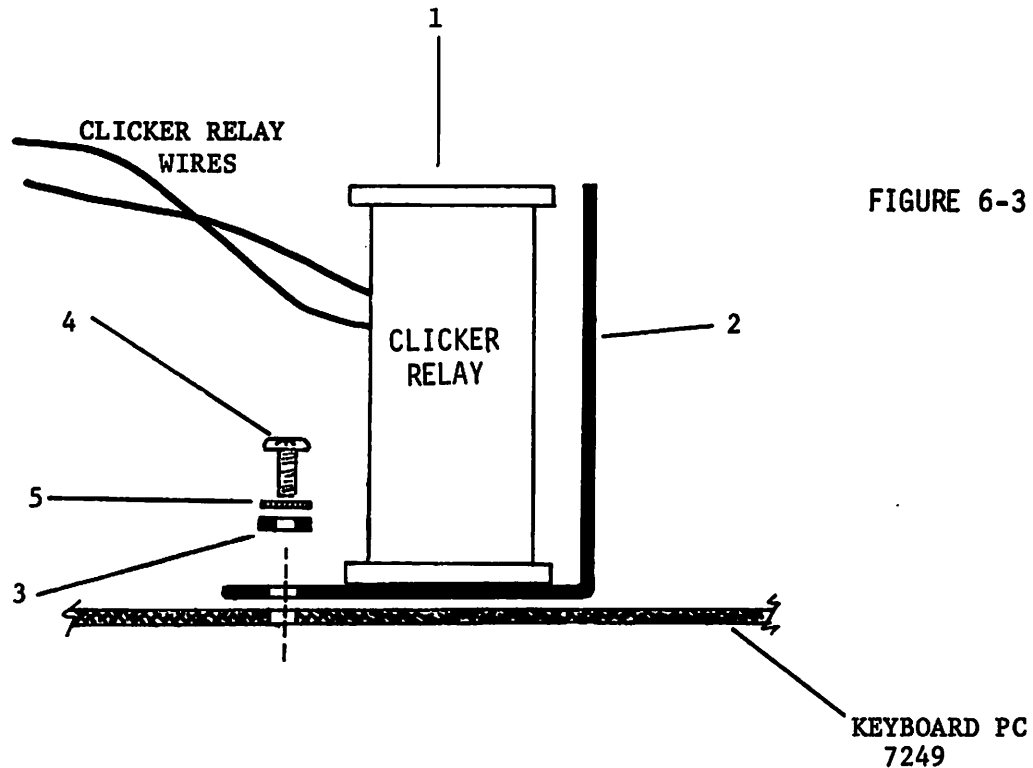


FIGURE 6-3

Parts required are as follows:

<u>ITEM</u>	<u>WL#:</u>	<u>QUANTITY:</u>	<u>DESCRIPTION</u>
1	320-0049	one	Keyboard Clicker (relay) Assy.
2	451-4379	one	Bracket, KB Clicker Mounting A6422-327

3	653-0003	one	No. 4 Nylon Flat Washer
4	650-2160	one	4-40 x 1/2" Pan Head PHL MS
5	653-2002	one	No. 4 Int. T Lock Washer

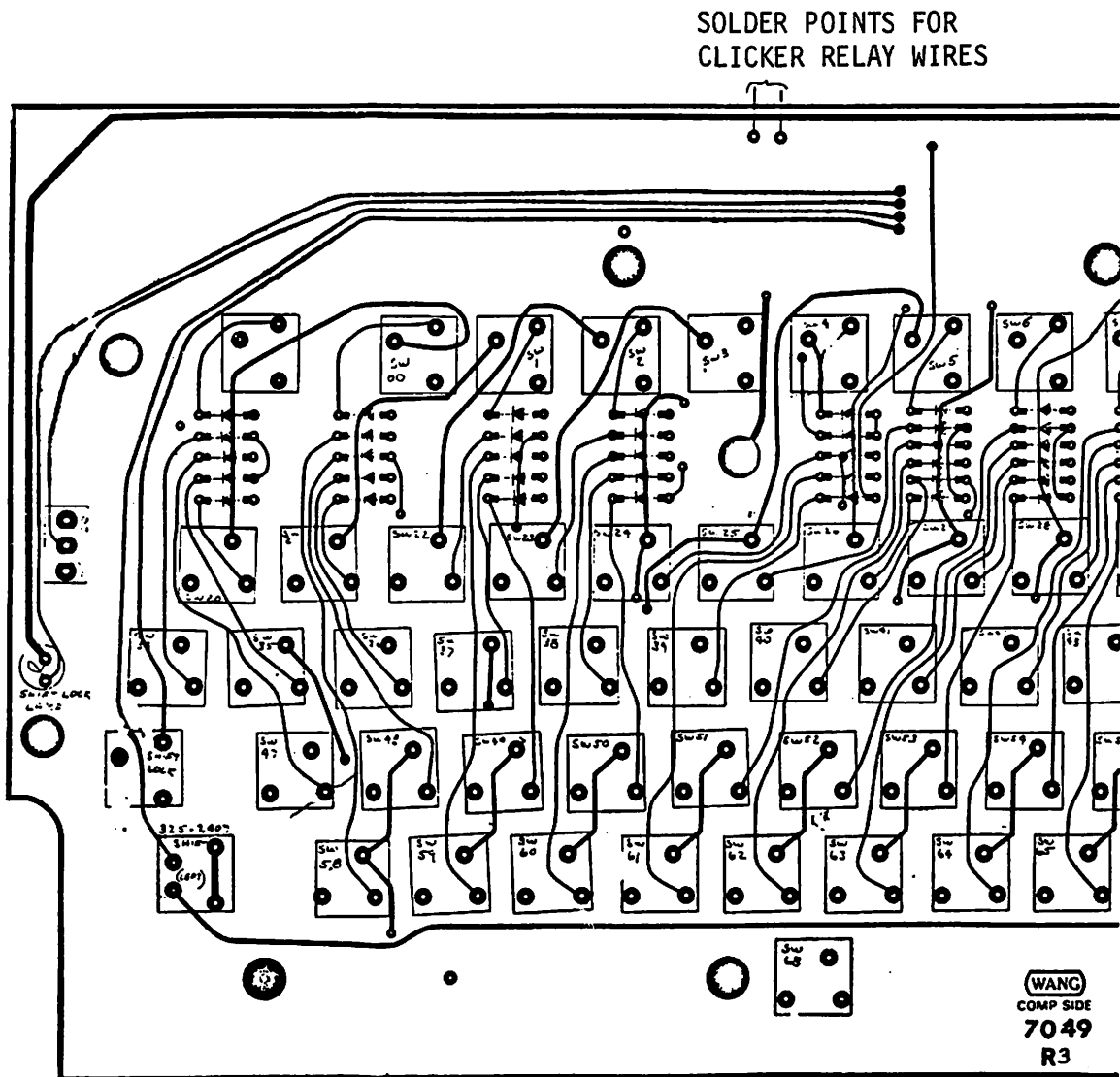


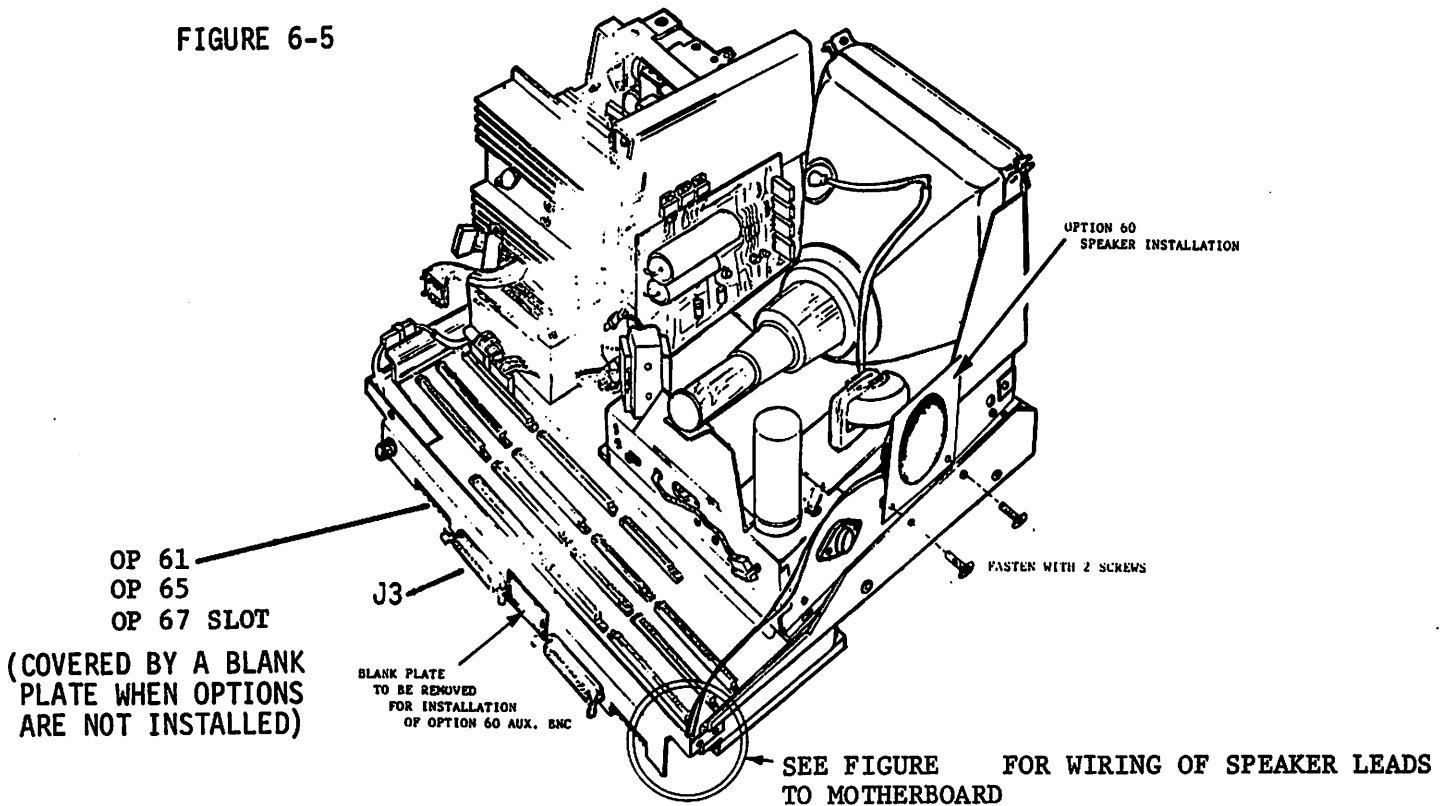
FIGURE 6-4
(7049 KEYBOARD)

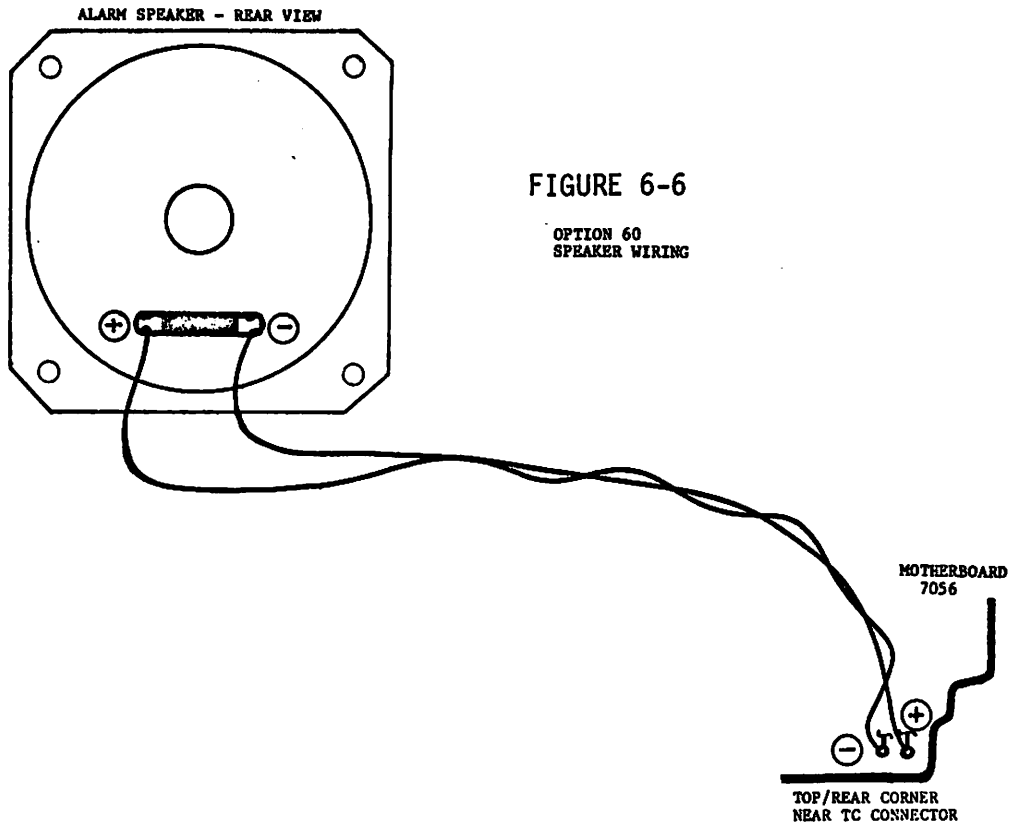
3. Proceed as follows for Audio Alarm speaker installation (Ref: Figures 6-5 and 6-6).

Parts required are as follows:

<u>ITEM</u>	<u>WL#:</u>	<u>QUANTITY:</u>	<u>DESCRIPTION</u>
1	320-0300	one	3" Speaker
2	650-3160	two	6-32 x 1/2" Pan Head PHL SEMS
3	652-0032	two	6-32 KEPS NUT
4	380-3001	one	Diode, 1N3255
5	600-2000	one	Black Wire, 24GA
6	600-2002	one	Red Wire, 24GA
7	605-0105	one	#6 Tubing (9" length)

FIGURE 6-5





4. Proceed as follows for Auxiliary Display BNC Connector installation (Ref: Figure 6-7).

Parts required are as follows:

<u>ITEM</u>	<u>WL#:</u>	<u>QUANTITY:</u>	<u>DESCRIPTION</u>
1	615-0377	one	BNC Mounting Plate
2	350-1036	one	BNC Socket Assembly
3	654-1011	one	3/8" Ground Lug
4	220-1069	one	CRT Cable/Male Nylon Connector
5	220-1026	one	CRT Cable/Female Nylon Connector

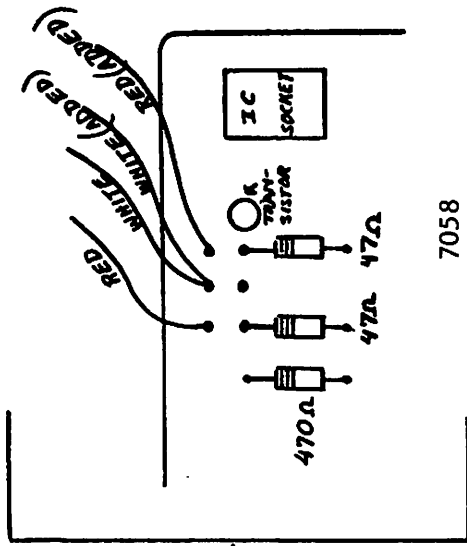
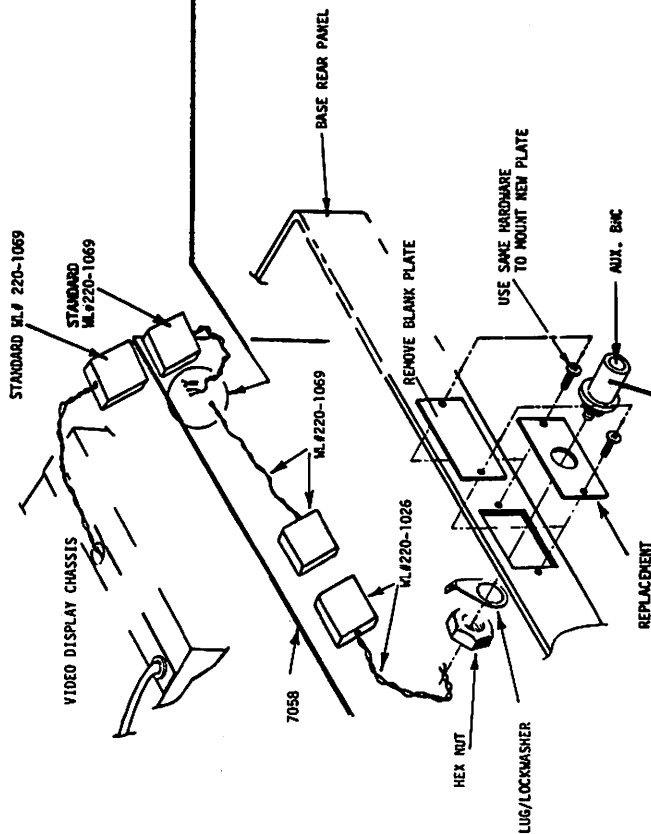


FIGURE 6-7
 ADDITION OF AUXILIARY
 BNC CONNECTOR
 (PART OF OP-60)



RED TO CENTER CONDUCTOR
 WHITE TO LUG/LOCKWASHER

WIRING OF CABLE 220-1026 TO BNC:

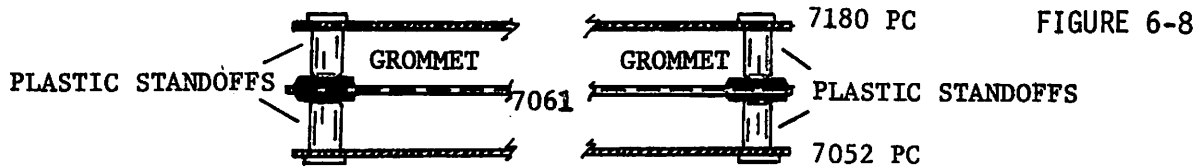
Reassemble the unit with the exception of the mini-disk cover. Turn power on and check the regulated voltages via opening in mini-disk base. Turn power off and reassemble the remainder of the unit. Run the Option 60 diagnostic. Run all other appropriate diagnostics (Section 5).

6.5 OPTION 60A 80 x 24 DISPLAY 7159 PC; KIT WL #177-22EA-60

1. Remove covers as described in paragraph 7.2.2 items a) through d).
2. Remove the 2 standoff screws holding PCBs together.
3. Disconnect the video signal cable going from the 7058 I/O controller (rearmost PCB) to the CRT (connector should be located near the back of display unit).
4. Remove the 7058 PCB.
5. On the 7159 (80 x 24 controller), the keyboard and printer addresses are hardwired to ØØ5 and Ø15, respectively.
6. The address of the *plotter* is hardwired to '1X' where 'X' is determined by SW1 (see Figure 2-7).
7. Once the switch has been set, insert the 7159 board in the slot that the 7058 was in, and reconnect the twisted wire pair (video signal from 7159).
8. Reassemble screws and standoffs at the top corners of the boards.
9. Turn power ON and check PCS-II regulated voltages.
10. Since 80 x 24 display timing is more critical than 64 x 16 timing, perform display adjustment procedures documented in Service Bulletin #73 (Wang Monitor) or in the 2200 Maintenance Manual for the Motorola Display.
11. Turn power *off* and complete reassembly of the PCS-II (Ref: paragraph 2.4).
12. To test 80 x 24 controller, run the diagnostic in paragraph 5.5; also, run all other appropriate diagnostics.

6.6 OPTION 61 - OUTPUT WRITER; KIT #177-22EF-61

1. Disassemble PCS-II per steps a) thru i) in paragraph 7.2.2.
2. Remove blank plate from rear apron of unit base at location adjacent to J3 (Ref: Figure 6-5).
3. Remove motherboard strengthening bracket (see Figure 1-10) and set aside hardware for reinstallation.
4. Attach 24-pin Amphenol connector and plate assembly in place of blank plate removed in step 2.
5. Place the 44-pin PC connector and I/O cable into the option slot (see location of OP-61 connector 4 slot in Figure 1-8) in the motherboard. Be sure to install the 44 pin connector so that components on the option board (7061) will face rear.
6. Install mounting hardware for 44-pin PC connector (2 screws, 2 lock-washers, 2 nuts).
7. Lay the Option 61 I/O cable against the motherboard. Observe the location of the rubber grommet for the motherboard strengthening bracket in relation to the cable position.
8. Spread the cable wires accordingly to provide room for the grommet; ensure that the cable wires are not pinched.
9. Replace the motherboard strengthening bracket.
10. Replace the chassis into the PCS II baseplate.
11. The normal address switch setting for output writer is 11; set this address on the 7061 board.
12. Install one rubber grommet in each top/outside hole of the 7061 I/O board.



13. Install the 7061 PC and reinstall other PC's previously removed.
14. Replace standoff hardware through PC boards (two screws; one on each side).
15. Turn PCS-II power on and check regulated voltages.
16. Turn power off and reassemble all hardware.
17. Connect Output Writer cable to J3.
18. Turn PCS II power and Output Writer power ON.
19. Run the diagnostic test for OP-61. Run all appropriate diagnostics.

6.7 OPTION 62 - TELECOMMUNICATIONS; KIT WL #177-22EE-62

1. a) Turn power off (unplug system). Disassemble per steps a) and b), paragraph 7.2.2.
- b) If the PCS-II motherboard is artwork REV 2 or below, perform the following ECN:

ECN 5870. Wires must be run to initiate certain signals:

<u>ITEM</u>	<u>FROM TC CONNECTOR</u>	<u>SIGNAL NAME</u>	<u>(4TH SLOT FROM REAR) TO SPARE SLOT</u>
1	Pin 11	SCA	6 1
2	Pin 12	SCF	7 1
3	Pin 15	DB	F 1
4	Pin 17	DD	E 1
5	Pin 18	SFG	5 1
6	Pin 19	SCA	D 1

2. Set the address switch on the 7153 board per paragraph 2.2.
3. Install one rubber grommet in each top/outside hole of the 7153 board.
4. Replace the disk controller 7180 PCB into the slot closest to the CRT.
5. Now install the 7153 board in the spare slot behind the disk controller. Press firmly on alternate ends of the board until it is properly seated in place; replace remaining boards. Per Section 2.4, connect CRT cable from 7058 (7159) PCB.
6. Replace standoff screws through PC boards (two; one each side).
7. Reassemble as described in Section 2.4, step 8. Turn ON and check Power Supply Voltages.
8. When the PCS II has been reassembled, plug the system into an AC outlet and turn power on.
9. Run OFF-LINE and ON-LINE diagnostics for OP 62.

6.8 OPTION 62B - BISYNC TELECOMMUNICATIONS CONTROLLER; KIT #177-22EA-62

Same as OPTION 62.

6.9 OPTION 65 IEEE - 488 STANDARD INTERFACE (2254 EQUIVALENT); KIT #177-22EE-65

1. Turn power off (unplug system).
2. Disassemble PCS-II per steps 7.2.2 a) through i).
3. Remove blank plate from rear apron of unit base at left side (facing rear).
4. Remove motherboard strengthening bracket (see Figure 1-10) and set aside hardware for reinstallation.

5. Attach 24-pin Amphenol connector and plate assembly in place of blank plate removed in step 3.
6. Route the I/O cable through the opening in the motherboard at the option slot.
7. Lay the I/O cable against the motherboard. Observe the location of the rubber grommet for the motherboard strengthening bracket in relation to the cable position.
8. Spread the cable wires accordingly to provide room for the grommet; ensure that the cable wires are not pinched.
9. Replace the motherboard strengthening bracket.
10. Replace the chassis into the PCS-II baseplate.
11. On the 7154 board, the normal device address switch setting is HEX 4C for the IEEE interface. Addresses 4D, 4E and 4F are also specified for the 7154.

To set the normal address 4C, set SW2 (Ref: Figure 2-5), with rocker switches 7, 4 and 3 on.

12. Set the Listener/Talker 5-bit switches.
13. Install the appropriate parallel poll and controller/non-controller jumpers.
14. Install one rubber grommet in each top/outside hole of the 7154 IEEE interface.
15. Inspect the 7154 before inserting it into the vacant slot between the disk controller and the RAM/ROM boards (Ref: Figure 1-3). Connect the I/O cable to the 7154 board per Figure 6-1.
16. Refer to Section 2.4 for installing PCBs.
17. Turn power on and check unit voltages.

18. Turn power off and complete reassembly of PCS-II.
19. Turn power back on and run the OP-65 IEEE 488 diagnostic stored on Diagnostic Diskette #2. Run all other appropriate diagnostics from Section 5.
20. Connect the IEEE 488 peripheral (if one is available) to the Amphenol connector installed by step 4.

6.10 OPTION 67 - I/O 8 BIT PARALLEL INTERFACE; KIT #177-22EE-67

1. Turn power off (unplug system).
2. Disassemble PCS-II per Section 7.2.2, steps a through i.
3. Remove blank plate from rear apron of unit base at left side (facing rear).
4. Fit cable through opening until the amphenol connector at the end of that I/O cable is snug against the rear apron option slot. Attach 36 pin amphenol connector and plate assembly in place of blank plate removed step 2. The switch on the 7155 board is set with an even address and is designated as the input address (Ref: Figure 2-6). The address immediately following the chosen primary address is an odd address which is automatically selected (hardwired on the 7155) as the output address. Normally the I/O controller *input* address is 3A; output is 3B.
5. Set the appropriate Input/Output signal polarities for *normal* or *invert* with the appropriate jumpers as shown on the schematic.
6. Install one rubber grommet in each top/outside hole of the 7155 I/O interface.
7. Inspect the 7155. Insert 7155 board (component side facing rear) in the vacant slot between the disk controller 7180 and the RAM/ROM 7052/52-1 board. Press firmly on alternate sides of the top of the board until the board is seated properly.

8. Route the cable installed up to the finger connector on the lower left corner of the 7155 (Ref: Figure 6-1). Pins A-Z are towards the rear; pins 1-22 are on the CRT side. Push the cable as close to the motherboard as possible. When the other CPU boards are installed, be sure the cable is under the board extrusion. This will keep the cable in place (Ref: Figure 6-1).
9. Avoid routing the cable where the fan will obstructed.
10. Reassemble the unit (leave covers off) per Section 2.4.
11. Turn power on and check power supply voltages.
12. Turn power off and complete reassembly of the PCS-II.
13. Turn power on and run the OP67 diagnostic on Diagnostic Diskette #2 (see paragraph 5.7.6) to insure proper operation of interface. Run all other appropriate diagnostics in Section 5.
14. Connect I/O device to rear panel connector installed by step 4.

6.11 50/60 Hz CONVERSION

Refer to appropriate schematic of 7058 or 7159 to verify jumper position.

- a) Remove the 7159 or 7058 I/O controller.

- b) To allow versatility with the I/O controllers, jumpers are used for 50Hz and 60 Hz operation. The diagrams that follow show jumper placement for 50/60 Hz variations.

NOTE:

- 1) The dotted jumper on the 7058 diagrams is an etch on the wire side of the board that should be cut for 50Hz and jumpered for 60 Hz.
- 2) There is one jumper on the 7159 that is not shown on the diagrams. It is located between L39 and L40 (toward the top of the chips). The common point is tied to a 220 pf mica capacitor, and the selectable points are connected to L40 pins 3 and 5. The common point should be tied to pin 3 for 60 Hz or pin 5 for 50 Hz.
3. 50 Hz boards should be marked with a '-1'; example: 7058-1.

6.12 PCS II TO PCS IIA CONVERSION

A PCSII can be upgraded to a PCS IIA by means of Conversion Kit #200-0132. This kit includes a new chassis (WL #270-0380-A) and a 7054/7059 PCB. Simply install the new chassis, replace the 7058/7159 board in the PCS II with the 7054/7059 and install the unit as described in Section 2.5.2. Disassembly instructions are in Section 7.2.2.

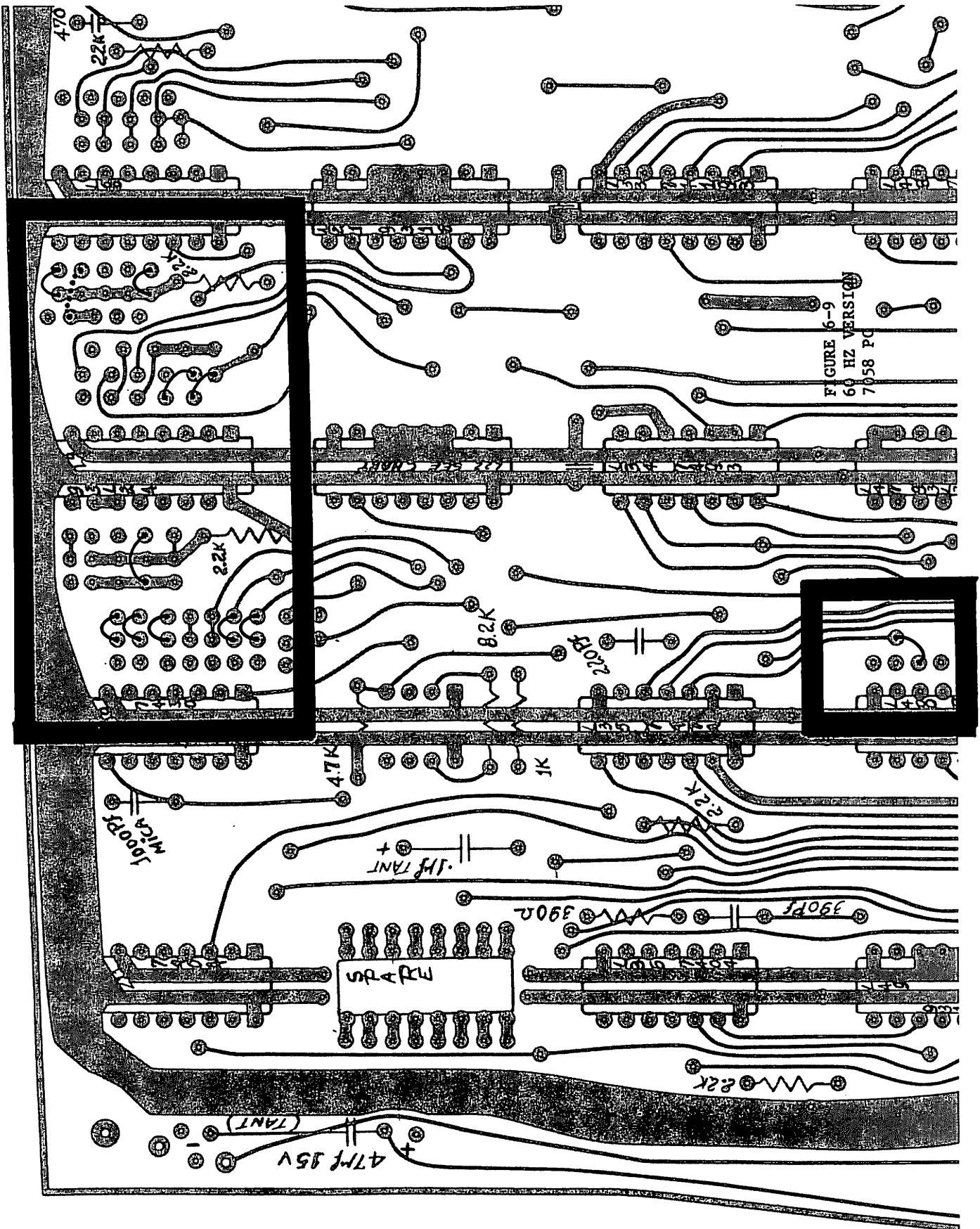


FIGURE 6-9
60 HZ VERSION
7958 PC

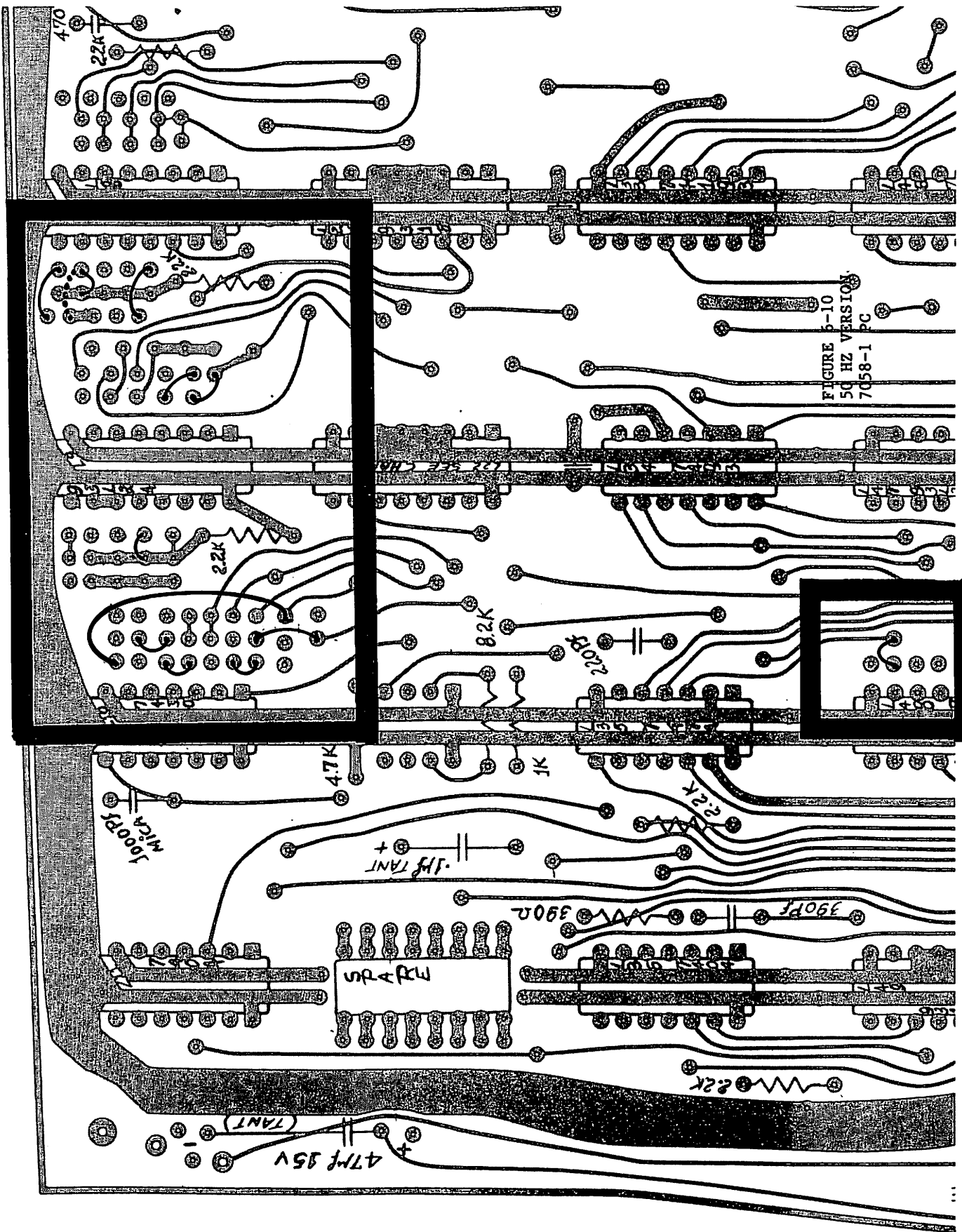


FIGURE 6-10
50 HZ VERSION
7058-1 PC

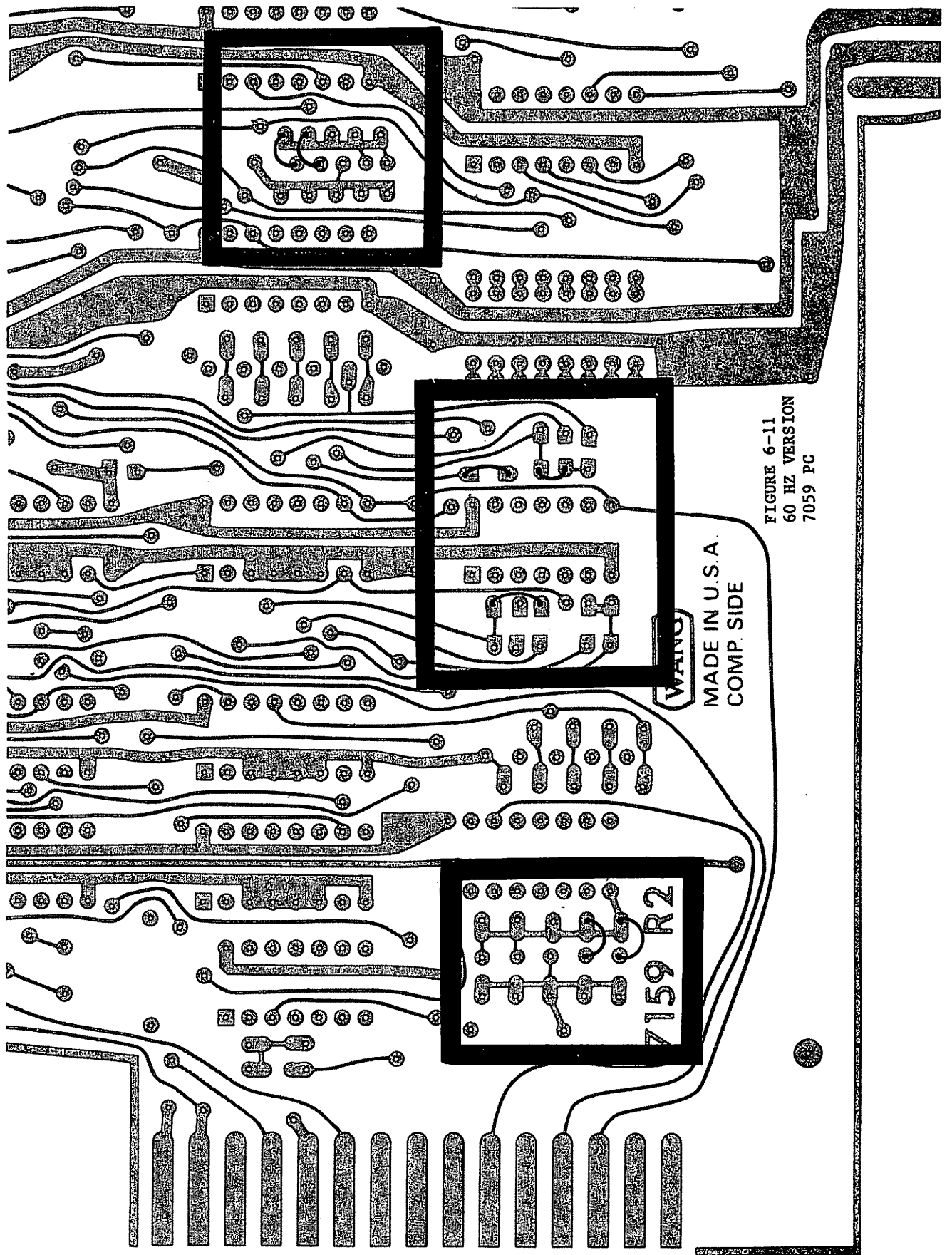


FIGURE 6-11
60 HZ VERSION
7059 PC

MADE IN U.S.A.
COMP. SIDE

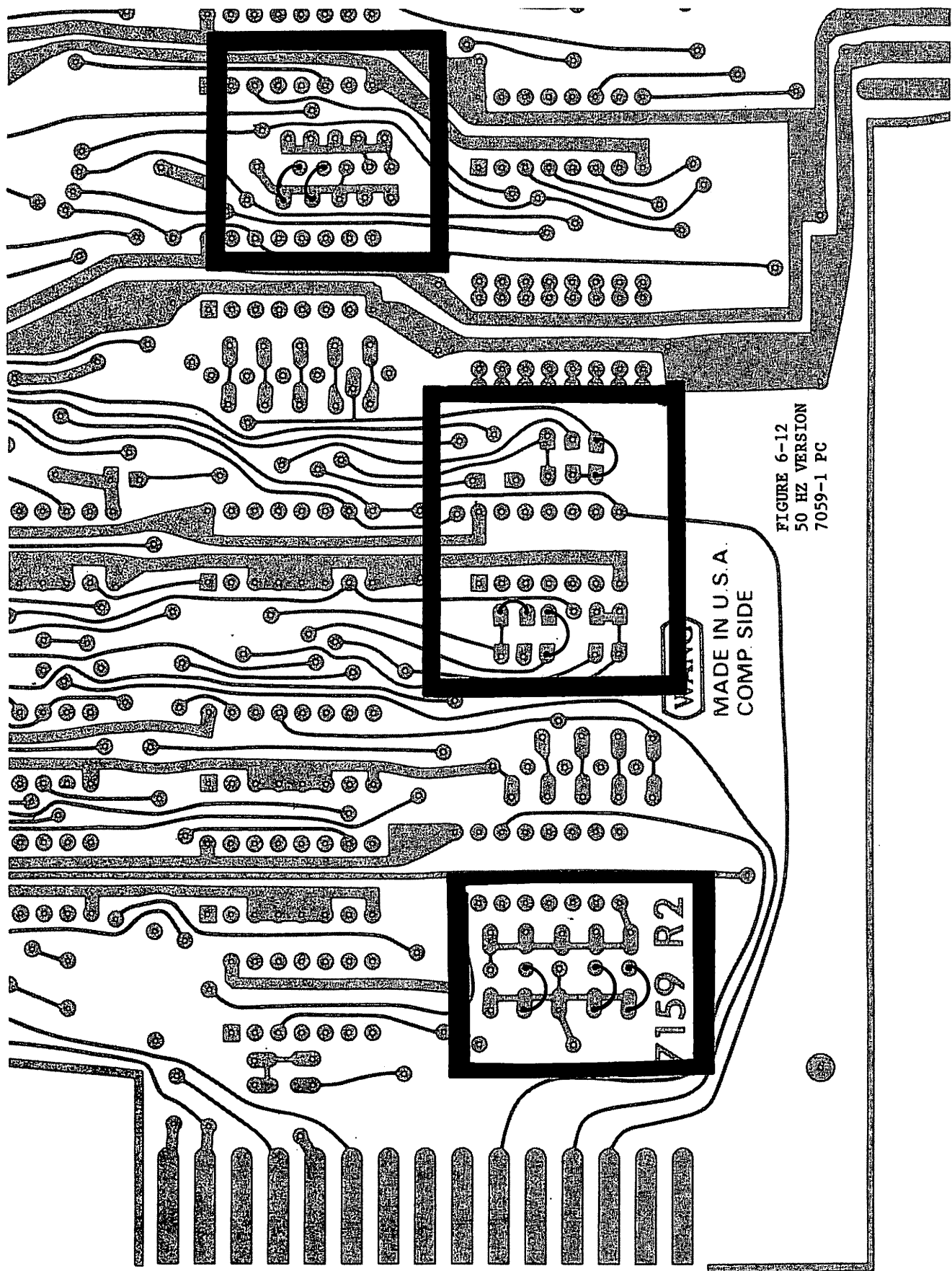


FIGURE 6-12
50 HZ VERSION
7059-1 PC

MADE IN U.S.A.
COMP. SIDE

7159 R2

SECTION 7
MAINTENANCE

7.1 DISASSEMBLY

7.1.1 RECOMMENDED TEST EQUIPMENT/TOOL LIST

- a) Digital Voltmeter, with an accuracy of at least $\pm 1\%$ of full scale and 1 mv. resolution factor. Multimeter/VTVM accuracy and resolution factors are unacceptable for certain critical measurements.

Acceptable Type/Equivalent: FLUKE #8000A

- b) Multimeter, 20,000 Ω/v (min.); 2% or greater full scale accuracy; for less critical measurements.

Acceptable Type/Equivalent: TRIPLETT VOM #630NA

- c) Oscilloscope, with two x 1 probes and two x 10 probes.

Acceptable Type/Equivalent: TEKTRONIX #465

- d) Allen Wrench Set

- e) Plastic Alignment Screwdriver for video display adjustments.

- f) Torque Driver (Utica TS-100)

- g) Heavy Duty Screwdriver with heavily insulated handle and shaft, for discharge of video display anode voltage.

- h) Insulated Heavy-Gauge Ground Wire with insulated Alligator clips (for use with item (g), above).

- i) Small Screwdriver with insulated shaft, used mostly for voltage adjustments.

- j) Head cable extender (Shugart #54143; WL #726-9640).

- k) Alignment Diskette (Shugart #SA 124; WL #726-9614).

- 1) Alcohol pads for R/W head cleaning (WL #660-0130).

7.2 PREVENTIVE MAINTENANCE

Except for cleaning of the mini-floppy Read/Write head, preventive maintenance is not required for the SA400 under normal use.

7.2.1 READ/WRITE HEAD CLEANING PROCEDURE

The head should ONLY be cleaned if it has an oxide build-up that is visible to the naked eye. Cleaning methods and materials other than those listed can permanently damage the head and should be avoided.

1. Lightly dampen a piece of clean lintless tissue with Isopropyl alcohol (use sparingly).
2. Lift the load arm off the head, being careful not to touch the load button.
3. Lightly wipe the head with the moistened portion of the tissue.
4. After the alcohol has evaporated, lightly polish the head with a clean dry piece of lintless tissue.
5. Lower the load arm onto the head. Do not let the load arm snap back.

7.2.2 DISASSEMBLY

CAUTION:

Ensure power is off and fan has stopped. If cover is removed while the fan is turning, the fan blades will break.

- a) Minidisk Cover - Remove the screw in the rear of the mini disk cover, lift cover up vertically. When planning to also remove the chassis cover, remove the flat ribbon cable(s) from the rear of the mini disks (J1 & J3 on top of drive(s)). Disconnect both power cables (one to each drive). Disconnect the fan cable on the right side of unit.
- b) Top Cover - Remove mini disk cover. Remove the two side cover screws. Loosen the two finger nuts and remove the special function strip. Remove the two screws found under the function strip. Remove Brightness and Contrast knobs. Using the function strip finger nuts, lift the key plate up and back until free. Firmly hold the top cover sides and lift upward until cover clears the top of inside components. Lay top cover on its side and disconnect fan cable.

CAUTION:

Do not remove the fish paper that covers the ventilation slots on the underside of the top cover.

- c) Keyboard - Remove top cover. Remove the four screws at the sides of the keyboard plate. Tilt the front of the keyboard up while lifting the keyboard out. Disconnect the 24-pin ribbon cable. Disconnect the OFF/ON switch cable which goes to a nylon connector; see Figure 1-10.
- d) Circuit Board Removals - Turn all power off and remove the top cover. Remove the two long screws extending through the plastic standoffs at the top outside corners of each board.
- e) Chassis - Remove keyboard. Remove the two side screws and lift the unit up and forward, being careful not to damage the AC power cord and fuse holder.
- f) 7058/7159 (I/O) - Disconnect the video cable and lift the board upward while rocking it slightly from side to side.

- g) 7051 (CPU) - Lift board upward while rocking it slightly from side to side.
- h) 7052 (MEMORY - RAM/ROM) - Same as 7051.
- i) 7180 (Mini Diskette Controller) - Remove this board cautiously; the neck of the CRT is very close to the 7180.
- j) 7056 (MOTHERBOARD) - Remove chassis assembly from baseplate. Remove the 7051, 7052, 7180 and 7058 circuit boards. Remove screws located at circuit board amphenol connectors and at each side of the motherboard. Remove 7056 motherboard from bottom of chassis assembly.
- k) 7067-2 (POWER SUPPLY REGULATOR) - Lift 7067-2 hold-down bracket; pull board upwards while rocking it slightly from side to side (be careful of display monitor).
- l) 7048 (KEYBOARD ENCODER) - Remove keyboard. Disconnect ribbon cable. Remove 3 Phillips screws from 7048 pc. Unplug 7048 from the keyboard.
- m) Mini Diskette Drive Removal - Disassemble unit per step a. To remove the primary drive, unsolder the wires connected to the format switch at the disk drive end. Remove the disk mounting bracket (2 screws from each side of the disk mounting bracket), thus removing disk drive(s) simultaneously (applied to single or dual mini disk PCS II). Dislodge the bracket from the main chassis cover. Lift the bracket out; for the mini disk drive to be removed, remove 4 screws from the bottom of the drive.

7.3 ADJUSTMENTS

7.3.1 PCS-II CPU VOLTAGE ADJUSTMENTS

TABLE 7-1

PCS-II POWER SUPPLY ADJUSTMENTS (7067-2 REGULATOR)

LOCATION	VOLTAGE	LIMITS	ADJ	RIPPLE	
7052 TP+5	+ 5VR	+4.95 vdc to +5.10 vdc	R4	20 mvp-p	7067-2, pin S/15
7052 TP-5	- 5VR	-4.90 vdc to -5.10 vdc	R19	15 mvp-p	7067-2, pin 12
7052 TP+12	+12VR	+11.80 vdc to +12.20 vdc	R10	50 mvp-p	7067-2, pin F/6
7052 TP-12	-12VR	-11.80 vdc to -12.20 vdc	R16	50 mvp-p	7067-2, pin H/7

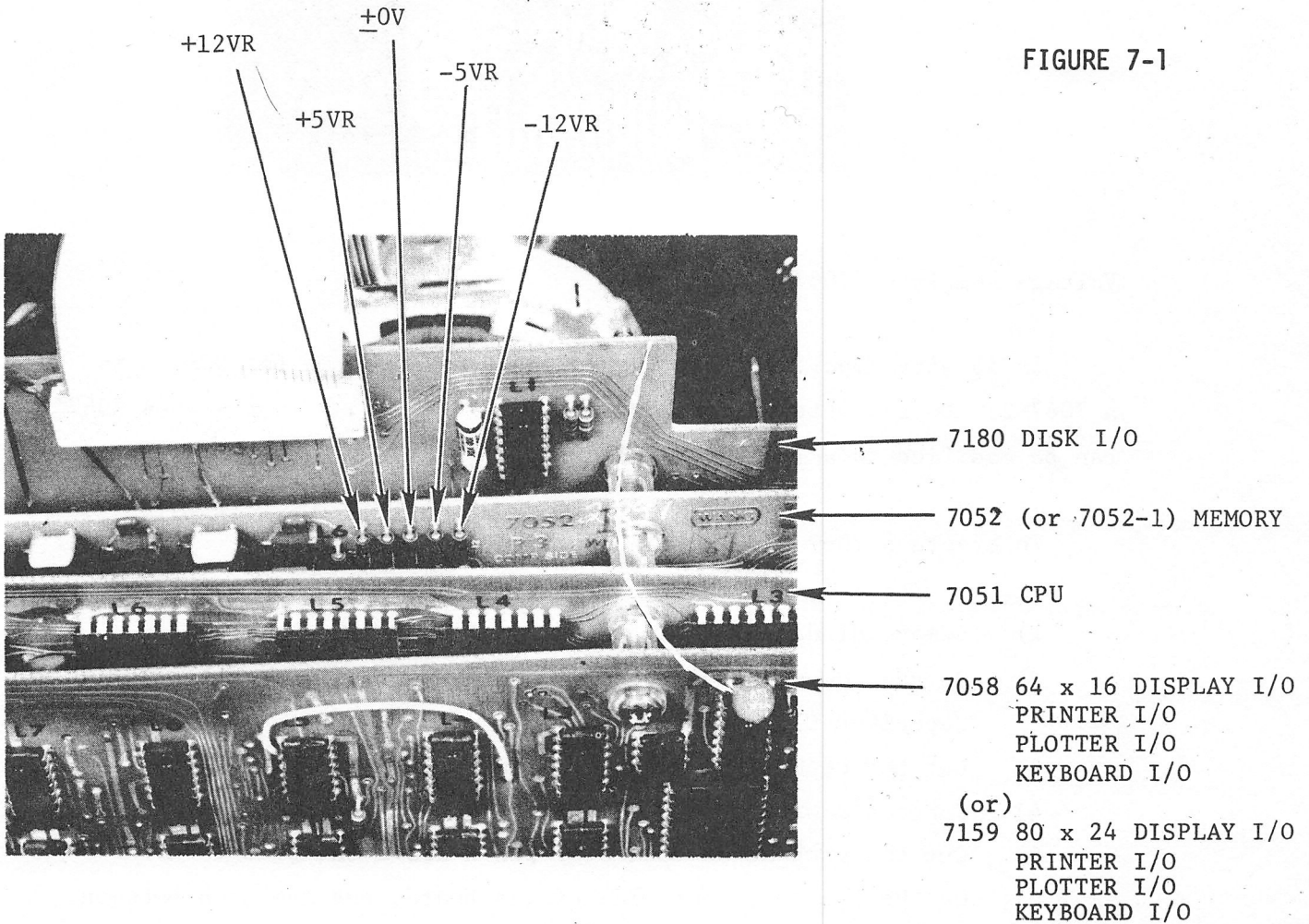
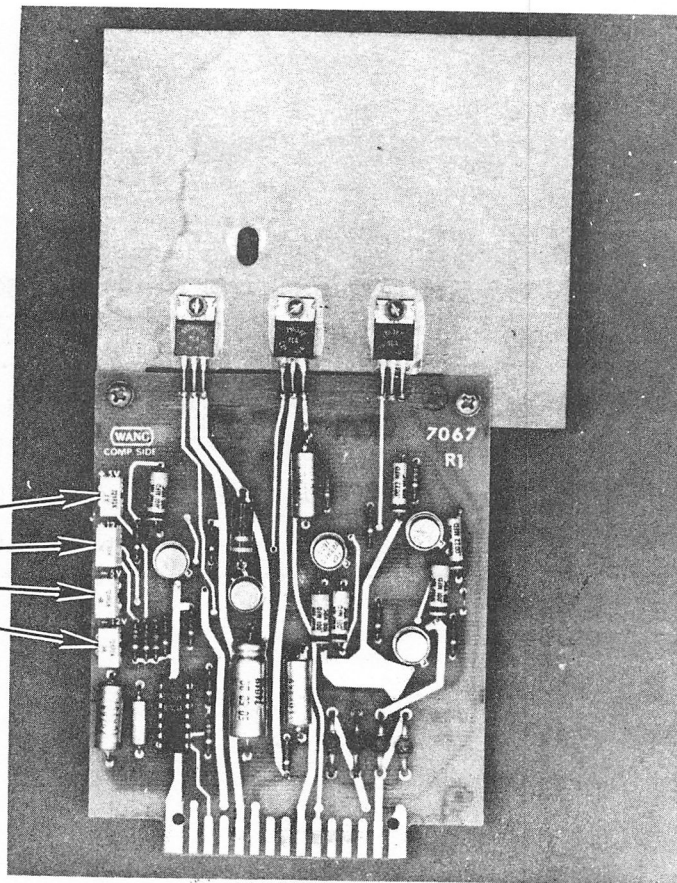


FIGURE 7-1

VOLTAGE CHECK POINTS AS VIEWED FROM TOP/REAR OF PCS-II;
ACCESS VIA MINI DISK BASE OPENING (MINI DISK COVER REMOVED)

FIGURE 7-2
ADJUSTMENTS

- +5 (R4)
- +12 (R10)
- 5 (R19)
- 12 (R16)



7067-2 REGULATOR

Voltage Regulator 7067-2 PCB

It is very important that the voltage regulator in the PCS-IF is a 7067-2. Do not attempt to substitute a 7067 A 7067 can be modified to a 7067-2 as follows:

To create a 7067-2 from 7067 art revs. 0, 1, 2, or 3:

- 1) Remove diodes D1 & D3.
- 2) On the component side, cut the etch between Q3 (emitter) and capacitor C7.
- 3) Cut the etch at pc connector pin F *below* the platethru.
- 4) Connect a wire from Q3 (emitter) to pc pin F.
- 5) Cut the etch at pc connector pin H *above* the platethru.
- 6) On the non-component side of the board, cut the etch between connector pin 7 and the platethru.
- 7) Cut the etch between L4 pin 8 and capacitor C10.

- 8) Connect a wire between L4 pin 8 and pc connector pin H at the platethru above pc connector pin 7.
- 9) Connect a wire between C10 and pc connector pin 7.
- 10) Change Q3 from a 2N6387 Darlington pair to a 2N6103 transistor WL #375-1035 (ECN 6929).
- 11) Change C7 from 10 μ f to 200 μ f, WL #300-4033 (part of ECN 6756).
- 12) Change C3 from 18 μ f to 47 μ f, WL #300-4020 (remainder of ECN 6756).
- 13) If conversion to 7067-2 is done with R2 artwork, remove jumper 'A' (Figure 7-5).
- 14) If conversion to 7067-2 is done with R3 artwork, remove jumper B (Figure 7-6).

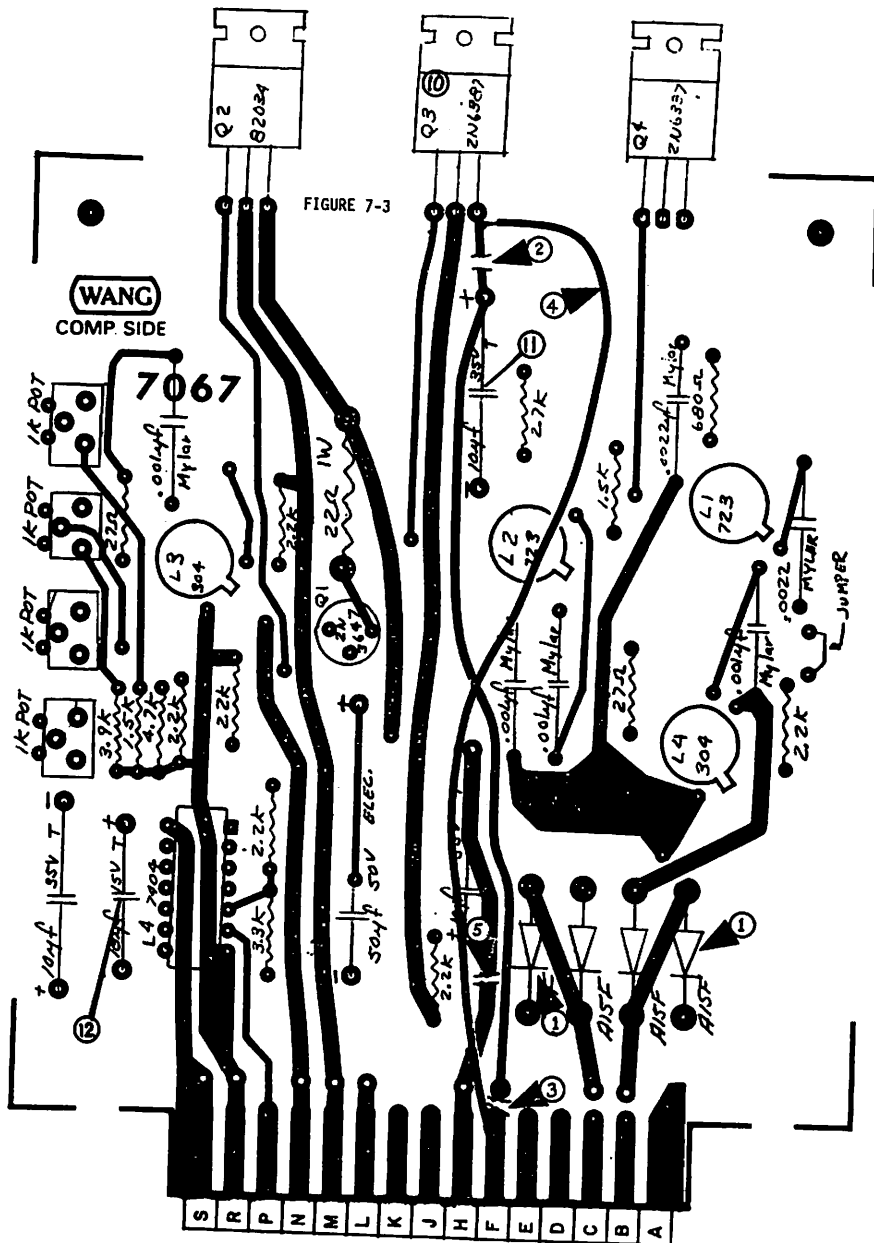
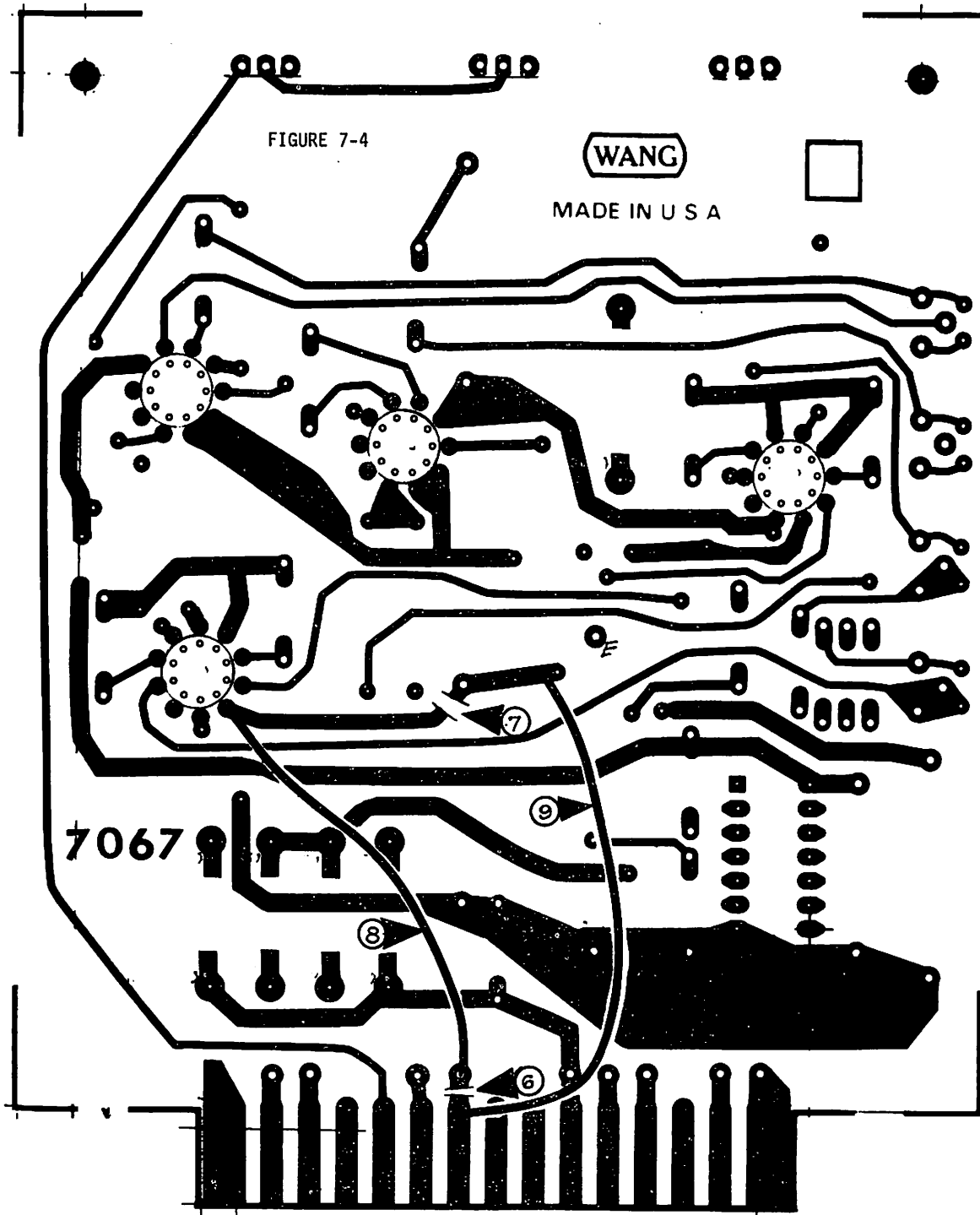


FIGURE 7-4



7.3.3 *MINI DISKETTE DRIVE; ADJUSTMENTS, REMOVALS, REPLACEMENTS*

Since original Shugart Mini Disk adjustments required the use of a disk exerciser (not available), adjustments have been rewritten using 2200 software. This information will be available in either a Service Bulletin addendum or a revision of the SA400 Manual.

7.4 PCS-II TROUBLESHOOTING

This information will be presented in a Bulletin addendum.

SECTION 8
PARTS LISTS

8.1 PCS II, WANG PARTS

ASSEMBLY PART NUMBER 177 2200 F2 LEGEND
ASSEMBLY DESCRIPTION 2200E2 COMMON MECH ASSY (2 FLOPPY) *KIT TAG #STATUS ITEM ###FRACTIONAL QTY

PART NUMBER	DESCRIPTION	QUANTITY
177 0064	DISKETTE, MINI FLOPPY	2.00
177 0064 UF	DISKETTE MINI FLOPPY W/OUT LABELS	1.00
615 1331	LABEL, MINI DISK(PCS2)WRITE R6611-65	1.00
615 1332	LABEL, MINI DISK(PCS2)HDLG B6611-66	1.00
615 1333	LABEL, MINI DISK(PCS2)BLANK B6611-67	1.00
210 7048 A * # 7048-A MODULE(A/I)		1.00
209 7048	# 7048 W/UNLOADED SOCKETS(A/I)	1.00
000 0001	LARDOR SUB-SYSTEMS	.95
000 0011	LARDOR QUALITY CONTROL	.19
300 1330	CAP 330 PF 10% 500 V CERAMIC DISC	1.00
300 1470	CAP 470 PF 10% 500 V CERAMIC DISC	1.00
300 1560	CAP 560 PF 10% 500 V CERAMIC DISC	1.00
300 1900	CAP .05 UF +80--20% 12 V CERAMIC D	5.00
300 3010	CAP 50 UF 50V -10+75% ELECT AXIAL	1.00
300 4022	CAP 15.0 UF 20 V 10% TANT AXIAL	3.00
300 4026	CAP 1.2 UF 35 V 5% TANT AXIAL	1.00
300 4032	CAP 10.0 UF 35 V 10% TANT AXIAL	1.00
300 5005	CAP 470 PF 5% 500 V MICA DIPPED	3.00
300 5007	CAP 330 PF 5% 500 V MICA DIPPED	1.00
330 2039	RES 390 OHM 1/4W 10% FIXED COMP	2.00
330 3022 R *	RES 2.2K OHM 1/4W 10% FIXED COMP	13.00
330 3047	RES 4.7K OHM 1/2W 10% FIXED FILM	1.00
330 4015	RFS 15K OHM 1/2W 10% FIXED FILM	1.00
330 4033 R *	RES 33K OHM 1/4W 10% FIXED COMP	3.00
331 2056	RES 560 OHM 1/2W 10% FIXED FILM	1.00
331 3010	RES 1K OHM 1/2W 10% FIXED FILM	2.00
333 0048	120K OHM 1/4W 2% RESISTOR	1.00
375 1024	TSTR 2N4234 1.0W 40V SP .PNP S T05	1.00
375 9001	TRANSIPAD 8977887-1 LARGE	1.00
376 0002	IC 7400N 4 2 IN POS NAND GATE	2.00
376 0006	IC 7474N 2 0 EDGE TRIG FLIP-FLOP	2.00
376 0028	IC 7403N 4 2 IN POS NAND GATE	3.00
376 0055	IC 7406 HEX INV BUF DRIVERS HV OUT	1.00
376 0056	IC 7407 HEX BUF DRIVER HV OUTPUT	1.00
376 0081	IC 7408 4 2 IN POS AND GATE	1.00
376 0104	IC 9602 2 RETRIG RESET MONOSTBL_MVR	3.00
376 9011	40 PIN IC SOCKET BURNDY # D1LR2A0P1	1.00
376 9016	24 PIN IC SOCKET (CAMBION)	1.00
376 9017	24 POS ANTI-WICKING WAFER	1.00
380 1001 4B	D035 SIL DIODE 30V, 100MA AT_1Y..4B RF2137	1.00
510 7048	A 7048 PRINTED CIRCUIT BOARD	1.00
377 0324	# EA2100PC ROM PATTERN (2200E)	1.00

ASSEMBLY PART NUMBER 177 2200 E2
ASSEMBLY DESCRIPTION 2200E2 COMMON MFCX ASSY (2 FLOPPY) LEGEND #=-KIT TAG #-STATUS ITEM ##=FRACTIONAL QTY

PART NUMBER	DESCRIPTION	QUANTITY
210 7051 A * # 7051-A MODULE(A/I)		
200 7051	# 7051 W/UNLOADED SOCKETS(A/I)	
000 0001	LABOR SUB-SYSTEMS	1.00
000 0011	QUALITY CONTROL	1.00
300 1180	CAP 180 PF 10% 500 V CERAMIC DISC	2.88
300 1903	CAP .01 UF +80-20X 25 V CERAMIC D	.58
300 1913	CAP .002 UF 20X 500 V CERAMIC DISC	1.00
300 4022	CAP 15.0 UF 20 V 10% TANT AXIAL	25.00
300 5005	CAP 470 PF 5% 500 V MICA DIPPED	2.00
330 2016 UB	RES 150 OHM 1/4W 5% FIXED COMP	4.00
330 2022 R *	RES 220 OHM 1/4W 10% FIXED COMP	1.00
330 2047 R *	RES 470 OHM 1/4W 10% FIXED COMP	3.00
330 3010 R *	RES 1K OHM 1/4W 10% FIXED COMP	32.00
330 3010 R *	RES 1K OHM 1/4W 10% FIXED COMP	5.00
330 4010	RES 10K OHM 1/2W 10% FIXED FILM	42.00
330 4034 UB	RES 33K OHM 1/4W 5% FIXED COMP	1.00
376 0002	IC 7400N 4 2 IN POS NAND GATE	3.00
376 0003	IC 7410N 3 3 IN POS NAND GATE	6.00
376 0004	IC 7420N 2 4 IN POS NAND GATE	1.00
376 0006	IC 7474N 2 D EDGE TRIG FLIP-FLOP	3.00
376 0008	IC 7442N 4 LINE-10 LINE DECODER	5.00
376 0010	IC 7404N HEX INVERTER	3.00
376 0012	IC 7451N EXP 2 W 2 IN AND OR INV GT	6.00
376 0016	IC 7402N 4 2 IN POS NOR GATE	1.00
376 0047	IC 74151 DATA SELECTOR MULTIPLEXER	2.00
376 0048	IC 74153 2 4-1 LINE DATA SEL MX	8.00
376 0049	IC 74155 2 2-4 LINE DECODER DEMX	20.00
376 0053	IC 74193 SYN 4 BIT UP DOWN COUNTER	1.00
376 0055	IC 7406 HEX INV BUF DRIVERS HV OUT	6.00
376 0056	IC 7407 HEX BUF DRIVER HV OUTPJT	1.00
376 0080	IC 74123 RETRIGGER MONDSTABLE MVB	2.00
376 0081	IC 7408 4 2 IN POS AND GATE	6.00
376 0082	IC 74157 4 2 IN MX	5.00
376 0093	IC 7432 4 2 IN OR GATE	7.00
376 0094	IC 74161 SYNCHRONOUS 4 BIT COUNTER	4.00
376 0096	IC 9321 2 1 OF 4 DECODER	1.00
376 0097	IC 74195 4 BIT PAR ACCESS SHIFT REG	3.00
376 0100	IC 9358 8 BIT MULTIPLE PORT REGISTR	4.00
376 0113	IC 7489 64 BIT READ WRITE MEMORY	8.00
376 0119	IC 74175 4 D TYPE EDGE TRIG. F.ZE	12.00
376 0122	IC 74184 BCD TO BINARY CONVERTER	1.00
376 0123	IC 74185 BINARY TO BCD CONVERTER	1.00

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ASSEMBLY PART NUMBER 177 2200 E2
ASSEMBLY DESCRIPTION 2200E2 COMMON MECH ASSY (2 FLOPPY)

LEGEND

*=KIT TAG #=STATUS ITEM ##=FRACTIONAL QTY

PART NUMBER	DESCRIPTION	QUANTITY
376 9003	24 PIN IC SOCKET BURNDY	1.00
510 7051	A 7051 PRINTED CIRCUIT BOARD	1.00
376 0099	IC 74181 ARITHMETIC LOGIC UNITS	1.00
210 7067 2	7067-2 MODULE (PCS II) (PRELIM) EC6825	1.00
300 2010	CAP .001 UF 10X 100 V MYLAR	4.00
300 2022	CAP .0022 UF 10X 100 V MYLAR	2.00
300 3010	CAP 50 UF 50V -10+75% ELECT AXIAL	1.00
300 4020	CAP 47.0 UF 15 V 10% TANT AXIAL	1.00
300 4032	CAP 10.0 UF 35 V 10% TANT AXIAL	1.00
300 4033	CAP 200.0 UF 15 V 10% TANT AXIAL	2.00
330 1027	RES 27 OHM 1/4W 10% FIXED COMP	2.00
330 2068	RES 680 OHM 1/4W 10% FIXED COMP	1.00
330 3015	RES 1.5K OHM 1/4W 10% FIXED COMP	3.00
330 3022 R *	RES 2.2K OHM 1/4W 10% FIXED COMP	6.00
330 3027	RES 2.7K OHM 1/2W 10% FIXED FILM	1.00
330 3033	RES 3.3K OHM 1/2W 10% FIXED FILM	2.00
330 3039	RES 3.9K OHM 1/2W 10% FIXED FILM	1.00
332 1022	RES 22 OHM 1W 10% FIXED COMP	1.00
333 0088	RES 5.11K OHM 1/8W 1% FIXED FILM	1.00
336 1014	1K TRIMPOT 90 DFG MOUNT BECKMAN#72X	2.00
336 1022	2K OHM TRIMPOT 90 DEG MT BECKMAN#72X	2.00
375 1024	TSTR 2N4234 1.0W 40V SP PNP S T05	1.00
375 1052	TRANSISTOR 2N6387 (PLASTIC)	2.00
375 1053	TRANSISTOR RCAB203A (PLASTIC)	1.00
375 9016	MICA INSUL#DFI03R FOR 375-1034/1035	3.00
376 0010	IC 7404N HEX INVERTER	1.00
376 0066	IC 723 VOLTAGE REGULATOR	2.00
376 0134	IC LM304 NEG VOLTAGE REGULATOR	2.00
380 3008	A15A RECTIFIER	1.00
478 0316	HEATSINK (F)REGULATOR RD R6829-145	1.00
510 7067	A 7067 PRINTED CIRCUIT BOARD	1.00
650 3131	6-32 X 3/8 NYLON COVERED FIL HD SLT	1.00
660 0123 *	THERMAL COMPOUND DOW#340(14 OZ TUBE	3.00
210 7180 A *	7180 MODULE	.01 ###
200 7180	* 7180 W/UNLOADED SOCKETS(PRELM PCS2)	1.00
000 0001	LABOR SUB-SYSTEMS	1.00
000 0011	LABOR QUALITY CONTROL	1.50 ###
220 3025	34 POS FT CABLE ASSY PCSII 6482-142	.30 ###
000 0001	LABOR SUB-SYSTEMS	2.00
000 0011	LABOR QUALITY CONTROL	.25 ###
350 0406 B	34 PIN FLT CBL CONN BOTTOM 3M 3402	.05 ###
350 0406 C	34 PIN FLT CBL CONN COVER 3M 3402	1.00

ASSEMBLY PART NUMBER 177 2200 E2
ASSEMBLY DESCRIPTION 2200E2 COMMON MFCB ASSY (2 FLOPPY) LEGEND **KIT TAG #=STATUS ITEM ###=FRACTIONAL QTY

PART NUMBER	DESCRIPTION	QUANTITY	###
300 1010	350 0407 34PDS CARD EDGE CONN 3M#3463-0001	1.00	
300 1900	420 0067 * 34 COND FLAT CABLE 3M 3365/34	.88	
300 1903	CAP 10 PF 10X 500 V CERAMIC DISC	1.00	
300 1908	CAP .05 UF +80--20X 12 V CERAMIC D	34.00	
300 2010	CAP .01 UF +R0--20X 25 V CERAMIC D	1.00	
300 2122	CAP .0022 UF 20X 500 V CERAMIC DISC	2.00	
300 3011	CAP .001 UF 10X 100 V MYLAR	3.00	
300 4012	CAP .022 UF 10X 100 V MYLAR	1.00	
300 4016	CAP 100 UF 16V -10+75% ELECT AXIAL	1.00	
300 4022	CAP .1 UF 35 V 10X TANT AXIAL	1.00	
300 4022	CAP .82 UF 35 V 10X TANT AXIAL	1.00	
300 4022	CAP 3.3 UF 15 V 10X TANT AXIAL	1.00	
300 4022	CAP 15.0 UF 20 V 10X TANT AXIAL	5.00	
300 4022	CAP 10 MC .05% RILEY BXW OSCILLATOR	1.00	
300 2018	RES 190 OHM 1/4W 10% FIXED COMP	1.00	
300 2022	RES 220 OHM 1/4W 10% FIXED COMP	2.00	
300 2047	RES 470 OHM 1/4W 10% FIXED COMP	14.00	
300 3015	RES 1.5K OHM 1/4W 10% FIXED COMP	1.00	
300 3022	RES 2.2K OHM 1/4W 10% FIXED COMP	1.00	
300 3047	RES 4.7K OHM 1/2W 10% FIXED FILM	26.00	
300 4012	RES 12K OHM 1/2W 10% FIXED FILM	1.00	
300 4027	RES 27K OHM 1/4W 10% FIXED COMP	2.00	
300 4047	RES 47K OHM 1/4W 10% FIXED COMP	2.00	
300 5010	RES 100K OHM 1/4W 10% FIXED COMP	2.00	
300 6018	RES 1.8M OHM 1/4W 10% FIXED COMP	1.00	
300 0030	SK OHM 15TURN TRIMPOT BCKMAN 89PRSK	2.00	
300 0002	IC 7400N 4 2 IN POS NAND GATE	8.00	
300 0003	IC 7410N 3 3 IN POS NAND GATE	3.00	
300 0005	IC 7473N 2 J-K MA-SLAVE FLIP-FLOP	2.00	
300 0006	IC 7474N 2 D EDGE TRIG FLIP-FLOP	6.00	
300 0007	IC 7476N 2 JK MA-SLV F/F PRST CLEAR	4.00	
300 0010	IC 7404N HEX INVERTER	8.00	
300 0012	IC 7451N EXP 2 W 2 IN AND OR INV GT	1.00	
300 0016	IC 7402N 4 2 IN POS NOR GATE	4.00	
300 0025	IC 993559X HEX INV DERECT IN-BASE	1.00	
300 0028	IC 7403N 4 2 IN POS NAND GATE	2.00	
300 0036	IC 7486N 4 2 IN EXCLUSIVE OR GATE	1.00	
300 0047	IC 74151 DATA SELECTOR MULTIPLEXER	1.00	
300 0048	IC 74153 2 4-1 LINF DATA SFL MX	8.00	
300 0049	IC 74155 2 2-4 LINE DECODER DENK	2.00	
300 0053	IC 74193 SYN 4 BIT UP DOWN COUNTER	3.00	
300 0056	IC 7407 HEX BUF DRIVER HV OUTPUT	1.00	

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ASSEMBLY PART NUMBER 177 2200 F2
ASSEMBLY DESCRIPTION 2200E2 COMMON MECH ASSY (2 FLOPPY)

LEGEND

*KIT TAG #STATUS ITEM ###=FRACTIONAL QTY

PART NUMBER	DESCRIPTION	QUANTITY
376 0073	IC 7490 DECADE COUNTER	1.00
376 0080	IC 74123 RETRIGGER MONOSTABLE MVB	2.00
376 0081	IC 7408 4 2 IN POS AND GATE	4.00
376 0082	IC 74157 4 2 IN MX	3.00
376 0093	IC 7432 4 2 IN OR GATE	6.00
376 0094	IC 74161 SYNCHRONOUS 4 BIT COUNTER EC6673	3.00
376 0096	IC 9321 2 1 OF 4 DECODER	2.00
376 0097	IC 74195 4 BIT PAR ACCESS SHIFT REG	1.00
376 0098	IC 74174 HEX D TYPE FLIP FLOP	8.00
376 0102	IC 74164 8 BIT SER TO PAR CONVERTER	3.00
376 0104	IC 9602 2 RETRIG RESET MONOSTBL MVB EC6673	2.00
376 0119	IC 74175 4 D TYPE EDGE TRIG F/F	1.00
376 0126	IC 555 TIMER	1.00
376 0138	IC 74298 4 2 IN MX W/STORAGE	4.00
376 0148	IC 74LS266 4 2 IN EXCL NNR GATE	2.00
376 0180	IC 74LS04 HEX INVERTER	1.00
376 9003	24 PIN IC SOCKET RURNDY	4.00
376 9010	22 PIN IC SOCKET BURNDY # DILRZ22P1	4.00
380 0000 4R	.49 GERMANIUM DIODE	1.00
380 1001 4B	D035 SIL DIODE 30V, 100MA AT IV .4R	31.00
510 7180	C 7180 PRINTED CIRCUIT BOARD EC6673	1.00
376 0099	IC 74181 ARITHMETIC LOGIC UNITS	2.00
377 0308	# 2101-1 RAM I.C.	4.00
377 0317	# 2708 INTEL PROM	2.00
378 2058 *	PCS-2 MINI FLOPPY	.00
378 2059 *	PCS-2 MINI FLOPPY	.00
220 1026 *	CRT CABLE ASSY(2220)B64R2-37	1.00
000 0001	LABOR SUB-SYSTEMS	.08
000 0011	LABOR QUALITY CONTROL	.02
600 2002	WIRE 24 GA RED UL	.67
600 2009	WIRE 24 GA WHITE UL	.67
605 0109	TUBING NO 6 CLEAR	.54
654 1149	PIN HOUSING 1-4A0305-0	1.00
654 1165 R	PIN TERM 30-22 GA(REEL)AMP3500079-4	2.00
220 1072	9"CRT CABLE R6482-R9	1.00
000 0001	LABOR SUB-SYSTEMS	.09
000 0011	LABOR QUALITY CONTROL	.02
600 0000	WIRF 18 GA BLACK UL	.66
600 0009	WIRF 18 GA WHITE UL	.66
600 0054	WIRF 18 GA GREEN/YELLOW UL	.66
605 0014	TUBING #5 CLEAR	.50
654 1163 R	SOCKET 20-14 GA(REEL)AMP 61117-4	3.00

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ASSEMBLY PART NUMBER 177 2200 F2 LEGEND
ASSEMBLY DESCRIPTION P200E? COMMON MFCH ASSY (2 FLOPPY) #=KIT TAG #=STATUS ITEM ###=FRACTIONAL QTY

PART NUMBER	DESCRIPTION	QUANTITY
654 1195	4 POS SOCKET HOUSING AMP 1-4R0424-0	1.00
270 0367	* 9" MONITOR ASSY W/OUT PWR SUPPLY	1.00
210 7256 1	* 72561 MODULE(PRELIM 9" MONITOR)	1.00
300 1470	CAP 470 PF 10% 500 V CERAMIC DISC	1.00
300 1820	CAP 820 PF 10% 500 V CERAMIC DISC	1.00
300 1912	CAP .02 UF 20% 500 V CERAMIC DISC	2.00
300 1915	CAP .0056 UF 20% 500 V CERAMIC DISC	1.00
300 1916	CAP .02 UF +R0-20% 1.4 V CERAMIC D	2.00
300 1918	CAP .1 UF +R0-20% 20 V CERAMIC DISC	1.00
300 2215	CAP .15 UF 10% 100 V MYLAR	1.00
300 2247	CAP .47 UF 10% 100 V MYLAR	3.00
300 2310	CAP .1 UF 10% 400 V MYLAR	1.00
300 2414	CAP .01 UF 10% 50 V POLYSTYRENE	1.00
300 2415	CAP .0033 UF 10% 600 V MYLAR	1.00
300 2416	CAP .68 UF 10% 200 V METL MYLAR	1.00
300 2417	CAP .015 UF 10% 400 V METL MYLAR	1.00
300 2418	CAP 2.2 UF 10% 100 V METL MYLAR	1.00
300 3006	CAP 10 UF 16V -10+75% ELECT AXIAL	2.00
300 3009	CAP 35 UF 16V -10+75% ELECT AXIAL	3.00
300 3010	CAP 50 UF 50V -10+75% ELECT AXIAL	1.00
300 3033	CAP 100 UF 25V -10+75% ELECT AXIAL	2.00
300 3062	1000 UF 25V ELECTROLYTIC CAPACITOR	3.00
300 4000	CAP 1.0 UF 35 V 10% TANT AXIAL	1.00
320 0054	CNILL.DYNAMIC FOCUS	1.00
320 0056	WIDTH COIL FOR 9" MONI PENNT FW4204	1.00
320 0058	COIL. LINEARITY FL-4222	1.00
330 1047	RES 47 OHM 1/4W 10% FIXED COMP	3.00
330 1056	RES 56 OHM 1/4W 10% FIXED COMP	1.00
330 106A	RES 68 OHM 1/4W 10% FIXED COMP	1.00
330 2015	RFS 150 OHM 1/4W 10% FIXED COMP	1.00
330 2018	RFS 180 OHM 1/4W 10% FIXED COMP	1.00
330 2022	RFS 220 OHM 1/4W 10% FIXED COMP	2.00
330 206A	RES 680 OHM 1/4W 10% FIXED COMP	1.00
330 20R2	RFS 820 OHM 1/4W 10% FIXED COMP	1.00
330 3010	RES 1K OHM 1/4W 10% FIXED COMP	1.00
330 3012	RES 1.2K OHM 1/4W 10% FIXED COMP	1.00
330 30P2	RES 2.2K OHM 1/4W 10% FIXED COMP	1.00
330 3047	RES 4.7K OHM 1/2W 10% FIXED FILM	2.00
330 306A	RES 6.8K OHM 1/2W 10% FIXED FILM	1.00
330 4015	RFS 15K OHM 1/2W 10% FIXED FILM	1.00
330 40P2	RES 22K OHM 1/2W 10% FIXED FILM	1.00
330 40P7	RFS 27K OHM 1/4W 10% FIXED COMP	1.00

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ASSEMBLY PART NUMBER 177 2200 E2
ASSEMBLY DESCRIPTION 2200E2 COMMON MECH ASSY (2 FLOPPY) LEGEND *#KIT TAG #=STATUS ITEM ###=FRACTIONAL QTY

PART NUMBER	DESCRIPTION	QUANTITY
330 5010	RES 100K OHM 1/4W 10% FIXED COMP	3.00
330 5022	RES 220K OHM 1/4W 10% FIXED COMP	1.00
330 5027	RES 270K OHM 1/4W 10% FIXED COMP	1.00
330 5047	RES 470K OHM 1/4W 10% FIXED COMP	1.00
330 6047	RES 4.7M OHM 1/4W 10% FIXED COMP	1.00
331 0022	RES 2.2 OHM 1/2W 10% FIXED FILM	1.00
331 2010	RES 100 OHM 1/2W 10% FIXED FILM	1.00
332 1033	RES 33 OHM 1W 10% FIXED COMP	1.00
333 0067	RES 8.25K OHM 1/8W 1% FIXED FILM	1.00
336 0031	2.5 MFG OHM POT 750V	1.00
336 1015	10K TRIMPOT 90 DEG MOUNT BECKMN#72X	1.00
336 1017	50K TRIMPOT 90 DEG MOUNT BECKMN#72X	1.00
336 1019	100K OHM TRIMPOT 90 DEG MOUNT	1.00
336 1020	5K OHM TRIMPOT 90 DEG MT BECKMN#72X	1.00
336 1021	20 OHM POT 90 DEG MT BECKMAN #72XR	1.00
337 1056	RES 56 OHM 2W 10% FIXED COMP	1.00
337 3012	RES 1.2K OHM 2W 10% FIXED COMP	1.00
375 1012	MPS 6512 SILICON TRANSISTOR	1.00
375 1027	TSTR 2N3725 0.8W 80V SH NPN S	1.00
375 1054	MPS-U04 TRANSISTOR	1.00
375 1057	BU-124 TRANSISTOR	1.00
376 0230	IC NE592A VIDEO AMP	1.00
376 0260	TBA 950 I.C.	1.00
376 0261	TDA 1044 I.C.	1.00
380 2056	D10 1N752A 5.6V 400MW ZEN S D035	1.00
380 2062	D10 1N753A 6.2V 400MW ZEN S D035	1.00
380 2091	D10 1N757A 9.1V 400MW ZEN S D035	1.00
380 3009	VG-1X RECTIFIER 1KV	2.00
380 3010	S1F4 400V DIODE	1.00
380 3012	3S1F2 3AMP 200V RECTIFIER	1.00
380 4000	D10 1N4004 400V 1A RECT S D041	1.00
410 1006	FX4061 TRANSFORMER(HORIZ DR)	1.00
510 7256	A 7256 PRINTED CIRCUIT BOARD	1.00
320 0057	DEFLECTION YOKE FOR 9" MONITOR	1.00
336 0032	250K OHM POT (BRIGHTNESS)	1.00
336 0035	250-OHM CONTRAST CONTROL	1.00
340 0102	CATHODE RAY TUBE 9" CE219F-MOP31E	1.00
350 0008	30 PIN PC CONN.SOLDER TYPE (CJ/AMP)	1.00
350.2073	ANODE CONNECTOR (125-29)	1.00
350 2084	CRT SOCKET FOR 9" MONITOR	1.00
380 3011	H-617 20000V RECTIFIER	1.00
410 1008	FLYBACK TRANSFORMER EF-4203 EC6529	1.00

ASSEMBLY PART NUMBER 177 2200 E2
ASSEMBLY DESCRIPTION 2200EP COMMON MECH ASSY (2 FLOOPY) LEGEND *KIT TAG #STATUS ITEM ##=FRACTIONAL QTY

PART NUMBER	DESCRIPTION	QUANTITY
446 0029	FILT.CONTRAST PANEL 9" MON 6635-504	1.00
451 1109	CHASSIS (9" MONITOR)	1.00
451 3861	PANEL*SIDF LH C6R35-500	1.00
451 3862	PANEL*SIDF RH C6R35-500	1.00
451 4513	BRKT,NECK SAVER C6R35-502	1.00
451 4519	BPACKET,SUPPORT B6R35-503	1.00
452 4042	GUIDE*CARD RCG-2 4"	2.00
462 0293	SPCR,DELRIIN 3/8DIA 4-40TAPR6835-505 EC6471	2.00
465 1643	SPRING,GROUNDING(12"MON)B6836-105	1.00
650 2120	4-40 X 3/8 PAN HD PHL MS SS SEMS	2.00
650 4126	8-32 X 3/8 FILISTER HD PHL MS SS	6.00
651 0024	#5X1/4 HEX HD SLOT TAP SCR TYPE-B EC6471	5.00
651 0030	SCREW,SFLF TAP T-R #4X1/2"L PNHD PH EC6471	2.00
651 0438	RIVET,CHERRY 0 SSP052	4.00
651 1004	STUD SELF CLINCH PEM FMS 632-6	1.00
652 0067	#8 EDGE NUT, INSERT SHEET	6.00
270 0380	* PCS 2 CHASSIS ASSY	1.00
210 7056	* # 7056 MODULE(M.R.)	1.00
000 0001	LABOR SUR-SYSTEMS	.24
000 0011	LABOR QUALITY CONTROL	.05
220 3014	24 COND 14"FLAT CABLE C-6482-79	1.00
000 0001	LABOR SUB-SYSTEMS	.06
000 0011	LABOR QUALITY CONTROL	.01
350 0403	24 PIN FLAT CABLE PLUG	2.00
420 0050	24 COND FLAT CABLE 3M 3365/24	1.17
350 0011	225-21521-110 PC CONN SOLDER TYPE	5.00
350 0021	225-22221-110 SOL TYPE RF2154	7.00
350 0039	44 POS P.C.CONN SOLDER TYPE(CINCH)	5.00
350 1031	DB-255 CH CONN 6000 SERIES	1.00
350 1038	57-40360 CONN NCN-HI-BARRIER (PC'S)	2.00
376 9017	24 POS ANTI-WICKING WAFER EC5615	1.00
510 7056	A 7056 PRINTED CIRCUIT BOARD	1.00
220 1001	6 1/2" BLACK WIRE + LUG D6482-12	1.00
000 0001	LABOR SUR-SYSTEMS	.01
600 0000	WIRE 18 GA BLACK UL	.54
654 0062	R #4 FORK LUG RED RA16F-6M (2K/REEL)	1.00
220 1070	CRT AC CARLE(E CHASSIS)R6482-87	1.00
000 0001	LABOR SUB-SYSTEMS	.17
000 0011	LABOR QUALITY CONTROL	.03
600 0000	WIRE 18 GA BLACK UL	.88
600 0009	WIRE 18 GA WHITE UL	.88
600 0054	WIRE 18 GA GREEN/YELLOW UL	.88

ASSEMBLY PART NUMBER 177 2200 F2
ASSEMBLY DESCRIPTION 2700E2 COMMON MECH ASSY (2 FLOPPY) LEGEND *KIT TAG #STATUS ITEM ##=FRACTIONAL QTY

PART NUMBER	DESCRIPTION	QUANTITY
605 0014	TUBING #5 CLEAR	.66
654 0050 R	#6 RING TONGUE RED RA16-6M(2K/REEL)	1.00
654 1164 R	PIN TERM 20-14 GA(RFEL)AMP 61118-4	3.00
654 1174	4 POS PIN HOUSING AMP #1-480426-0	1.00
220 1073	AC SWITCH CABLE(E/F CHAS)R6482-90	1.00
000 0001	LAROR SUB-SYSTEMS	.15
000 0011	LAROR QUALITY CONTROL	.03
600 0000	WIRE 18 GA BLACK UL	.83
600 0009	WIRE 18 GA WHITE UL	.83
600 0054	WIRE 18 GA GREEN/YELLOW UL	.83
605 0014	TUBING #5 CLEAR	1.00
654 0050 R	#6 RING TONGUE RED RA16-6M(2K/REEL)	1.00
654 1163 R	SOCKET 20-14 GA(REEL)AMP 61117-4	3.00
654 1173	4 POS SOCKET HOUSING AMP 1-480425-0	1.00
220 1101	P054 WIREPLUG ASSY(F CHAS)6482-12	1.00
000 0001	LAROR SUB-SYSTEMS	.01
600 0054	WIPF 18 GA GREEN/YELLOW UL	.25
654 0050 R	#6 RING TONGUE RED RA16-6M(2K/REEL) EC5924	1.00
300 3050	124K UF 15V ELECTROLYTIC CAPACITOR	1.00
300 306R	8.2K UF 25V ELECTROLYTIC CAP	1.00
300 3070	53000 UF 25V ELECTROLYTIC CAP	1.00
325 2112	SLIDE SW.115/230 VAC	1.00
332 2010	RFS 100 OHM 1W 10% FIXFD COMP	1.00
350 000R	30 PIN PC CONN.SOLDER TYPE (CJ/AMP)	1.00
360 0000	FUSE HOLDER 90 DEGREE CONTACT	1.00
360 1150	15 AMP 32V PICO FUSE LITTLEFU 275015	1.00
360 9000	RUBBER WSHR FDR 360-0000 / 360-0001	1.00
360 9002	HEX NUT FDR 360-0000 / 360-0001	1.00
360 9003	LOCK WSHR LF#905023(FDR 360-0000/1)	1.00
375 1048	TSTR 2N5301 200W 40V AP NPN S T03	2.00
375 9014	INSULATOR XTOR MOUNT WECKESSER TM-1	2.00
375 9020	MICA WSHR (LARGE) FOR POWER X1STORS EC6584	1.00
380 3000	DIO IN1200A 100V 12A RECT S D04	4.00
410 0114	NE10314 XEMR 50/60M PCS2 C5068-0119	1.00
420 1000	LINE FILTER 5 AMP CORCOM SK1	1.00
420 1005	CORD POWER 3 COND	1.00
451 1111	POWER CORD ROTRON FAN 16415	1.00
451 3626	CHASSIS WELDMENT(2200E1)E6852-508	1.00
451 4445	R REAR PANEL(E6F)D6R29-123	1.00
451 4446	BRKT.AC CONNECTOR(E/F)B6829-152	1.00
451 4446	SUPPT BRKT.MOTHER BD(E/F)C6829-153	1.00

ASSEMBLY PART NUMBER 177 2200 E2
ASSEMBLY DESCRIPTION 2200E2 COMMON MECH ASSY (2 FLOPPY) LEGEND * = KIT TAG # = STATUS ITEM ### = FRACTIONAL QTY

PART NUMBER	DESCRIPTION	QUANTITY
452 2151	COVER PLATE,RNC(E6F)B6829-140	1.00
452 2152	COVER PLATE,SPARE(E6F)B6829-141	1.00
452 2562	STIFFENER,MOTHER BD(E6F)C6829-119	1.00
452 2564	CLAMP,CAPACITOR 2.50 DIA B6815-20	2.00
452 2565	CLAMP,CAPACITOR 1.38 DIA B6815-23	2.00
458 0417	SUPPORT,HFATSINK C6852-505	1.00
462 0141	SPCR, PHENDLIC CURRENT 4-250	5.00
462 0193	INSULATED STANDOFF (FORKED)	1.00
462 0211	4-40 X 1/4L X 3/16D MCF SPACER	2.00
465 0736	(OBSOLETE) ECN6259A SEE 654-1288	1.00
478 0356	HEATSINK,FAB(WANG MONITOR)D6852-509	1.00
510 6749	A 6749 PRINTED CIRCUIT BOARD	1.00
600 0054	* WIRE 18 GA GREEN/YELLOW UL	.84 ###
605 1004	CABLE TYE, PAN-TY PLTIM-M	6.00
650 1080	3-48 X 1/4 PAN HD MS SS	6.00
650 2087	4-40X1/4 PAN HD PHL MS SS MAG. SEMS	2.00
650 2200	4-40 X 5/8 PAN HD PHL MS SS SEMS	6.00
650 2240	4-40 X 3/4 PAN HD PHL MS SS SEMS	5.00
650 3120	6-32 X 3/8 PAN HD PHL MS SS SEMS	9.00
650 3160	6-32 X 1/2 PAN HD PHL MS SS SEMS	2.00
651 0401	RIVET,POP 1/8 X 3/16 AD42ARS	2.00
651 0455	10-32 RIVNUT A10-130	4.00
651 1006	STUD SELF CLINCH PEM FHS 632-6	10.00
651 1019	6-32 X 1/2 PEM STUD FHS 632-8	1.00
652 0007	PEM NUT CL 832-2	8.00
652 0008	6-32 PEM NUT #CL 632-2	6.00
652 0010	4-40 PEM NUT CLS440-2	4.00
652 0029	8-32 LOCK-NUT KEPS 511-081800-50	8.00
652 0032	6-32 LOCK-NUT KEPS 511-061800-00	8.00
652 2000	4-40 HEX NUT SS	2.00
652 3004	6-32 SM PATTERN NUT,NAS 671-C6	6.00
653 2000	NO. 4 FLAT WASHER	4.00
653 2002	NO. 4 INT T LK WASHER	2.00
653 3000	NO. 6 FLAT WASHER	4.00
653 3001	NO. 6 INT T LK WASHER	2.00
653 3003	NO. 6 SPLIT LOCK MED WASHFR	4.00
654 1006	#6 GROUND LUG	5.00
654 1010	#10 GROUND LUG	6.00
654 1238	MEYCO STRAIN RELIEFF SRSP-4	1.00
271 1121	* 2200E/F KEYBOARD ASSY	1.00 ###
000 0001	LABOR SUB-SYSTEMS	2.17 ###
000 0011	LABOR QUALITY CONTROL	.43 ###

ASSEMBLY PART NUMBER 177 2200 E2 LEGEND
ASSEMBLY DESCRIPTION 2200E2 COMMON MFCH ASSY (2 FLOPPY) *KIT TAG #STATUS ITEM ##=FRACTIONAL QTY

PART NUMBER	DESCRIPTION	* # 7049 MODULE	LABOR SUB-SYSTEMS	QUANTITY	###
000 0001	LAMPOR		QUALITY CONTROL	1.00	###
000 0011	LABOR		QUALITY CONTROL	.22	###
350 0022	225-22221-105 PC CONN SOLDER TYPE			.04	###
380 1001 R *	D035 SIL DIODE 30V, 100MA AT IV TCR			1.00	
510 7049	A 7049 PRINTED CIRCUIT BOARD			92.00	
220 1071	AC SWITCH CARLE(F/F KEYBD)86482-88		EC5619	1.00	
000 0001	LABOR SUB-SYSTEMS			.16	###
000 0011	LABOR		QUALITY CONTROL	.03	###
600 0000	WIRE 18 GA BLACK UL			.57	###
600 0009	WIRE 18 GA WHITE UL			.58	###
600 0054	WIRE 18 GA GREEN/YELLOW UL			.65	###
605 0014	TUBING #5 CLEAR			.50	###
654 0050 R	#6 RING TONGUE RED #A16-6M(2K/REEL)			1.00	
654 1164 R	PIN TERM 20-14 GA(REEL)AMP 61118-4			3.00	
654 1174	4 POS PIN HOUSING AMP #1-480426-0			1.00	
325 0020	SPST TOGGLE SWITCH C&K U11-1-P1			1.00	
325 0026	SPOT SWITCH MSP105F		EC5619	1.00	
325 0033	TOGGLE SWITCH(SPST)C&K U11P3YZO		EC5619	1.00	
325 2405	SW OAK SPST 1/2 PLUNGER			73.00	
325 2407	SW OAK SPST 1/2 PLUNGER			5.00	
325 2413	SW OAK SPST 7/16 PLUNGER			17.00	
325 9048	C-14 SMALL CHROME BUTTON ALCO C-14			1.00	
370 0004	1762 WHITE LAMP			2.00	
370 1002	LAMP LOCK CLIP			2.00	
451 4323	2220/23 SPACE BAR BRKT(LH)B6621-30			1.00	
451 4324	2220/23 SPACE BAR BRKT(RH)B6621-30			1.00	
452 1048	A BEARING PLATE(2200F/F)D66829-101			1.00	
452 2109	2222 TOG SW ADAPTER PLATE B6422-167			1.00	
452 4027	GUIDE ROD 2220/23 KB B6621-26			2.00	
458 0185	722 LEVELING ROD B6409-59			1.00	
462 0178	LAMP SPACER B6422-123			2.00	
462 0241	SPACER HEX 4-40X1/4X.750 RS300-1087			16.00	###
465 0922	T0 23 DRIVE HUB SPRING B5900-605 P1			.50	###
550 0048	* SM CLR KEY CAP T-4 C6422-50			10.00	
550 0049	* KEYTOP LARGE C6422-51			5.00	
550 0050	* KEYTOP SMALL C6422-49			72.00	
550 0051	* SM RED KEY CAP T-4 C6422-50			3.00	
550 0057	* LG SMOKE KEY CAP T-4 C6422-52			5.00	
550 0058	* SM SMOKE KEY CAP T-4 C6422-50			41.00	
550 0059	* SPECIAL FUNCTION KEYTOP C6140-8?			17.00	
550 0060	* SPACE BAR KEYTOP D6422-116			1.00	

ASSEMBLY PART NUMBER 177 2200 E2
ASSEMBLY DESCRIPTION 2200E? COMMON MFCH ASSY (2 FLOPPY)

LEGEND
* = KIT TAG # = STATUS ITEM ### = FRACTIONAL QTY

PART NUMBER	DESCRIPTION	QUANTITY
550 0061	* SPACE BAR KEY CAP C6422-117	1.00
550 0066	* SM COZ GREY KEY CAP T-4 C6422-50	17.00
550 0738	* NO 38 INSERT GROUP(2200E/F)	1.00
600 2009	* WIRE 24 GA WHITE UL	.67 ###
605 0001	* TURING #14 CLEAR	.17 ###
605 0012	* TURING #4 CLEAR	.33 ###
650 2087	4-40X1/4 PAN HD PHL MS SS MAG. SEMS	32.00
651 0406	RIVET POP 3/32 X .212	2.00
651 1006	STUD SELF CLINCH PEM FHS 632-6	1.00
652 0000	HEX NUT 1/4 - 20	1.00
652 0056	PEM NUT 10-32 FLOATING AS-032-2	2.00
653 0029	ALCO LOCKWASHER	1.00
660 0552	PAD-BEARING PLATE(2200E/F)D6829-102	1.00
279 1012	* GASE ASSY(2200E/F)D6829-12	1.00 ###
000 0011	LABOR QUALITY CONTROL	.02
000 0020	LABOR PREP AREA	.11
449 0095	A 2220 RASE C6621-36	1.00
451 2134	A COVER,BOTTOM(E6F)D6829-122	1.00
651 0400	RIVET AVDEL 11290412 1/8 X 3/8 LG	16.00
651 0402	RIVET AVDEL 11210615 3/16 X 7/16 LG	4.00
651 1010	SONIC SERT POLMAN #313132	4.00
655 0205	BUMPER,WHITE #2096\$W	4.00
360 1015	* 1 1/2 AMP FUSE 250V	1.00
360 1025	SR 2-1/2 AMP FUSE SLD RLN	1.00
400 1010	FAN,SKELETON(75CFM)ROTRON WR2H2	1.00
449 0101	9 FAN GUARD 4"(WHITE)D5300-1085	1.00
449 0105	9 BEZEL,9"CRT(W/OUT TAPE)WHT D6621-59	1.00
449 0158	BASE,MINI FLOPPY(MOLDED)E6829-161	1.00
449 0159	COVER,MINI FLOPPY(MOLDED)E6829-162	1.00
449 0176	COVER,(PCS 2) E6852-500	1.00
451 4419	BRKT,NECK SAVER(E)C6829-133	1.00
451 4525	BRACKET,FORMAT SWITCH B6852-504	1.00
452 2343	PCS 2 FINISH PLATE(WHITE)D6829-120	1.00
452 2517	700 PROGRAM CLAMPS B5900-39 (2	2.00
452 2560	CLAMP,MOUNTING B6852-503	2.00
452 2581	CLIP,MOUNTING (LH) B6852-502	1.00
452 2582	CLIP,MOUNTING (RH) B6852-502	1.00
452 3538	SHIELD,AIR VENT(E/F)B6829-151	1.00
458 0424	SUPPORT,REGULATOR CARD C6852-501	1.00
461 0116	PLATE,DISK MTG D6852-510	1.00
462 0191	CAPTIVE SHIM SPACER B6491-3	2.00
462 0265	* SPACER,PC BOARD(E/F)C6815-13	8.00

ASSEMBLY DESCRIPTION 2200E2 COMMON MECH ASSY (2 FLOPPY) LEGEND **KIT TAG #=STATUS ITFM ##=FRACTIONAL QTY

PART NUMBER	DESCRIPTION	QUANTITY
478 0061	700 PROGRAM CLAMP NUTS R5900-27 (2	2.00
478 0252	EDIT KEY HOLE PLUG R6422-288	1.00
615 0359	2200 F01T OPTION FCTN STRIP B6611-1	1.00
615 1073	* UNIVERSAL ID LABEL(LARGE)C5300-1066	1.00
615 1303	* LABEL.CONN ID(E)(20/ROLL)C6R29-135	.05
650 2087	4-40X1/4 PAN HD PHL MS SS SEMS	3.00
650 3120	6-32 X 3/8 PAN HD PHL MS SS SEMS	8.00
650 3840	6-32 X 2-1/2 PN HD PH MS CAD P1	2.00
650 4123	8-32X3/8 TRUSS HD PHL MS SS	2.00
650 4133	8-32 X 3/8 FLANGE WHI7-LOCK MS ZINC	8.00
650 4160	8-32 X 1/2 PAN HD PHL MS SS SEMS	2.00
650 4243	8-32 X 3/4 PAN HD PHL(DYSTER WHITE)	4.00
650 6121	10-32X3/8 TRUSS HD PHL MS SS	4.00
650 6165	10-32 X 1/2 CUP PT. ALLEN SET SCREW	2.00
650 6241	10-32 X 3/4 FL HD PHL MS SS	2.00
650 6243	10-32 X 3/4 TR. HD. PH. MS. SS.	2.00
651 0021	W SCR.#RX1/2 SELF TAP TRUSS HD(WHITE)	6.00
652 0007	PEM NUT CL R32-2	2.00
652 0008	6-32 PEM NUT #CL 632-2	6.00
652 0029	8-32 LOCK-NUT KEPS 511-081800-50	4.00
652 3006	6-32 WING NUT CAD PLATE	2.00
653 3000	NO. 6 FLAT WASHER	2.00
653 3001	NO. 6 INT T LK WASHER	2.00
653 4000	NO. 8 FLAT WASHER	8.00
653 4006	WASHER #8 INTERNAL EXTERNAL	8.00
653 6002	#10 FLAT WSHR (7/32X1/2X1/16ZINC PL	4.00
654 0110	STUD BALL RECEPTACLF C1663-017-4	2.00
654 0111	STUD BALL P116-625-8-495	2.00
654 1204	GROMMET 3/16 ID FOR 5/16 HOLE	2.00
654 1233	GROM.5/16 ID FOR 7/16 HOLE A.I.#2538	2.00
654 1274	CABLE CLAMP ADH.BACK DKLSP 021-0375	1.00
655 0009	PLUG BUTTON(BLACK)SS51338 P5001	2.00
655 0012	VENT,AIR D6R15-17	3.00
655 0166	KN08 ASSY,CONTROL R6621-54	2.00
725 0057	MINI FLOPPY DISK DRIVE	2.00

ASSEMBLY PART NUMBER 210 7052 8A
ASSEMBLY DESCRIPTION 7052-RA MODULE (32K)

LEGEND
* = KIT TAG # = STATUS ITEM ### = FRACTIONAL QTY

PART NUMBER	DESCRIPTION	LABOR	DFDESCRIPTION	LABOR	QUANTITY
000 0003	CALCULATING SYSTEMS				3.00
000 0011	QUALITY CONTROL				.60
209 7052 1	# 7052-1 W/UNLOADED RAM/ROM(24+32K)A1				1.00
000 0001	LABOR SUB-SYSTEMS				3.21
000 0011	LABOR QUALITY CONTROL				.64
300 1047	CAP 47 PF 10X 500 V CERAMIC DISC			EC5645	1.00
300 1270	CAP 270 PF 10X 500 V CERAMIC DISC			RF2047	9.00
300 1900	CAP .05 UF +80-20% 12 V CERAMIC D			R2104A	11.00
300 1930	.1 UF 50V +80-20% CERAMIC CAP(HIFRO			R2104A	38.00
300 1931	1 UF CERAMIC CAPACITOR(HIGH FREQ)			R2104A	41.00
300 401A	CAP 18.0 UF 15 V 10% TANT AXIAL			PCRFNL	4.00
300 402P	CAP 15.0 UF 20 V 10% TANT AXIAL			R2104A	6.00
321 000R	10 MC .05% RLJLEY BXW OSCILLATOR				1.00
330 1011 R *	RES 10 OHM 1/4W 5% FIXED COMP			PCRFNL	17.00
330 2018	RFS 180 OHM 1/4W 10% FIXED COMP			RF2047	2.00
330 2022 R *	RES 220 OHM 1/4W 10% FIXED COMP			EC5645	6.00
330 3010	RFS 1K OHM 1/4W 10% FIXED COMP				1.00
330 3010 R *	RES 1K OHM 1/4W 10% FIXED COMP			EC5645	2.00
330 3018	RFS 1.8K OHM 1/4W 10% FIXED COMP				1.00
330 3022 R *	RES 2.2K OHM 1/4W 10% FIXED COMP				33.00
330 306A R *	RES 6.8K OHM 1/4W 10% FIXED COMP				48.00
375 1050	TRANSISTOR SPS6551				4.00
376 0002	IC 7400N 4 2 IN POS NAND GATE				6.00
376 0003	IC 7410N 3 3 IN POS NAND GATE				1.00
376 0006	IC 7474N 2 D EDGE TRIC FLIP-FLOP				2.00
376 0007	IC 7476N 2 JK MA-SLV F/F PRST CLFAR				1.00
376 0010	IC 7404N HEX INVERTFR				4.00
376 004R	IC 74153 2 4-1 LINE DATA SEL MX				4.00
376 0081	IC 7408 4 2 IN POS AND GATE				2.00
376 0082	IC 74157 4 2 IN MX				8.00
376 0093	IC 7432 4 2 IN OR GATE			PCBFNL	4.00
376 0094	IC 74161 SYNCHRONOUS 4 BIT COUNTER				2.00
376 0096	IC 9321 2 1 OF 4 DECODER				2.00
376 0097	IC 74195 4 BIT PAR ACCESS SHIFT REG				4.00
375 0119	IC 74175 4 D TYPE EDGE TRIG F/F			PCBFNL	4.00
376 0125	IC 7427 3 3 IN NOR GATE				2.00
376 013R	IC 74298 4 2 IN MX W/STORAGE				5.00
376 017R	IC 75322 2 TTL TO MOS DRIVER			EC5645	2.00
376 0192	IC 74LS367 HEX BUS DRIVER 3 STATE			RF2047	3.00
376 0193	IC 74LS368 HEX BUS DRIVER 3 STATE			RF2047	6.00
376 0197	IC 74S04 HEX INVERTER				1.00
376 9001	14 PIN IC SOCKET (SOLDER TAIL)			EC5525	2.00

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ASSEMBLY PART NUMBER 210 7052 8A
 ASSEMBLY DESCRIPTION 7052-8A MODULE(32K)
 LEGEND #=KIT TAG #=STATUS ITEM ##=FRACTIONAL QTY

PART NUMBER	DESCRIPTION	PCRFNL	QUANTITY
376 9002	16 PIN IC SOCKET RURNDY		5.00
376 9003	24 PIN IC SOCKET RURNDY		24.00
376 9014	18 PIN IC SOCKET		64.00
510 7052	A 7052 PRINTED CIRCUIT BOARD		1.00
377 0236	# 49198 ROM I.C.		1.00
377 0237	# 49199 ROM I.C.		1.00
377 0241	# 49203 ROM I.C.		1.00
377 0242	# 49204 ROM I.C.		1.00
377 0243	# 49205 ROM I.C.		1.00
377 0284	# 49209 ROM I.C.(OP 22/23)		1.00
377 0285	# 49210 ROM I.C.(OP 22/23)		1.00
377 0291	# 49394 ROM I.C. (8 BIT)		1.00
377 0295	# 49400 ROM I.C. (20 BIT)(2200T)		1.00
377 0296	# 49401 ROM I.C. (20 BIT)(2200T)		1.00
377 0297	# 49402 ROM I.C. (20 BIT)(2200T)		1.00
377 0298	# 49395 ROM I.C. (20 BIT)(2200T)		1.00
377 0299	# 49396 ROM I.C. (20 BIT)(2200T)		1.00
377 0303	# 49403 ROM I.C. (20 BIT)(2200T)		1.00
377 0304	# 49404 ROM I.C. (20 BIT)(2200T)		1.00
377 0314	# TMS4050 RAM 4K (18 PIN)		64.00
377 0327	# EA49409 ROM PATTERN		1.00
377 0328	# EA49410 ROM PATTERN		1.00
377 0329	# EA49411 ROM PATTERN		1.00
377 0330	# EA49412 ROM PATTERN		1.00
377 0331	# EA49413 ROM PATTERN		1.00
377 0332	# EA49414 ROM PATTERN		1.00
377 0333	# EA49415 ROM PATTERN		1.00
377 0334	# EA49416 ROM PATTERN		1.00
377 0335	# EA49417 ROM PATTERN		1.00

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ASSEMBLY PART NUMBER 200 EF08 16
 ASSEMBLY DESCRIPTION 8K TO 16K MEMORY UPGRADE

LEGEND
 #=KIT TAG #=ST

PART NUMBER	DESCRIPTION	CHG NO.	QUANTITY
000 0003	LABOR CALCULATING SYSTEMS		1.00
000 0011	LABOR QUALITY CONTROL		.20
377 0314	# TMS4050 RAM 4K (18 P'N)		16.00

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ASSEMBLY PART NUMBER 200 EF08 24
 ASSEMBLY DESCRIPTION 8K TO 24K MEMORY UPGRADE

LEGEND
 #=KIT TAG #=ST

PART NUMBER	DESCRIPTION	CHG NO.	QUANTITY
210 7052 6A	# 7052-6A MODULE(24K)		1.00

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 ASSEMBLY PART NUMBER 200 EF08 32
 ASSEMBLY DESCRIPTION 8K TO 32K MEMORY UPGRADE
 LEGEND
 #=KIT TAG #=ST
 PART NUMBER DESCRIPTION CHG NO. QUANTITY
 210 7052 8A # 7052-8A MODULE(32K) 1.00

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 ASSEMBLY PART NUMBER 200 EF16 24
 ASSEMBLY DESCRIPTION 16K TO 24K MEMORY UPGRADE
 LEGEND
 #=KIT TAG #=ST
 PART NUMBER DESCRIPTION CHG NO. QUANTITY
 210 7052 6A # 7052-6A MODULE(24K) 1.00

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ASSEMBLY PART NUMBER 200 EF16 32
 ASSEMBLY DESCRIPTION 16K TO 32K MEMORY UPGRADE

LEGEND
 * = KIT TAG # = ST

PART NUMBER	DESCRIPTION	CHG NO.	QUANTITY
210 7052 8A	# 7052-8A MODULE(32K)		1.00

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ASSEMBLY PART NUMBER 200 EF24 32
 ASSEMBLY DESCRIPTION 24K TO 32K MEMORY UPGRADE

LEGEND
 * = KIT TAG # = ST

PART NUMBER	DESCRIPTION	CHG NO.	QUANTITY
C00 0003	LABOR CALCULATING SYSTEMS		1.00
000 0011	LABOR QUALITY CONTROL		.20
377 0314	# TMS4050 RAM 4K (18 PIN)		16.00

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ASSEMBLY PART NUMBER 177 22EF 60 LEGEND
 ASSEMBLY DESCRIPTION OP 60 KB CLICK/AUDIO ALARM/BNC CONN #=KIT TAG #=SI

PART NUMBER	DESCRIPTION	CHG NO.	QUANTITY
000 0003	LABOR CALCULATING SYSTEMS		1.50
000 0011	LABOR QUALITY CONTROL		.30
220 1026	CRT CABLE ASSY(2220)B6482-37		1.00
220 1069	CABLE,CRT BD (7054)(F)86482-86		1.00
320 0049	KEYBD CLICKER ASSY E-8600-40-016		1.00
320 0300	SPEAKER 3" RECTANGULAR FILMOR TS-27		1.00
350 1036	BNC SOCKET (F) CONN UG1094A		1.00
380 3001	IN3255 RECTIFIER		1.00
451 4379	BRKT,KB CLICKER MTG A6422-327		1.00
600 2000	# WIRE 24 GA BLACK UL		1.00
600 2002	# WIRE 24 GA RED UL		1.00
605 0015	# 3 CLEAR TUBING		.82
605 1006	CABLE TYE PAN-TY PLY25-C		1.00
615 0377	INSULATOR,BNC CONN(1)B6829-150		1.00
650 2160	4-40 X 1/2 PAN HD PHL MS SS SEMS		1.00
650 3160	6-32 X 1/2 PAN HD PHL MS SS SEMS		2.00
652 0032	6-32 LOCK-NUT KEPS 511-061900-00		2.00
653 0003	WASHER, ND.4 NYLON 1/8 ID X 3/8 OD		1.00
654 1011	3/8" GROUND LUG HH SMITH 1497		1.00
660 0004	ELECTRICAL TAPE VINYL 1/2 INCH		1.00

ASSEMBLY PART NUMBER 177 22EA 6G
 ASSEMBLY DESCRIPTION 0P-60A 80X24, CLICKER, ALARM
 LEGEND #=KIT TAG #=STATUS ITEM ##=FRACTIONAL QTY

PART NUMBER	DESCRIPTION	QUANTITY
210 7159 A # 7159-A MODULE (PCS II) 60HZ		
209 7159 # 7159 W/UNLOADED SOCKETS (PRELJM)		
300 1470	CAP 470 PF 10X 500 V CERAMIC DISC	1.00
300 1900	CAP .05 UF +80-20X 12 V CERAMIC D	1.00
300 1903	CAP .01 UF +80-20X 25 V CERAMIC D	17.00
300 1906	CAP .001 UF 10X 500 V CERAMIC DISC	2.00
300 1930	.1 UF 50V +80-20X CERAMIC CAP (HIFRO	4.00
300 2033	CAP .0033 UF 10X 100 V MYLAR	1.00
300 4002	CAP .1 UF 35 V 10X TANT AXIAL	1.00
300 4020	CAP 47.0 UF 15 V 10X TANT AXIAL	1.00
300 4022	CAP 15.0 UF 20 V 10X TANT AXIAL	7.00
300 5004	CAP 220 PF 5X 500 V MICA DIPPED	8.00
300 5007	CAP 330 PF 5X 500 V MICA DIPPED	2.00
321 0018	17.1 MHZ OSCILLATOR	1.00
325 1503	8 BANK ROCKER SWITCH	1.00
330 2010	RES 100 OHM 1/4W 10% FIXED COME	1.00
330 2022	RES 220 OHM 1/4W 10% FIXED COMP	1.00
330 2039	RES 390 OHM 1/4W 10% FIXED COMP	4.00
330 2047	RFS 470 OHM 1/4W 10% FIXED COMP	2.00
330 3010	RFS 1K OHM 1/4W 10% FIXED COMP	3.00
330 3022	RES 2.2K OHM 1/4W 10% FIXED COMP	20.00
330 3047	RES 4.7K OHM 1/2W 10% FIXED FILM	15.00
330 3082	RES 8.2K OHM 1/2W 10% FIXED FILM	1.00
330 4018	RES 18K OHM 1/2W 10% FIXED FILM	1.00
330 4033	RFS 33K OHM 1/4W 10% FIXED COMP	4.00
330 4047	RFS 47K OHM 1/4W 10% FIXED COMP	1.00
331 1015	RFS 15 OHM 1/2W 10% FIXED FILM	1.00
331 1076	RFS 75 OHM 1/2W 5X FIXED FILM	2.00
331 2047	RES 470 OHM 1/2W 10% FIXED FILM	1.00
375 1021	TSTR 2N5189 1.0W 60V SH NPN S	1.00
375 9001	TRANSIPAD 8977887-1 LARGE	1.00
376 0002	IC 7400N 4 2 IN POS NAND GATE	5.00
376 0003	IC 7410N 3 3 IN POS NAND GATE	2.00
376 0004	IC 7420N 2 4 IN POS NAND GATE	2.00
376 0006	IC 7474N 2 D EDGE TRIG FLIP-FLOP	9.00
376 0008	IC 7442N 4 LINE-10 LINE DECODER	1.00
376 0010	IC 7404N HEX INVERTER	4.00
376 0011	IC 7493N 4 BIT BINARY COUNTER	4.00
376 0016	IC 7402N 4 2 IN POS NOR GATE	3.00
376 0028	IC 7403N 4 2 IN POS NAND GATE	2.00
376 0031	IC 7430 8 I POS NAND GATE	1.00
376 0053	IC 74193 SYN 4 BIT UP DOWN COUNTER	3.00

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ASSEMBLY PART NUMBER 177 22EA 60
ASSEMBLY DESCRIPTION OP-60A BOX24-CLICKER-ALARM

LEGEND
*KIT TAG #STATUS ITEM ###=FRACTIONAL QTY

PART NUMBER	DESCRIPTION	QUANTITY
376 0055	IC 7406 HEX INV BUF DRIVERS HV INUT PATREL	2.00
376 0056	IC 7407 HEX BUF DRIVER HV OUTPUT	2.00
376 0059	IC 74145 3CD TO DFC DECODER DRIVER	1.00
376 0081	IC 7408 4 2 IN POS AND GATE	7.00
376 0082	IC 74157 4 2 IN NX	4.00
376 0093	IC 7432 4 2 IN OR GATE	4.00
376 0094	IC 74161 SYNCHRONOUS 4 BIT COUNTER	4.00
376 0095	IC 74174 HEX D TYPE FLIP FLOP	1.00
376 0104	IC 6402 2 RETIC RESET MONOSTRL MVH	3.00
376 0105	IC 74165 8 BIT PAR TO SERIAL CONVRT	1.00
376 0114	IC 74175 4 D TYPE EDGE TRIG F/F	8.00
376 0120	IC 93L24 5 BIT MAGNITUDE COMPARATOR	3.00
376 0125	IC 7427 3 3 IN NOR GATE	1.00
376 0126	IC 555 TIMER	1.00
376 0145	IC 74LS266 4 2 IN EXCL NOR GATE	3.00
376 0162	IC 93L14 4 LATCH LOW POWER	1.00
376 0184	IC 74551 2 2 W 2 IN AND OR INV GT	1.00
376 0190	IC 74192 SYN 4 BIT UP DOWN COUNTER	1.00
376 0191	IC 74160 SYN 4 BIT CTR	3.00
376 0197	IC 74504 HEX INVERTER	1.00
376 0199	IC 74502 4 2 IN POS NOR GATE	1.00
376 0202	IC 74574 2 D TYPE F F W PRESET CLER	1.00
376 9002	14 PIN IC SOCKET RUNDY PATREL	1.00
376 9003	24 PIN IC SOCKET RUNDY	1.00
377 0059	2102A-4 / 2102-1 / 9102B RAM	16.00
510 7159	7159 PRINTED CIRCUIT BOARD	1.00
376 0077	IC 75154 4 LINE REC PATREL	1.00
377 0 423	# FAR306APC 710 ROW PATTERN	1.00
220 1026	CRT CARLE ASSY(2220)R6482-37	1.00
000 0001	LARDR SUB-SYSTEMS	.08 ###
000 0011	LARDR QUALITY CONTROL	.02 ###
600 2002	WIRE 24 GA RED UL	.67 ###
600 2009	WIRE 24 GA WHITE UL	.67 ###
605 0100	TUBING NO 5 CLEAR	.54 ###
654 1140	PIN HOUSING 1-4R0305-0	1.00
654 1144 Q	PIN TERM 30-22 GA(RFEL)AMP3500079-4	2.00
220 1060	CARLE-CRT RD (7054)(F)R4402-85	1.00
000 0001	LARDR SUB-SYSTEMS	.07 ###
000 0011	LARDR QUALITY CONTROL	.01 ###
600 2002	WIRE 24 GA RED UL	.83 ###
600 2009	WIRE 24 GA WHITE UL	.83 ###
605 0010	TUBING PVC WR CLEAR	.75 ###

ASSEMBLY PART NUMBER 177 22EA 60
 ASSEMBLY DESCRIPTION 0P-60A 80X24,CLICKER,ALARM

LEGEND
 * = KIT TAG # = STATUS ITEM ### = FRACTIONAL QTY

PART NUMBER	DESCRIPTION	QUANTITY
654 1150	SOCKET HOUSING 1-480303-0	1.00
654 1165 R	SOCKET 30-22 GA (REEL) AMP 3500078-4	2.00
320 0049	KFYBD CLICKER ASSY F-8600-40-016	1.00
320 0300	SPEAKER 3" RECTANGULAR FILMOR TS-27	1.00
350 1036	BNC SOCKET (F) CONN UG1094A	1.00
380 3001	DIN IN3255 600V .75A RECT S D041	1.00
451 4379	BRKT,KB CLICKER MTG A6422-327	1.00
600 2000	* WIRF 24 GA BLACK UL	1.00
600 2002	* #3 CLEAR TUBING	1.00
605 0015	* CABLE TIE PAN-TY PLT25-C	.83
605 1006	* INSULATOR,BNC CONN(1)R6829-150	1.00
615 0377	4-40 X 1/2 PAN HD PHL MS SS SEMS	1.00
650 2160	6-32 X 1/2 PAN HD PHL MS SS SFMS	1.00
650 3160	6-32 LOCK-NUT KEPS 511-061800-00	2.00
652 0032	WASHER, NO.4 NYLON 1/8 ID X 3/8 OD	2.00
653 0003	3/8" GROUND LUG MH SMITH 1497	1.00
654 1011	ELECTRICAL TAPE VINYL 1/2 INCH	1.00
660 0004		1.00

ASSEMBLY PART NUMBER	177 22EF 61	LEGEND	QUANTITY
ASSEMBLY DESCRIPTION	OP-61 OUTPUT WRITER	*KIT TAG #=STATUS ITEM ##=FRACTIONAL	
PART NUMBER	DESCRIPTION		
177 0002 C	701C OUTPUT WRITER		1.00
210 6053 1	* # 6053-1 MODULE W/OUT 1W DIODES		1.00
220 0017	701/702 INPUT CABLE (C6080)		1.00
220 0054	701 CABLE C5776-283		1.00
269 0100	* 701-1 FILTER ASSY		.20
279 0027	LEVER ASSEMBLY B5776-99		6.00
279 0118	ARMATURE SUB-ASSY B5776-81	EC5412	5.00
279 0157	RFFD SW ASSY C5776-224	EC4890	1.00
279 0158	* TAB SET/CLR SOLENOID ASSY C5776-229	EC4891	1.00
279 0169	* PLUNGER STOPPER"A" ASSY B5776-573	EC4935	1.00
279 0170	* PLUNGER STOPPER"B" ASSY B5776-572	EC4935	1.00
210 7061 A	# 7061-A MODULE(A/I)		1.00
209 7061	# 7061 W/UNLOADED SOCKETS(A/I)		1.00
220 0145	OPTION 61 I/O CABLE C6482-104		1.00
462 0265	SPACER PCB BOARD(E/F)C6815-13	FC5703	2.00
650 2200	4-40 X 5/8 PAN HD PHL MS SS SEMS	EC5703	2.00
650 3880	6-32 X 2 3/4 PAN HD PHL MS SS	EC5703	2.00
652 2000	4-40 HEX NUT SS	EC5703	2.00
653 0003	WASHER, NO.4 NYLON 1/8 ID X 3/8 OD	EC5703	2.00
653 2000	NO. 4 FLAT WASHER	EC5703	2.00
654 1215	GROMMET, ACCURATE 2103	EC5703	2.00

ASSEMBLY PART NUMBER 177 22EE 62 ASSEMBLY DESCRIPTION OP-62 ASYNC T.C. (PCS2227B) (2200E) LEGEND #KIT TAG #STATUS ITEM ##=FRACTIONAL QTY

PART NUMBER	DESCRIPTION	QUANTITY
210 7153 A	7153-A MODULE(PRELIMINARY)	1.00
209 7153	7153 W/UNLOADED SOCKETS	1.00
000 0001	LABOR SUB-SYSTEMS	3.00
000 0011	LABOR QUALITY CONTROL	.60
300 106A	CAP 68 PF 10% 500 V CERAMIC DISC	1.00
300 1220	CAP 220 PF 10% 500 V CERAMIC DISC	1.00
300 1900	CAP .05 UF +80-20% 12 V CERAMIC D	20.00
300 1901	CAP .1 UF 20% 12 V CERAMIC DISC	1.00
300 1913	CAP .002 UF 20% 500 V CERAMIC DISC	2.00
300 1930	.1 UF 50V +80-20% CERAMIC CAP(HIFRO	9.00
300 1931	1 UF CERAMIC CAPACITDR(HIGH FREQ)	16.00
300 2047	CAP .0047 UF 10% 100 V MYLAR	1.00
300 4017	CAP 5.6 UF 35 V 10% TANT AXIAL	3.00
300 4022	CAP 15.0 UF 20 V 10% TANT AXIAL	5.00
300 4034	CAP 47.0 UF 20 V 10% TANT AXIAL	1.00
321 0015	1.8432 MC OSCILLATOR MANANN ML17P	1.00
321 0018	17.1 MHZ OSCILLATOR	1.00
325 1503	8 BANK ROCKER SWITCH	1.00
330 1011	RES 10 OHM 1/4W 5% FIXED COMP	2.00
330 2018	RES 180 OHM 1/4W 10% FIXED COMP	1.00
330 2033	RES 330 OHM 1/4W 10% FIXED COMP	1.00
330 2069	RFS 680 OHM 1/4W 5% FIXED COMP	1.00
330 3010	RES 1K OHM 1/4W 10% FIXED COMP	2.00
330 3047	RES 4.7K OHM 1/2W 10% FIXED FILM	32.00
330 4010	RES 10K OHM 1/2W 10% FIXED FILM	15.00
330 4012	RES 12K OHM 1/2W 10% FIXED FILM	2.00
330 4047	RES 47K OHM 1/4W 10% FIXED COMP	1.00
330 6028	RES 2.7M OHM 1/4W 5% FIXED COMP	1.00
375 0017	TSTR 2N3014 360MW 40V SH NPN S 52	1.00
375 1050	TRANSISTOR SPS6551	2.00
376 0002	IC 7400N 4 2 IN POS NAND GATE	3.00
376 0004	IC 7420N 2 4 IN POS NAND GATE	1.00
376 0005	IC 7473N 2 J-K MA-SLAVE FLIP-FLOP	2.00
376 0006	IC 7474N 2 D EDGE TRIG FLIP-FLOP	3.00
376 0008	IC 7442N 4 LINE-10 LINE DECODER	2.00
376 0010	IC 7404N HEX INVERTER	3.00
376 0011	IC 7493N 4 81T BINARY COUNTER	1.00
376 0016	IC 7402N 4 2 IN POS NOR GATE	1.00
376 0049	IC 74155 2 2-4 LINE DECODER DEMX	1.00
376 0059	IC 7495 4 BIT R L SHIFT REGISTER	1.00
376 0076	IC 75150P 2 LINE DRIVER	2.00
376 0077	IC 75154 4 LINE REC	2.00

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ASSEMBLY PART NUMBER 177 22EE 62
ASSEMBLY DESCRIPTION OP-62 ASYNC T.C. (PCS22278)(2200E) LEGEND *KIT TAG *STATUS ITEM ***=FRACTIONAL QTY

PART NUMBER	DESCRIPTION	ITEM	QUANTITY
376 0081	IC 7408 4 2 IN POS AND GATE	EC631R	3.00
376 0082	IC 74157 4 2 IN MX	EC6617	2.00
376 0093	IC 7432 4 2 IN OR GATE		2.00
376 0094	IC 74161 SYNCHRONOUS 4 BIT COUNTER		2.00
376 0104	IC 9602 2 RFTRIG RESET MONOSTRL MVR		1.00
376 010R	IC 9314 4 LATCH		1.00
376 0119	IC 74175 4 D TYPF EDGE TRIG F/F	EC6617	6.00
376 012C	IC 555 TIMER		1.00
376 0148	IC 74LS266 4 2 IN EXCL NOR GATE		2.00
376 0155	IC 74LS74 2 D TYPE EDGE TRIG FF	EC6617	2.00
376 0160	IC 74LS175 4 D TYPE EDGE TRIG F/F		2.00
376 0178	IC 75322 2 TTL TO MOS DRIVER		1.00
376 0192	IC 74LS367 HEX BUS DRIVER 3 STATE	EC631R	8.00
376 0193	IC 74LS368 HEX BUS DRIVER 3 STATE		2.00
376 9002	16 PIN IC SOCKET BURNDY		2.00
376 9003	24 PIN IC SOCKET BURNDY	EC6510	1.00
376 9005	16 PIN IC SOCKET CAMBION	EC6617	1.00
376 900R	IC PAD 16 PIN TFKNA #4330	EC6617	1.00
376 9011	40 PIN IC SOCKET BURNDY # D1LR2A0P1		1.00
376 9014	18 PIN IC SOCKET	EC6617	8.00
376 9015	28 PIN IC SOCKET (BURNDY)		1.00
376 9016	24 PIN IC SOCKET (CAMBION)	EC6617	1.00
376 9017	24 POS ANTI-WICKING WAFER	EC6617	1.00
380 1001 4B	D035 SIL DIODE 30V, 100MA AT IV .48		1.00
510 7153	C 7153 PRINTED CIRCUIT BOARD		1.00
377 0259	8080A MICROPROCESSOR		1.00
377 0314	# TMS4050 RAM 4K (18 PIN)		16.00
377 0317	# 2708 INTEL PROM		1.00
377 031R	# 8251(USART)ROM		1.00
377 0337	# 8224 I.C.		1.00
377 033R	# 822R I.C.		1.00

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ASSEMBLY PART NUMBER 177-22CA-62 LEGEND
ASSEMBLY DESCRIPTION OP-62R SYNCHRONOUS TC CONTROLLER **KIT TAG #=ST
PART NUMBER DESCRIPTION CHG NO. QUANTITY
210 7153 1A 7153-1A MODULE (PRELIM) RSYNC TC OP 1.00

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ASSEMBLY PART NUMBER 177 22EE 65
ASSEMBLY DESCRIPTION OP-65 IEEE INTERFACE(2200E)

LEGEND
*KIT TAG #STATUS ITEM ###FRACTIONAL QTY

PART NUMBER	DESCRIPTION	QUANTITY
210 7154	7154 MODULE (2254 FOR PCS)	1.00
000 0001	LAROR SUB-SYSTEMS	1.50
000 0011	LAROR QUALITY CONTROL	.30
300 1150	CAP 150 PF 10X 500 V CERAMIC DISC	2.00
300 1900	CAP .05 UF +80-20X 12 V CERAMIC D	24.00
300 1903	CAP .01 UF +80-20X 25 V CERAMIC D	1.00
300 4022	CAP 15.0 UF 20 V 10X TANT AXIAL	2.00
300 4032	CAP 10.0 UF 35 V 10X TANT AXIAL	1.00
300 5005	CAP 470 PF 5X 500 V MICA DIPPED	3.00
325 1501	5 BANK ROCKER SW.	1.00
325 1503	8 BANK ROCKER SWITCH	1.00
325 9045	* 5 BANK ROCKER SWITCH CAP (325-1501)	1.00
325 9047	* 8 BANK ROCKER SWITCH CAP (325-1503)	1.00
330 3010	RES 1K OHM 1/4W 10X FIXED COMP	11.00
330 3047	RES 4.7K OHM 1/2W 10X FIXED FILM	11.00
330 4010	RES 10K OHM 1/2W 10X FIXED FILM	3.00
330 401A	RES 15K OHM 1/4W 5X FIXED COMP	1.00
330 4034	RES 33K OHM 1/4W 5X FIXED COMP	2.00
330 4039	RES 39K OHM 1/4W 10X FIXED COMP	1.00
333 0068	RES 3.01K OHM 1/8W 1X FIXED FILM	20.00
333 0069	RES 6.19K OHM 1/8W 1X FIXED FILM	16.00
350 0009	* 225-21521-10500 PC CONN SOLDER TYPE	1.00
376 0002	IC 7400N 4 2 IN POS NAND GATE	2.00
376 0003	IC 7410N 3 3 IN POS NAND GATE	1.00
376 0005	IC 7473N 2 J-K MA-SLAVE FLIP-FLOP	1.00
376 0006	IC 7474N 2 D EDGE TRIG FLIP-FLOP	6.00
376 0008	IC 7442N 4 LINE-10 LINE DECODER	2.00
376 0010	IC 7404N HEX INVERTER	5.00
376 0016	IC 7402N 4 2 IN POS NOR GATE	2.00
376 0028	IC 7403N 4 2 IN POS NAND GATE	1.00
376 0031	IC 7430 8 1 POS NAND GATE	2.00
376 0048	IC 74153 2 4-1 LINE DATA SEL MX	4.00
376 0055	IC 7406 HEX INV BUF DRIVERS HV OUT	2.00
376 0056	IC 7407 HEX BUF DRIVER HV OUTPUT	1.00
376 0080	IC 74123 RETRIGGER MONOSTABLE MVB	3.00
376 0081	IC 7408 4 2 IN POS AND GATE	6.00
376 0093	IC 7432 4 2 IN OR GATE	5.00
376 0096	IC 9321 2 1 OF 4 DECODER	1.00
376 0098	IC 74174 HEX D TYPE FLIP FLOP	1.00
376 0108	IC 9314 4 LATCH	3.00
376 0119	IC 74175 4 D TYPE EDGE TRIG F/F	4.00
376 0120	IC 93L24 5 BIT MAGNITUDE COMPATOR	1.00

ASSEMBLY PART NUMBER 177 22EE 65
 ASSEMBLY DESCRIPTION 0P-65 IEEE INTERFACE(2200F)

LEGEND
 #=KIT TAG #=STATUS ITEM ##=FRACTIONAL QTY

PART NUMBER	DESCRIPTION	QUANTITY
376-0125	IC 7427 3 3 IN NOR GATE	1.00
376-0128	IC 7438 4 2 IN NAND BUFFER	6.00
376-0139	IC 7414 HEX SCHMITT TRIGGER	3.00
376-0148	IC 74LS266 4 2 IN EXCL NOR GATE	3.00
375-0194	IC 7411 3 3 IN POS AND GATE	4.00
510 7154	C 7154 PRINTED CIRCUIT BOARD	1.00
220 0162	IEEE OPT.65 CABLF ASSY C6482-144	1.00
000 0001	LABOR SUB-SYSTEMS	.57 ###
000 0011	LABOR QUALITY CONTROL	.11 ###
350 2070	CONN 12-24 CABLE TO CABLE RECPT	1.00
350 4232	STRAIN RELIEF,24 POS AMP 1-552298-1	2.00
420 0053	* 24 COND 26 GA SHIELDED CARLE	1.25 ###
451 4524	BRKT,24PIN CONN(FOR IEEE) B6422-341	1.00
462 0282	SPACER,MALE/FEMALE(PC FACE)R6815-41	2.00
510 5223 C	A 5223C PRINTED CIRCUIT BOARD	1.00
605 1004	* CABLE TYE, PAN-TY PLTJM-M	1.00
652 6000	10-32 HEX NUT SS	2.00
654 1010	#10 GROUND LUG	1.00

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ASSEMBLY PART NUMBER 177 22FE 67
ASSEMBLY DESCRIPTION OP-67 INTERFACE (PCS2250-8) (2200E) LEGEND
= KIT TAG # = STATUS ITEM ### = FRACTIONAL QTY

PART NUMBER	DESCRIPTION	QUANTITY
210 7155	7155 MODULE (2250 FOR PCS)	1.00 ###
000 0001	LABOR SUR-SYSTEMS	1.50 ###
000 0011	LABOR QUALITY CONTROL	.30 ###
300 1022	CAP 22 PF 10X 500 V CERAMIC DISC	1.00
300 1047	CAP 47 PF 10X 500 V CERAMIC DISC	3.00
300 1903	CAP .01 UF +80-20X 25 V CERAMIC D	18.00
300 4022	CAP 15.0 UF 20 V 10X TANT AXIAL	2.00
300 5005	CAP 470 PF 5X 500 V MICA DIPPED	3.00
325 1503	8 BANK ROCKER SWITCH	1.00
325 9047	* 8 BANK ROCKER SWITCH CAP (325-1503)	1.00
330 3010 R *	RES 1K OHM 1/4W 10% FIXED COMP	35.00
330 4016	RES 15K OHM 1/4W 5% FIXED COMP	1.00
330 4023 R *	RES 22K OHM 1/4W 5% FIXED COMP	3.00
330 4034	RES 33K OHM 1/4W 5% FIXED COMP	3.00
350 0022	225-22221-105 PC CONN SOLDER TYPE	1.00
376 0003	IC 7410N 3 3 IN POS NAND GATE	1.00
376 0010	IC 7474N 2 D EDGE TRIG FLIP-FLOP	3.00
376 0016	IC 7404N HEX INVERTER	4.00
376 0028	IC 7402N 4 2 IN POS NOR GATE	2.00
376 0036	IC 7403N 4 2 IN POS NAND GATE	2.00
376 0056	IC 7486N 4 2 IN EXCLUSIVE OR GATE	5.00
376 0077	IC 7407 HEX BUF DRIVER HV OUTPUT	1.00
376 0080	IC 75154 4 LINE REC	3.00
376 0119	IC 74123 RETRIGGER MONOSTABLE MVB	4.00
376 0120	IC 74175 4 D TYPE EDGE TRIG F/F	3.00
376 0137	IC 93L24 5 BIT MAGNITUDE COMPARATOR	2.00
510 7155	IC 8110 4 D TYPE BUS FLIP FLOP	1.00
620 0163	C 7155 PRINTED CIRCUIT BOARD	1.00
000 0001	INTERFACE OPT-67 CBLE ASSY 6482-145	1.00
000 0011	LABOR SUB-SYSTEMS	1.18 ###
350 2066	LABOR QUALITY CONTROL	.24 ###
350 4225	36 POS CHAMP CONN(F) AMP 2-552475-1	1.00
420 0054	* STRAIN RELTFF 36 POS AMP 1-552297-1	2.00
451 4421	36 COND 26 GA SHIELDED CARLE	1.25
462 0291	PRKT.36 PIN CONN(E2F)B6829-128	1.00
510 6703	A STANDOFF,MALE/FEMALE B6815-56	2.00
605 1004	* 6703 PRINTED CIRCUIT BOARD	1.00
653 3000	CARLE TYE, PAN-TY PLTIM-M	3.00
654 1004	NO. 6 FLAT WASHER	2.00
	#4 GROUND LUG 1414-4	1.00

<u>WANG PART NO.</u>	<u>SHUGART PART NO.</u>	<u>DESCRIPTION</u>
726-1051	17212	Order 325-2307
726-1052	17211	SW Track Zero
726-1053	54048	Belt Drive
726-1054	54047	MTR Drive
726-1055	54068	MRT Stepping
726-1056	54145	Load Button Assy.
726-1057	54026	Hub Collet
726-1058	54055	Head Carr. Assy.
726-1059	54064	Head Load Sol. Assy.
726-1060	54136	Index Detector Assy.
726-1061	54137	Index Led Assy.
726-1062	25060	PCB Logic
726-1063	25063	PCB MTR Control
726-1068	54135	Load Bail
726-1069	54087	Activity Light Assy.
726-9614	54087	Align Diskette

8.2 SHUGART PARTS

DESCRIPTION

General

The Illustrated Parts Catalog is arranged so that the figures precede the parts listings and will be on the opposite page.

The drive assembly is contained on a single page. Sub assemblies will be separated by a solid line and are broken down on this page.

Indented Level

The parts list is indented to show the levels of assembly within a figure. The major assembly will always be level 1, all parts or assemblies that attach to that assembly will be level 2 and assemblies within level 2 will have their attaching parts level 3 and so on.

Parts Replacement

Some parts and assemblies are not field replaceable. These will be noted by an asterisk* and a footnote. These part numbers are included so they can be ordered for factory and/or repair centers.

Quantity Per Assembly

The quantity listed is the quantity used on the assembly.

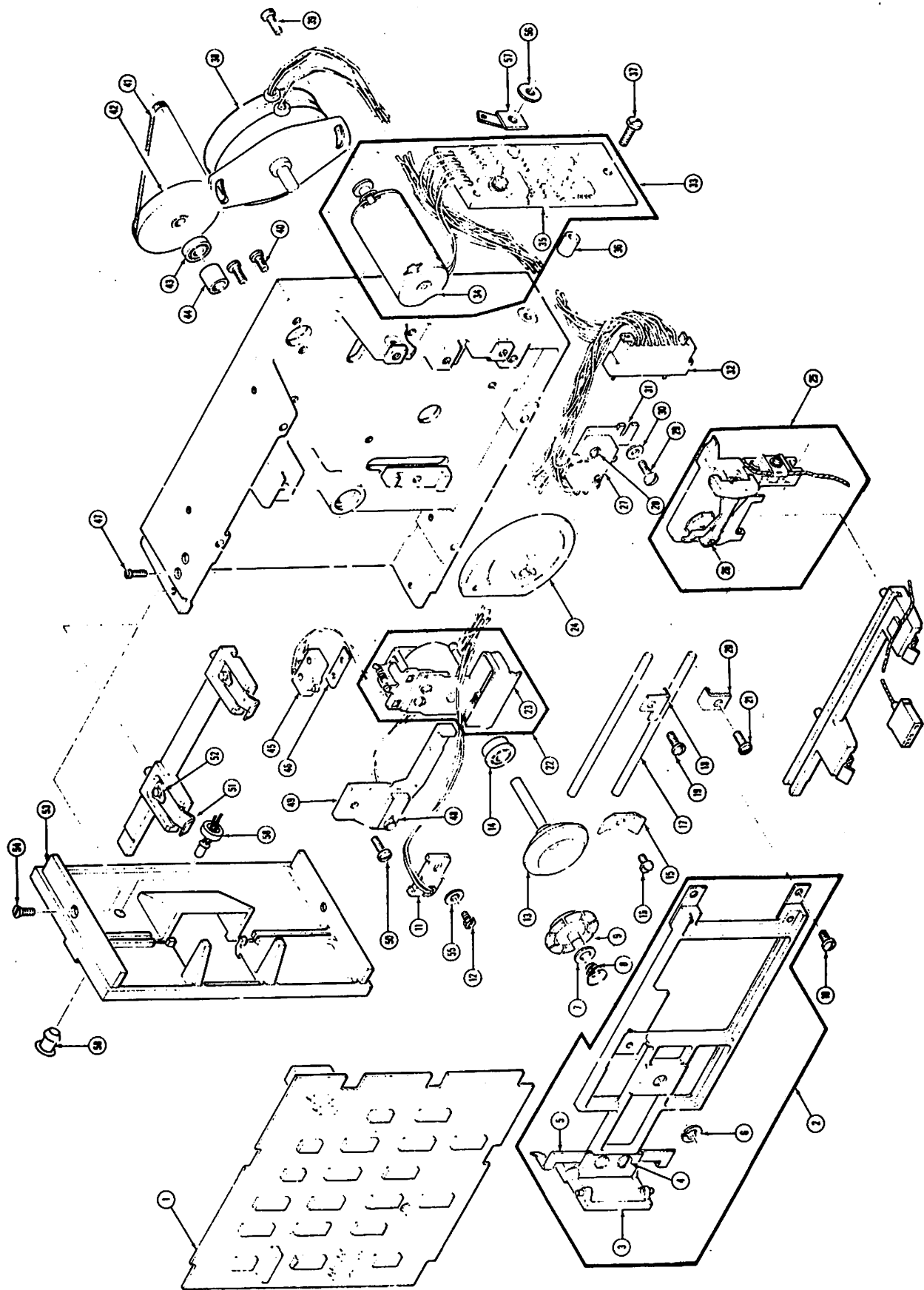
Numerical Index

The numerical index lists all parts in part number sequence and is cross referenced to the figure and reference number.

FIGURE & REF. NUMBER	PART NUMBER	DESCRIPTION				QTY PER ASM
		1	2	3	4	
1		DRIVE ASSEMBLY				
1	25062	PCB, DRIVE				1
2	54070	HUB FRAME ASSEMBLY				1
3	54073	DOOR HINGE				1
4	10186	SCREW 6 32 X .188 BH				2
5	54057	STOPDISK				1
6	11305	E RING				1
7	54131	COLLAR HUB				1
8	54132	SPRING, CLAMP				1
9	54026	HUB, COLLETT				1
10	10186	SCREW 6-32X.188 BH				2
11	54136	DETECTOR INDEX				1
12	10187	SCREW 6 32X.188 BH				1
13	* 54032	SPINDLE				1
14	* 10805	BEARING, FLANGED				1
15	54078	KEEPER, GUIDE ROD				1
16	10186	SCREW 6 32X.188 BH				1
17	54006	GUIDE ROD				2
18	54099	STOP, CARRIAGE				1
19	10186	SCREW 6 32X.188 BH				1
20	54078	KEEPER GUIDE ROD				1
21	10186	SCREW 6 32X.188 BH				1
22	54064	SOLENOID ASSMY. HEAD LOAD				1
23	54135	BAIL, LOAD				1
24	54003	CAM, ACTUATOR				1
25	54055	HEAD & CARRIAGE ASSMY.				1
26	54145	LOAD BUTTON				1
27	17211	TK 00 SWITCH				1
28	10176	SCREW 4 40X.50 BH				2
29	10187	SCREW 6 32X.250 BH				1
30	10013	WASHER				1
31	54038	MOUNT TK 00 SWITCH				1
32	15655	CONNECTOR P-3				1
33	54067	MOTOR & CONTROL ASSEMBLY				1
34	54047	MOTOR DRIVE				1
35	25063	PCB MOTOR CONTROL				1
36	54069	STANDOFF, MOTOR PCB				2
37	10191	SCREW 6 32X.50 BH				2
38	* 54068	MOTOR, STEPPER				1
39	10187	SCREW 6 32X 250 BH				2
40	10177	SCREW 4 40X.625 BH				2
41	54048	BELT, DRIVE				1
42	* 54138	PULLEY, SPINDLE				1
43	* 10804	BEARING				1
44	* 54097	SPACER, LONG				1
45	17212	SWITCH WRITE PROTECT				1
46	54062	NUT PLATE				1
47	10166	SCREW 2 56X.50 BH				1
48	54137	LED, INDEX				1
49	54034	PLATEN				1
50	10189	SCREW 6 32X.250 BH				1
51	54036	CLAMP, PCB				4
52	11311	RETAINER, CLAMP				4
53	54077	FACEPLATE				1
54	11900	6 32X.250 F.H.				2
55	10013	WASHER				1
56	12501	WASHER				1
57	15663	FASTON				1
58	11312	ACTIVITY LIGHT ASSEMBLY				1
		* NOT FIELD REPLACEABLE				

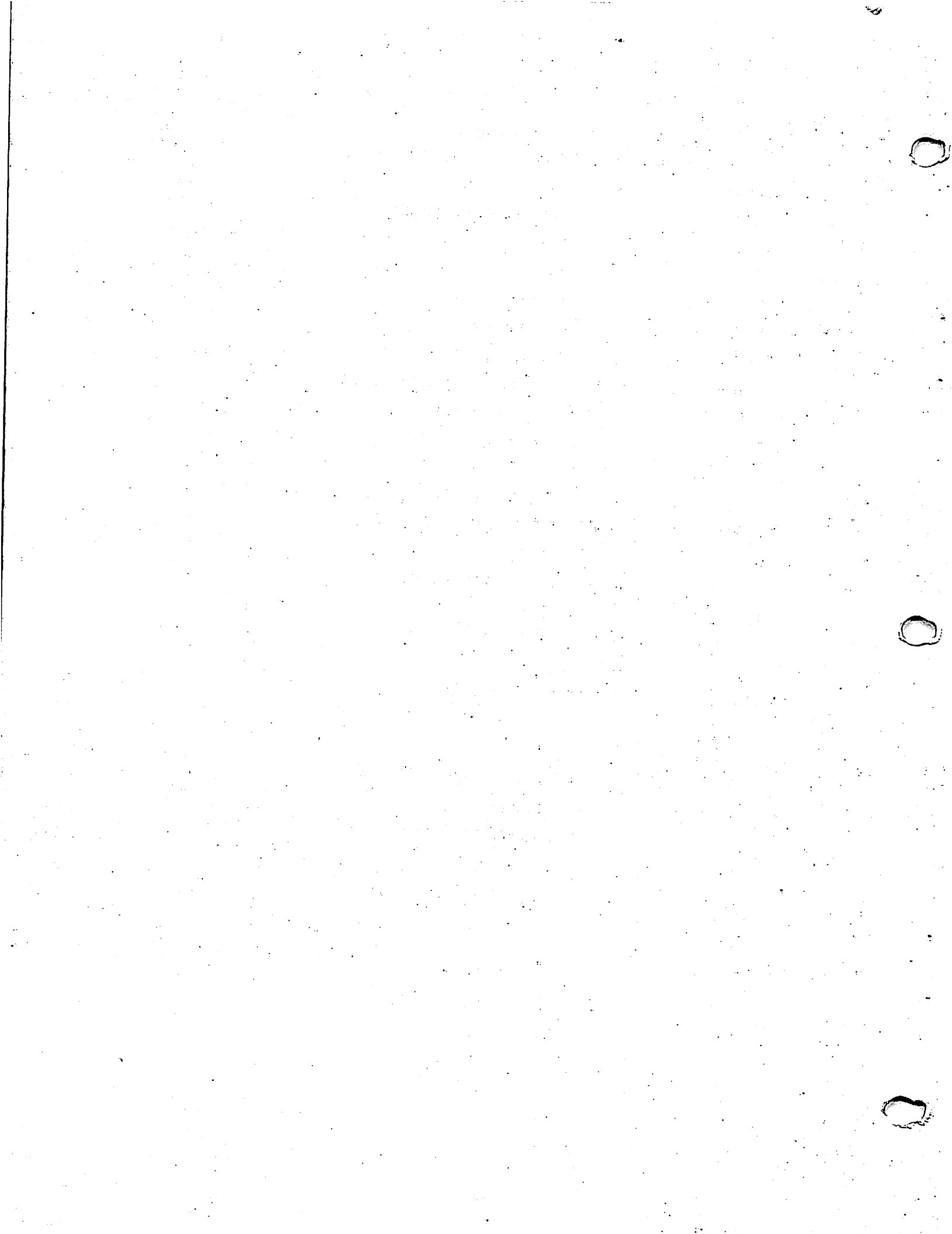
PART NUMBER	REF
10013	33
	55
10166	47
10176	28
10177	40
10186	4
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10187	12
	29
	39
10189	50
10191	37
10804	43
10805	14
11305	6
11311	52
11312	58
11900	54
12501	56
15655	32
15663	57
17211	27
17212	45
25062	1
25063	35
50542	26
54003	24
54006	17
54138	42
54026	9
54032	13
54034	49
54036	51
54038	31
54047	34
54048	41
54055	25
54057	5
54062	46
54064	22
54065	36
54067	33
54068	38
54070	2
54073	3
54077	53
54078	15
	20
54097	44
54099	18

PART NUMBER	REF.
54131	7
54132	8
54135	23
54136	11
54137	48



SECTION 9
ASSEMBLY DRAWINGS & ELECTRICAL SCHEMATICS

7048	KEYBOARD DECODER DAUGHTERBOARD
7049	KEYBOARD
7051	CPU (3 sheets)
7052/52-1	MEMORY (3 sheets)
7056	MOTHERBOARD
7058	PRINTER/PLOTTER/64 x 16 DISPLAY I/O (2 sheets)
7061/61-1	DOUBLE BUFFERED TYPEWRITER/PLOTTER OUTPUT
7153/53-1	PCS TELECOMMUNICATIONS (2 sheets)
7154	IEEE INTERFACE (2 sheets)
7155	8 BIT PARALLEL I/O
7159	PRINTER/PLOTTER/80 x 24 DISPLAY I/O (2 sheets)
7180	MINI DISK CONTROL (3 sheets)
C6482-79	24 PIN FLAT CABLE ASSY.
C6482-104	OPTION 61 I/O CABLE
C6829-12	BASE ASSY.
PCS-II	OUTER CHASSIS ASSY.
PCS IIA PCB's:	
7054	CRT/DISK/PTR I/O
7059	CRT/DISK/PTR I/O
7367	MOTHERBOARD PCS IIA/PCS III



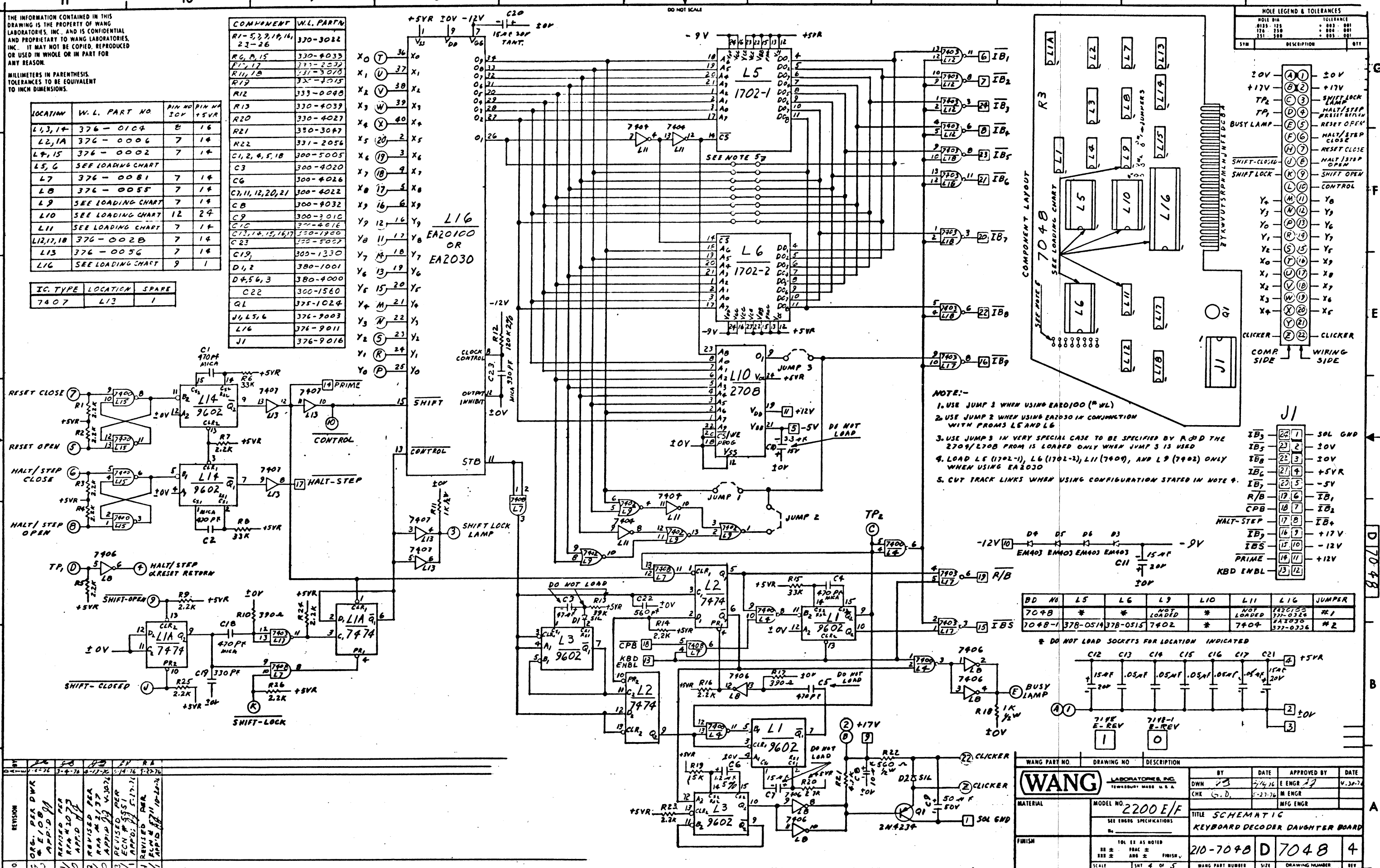
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MILLIMETERS IN PARENTHESIS. TOLERANCES TO BE EQUIVALENT TO INCH DIMENSIONS.

LOCATION	W. L. PART NO	PIN NO	PIN NO
		ICV	+5VR
L1,3,14	376-0104	8	16
L2,1A	376-0006	7	14
L4,15	376-0002	7	14
L5,6	SEE LOADING CHART		
L7	376-0081	7	14
L8	376-0055	7	14
L9	SEE LOADING CHART		
L10	SEE LOADING CHART	12	24
L11	SEE LOADING CHART	7	14
L12,17,18	376-002B	7	14
L13	376-0056	7	14
L16	SEE LOADING CHART	9	1

IC TYPE	LOCATION	SPARE
7407	L13	1

COMPONENT	W.L. PART NO
R1-5,7,9,14, 23-26	370-3022
R6,8,15	330-4033
R17,17	371-2032
R11,18	371-3078
R19	371-3015
R12	333-0048
R13	330-4039
R20	330-4027
R21	330-3047
R22	331-2056
C1,2,4,5,18	300-5005
C3	300-4020
C6	300-4026
C7,11,12,20,21	300-4022
C8	300-4032
C9	300-3010
C10	371-4016
C13,14,15,16,17	300-1800
C23	350-5007
C19	300-1330
D1,2	380-1001
D4,5,6,3	380-4000
C22	300-1560
Q1	375-1024
J4,5,6	376-9003
L16	376-9011
J1	376-9016



- NOTE:-
1. USE JUMP 3 WHEN USING EA20100 (M WL)
 2. USE JUMP 2 WHEN USING EA2030 IN CONJUNCTION WITH PROMS L5 AND L6
 3. USE JUMPS IN VERY SPECIAL CASE TO BE SPECIFIED BY R.D THE 2709/L70B FROM IS LOADED ONLY WHEN JUMP 3 IS USED
 4. LOAD L5 (1702-1), L6 (1702-2), L11 (7409), AND L9 (7402) ONLY WHEN USING EA2030
 5. CUT TRACK LINKS WHEN USING CONFIGURATION STATED IN NOTE 4.

BD NO	L5	L6	L9	L10	L11	L16	JUMPER
704B	*	*	NOT LOADED	*	NOT LOADED	EA20100	#1
704B-1	378-0514	378-0515	7402	*	7404	EA2030	#2

* DO NOT LOAD SOCKETS FOR LOCATION INDICATED

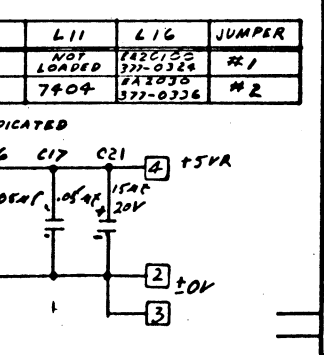
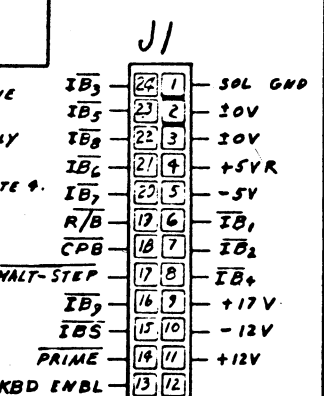
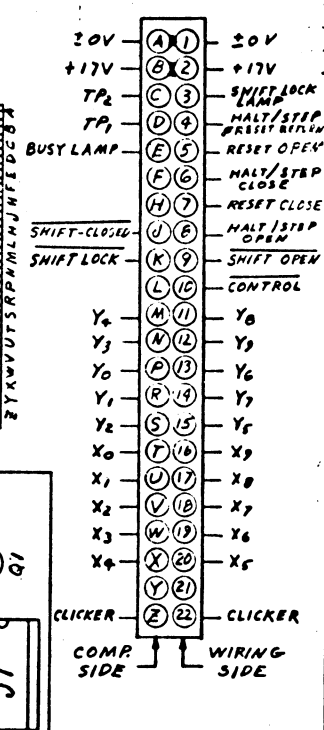
WANG PART NO	DRAWING NO	DESCRIPTION
2200 E/F <td> <td>KEYBOARD DECODER DAUGHTER BOARD </td></td>	<td>KEYBOARD DECODER DAUGHTER BOARD </td>	KEYBOARD DECODER DAUGHTER BOARD

BY	DATE	APPROVED BY	DATE
DWN	2/16/76	E ENGR	2/16/76
CHK	5-27-76	M ENGR	

MATERIAL	MODEL NO	TITLE
	2200 E/F	SCHEMATIC

FINISH	SCALE	SHT	OF	WANG PART NUMBER	SIZE	DRAWING NUMBER	REV
	1:1	4	5	210-704B	D7048	4	

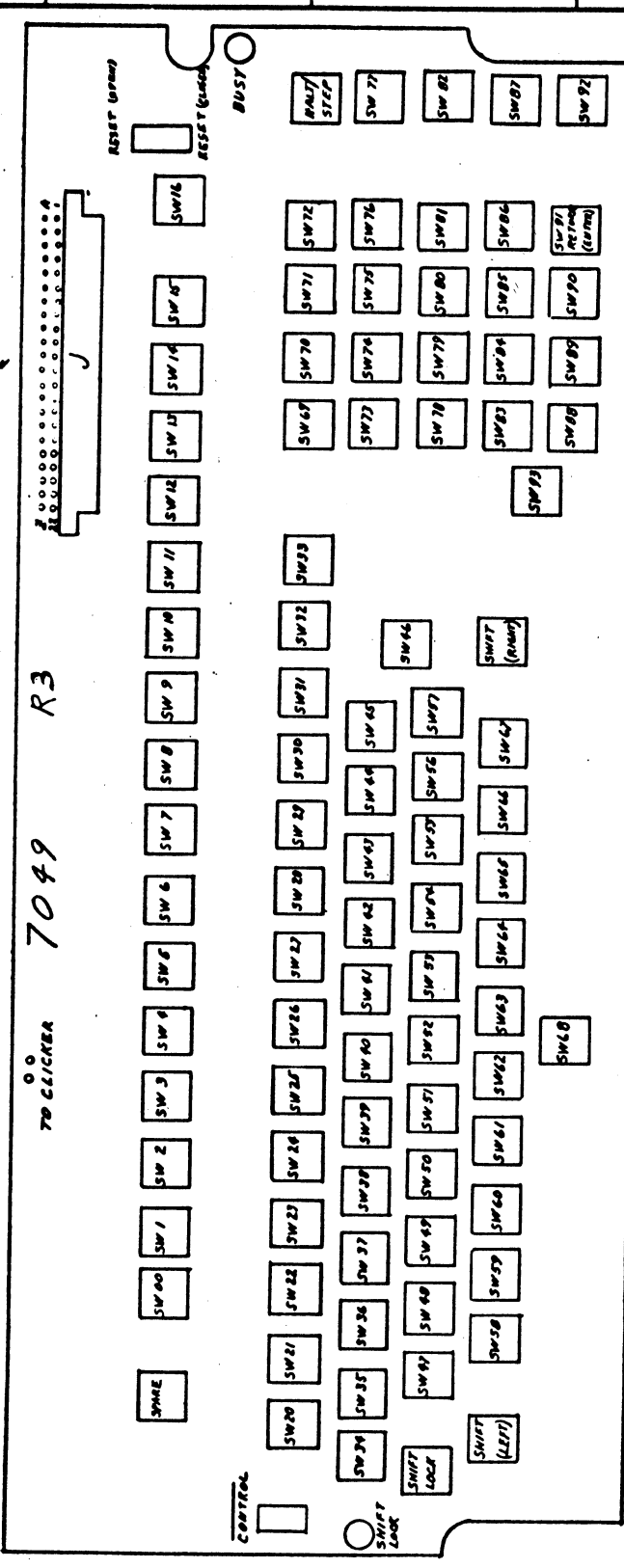
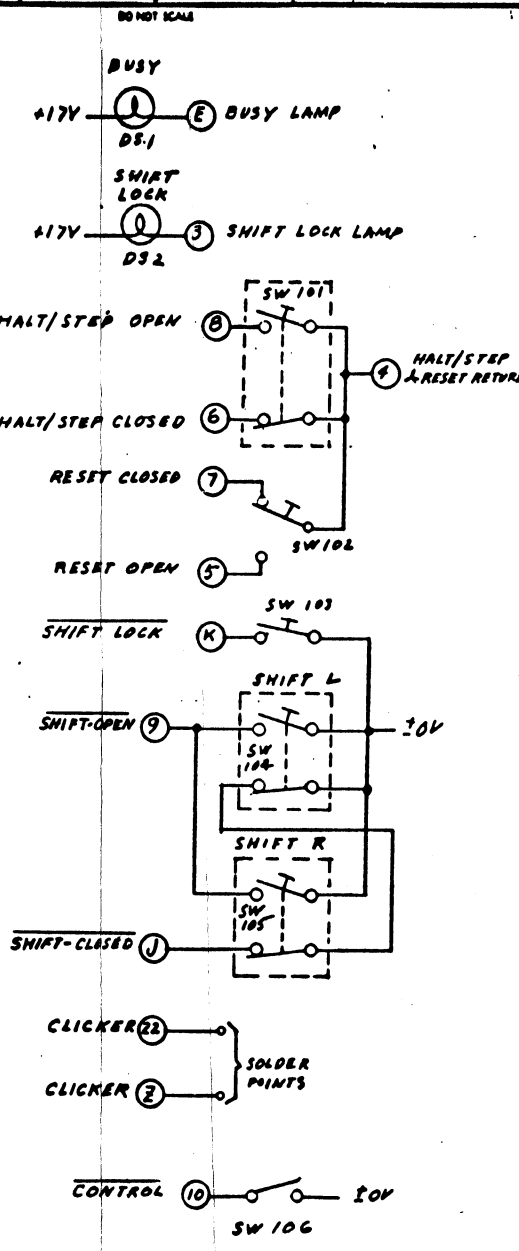
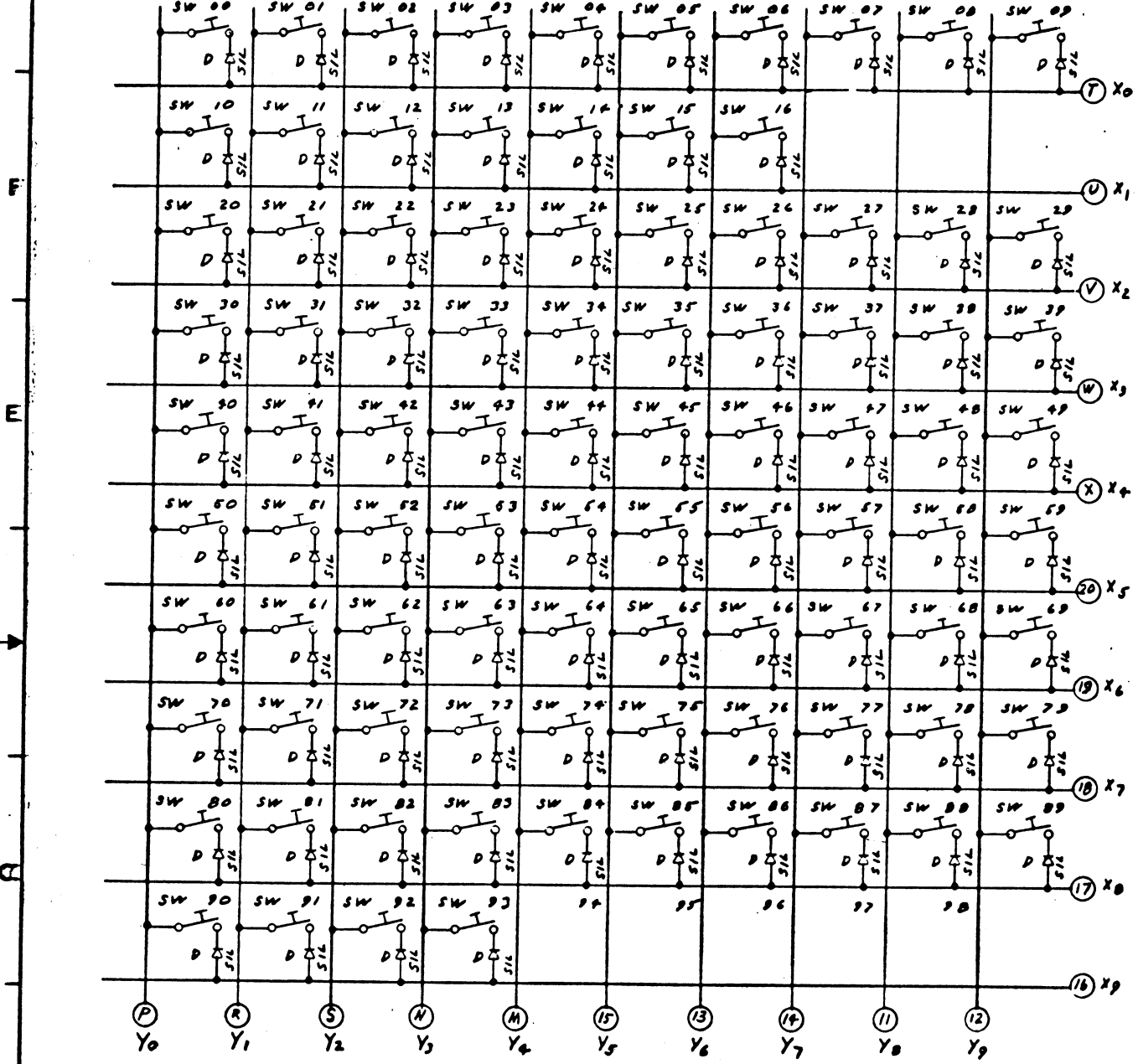
MOLE LEGEND & TOLERANCES	
MOLE DIA	TOLERANCE
.0125 - .015	.001 - .001
.016 - .018	.001 - .001
.021 - .024	.001 - .001



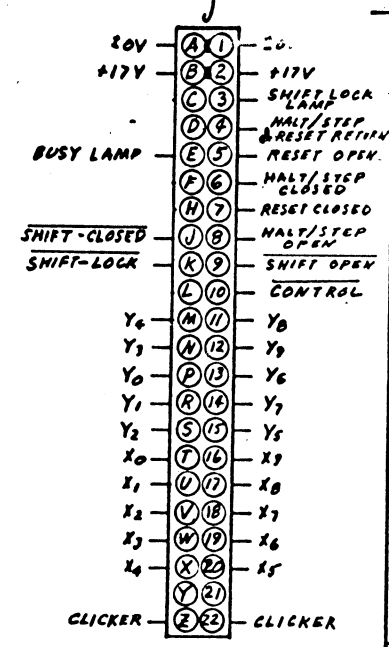
NO	REVISION	DATE	BY	APP'D	REV
1	ORG. PER DWR	3-4-76			
2	REVISED PER	3-4-76			
3	REVISED PER	6-12-76			
4	REVISED PER	5-14-76			
5	REVISED PER	7-22-76			

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



HOLE LEGEND & TOLERANCES		
SIZE DIA	TOLERANCE	
0125 - 125	± 0.02	0.01
126 - 225	± 0.03	0.01
226 - 325	± 0.04	0.01
326 - 425	± 0.05	0.01
SYM	DESCRIPTION	QTY
A		



COMPONENT	W.L. PART NO.
SW00-16	325-2413
SW20-93, 103	325-2405
SW101, 104, 105	325-2407
SW102	325-0026
SW106	325-0020
D (514)	780-1001
DS1, 2	370-0004
J (4+PIN)	350-0022

REV	DATE	BY	APP'D
01	3-8-76	WJL	
02	4-15-76	WJL	

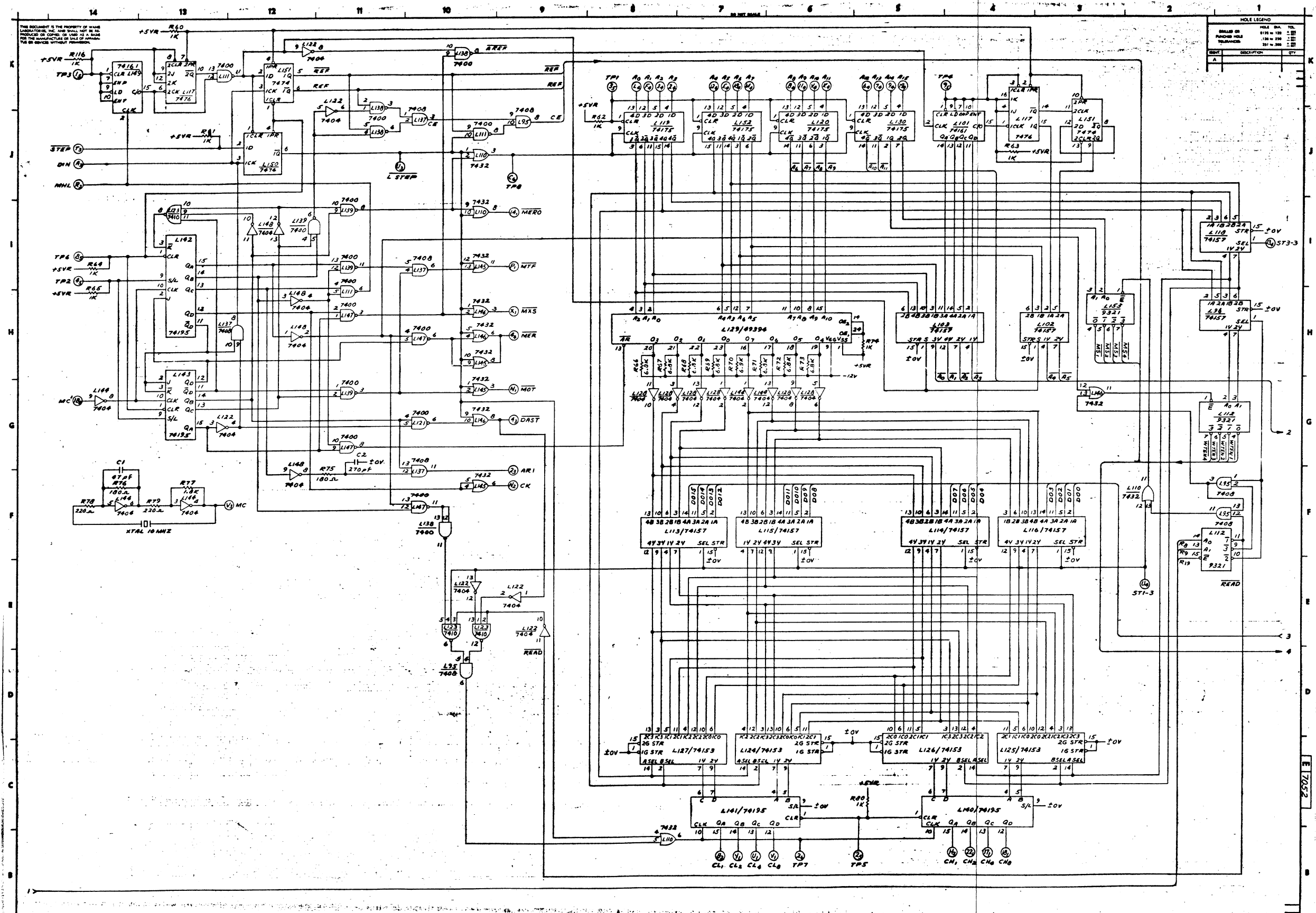
NO	REVISION	QTY	ITEM	WANG PART NO	DRAWING NO	DESCRIPTION
1	01		KEYBOARD			

BY	DATE	APPROVED BY	DATE
DWN	7-8-76	E ENGR	
CHK	9-16-76	M ENGR	

MODEL NO 2200 E/F
SEE ENGR SPECIFICATIONS

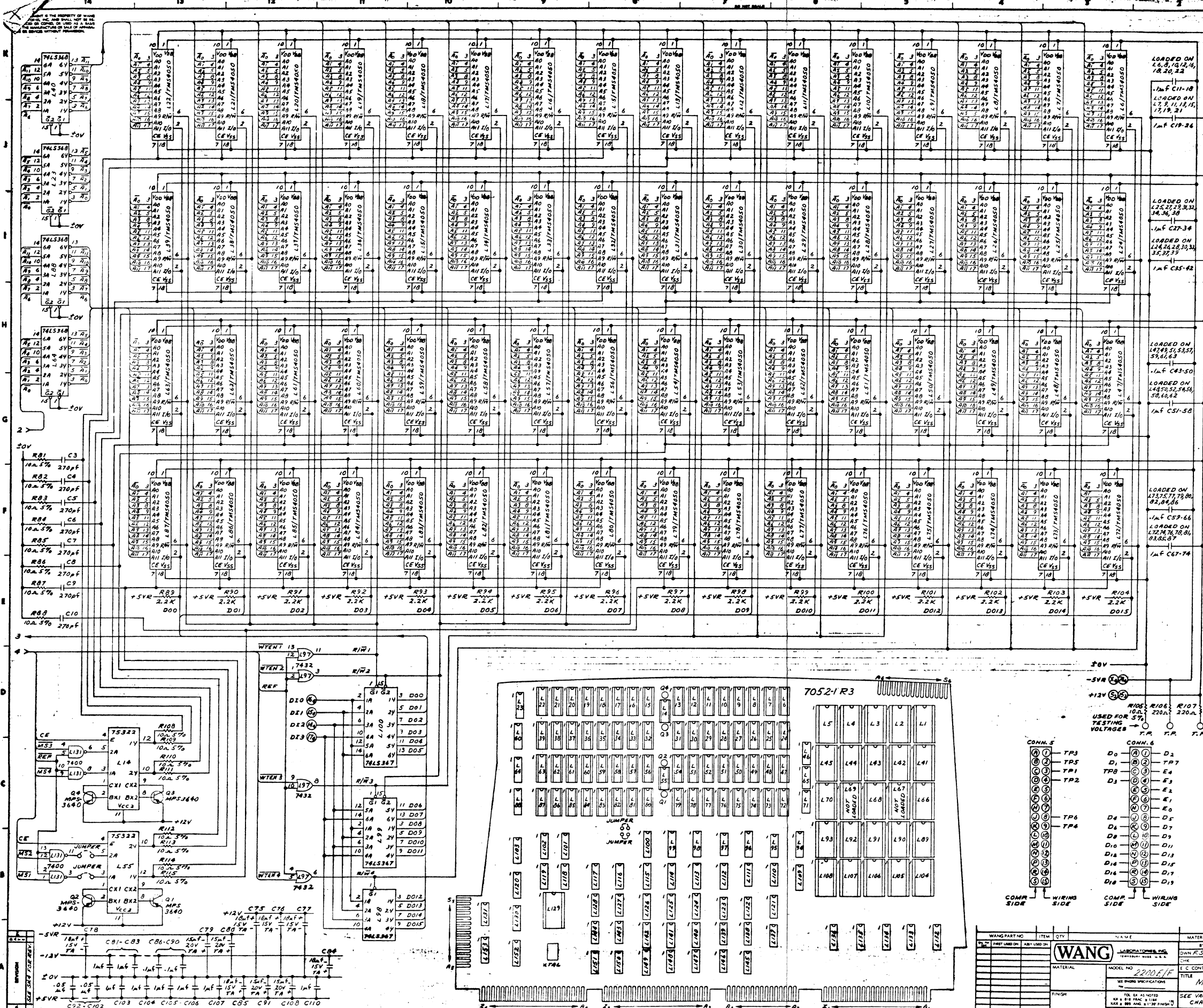
TITLE SCHEMATIC KEYBOARD

220-7049 D 7049 2



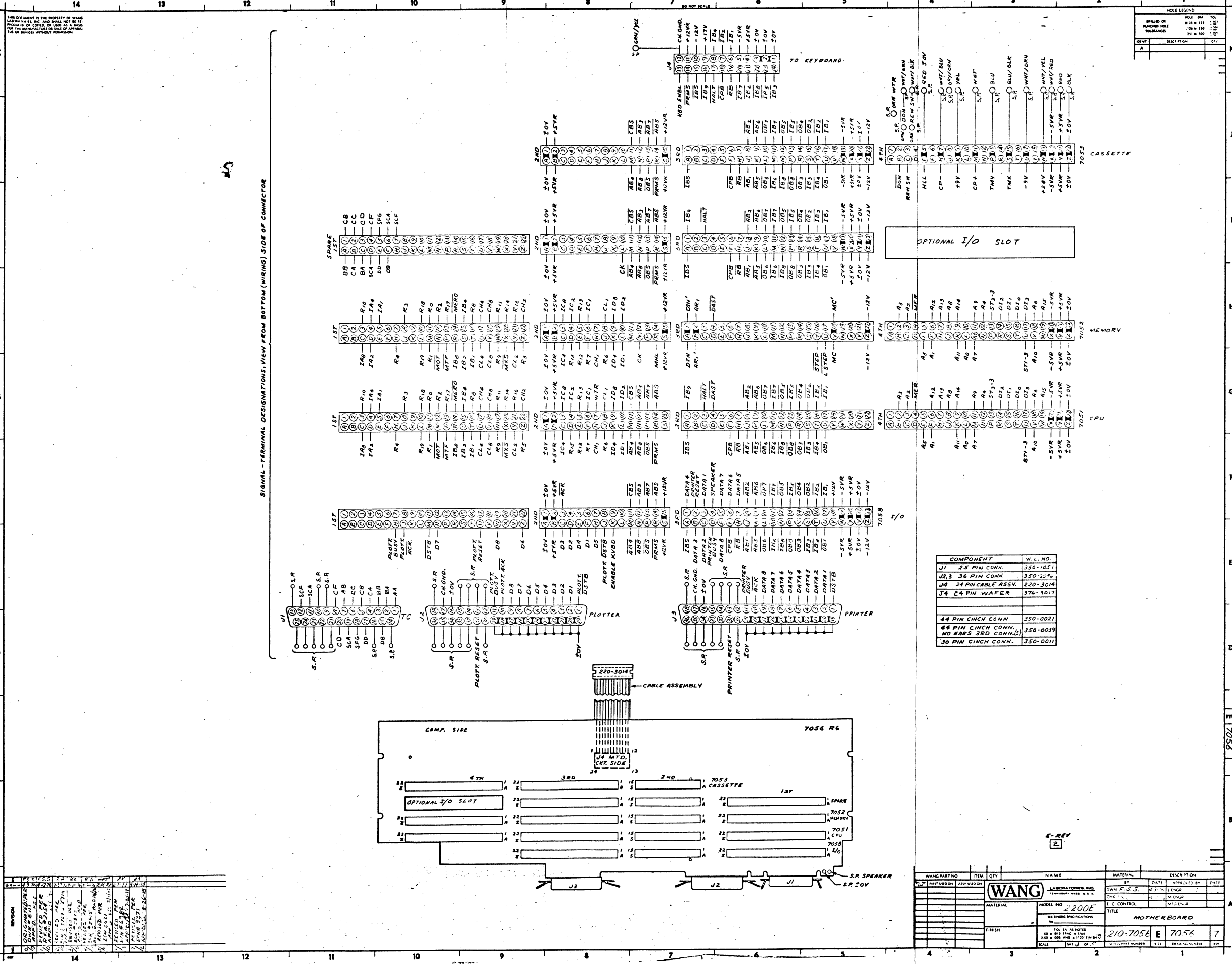
HOLE LEGEND	
NO.	DESCRIPTION
1	...
2	...
3	...
4	...
5	...
6	...
7	...
8	...
9	...
10	...
11	...
12	...
13	...
14	...

WANG PART NO.	ITEM	QTY	NAME	MATERIAL	DATE	APPROVED BY	DATE
...
WANG LABORATORIES, INC.			MODEL NO. 2200E/F	TITLE			
MEMORY			SEE VARIATION CHART				
E 7052			7				



NO.	DESCRIPTION	QTY
1	CONN. 1	
2	CONN. 2	
3	CONN. 3	
4	CONN. 4	
5	CONN. 5	
6	CONN. 6	
7	CONN. 7	
8	CONN. 8	
9	CONN. 9	
10	CONN. 10	
11	CONN. 11	
12	CONN. 12	
13	CONN. 13	
14	CONN. 14	
15	CONN. 15	
16	CONN. 16	
17	CONN. 17	
18	CONN. 18	
19	CONN. 19	
20	CONN. 20	
21	CONN. 21	
22	CONN. 22	
23	CONN. 23	
24	CONN. 24	
25	CONN. 25	
26	CONN. 26	
27	CONN. 27	
28	CONN. 28	
29	CONN. 29	
30	CONN. 30	
31	CONN. 31	
32	CONN. 32	
33	CONN. 33	
34	CONN. 34	
35	CONN. 35	
36	CONN. 36	
37	CONN. 37	
38	CONN. 38	
39	CONN. 39	
40	CONN. 40	
41	CONN. 41	
42	CONN. 42	
43	CONN. 43	
44	CONN. 44	
45	CONN. 45	
46	CONN. 46	
47	CONN. 47	
48	CONN. 48	
49	CONN. 49	
50	CONN. 50	
51	CONN. 51	
52	CONN. 52	
53	CONN. 53	
54	CONN. 54	
55	CONN. 55	
56	CONN. 56	
57	CONN. 57	
58	CONN. 58	
59	CONN. 59	
60	CONN. 60	
61	CONN. 61	
62	CONN. 62	
63	CONN. 63	
64	CONN. 64	
65	CONN. 65	
66	CONN. 66	
67	CONN. 67	
68	CONN. 68	
69	CONN. 69	
70	CONN. 70	
71	CONN. 71	
72	CONN. 72	
73	CONN. 73	
74	CONN. 74	
75	CONN. 75	
76	CONN. 76	
77	CONN. 77	
78	CONN. 78	
79	CONN. 79	
80	CONN. 80	
81	CONN. 81	
82	CONN. 82	
83	CONN. 83	
84	CONN. 84	
85	CONN. 85	
86	CONN. 86	
87	CONN. 87	
88	CONN. 88	
89	CONN. 89	
90	CONN. 90	
91	CONN. 91	
92	CONN. 92	
93	CONN. 93	
94	CONN. 94	
95	CONN. 95	
96	CONN. 96	
97	CONN. 97	
98	CONN. 98	
99	CONN. 99	
100	CONN. 100	

WANG PART NO.	ITEM	QTY	MATERIAL	DESCRIPTION
2200E/F	MEMORY			



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HOLE LEGEND

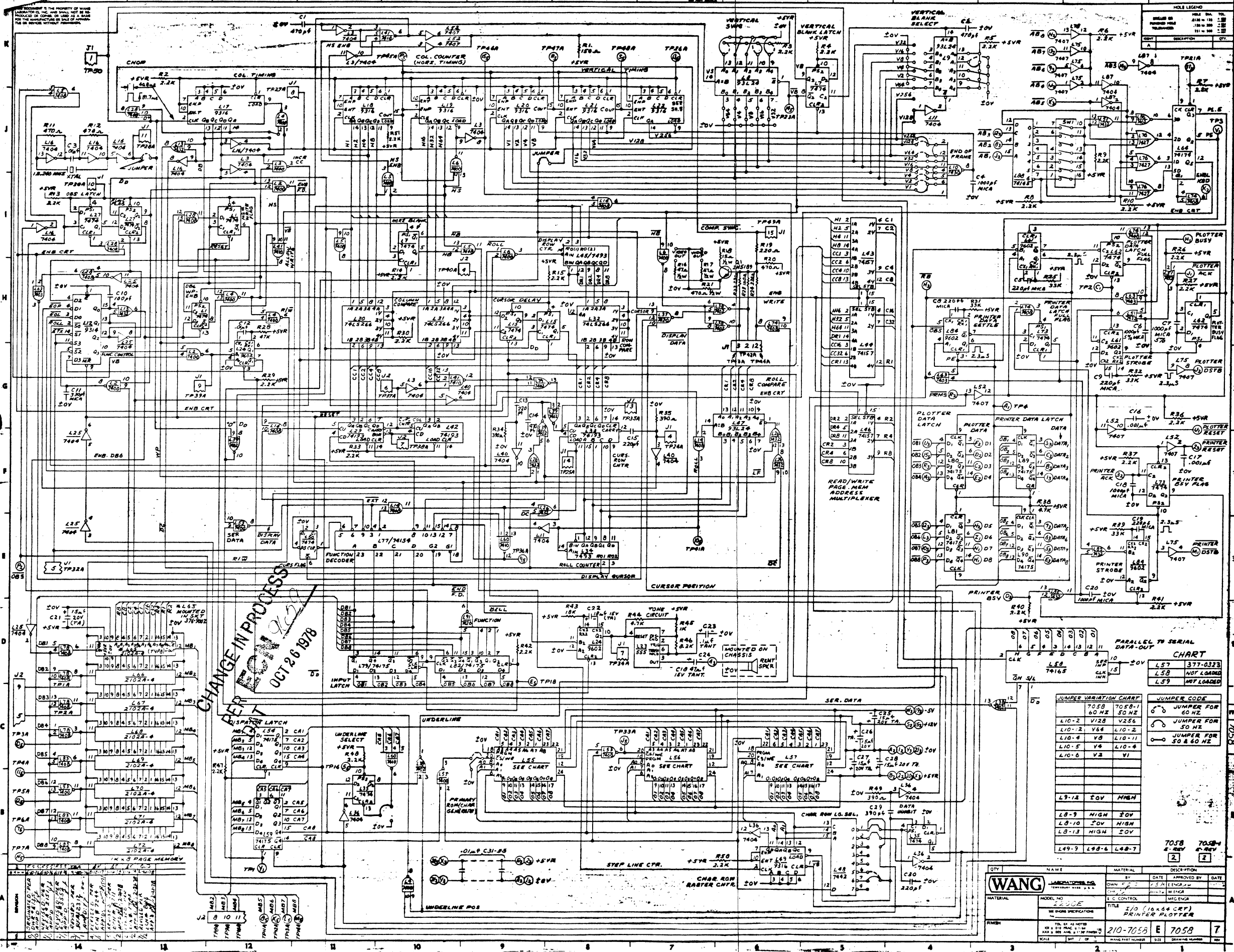
DRILLED OR REAMED HOLE	NO. 1	NO. 2	NO. 3
PLACEMENT	130 ± .010	128 ± .010	126 ± .010
DEPTH	1.50 ± .010	1.50 ± .010	1.50 ± .010

REVISIONS

NO.	DATE	DESCRIPTION
1	11/15/74	REVISED FOR...
2	11/15/74	REVISED FOR...
3	11/15/74	REVISED FOR...
4	11/15/74	REVISED FOR...
5	11/15/74	REVISED FOR...
6	11/15/74	REVISED FOR...
7	11/15/74	REVISED FOR...
8	11/15/74	REVISED FOR...
9	11/15/74	REVISED FOR...
10	11/15/74	REVISED FOR...
11	11/15/74	REVISED FOR...
12	11/15/74	REVISED FOR...
13	11/15/74	REVISED FOR...
14	11/15/74	REVISED FOR...

E-REV
2

E 7056



CHANGE IN PROCESS
 PER [Signature]
 OCT 26 1978

PARALLEL TO SERIAL DATA-OUT CHART

L57	377-0323
L58	NOT LOADED
L59	NOT LOADED

JUMPER VARIATION CHART

705B	705B-1
60 HZ	50 HZ
L10-2	V128
L10-2	V68
L10-4	V8
L10-5	V4
L10-6	V2
L9-12	I0V
L8-9	HIGH
L8-10	I0V
L8-13	HIGH
L49-9	L48-6
L48-7	

JUMPER CODE

6	JUMPER FOR 60 HZ
5	JUMPER FOR 50 HZ
4	JUMPER FOR 50 & 60 HZ

WANG		LABORATORY	
DATE	APPROVED BY	DATE	APPROVED BY
2/10/78	[Signature]	2/10/78	[Signature]
TITLE		7058 (16x64 CRT) PRINTER PLOTTER	
210-7058	E 7058	7	

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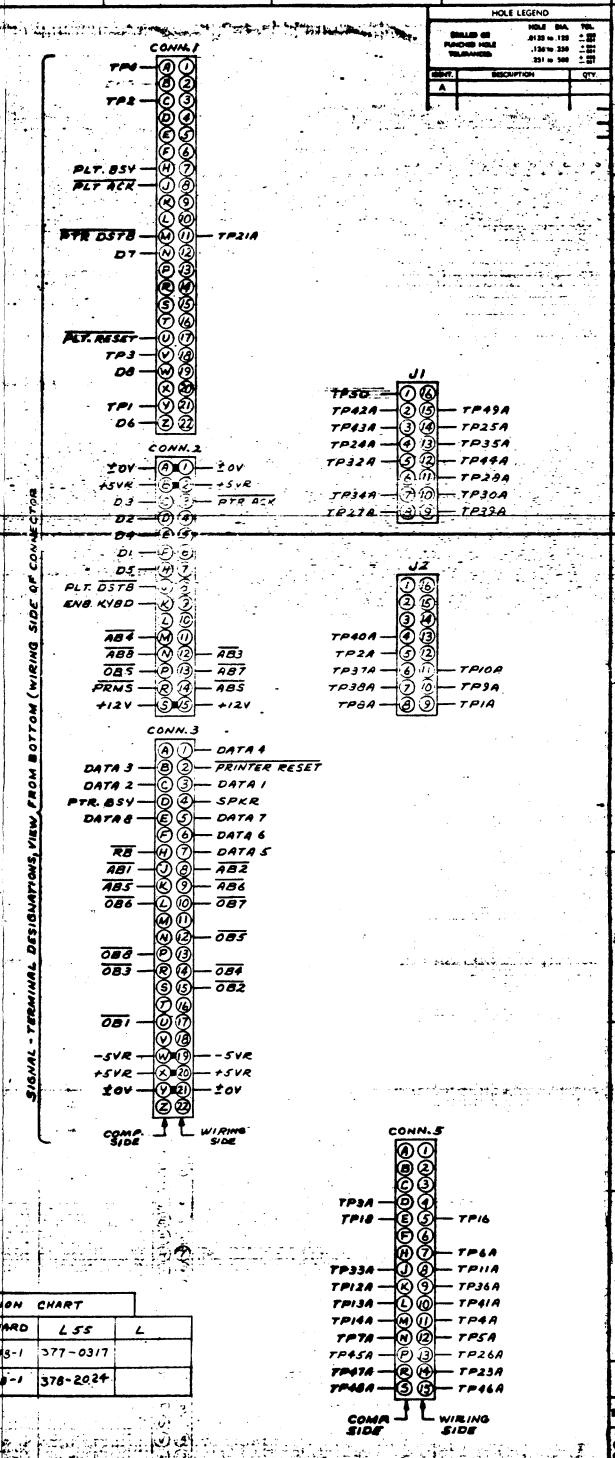
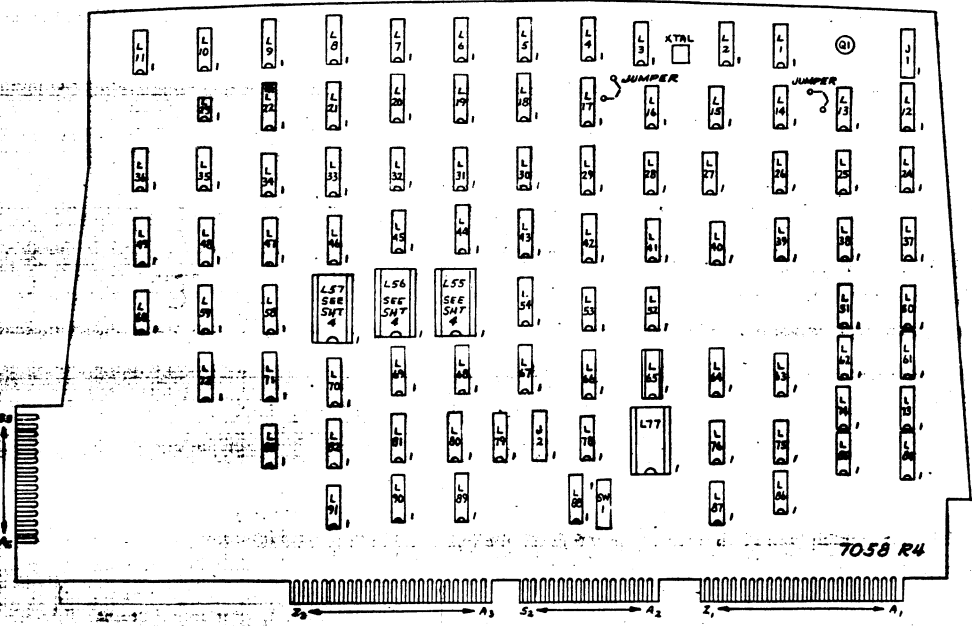
COMPONENT	W.L. NO.
R1	330-2015
R2-10,13,15,16,17,18,20,22,24,27,28,30,32,34,37,40,41,42,43,45,50,51	330-3022
R11,12,20	330-3047
R16,17	331-1047
R18	331-1015
R19,22,26	330-2022
R21	331-2047
R23	330-2015
R25,28,29	330-4033
R28	330-4047
R29,35,49	330-2039
R30,44	330-3047
R43	330-4018
R45	330-3010
R46	330-3082
C1,2,14	300-1470
C3,12,31,53	300-1503
C4,5,7,14,20	300-5004
C5,9,19	300-5004
C10	300-1127
C11	300-6067
C13,15,20	300-1220
C16,17	300-1506
C21,25-28	300-4022
C22	300-4018
C23	300-4002
C24	300-4020
C29	300-1390
SW1	325-1503
SW1 CAP	325-3047
XTAL	321-0019
Q1	375-1021
L55-S7, 77 SKT	376-9003
L65 SKT	376-9002
J1,2	376-9004
B.M.C. CONN.	350-2069 Ref

P.C. TYPE	LOCATION	QTY
7474	L50	7
7400	L4	7
	L8	1
	L11	1
	L24	1
	L34	2
	L40	3
	L47	2
7408	L83	1
7412	L13	2
	L57	1
	L85	2
7420	L37	1
	L91	1
7402	L86	3
7410	L60	1
7403	L63	1
7407	L52	1

P.C. LOCATION	W.L. NO.	TERM. FOR	TERM. FOR
L13,15,17,21,23,25,29,42,53	376-0006	7	16
L2,4,6,53	376-0002	7	16
L3,11,16,25,34,40,87	376-0010	7	16
L5,14,28,74,83	376-0001	7	16
L8,9,47	376-0120	8	16
L10	376-0031	7	16
L12	376-0108	8	16
L13,26,51,85	376-0093	7	16
L17,21,49	376-0094	8	16
*L22	376-0094	8	16
L23	376-0124	1	8
L24,61,84	376-0104	8	16
L29,33,42	376-0053	8	16
L30-32	376-0148	7	16
L34,45	376-0011	10	5
L37,57	376-0028	7	16
L38,39,56	376-0016	7	16
L42	376-0022	8	16
L49	376-0008	8	16
L52,75	376-0056	7	16
L54,59,79,80-82,89,90	376-0119	8	16
L55-S7	SEE CHART	12	24
L58	376-0105	8	16
L63	376-0028	7	16
L64	376-0070	8	16
L65-72	377-0069	9	10
L76	376-0125	7	16
L77	376-0090	12	24
L88	376-0069	8	16

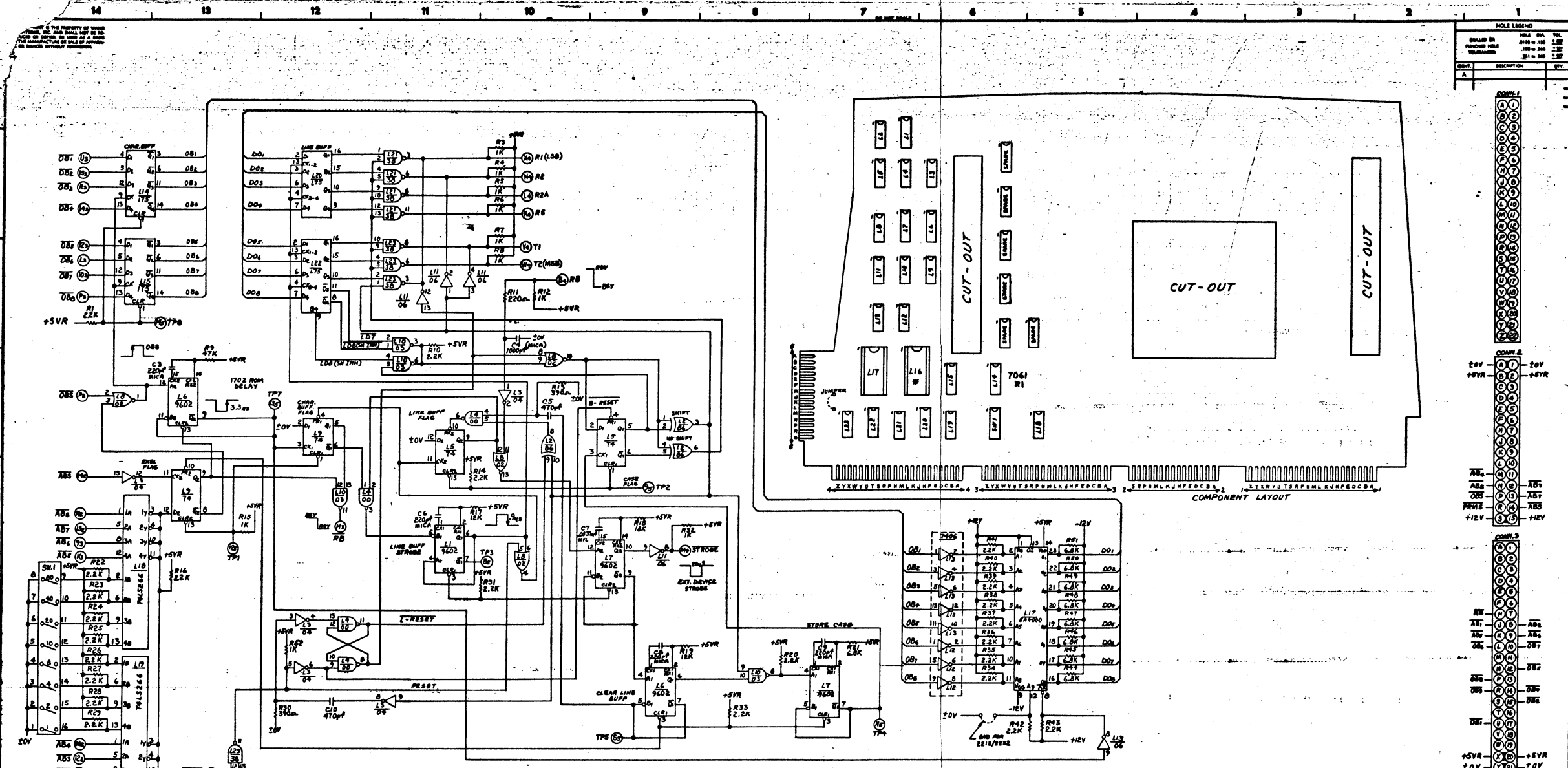
* NOTE: L22 LOADED ON 7058-1 ONLY.

CHANGE IN PROCESS
 PER ECN 7659
 DATE OCT 26 1978



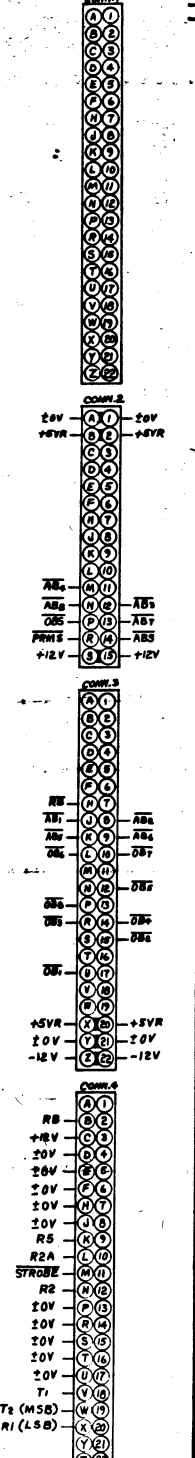
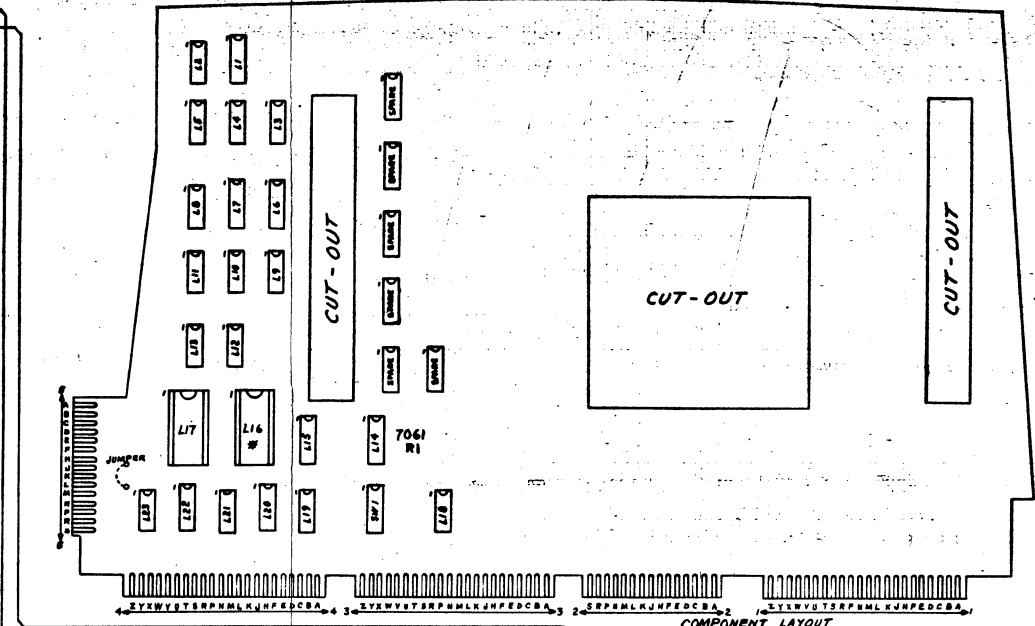
MODEL	P.C. BOARD	L55	L
210-7058-1B	207-7058-1	377-0317	
210-7058-1C	207-7058-1	376-2024	

WANG PART NO.	ITEM	QTY	N.A. NAME	MATERIAL	DESCRIPTION
210-7058-1	PC BOARD	1	WANG	2200E	1/0 (16 x 64 CRT) PRINTER PLOTTER



HOLE LEGEND

DRILL DIA.	HOLE DIA.	VAL.
0.0315	0.0315	1.00
0.0630	0.0630	1.00
0.1260	0.1260	1.00
0.2520	0.2520	1.00



LOCATION	W.L. PART NO.	TERM. NO. 10V	TERM. NO. Vcc+5V
L1, 6, 7	376-0104	8	16
L2	376-0036	7	14
L3	376-0010	7	14
L4	376-0002	7	14
L5, 9	376-0006	7	14
L8	376-0016	7	14
L10	376-0028	7	14
L11, 12, 13	376-0055	7	14
L14, 15	376-0119	8	16
L17 SKT	376-9003		
L17	377-0156		24
L18, 19	376-0148	7	14
L20, 22	376-0151	12	5
L21, 23	376-0128	7	14
L16	DO NOT LOAD		

COMPONENT	W.L. PART NO.
R1, 4, 31, 33-43, 15, 16, 20, 22-23	330-3022
R3-8, 12, 13, 38, 52	330-3010
R9	330-4047
R11	330-2022
R13, 30	330-2039
R17, 19	330-4012
R18, 33	330-4018
R21, 44-51	330-3068
C3, 6, 8, 9	300-5004
C4	300-5006
C5, 10	300-1470
C11-19	300-1900
C2, 20, 21, 23	300-4022
SW.1	325-1503
SW.1 CAP	325-9047
C7	300-2033
D1	380-1001
C22	300-3009

LOCATION	TYPE	SPHRES
L1	9602	1
L2	7486	1
L17	7406	2
L12	7406	3
L3	7404	1

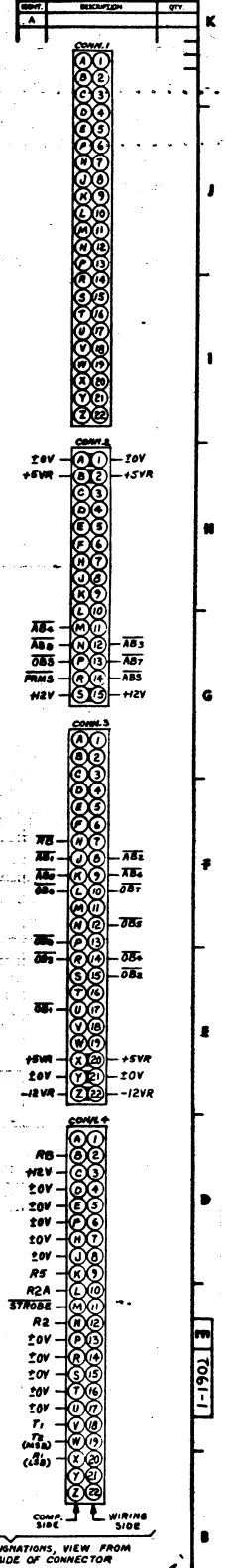
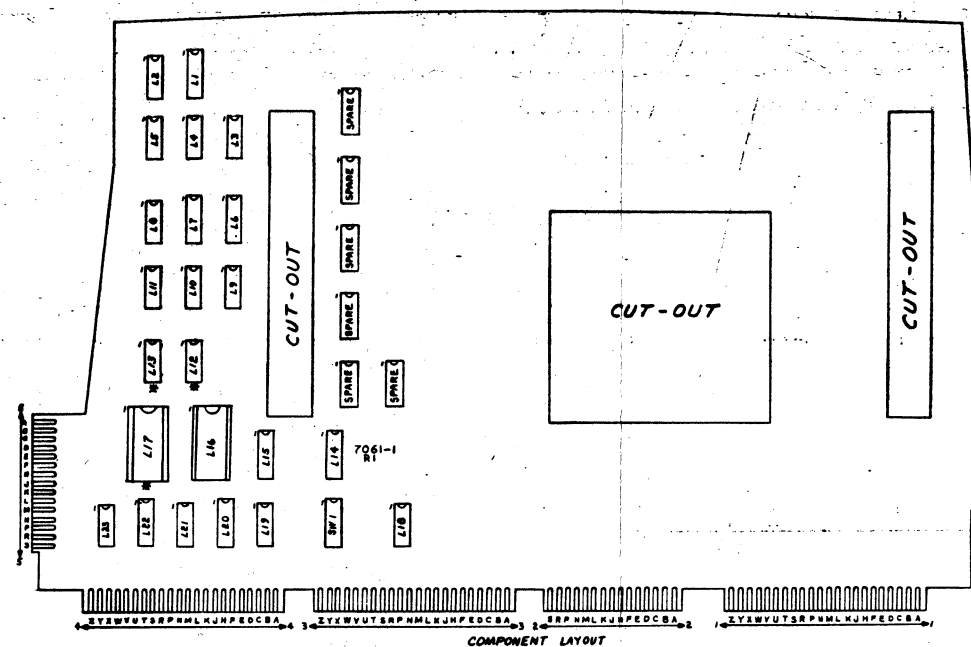
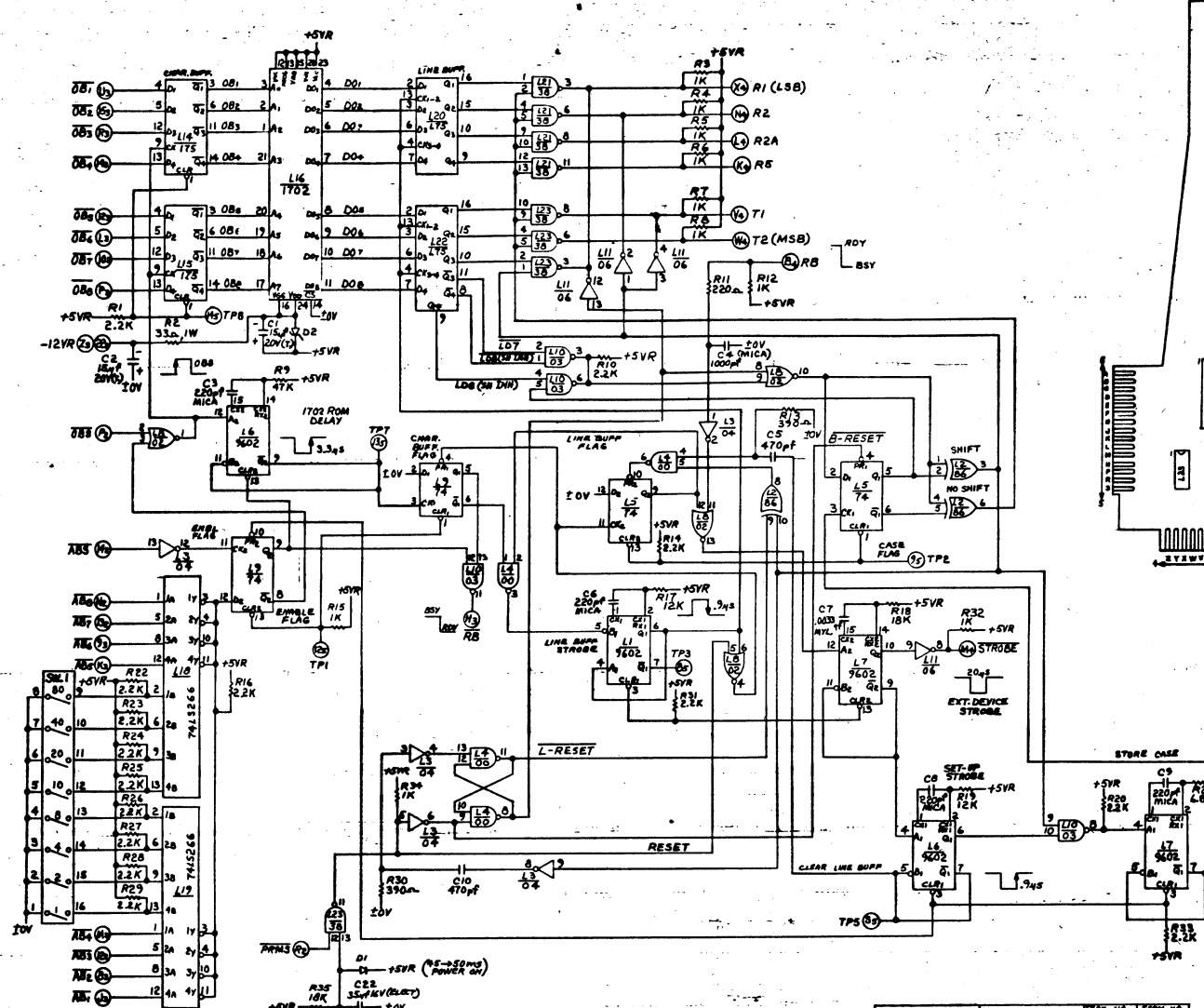
1. ALL I.C. CHIPS ARE 7400 SERIES UNLESS OTHERWISE NOTED.

REVISION	DATE	BY	DESCRIPTION
1	11/17/73	WJ	INITIAL DESIGN
2	11/20/73	WJ	REVISED FOR MANUFACTURE
3	11/20/73	WJ	REVISED FOR MANUFACTURE
4	11/20/73	WJ	REVISED FOR MANUFACTURE
5	11/20/73	WJ	REVISED FOR MANUFACTURE
6	11/20/73	WJ	REVISED FOR MANUFACTURE
7	11/20/73	WJ	REVISED FOR MANUFACTURE
8	11/20/73	WJ	REVISED FOR MANUFACTURE
9	11/20/73	WJ	REVISED FOR MANUFACTURE
10	11/20/73	WJ	REVISED FOR MANUFACTURE
11	11/20/73	WJ	REVISED FOR MANUFACTURE
12	11/20/73	WJ	REVISED FOR MANUFACTURE
13	11/20/73	WJ	REVISED FOR MANUFACTURE
14	11/20/73	WJ	REVISED FOR MANUFACTURE

WANG PART NO.	ITEM	QTY	NAME	MATERIAL	DESCRIPTION
210-7061	1	1	WANG LOGIBLOC PLOTTER	2200E/F	SCHEMATIC LOGIBLOC DOUBLE BUFFERED TYPEWRITER PLOTTER

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HOLE NO.	SIZE	TYPE
1-10	.0315	STANDARD
11-15	.0470	STANDARD
16-20	.0625	STANDARD
21-25	.0780	STANDARD
26-30	.0935	STANDARD
31-35	.1090	STANDARD
36-40	.1245	STANDARD
41-45	.1400	STANDARD
46-50	.1555	STANDARD
51-55	.1710	STANDARD
56-60	.1865	STANDARD
61-65	.2020	STANDARD
66-70	.2175	STANDARD
71-75	.2330	STANDARD
76-80	.2485	STANDARD
81-85	.2640	STANDARD
86-90	.2795	STANDARD
91-95	.2950	STANDARD
96-100	.3105	STANDARD



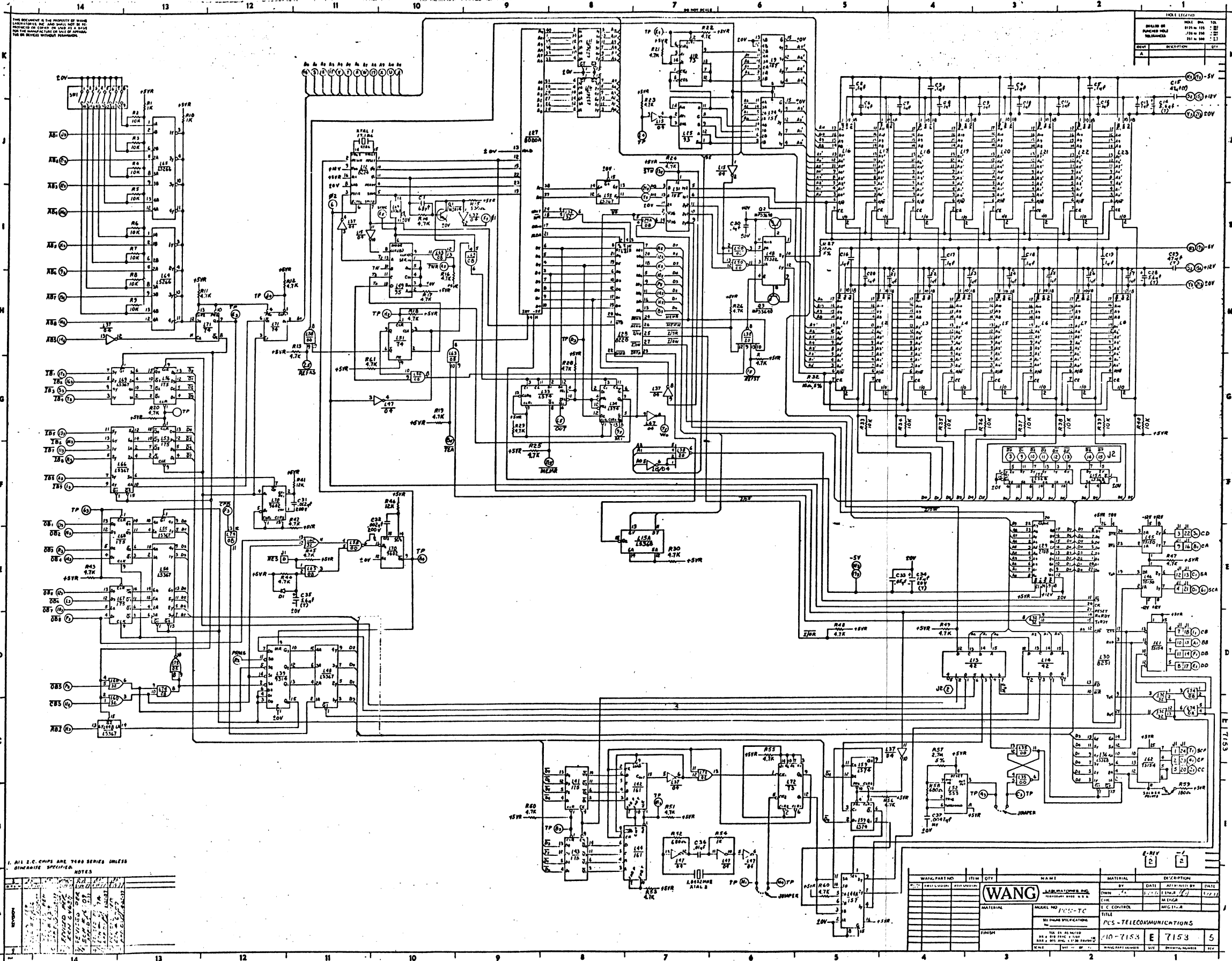
LOCATION	W.L. PART NO.	QTY	REMARKS
L1, 6, 7	374-0104	8	16
L2	374-0034	7	14
L3	374-0010	7	14
L4	374-0002	7	14
L5, 9	374-0004	7	14
L6	374-0014	7	14
L10	374-0028	7	14
L11	374-0055	7	14
L14, 15	374-0119	8	16
L16 SKT	374-9003		
L18, 19	374-0148	7	14
L20, 22	374-0151	12	5
L21, 23	374-0128	7	14
L16	377-0009		12
L12, 13, 17			NOT LOADED

COMPONENT	W.L. PART NO.	QTY	REMARKS
R1, 11, 12, 13, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32	330-3022		
R2	332-1033		
R3-8, 12, 15, 32, 34	330-3010		
R9	330-4047		
R11	330-2022		
R13, 30	330-2039		
R17, 19	330-4012		
R18, 35	330-4016		
R21	330-3068		
SW 1	325-1503		
SW 1 CAP	325-9047		
D2	380-2091		
C1, 2, 20, 21, 23	300-4022		
C3, 6, 9, 7	300-5009		
C4	300-3006		
C5, 10	300-1410		
C11-19	300-1900		
C7	300-2033		
C22	300-3009		
D1	380-1001		

LOCATION	TYPE	SPARES
L1	9602	1
L2	7466	1
L11	7406	2
L3	7404	1

REV.	DESCRIPTION	DATE
1	ORIGINAL PER WANG LABS	11-19-60
2	REVISED PER WANG LABS	11-19-60
3	REVISED PER WANG LABS	11-19-60
4	REVISED PER WANG LABS	11-19-60

WANG PART NO.	ITEM	QTY	NAME	MATERIAL	DESCRIPTION
210-7061	E	1	SCHEMATIC LOGIBLOC DOUBLE BUFFERED TYPEWRITER/ PLOTTER OUTPUT		



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1. ALL I.C. CHIPS ARE 7400 SERIES UNLESS OTHERWISE SPECIFIED. NOTES

REV.	DESCRIPTION	DATE
1	ISSUED FOR PCB LAYOUT	11/15/73
2	ISSUED FOR PCB LAYOUT	11/15/73
3	ISSUED FOR PCB LAYOUT	11/15/73
4	ISSUED FOR PCB LAYOUT	11/15/73
5	ISSUED FOR PCB LAYOUT	11/15/73
6	ISSUED FOR PCB LAYOUT	11/15/73
7	ISSUED FOR PCB LAYOUT	11/15/73
8	ISSUED FOR PCB LAYOUT	11/15/73
9	ISSUED FOR PCB LAYOUT	11/15/73
10	ISSUED FOR PCB LAYOUT	11/15/73
11	ISSUED FOR PCB LAYOUT	11/15/73
12	ISSUED FOR PCB LAYOUT	11/15/73
13	ISSUED FOR PCB LAYOUT	11/15/73
14	ISSUED FOR PCB LAYOUT	11/15/73

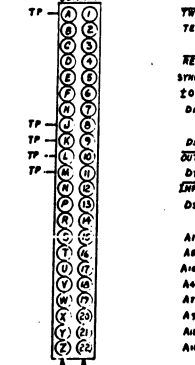
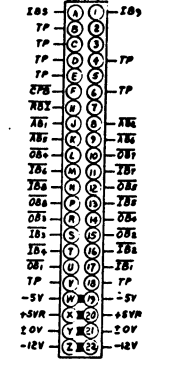
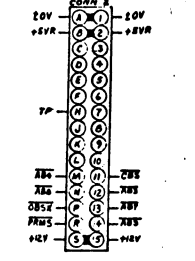
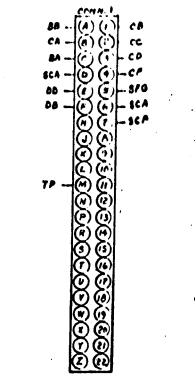
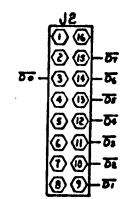
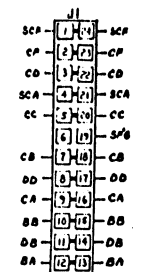
WORKPART NO.	ITEM	QTY	NAME	MATERIAL	DESCRIPTION	DATE
210-7153	1	1	PCB	FR-4	PCB	11/15/73
210-7153	2	1	PCB	FR-4	PCB	11/15/73
210-7153	3	1	PCB	FR-4	PCB	11/15/73
210-7153	4	1	PCB	FR-4	PCB	11/15/73
210-7153	5	1	PCB	FR-4	PCB	11/15/73
210-7153	6	1	PCB	FR-4	PCB	11/15/73
210-7153	7	1	PCB	FR-4	PCB	11/15/73
210-7153	8	1	PCB	FR-4	PCB	11/15/73
210-7153	9	1	PCB	FR-4	PCB	11/15/73
210-7153	10	1	PCB	FR-4	PCB	11/15/73
210-7153	11	1	PCB	FR-4	PCB	11/15/73
210-7153	12	1	PCB	FR-4	PCB	11/15/73
210-7153	13	1	PCB	FR-4	PCB	11/15/73
210-7153	14	1	PCB	FR-4	PCB	11/15/73

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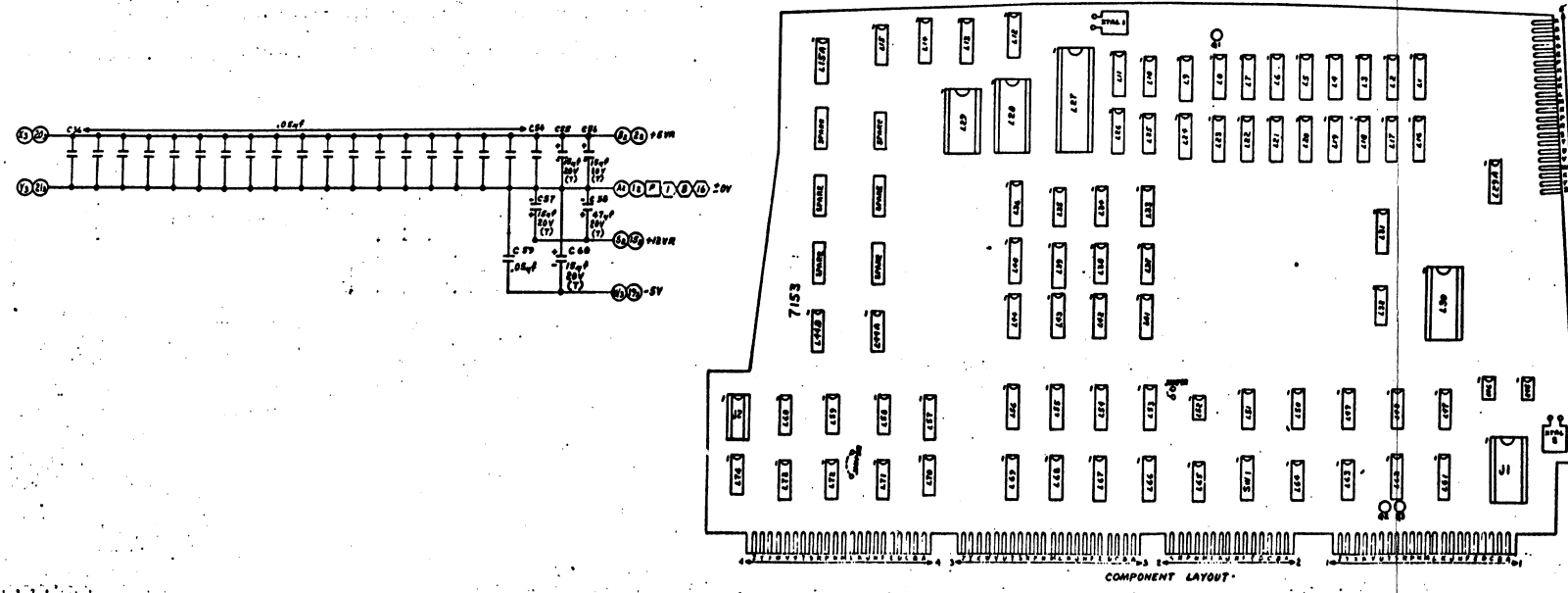
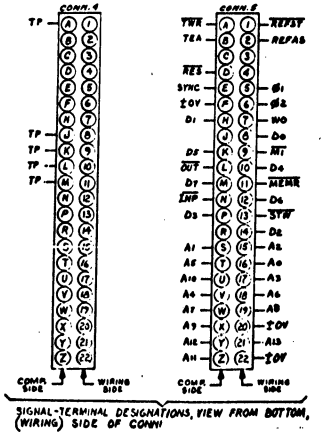
COMPONENT	W.L. PART NO.
SWITCH 1	325-1533
Q1	375-0017
Q2, 3	375-1050
J1	376-9009
J2	376-9001
C1	300-1048
C2-5,16,19,30	300-1930
C4-13, 20-27	300-1931
C14, 20, 35	300-4017
C15	300-1230
C31, 32	300-1913
C33, 36, 54, 59	300-1900
C34, 55, 56, 57, 60	300-4022
C36	300-1903
C37	300-2047
C58	300-4036
R1, 5*	330-3010
R2-10, 33-40	330-4010
R11-14, 16-24, 25, 31, 42, 43, 45, 47-51, 53, 55, 56, 59, 66, 60, 61	330-3047
R15	330-2033
R27, 32	330-1010
R41, 46	330-4012
R44	330-4047
R52	330-2068
R57	330-4028
R58	330-2067
R59	330-2018
Y1A1, 1	325-0018
Y1A1, 2	321-0015
O1	380-1001 4B

LOCATION	W.L. PART NO.	QUANTITY	FROM NO. OF 25P
L1-8, 14-23	377-0314	18	18
L9, 24, 44A	376-0002	8	16
L10, 72	376-0005	11	4
L11, 26, 40, 54, 56, 66, 69, 44B	376-0192	8	16
L12	377-0337	8	16
L13, 14	376-0008	8	16
L15, 37, 47	376-0010	7	14
L25	376-0011	10	8
L27	377-0269	2	20
L28	377-0338	14	20
L29	378-2060 RI		
L30	377-0318	4	16
L31	376-0049	8	16
L32, 60	376-0093	7	14
L33, 34, 59	376-0155	7	14
L35, 50, 58	376-0002	7	14
L36, 57, 75, 15A	376-0193	8	16
L38	376-0004	7	14
L39	376-0108	8	16
L41, 43, 63, 56	376-0160	8	16
L42, 44	376-0094	8	16
L45, 46	376-0076	4	14
L48	376-0178	7	14
L49	376-0059	14	7
L51, 71	376-0006	7	14
L52	376-0126	1	8
L61, 62	376-0077	8	16
L63, 74, 29A	376-0001	7	14
L64, 65	376-0148	7	14
L67, 68	376-0119	8	16
L70	376-0104	8	16
L73	376-0016	7	14
L27 SOCKET	376-9011		
28 PIN SOCKET	376-9015		

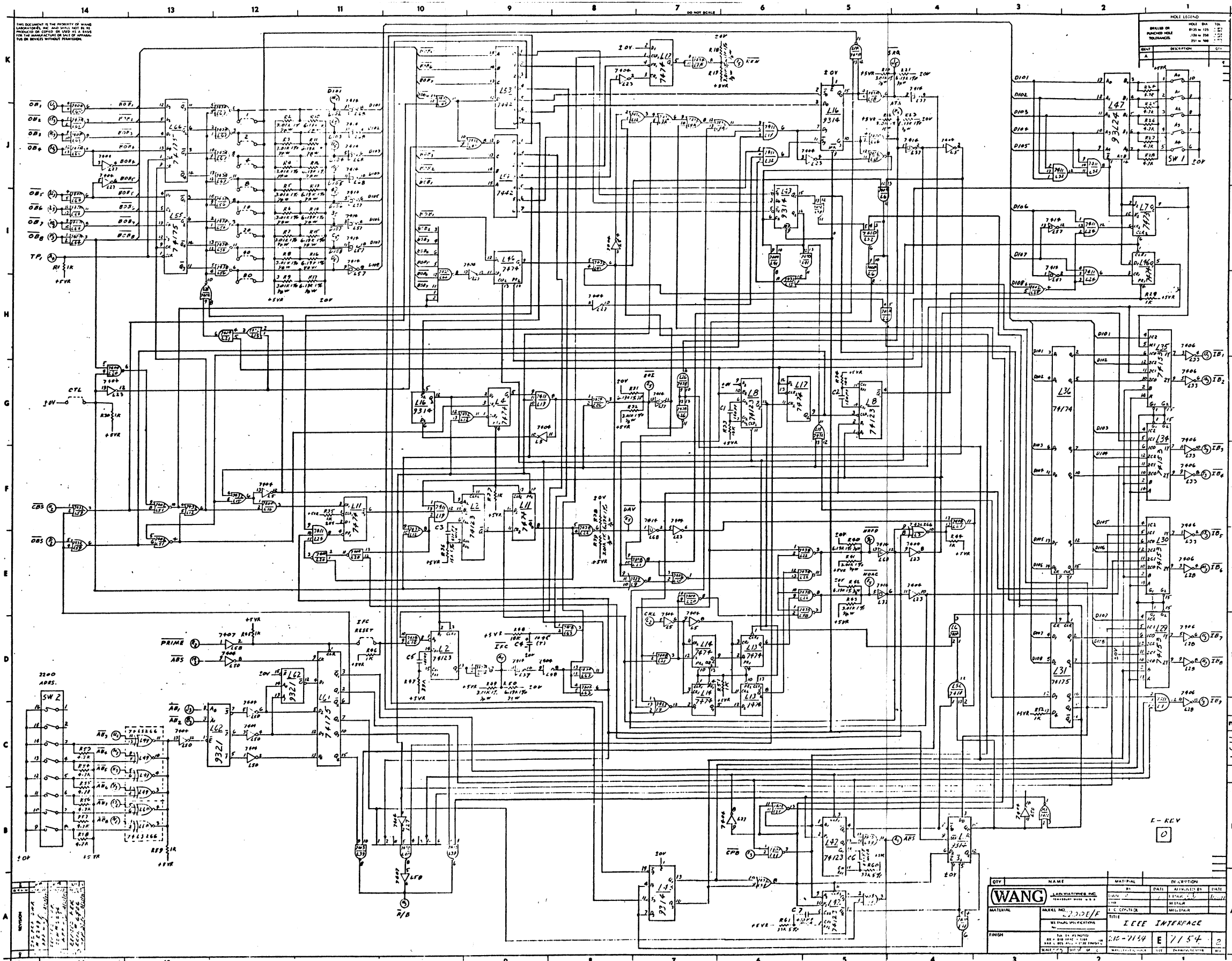
LOCATION	TYPE	SPARES
L13	7442	1
L14	7442	3
L17	7404	1
L38	7420	1
L51	7474	1
L63	7408	1
L73	7402	3
L74	7402	1
L75	74L8368	1



REV.	DESCRIPTION	DATE
1		
2		
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20		



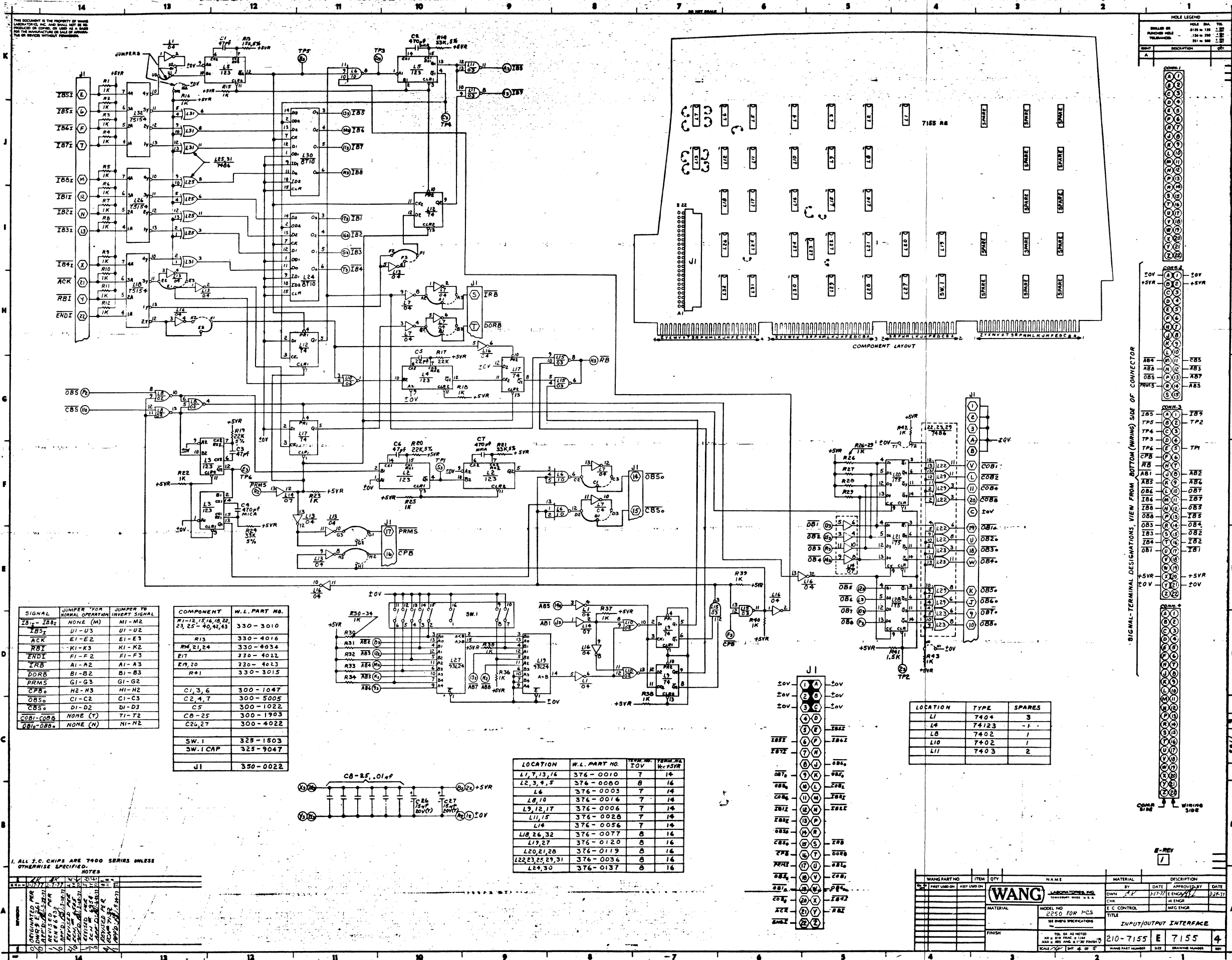
WANG PART NO.	ITEM	QTY	NAME	MATERIAL	DESCRIPTION
WANG ELECTRONICS, INC.					
100 WASHINGTON STREET, NEWTON, MASS. 02459					
TEL: (617) 552-1000 FAX: (617) 552-1001					
WWW.WANG-TE.COM					
TITLE: JCS-TELECOMMUNICATIONS					
PROJECT NO: 110-7153 E 7153 5					
DATE: 11/15/00					
SCALE: 1:1					
DRAWN BY: [Signature]					
CHECKED BY: [Signature]					
APPROVED BY: [Signature]					



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HOLE LEGEND		
DRILL DIA.	DRILL DIA.	DRILL DIA.
0.0315	0.0630	0.1260
0.0630	0.1260	0.2520
0.1260	0.2520	0.5040
0.2520	0.5040	1.0080

REV.	DESCRIPTION	DATE	BY
1	ISSUED FOR FAB	11/15/64	W. J. ...
2	REVISED	11/15/64	W. J. ...
3	REVISED	11/15/64	W. J. ...
4	REVISED	11/15/64	W. J. ...
5	REVISED	11/15/64	W. J. ...
6	REVISED	11/15/64	W. J. ...
7	REVISED	11/15/64	W. J. ...
8	REVISED	11/15/64	W. J. ...
9	REVISED	11/15/64	W. J. ...
10	REVISED	11/15/64	W. J. ...
11	REVISED	11/15/64	W. J. ...
12	REVISED	11/15/64	W. J. ...
13	REVISED	11/15/64	W. J. ...
14	REVISED	11/15/64	W. J. ...



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SIGNAL	JUMPER FOR NORMAL OPERATION	JUMPER TO INVERT SIGNAL
IBS1-IBS2	NONE (M)	M1-M2
IBS3	U1-U3	U1-U2
ACK	E1-E2	E1-E3
RBT	K1-K3	K1-K2
ENDI	F1-F2	F1-F3
IRB	A1-A2	A1-A3
DORB	B1-B2	B1-B3
PRMS	G1-G3	G1-G2
CPB	H2-H3	H1-H2
OBS0	C1-C2	C1-C3
CBS0	D1-D2	D1-D3
COB1-COB6	NONE (T)	T1-T2
OBI1-OBI6	NONE (N)	N1-N2

COMPONENT	W.L. PART NO.
R1-12, 15, 16, 18, 22, 23, 25, 40, 42, 43	330-3010
R13	330-4016
R4, 21, 24	330-4034
R17	330-4022
R7, 20	330-4023
R41	330-3015
C1, 3, 6	300-1047
C2, 4, 7	300-5005
C5	300-1022
C8-25	300-1993
C26, 27	300-4022
SW. 1	325-1503
SW. 1 CAP	325-9047
J1	350-0022

LOCATION	W.L. PART NO.	TERM. NO. TOV	TERM. NO. TO +SVR
L1, 7, 13, 16	376-0010	7	14
L2, 3, 4, 5	376-0060	8	16
L6	376-0003	7	14
L8, 10	376-0016	7	14
L9, 12, 17	376-0006	7	14
L11, 15	376-0028	7	14
L14	376-0056	7	14
L18, 26, 32	376-0077	8	16
L19, 27	376-0120	8	16
L20, 21, 28	376-0119	8	16
L22, 23, 25, 29, 31	376-0036	8	16
L4, 30	376-0137	8	16

1. ALL I.C. CHIPS ARE 7400 SERIES UNLESS OTHERWISE SPECIFIED.

NOTES

ORIGINATED FOR: [REDACTED]

DESIGNED BY: [REDACTED]

REVISIONS:

1. REVISED FOR [REDACTED]

2. REVISED FOR [REDACTED]

3. REVISED FOR [REDACTED]

4. REVISED FOR [REDACTED]

5. REVISED FOR [REDACTED]

6. REVISED FOR [REDACTED]

7. REVISED FOR [REDACTED]

8. REVISED FOR [REDACTED]

9. REVISED FOR [REDACTED]

10. REVISED FOR [REDACTED]

11. REVISED FOR [REDACTED]

12. REVISED FOR [REDACTED]

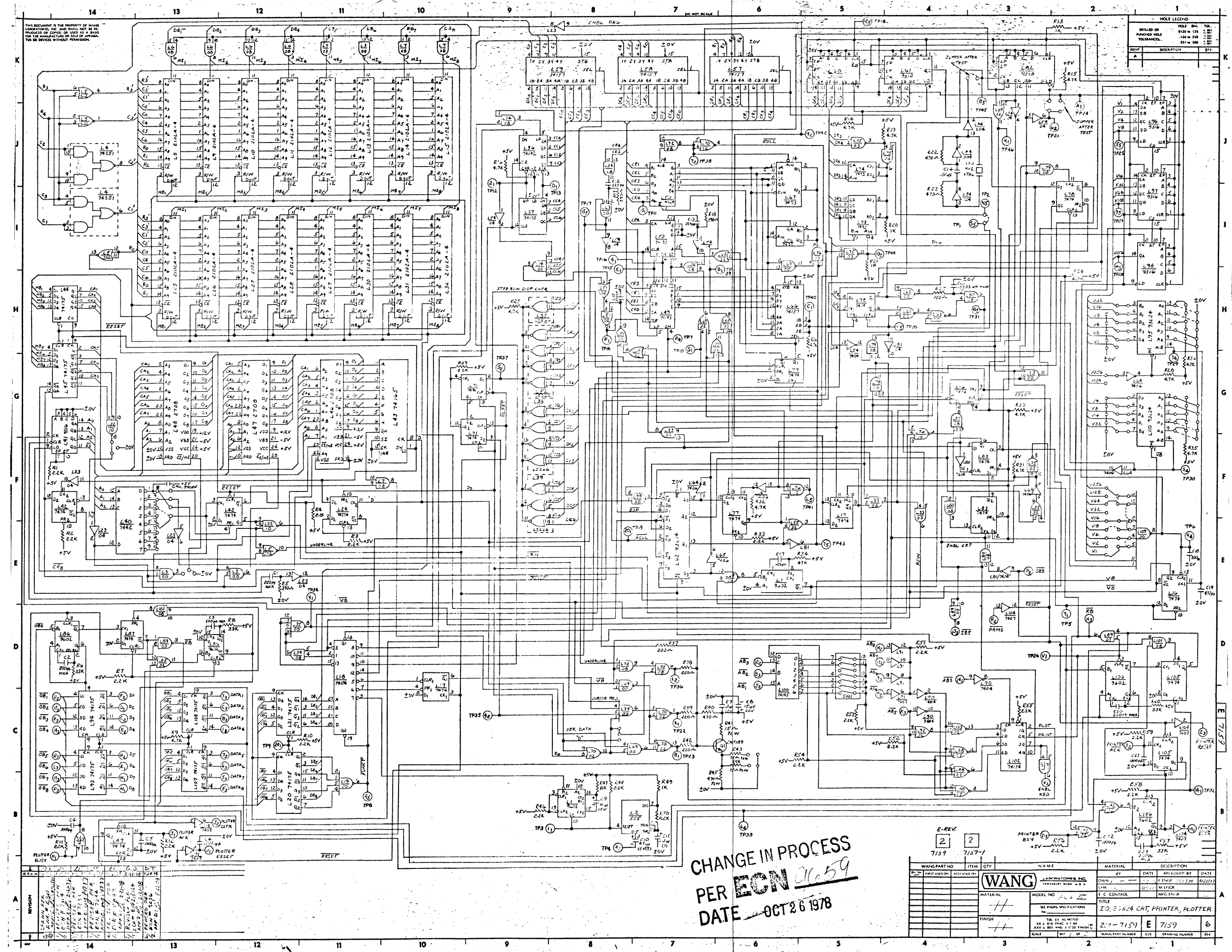
13. REVISED FOR [REDACTED]

14. REVISED FOR [REDACTED]

LOCATION	TYPE	SPARES
L1	7404	3
L4	74123	-1
L8	7402	1
L10	7402	1
L11	7403	2

WANG PART NO.	ITEM	QTY	NAME	MATERIAL	DESCRIPTION
210-7155	1	1	INPUT/OUTPUT INTERFACE	PCB	INPUT/OUTPUT INTERFACE
210-7155	2	1	INPUT/OUTPUT INTERFACE	PCB	INPUT/OUTPUT INTERFACE
210-7155	3	1	INPUT/OUTPUT INTERFACE	PCB	INPUT/OUTPUT INTERFACE
210-7155	4	1	INPUT/OUTPUT INTERFACE	PCB	INPUT/OUTPUT INTERFACE

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QTY	DESCRIPTION	QTY
1
1
1

CHANGE IN PROCESS
 PER **EON** 01659
 DATE OCT 26 1978

WANG PART NO.	ITEM	QTY	NAME	MATERIAL	DESCRIPTION
7159	2	2
7157	1	1
(WANG) LABORATORIES, INC.					
SEE ENGR SPECIFICATIONS					
TITLE: 2200 2200 CAT, PRINTER, PLOTTER					
DATE: 2-7-75					
SCALE: 1:1					
REV: 6					

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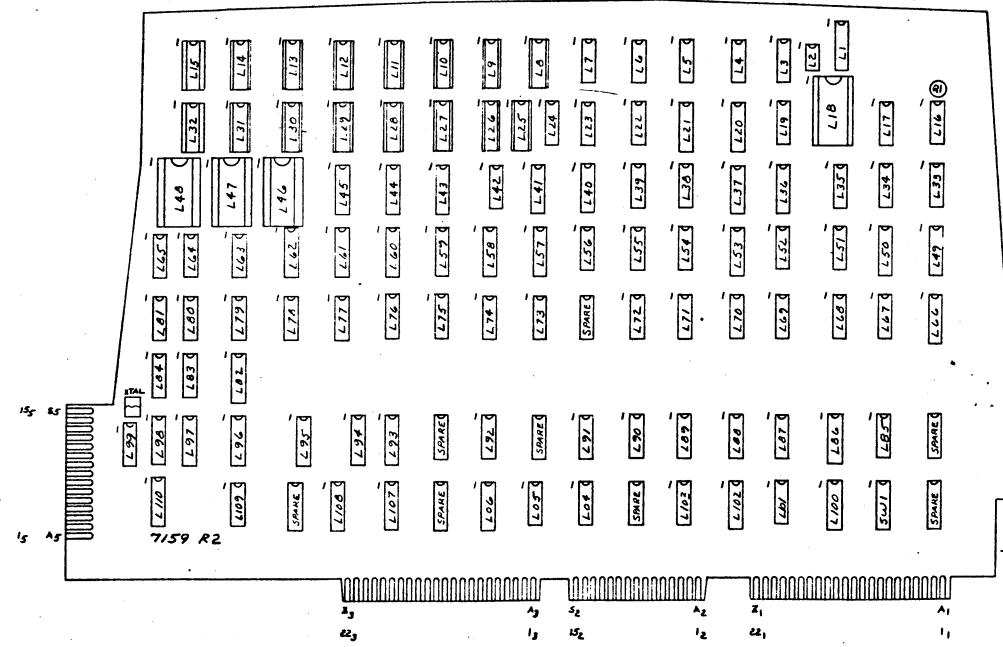
REV	DESCRIPTION	QTY
A		

LOCATION	WVL. PT. NO.	VCC	GND
L1, 24, 106	376-0104	16	8
L2	376-0126	8	1
L3, 33, 65, 69, 79	376-0002	14	7
L4	376-0104	14	7
L5	376-0199	14	7
L6, 7, 14, 17, 28, 31, 101	376-0081	14	7
L8-15, 25-32	377-0069	10	9
L16, 17, 41, 71, 78, 81, 85, 88	376-0006	14	7
L18	376-0090	24	12
L19, 35	376-0004	14	7
L20, 21, 44, 45, 51, 52, 60, 61, 66	376-0119	16	8
L22, 70	376-0003	14	7
L23, 54, 61, 70	376-0010	14	7
L24	376-0202	14	7
L100	376-0069	16	8
L30	376-0130	16	8
L37, 49, 57	376-0053	16	8
L38, 39, 52	376-0148	14	7
L40	376-0008	16	8
L41, 36, 37, 78	376-0076	16	8
L43	376-0105	16	8
L46-48	377-0317	24	12
L50, 35, 10	376-0120	16	8
L57, 70, 102	376-0016	14	7
L55, 68, 85, 90	376-0093	14	7
L57-59, 64	376-0082	16	8
L62	376-0162	16	8
L64, 65	376-0055	14	7
L54, 67, 73, 74	376-0011	5	10
L60, 61, 82	376-0171	16	8
L75, 83	376-0028	14	7
L84	376-0197	14	7
L88	376-0125	14	7
L90, 104	376-0036	14	7
L102	376-0098	16	8
L109	376-0031	14	7
L98	376-9003		

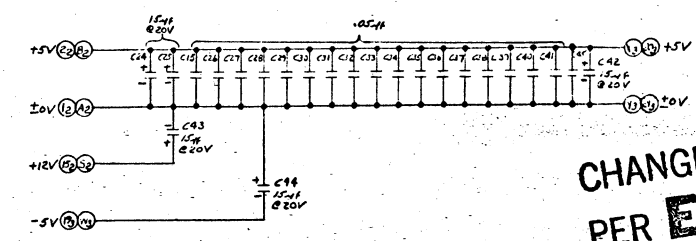
LOCATION	TYPE	SPARE
L3	7400	1
L99	7400	3
L71	7402	1
L103	7402	3
L87	7403	1
L23	7404	1
L81	7404	2
L90	7404	3
L84	7404	3
L64	7406	1
L65	7406	5
L91	7407	1
L104	7407	2
L72	7408	1
L79	7408	1
L101	7408	1
L22	7410	1
L65	7432	2
L92	7432	1
L24	74374	1

COMPONENT	WVL. PART NO.
F1-4, 7, 10-2, 19, 23	330-3022
46, 48, 51-54, 58, 59	
R5, 17, 18	330-2039
R6, 8, 57, 60	330-4033
R9, 14, 20, 19, 14, 15, 16, 24, 25, 31, 34, 35, 36	330-3047
R13, 20, 49, 21	330-3010
R11, 23, 40	330-2047
R27	330-2010
R34	330-4047
R37, 38, 39, 42	330-2022
R41	331-1015
R47	330-4010
R50	330-3002
R45	331-2047
R44, 45	331-1076
C1, 2, 3, 20, 23	300-5004
C4, 5, 6, 21, 22	300-1006
C7	300-1930
C8, 24, 25, 42-44, 9	300-4022
C10	300-4020
C11	300-4002
C12, 13	300-1220
C14, 17	300-1903
C15	300-1330
C16	300-2033
C19	300-1470
C26-41, 45	300-1900
XTAL	321-0018
SW1	325-1503
Q1	375-1021
C44	300-1390
C18	300-5007

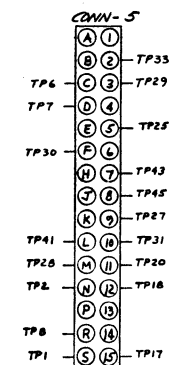
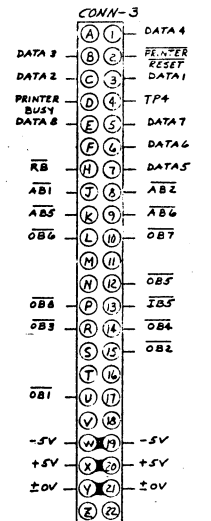
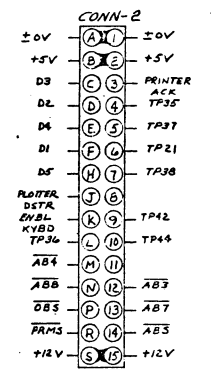
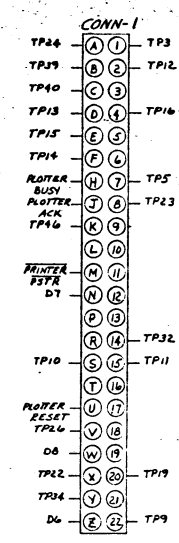
MODEL	P.C. BOARD	L48
210-7159-1B KATA KANA	209-7159-1	378-2044
210-7159-1C CYRILLIC	209-7159-1	378-2024



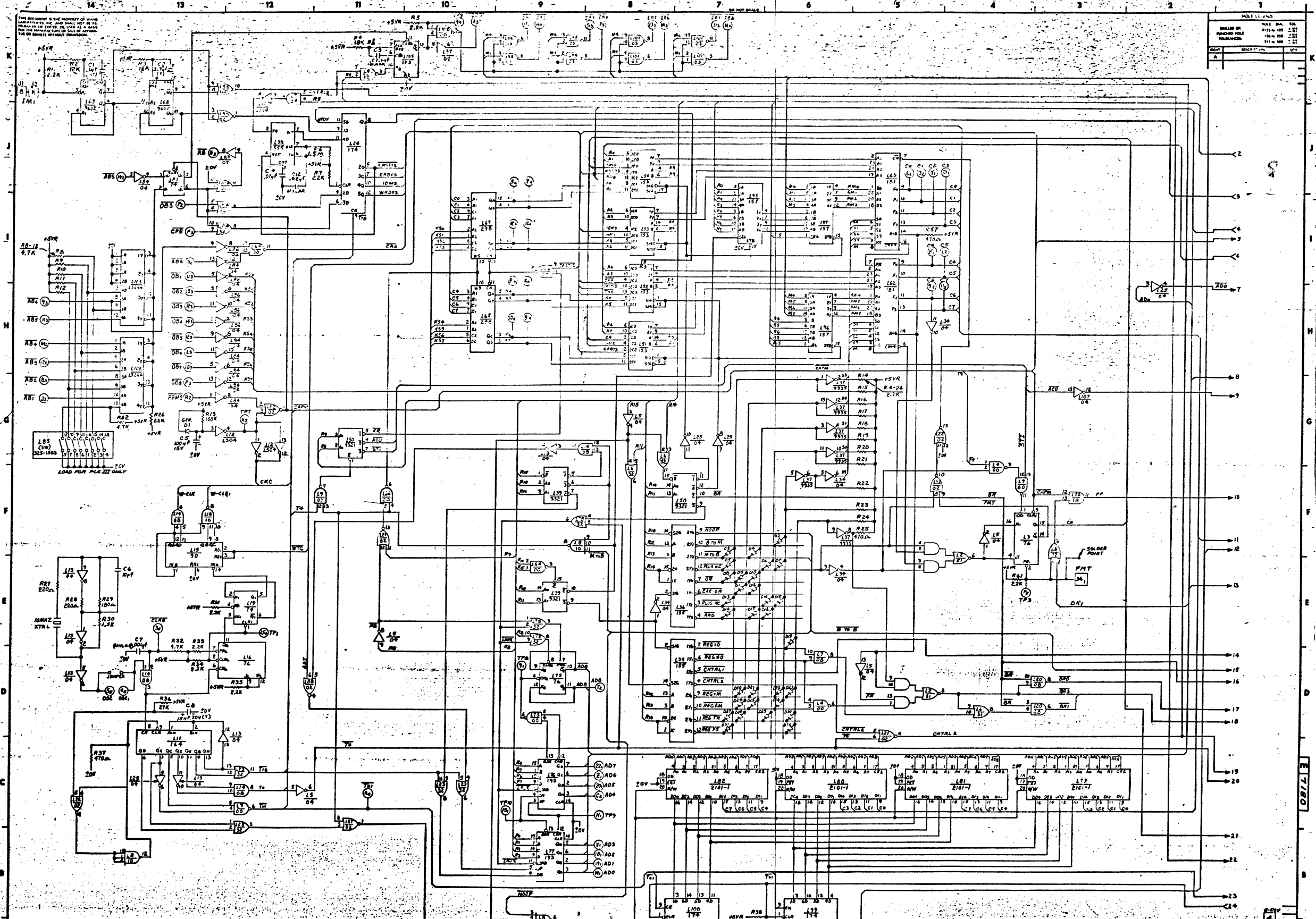
COMMON	SO NB	TO NE
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CHANGE IN PROCESS
PER ECN 9659
DATE OCT 26 1978



WANG PART NO.	ITEM	QTY	NAME	MATERIAL	DESCRIPTION
210-7159-1B	PC BOARD	1	7159 R2		

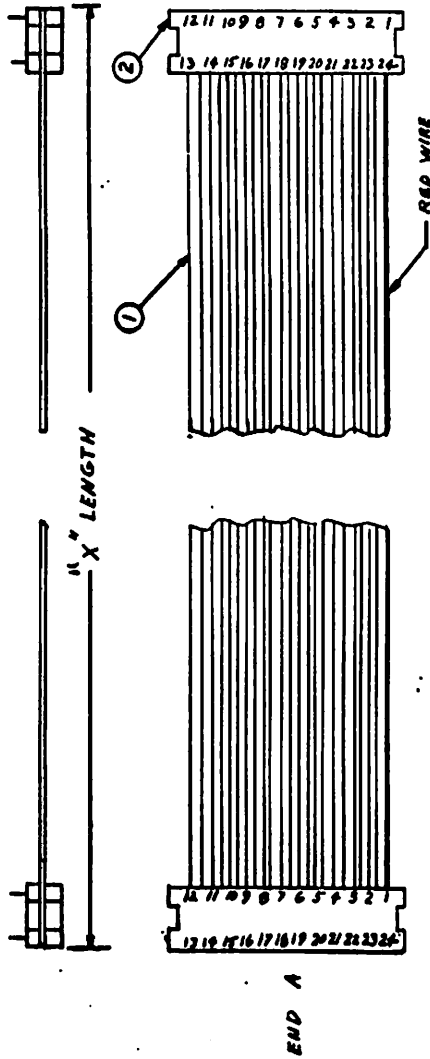


MATERIAL			
QTY	DESCRIPTION	DATE	BY
1

NO.	DESCRIPTION	QTY	DATE	BY
1

WANG PART NO.	ITEM	QTY	NAME	MATERIAL	DATE	BY
...

80 WFT SCALE



NOTE:

- 1. STRIP WIRES BACK $\frac{1}{4}$ INCH TIM $\frac{1}{2}$ INCH
- 2. FOLD AND STRAIN RELIEVE END 'A'
- 3. FOLD AND STRAIN RELIEVE END 'B'
- 4. LENGTH AFTER FOLD APPROX $\frac{3}{4}$ LESS THAN $1\frac{1}{2}$ " LENGTH

SEE NOTE 3 & 4

W.L. PART NO	END A	END B	14" LENGTH	MODEL(S) USED ON
220-3014	350-0403	350-0403	14"	2200E 2200F
220-3016	350-0403	350-0403	8"	2200E
220-3018	350-0403	350-0403	36"	928 DEBUG

△

REV	DATE	BY	CHK	DESCRIPTION
1	10/20/78	WLS		REV PER DWG #113
2	10/20/78	WLS		REV PER DWG #210

W.L. PART NO	END A	END B	14" LENGTH	MODEL(S) USED ON
350-0403	2	1/2	24 PIN FLAT CABLE COMM	3M W33C7/E
620-0050	1	1/2	24 WIRE FLAT CABLE	

WANG LABS
 1000 W. 10TH ST
 RICHMOND, CALIF 94804
 TEL: 415-733-2200
 FAX: 415-733-2201

WANG PART NO	QTY	NAME	MATERIAL	DESCRIPTION

DATE	CHK	DATE	SCALE	SHEET
3-9-76		3-19-78		1 OF 1

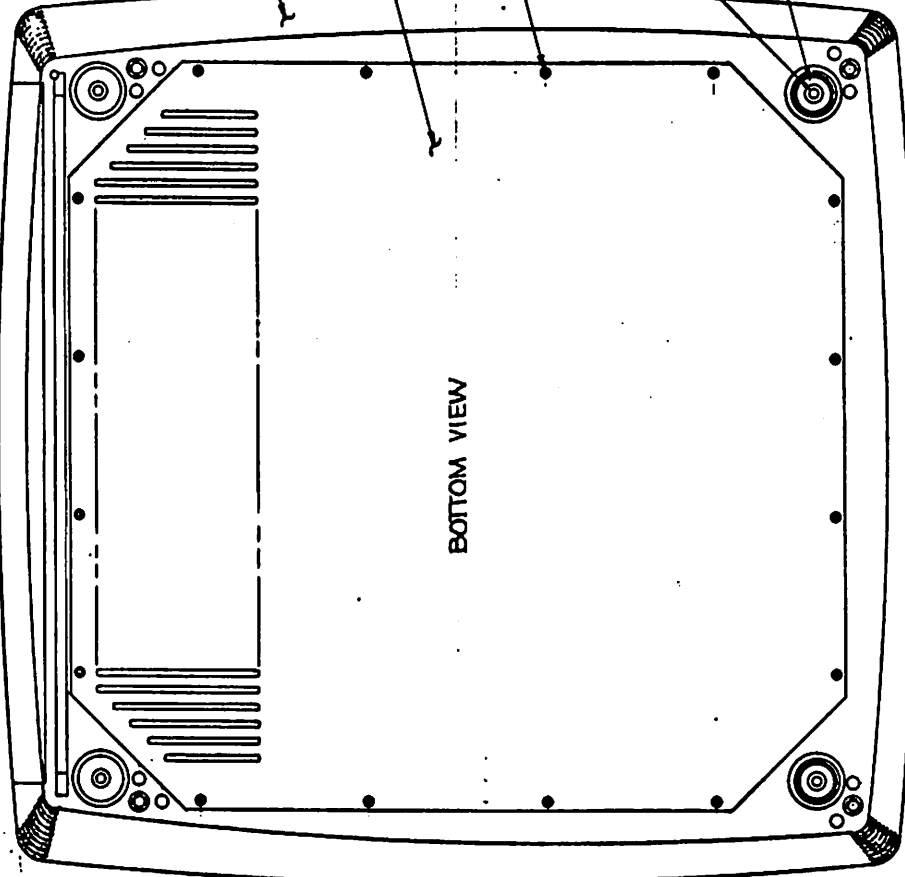
W.O. No.	W.L. No.

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

W.L. PART NO	REV	SIZE	DRAWING NUMBER

24 PIN FLAT CABLE ASSEMBLY
 SEE CHART.

SYMBOL	DESCRIPTION	TOLERANCE
1	± .005	± .005
2	± .010	± .010
3	± .015	± .015
4	± .020	± .020
5	± .030	± .030
6	± .040	± .040
7	± .050	± .050



BOTTOM VIEW

BACK

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MILLIMETERS IN PARENTHESES. TOLERANCES TO BE EQUIVALENT TO SUCH DIMENSIONS.

SEE PL 6829-12

QTY.	ITEM	WANG PART NO.	DRAWING NO.	DESCRIPTION	BY	DATE	APPROVED BY
	REPT ASSY	(WANG)	LABORATORIES, INC. TEMPERLEY ROAD N. A.		D.W. L.T.	5/17/61	E. ENGR
		MATERIAL	MODEL NO. 2200E 1/2	SEE USER SPECIFICATIONS	CHE 5/22	7/14/61	M. ENGR
		FINISH			C.T.Y. / L.S.A.	8/22/61	MFG ENGR
			FOR 11 AS BOTTLE	SEE USER SPECIFICATIONS	TITLE		BASE ASSY
			AS BOTTLE	1/25-1001			
			1/25-1001	1/25-1001			
			1/25-1001	1/25-1001			
0	GEN PDR DWF: M129						
0	REVISION						
0	279-1012						
0	279-1012						
			21-6289				

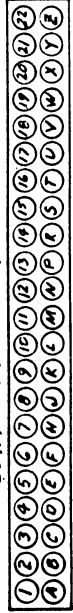
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 OR DEVICES WITHOUT PERMISSION

CONM. 350-2070



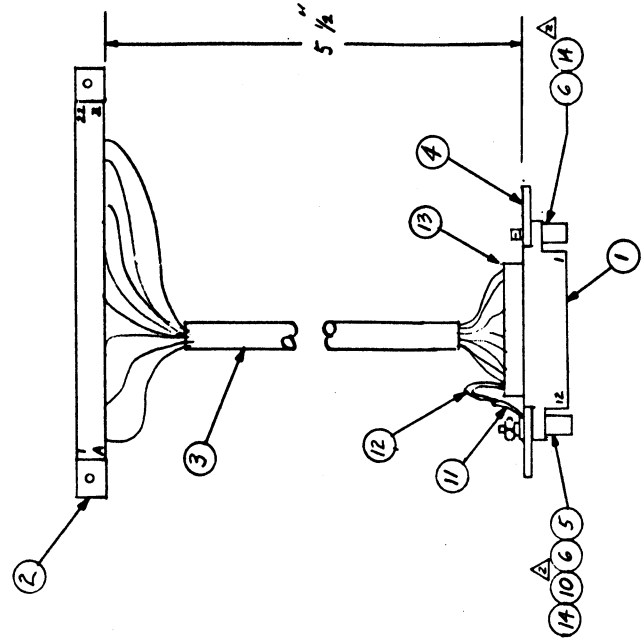
WIRING VIEW

CONM. 350-0040



WIRING VIEW

NOTE:
 1. TOL 1/2"
 2. CUT OFF DRAIN WIRE.



SIGNAL	CONM. 24 PIN	WIRE NO	CONM. 44 PIN
R1 (LSB)	1	1	X
R2	2	2	M
R2A	3	3	L
R5	4	4	K
T1	5	5	V
T2 (MSB)	6	6	W
STROBE	7	7	M
RB	8	8	B
	9	9	-
	10	10	-
30V	11	11	D
±12V	12	12	C

SIGNAL	CONM. 24 PIN	WIRE NO.	CONM. 44 PIN
I0V	13	13	F
I0V	14	14	F
I0V	15	15	H
I0V	16	16	J
I0V	17	17	P
I0V	18	18	R
I0V	19	19	S
I0V	20	20	T
CH. CHL	23	23	23
±0V	24	24	U

WANG PART NO	ITEM	QTY	NAME
142-0291	14	2	STANDOFF MIF
350-4232	13	2	STRAIN RELIEF
660-0203	AK		SOLDER
600-3000	12	.16	WIRE
654-1004	11	1	GROUND LUG
652-1000	10	1	HEX NUT
	9	2	
	8	2	
	7	2	FLAT WASHER
653-2000	6	2	
451-4420	4	1	BRKT. 24 PIN CONNECTOR
920-0059	3	1.00	CABLE 24 CONDUCTOR
350-0040	2	1	EDGE CONNECTOR 24 POS
350-2070	1	1	CONNECTOR FEMALE 24 POS

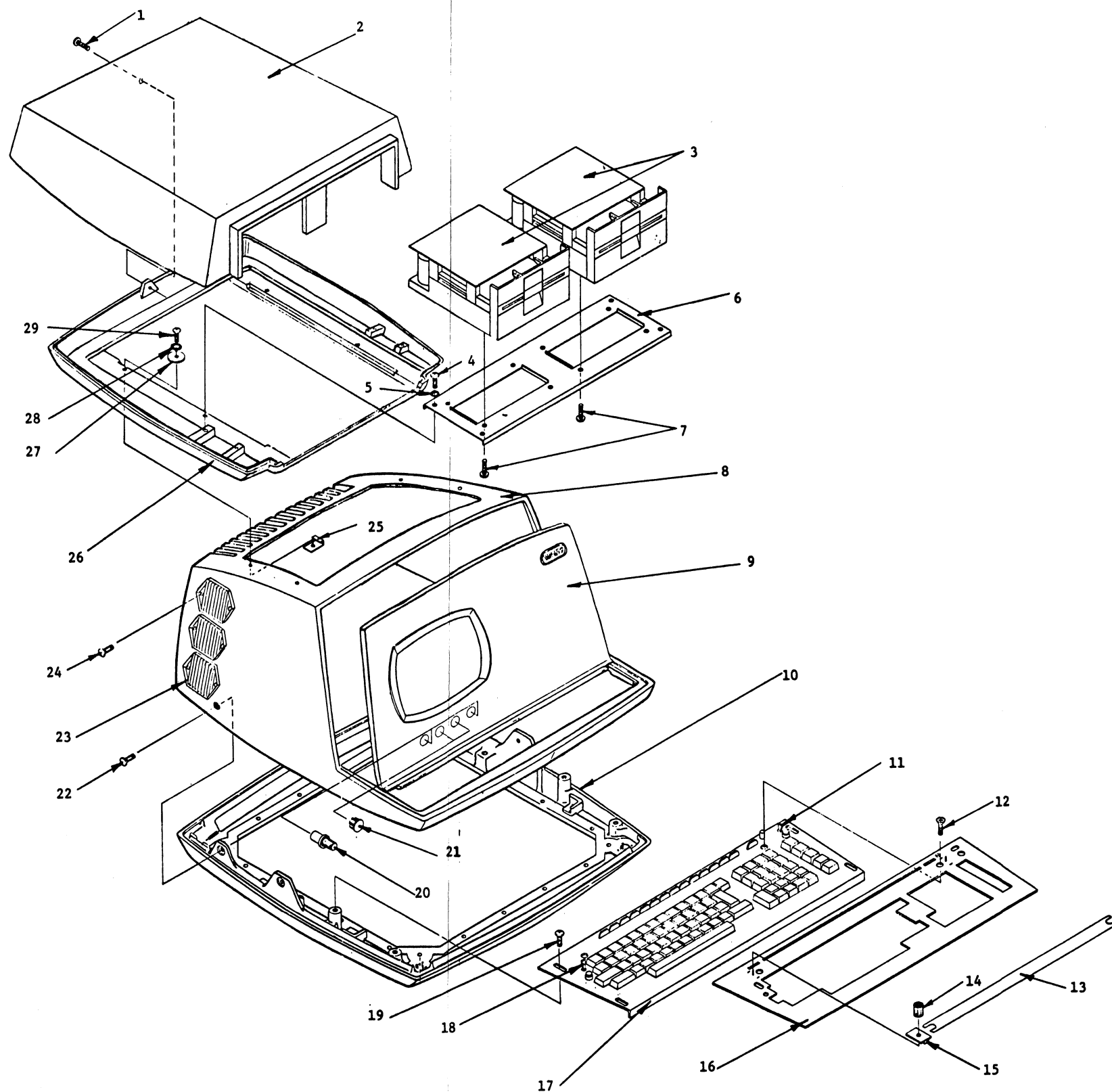
DATE	APPROVED BY	DATE	APPROVED BY
7/11/54	E ENGR		
	M ENGR		
	MFG ENGR		

REVISION

REV	DESCRIPTION	DATE
1	OPTION 61 I/O CABLE	7/11/54
2		

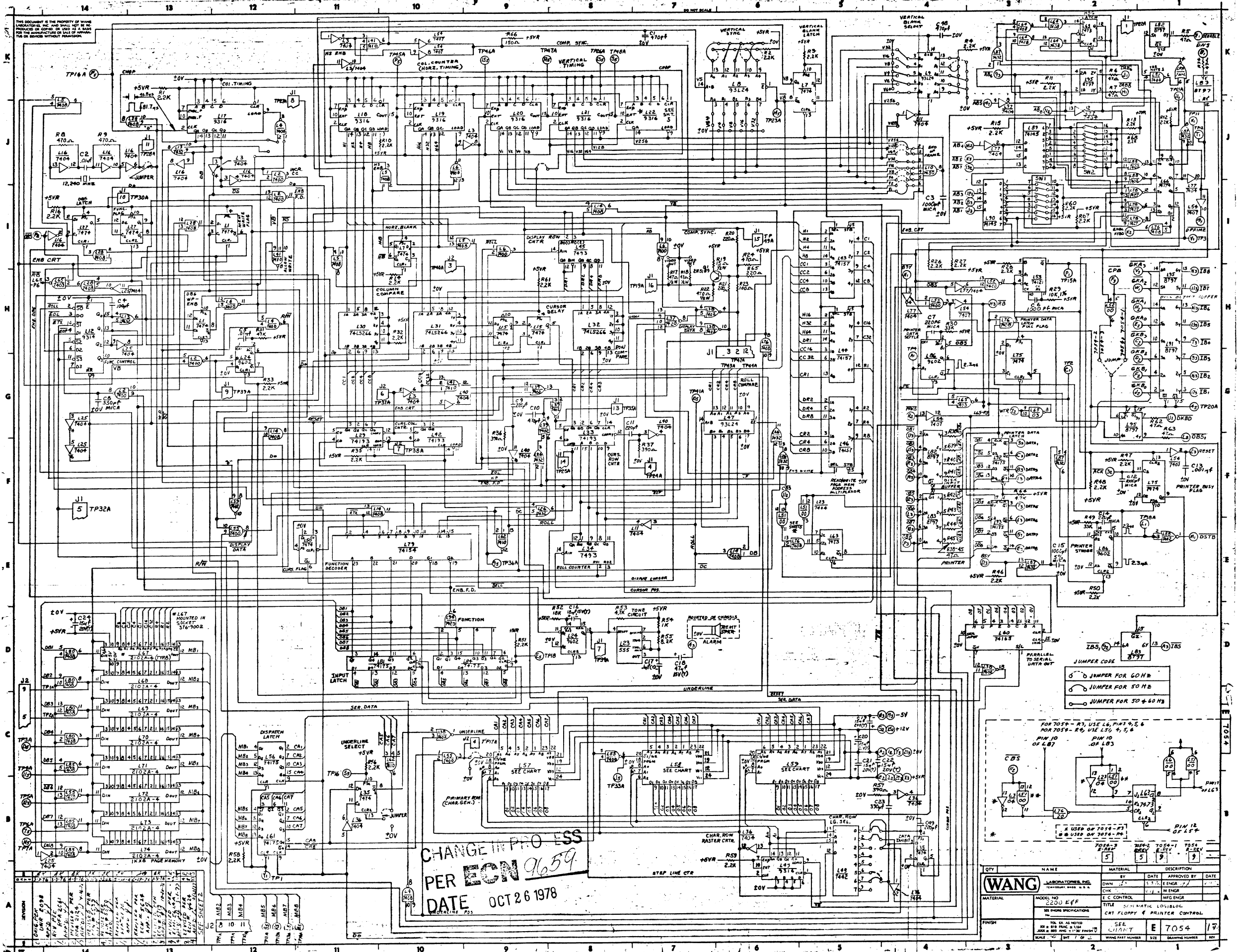
		MODEL NO. 2200E SEE ENG'G SPECIFICATIONS
TOL EX AS NOTED 1/8" = .003" FINISH 1/16" = .001" FINISH		
SCALE	SHEET	OF
220-0195	3	3
WANG PART NUMBER	SIZE	DRAWING NUMBER
	C	6482-104
REV		2

1 2 3 4 5 6 7 E D C B A



<u>ITEM</u>	<u>WLI #</u>	<u>DESCRIPTION</u>
1	650-3240	#6-32 x 3/4" Phillips Head Screw
2	449-0159	Mini-floppy cover
3	725-0057	Mini-floppy disk drive
4	650-4123	#8-32 x 3/8" Screw
5	653-3001	#8 Lock Washer
6	461-0116	Disk mounting plate
7	650-3120	#6-32 x 3/8" Screw
8	449-0176	PCSII cover
9	449-0105	Bezel
10	279-1012	Base assembly
11		On/Off switch
12	650-6241	#10-32 x 3/4" Flat Head Screw
13	615-0359	Function Strip
14	478-0061	Clamp Nut
15	452-2517	Program clamp
16	452-2335/43	Keyboard finishing plate
17	271-1121	Keyboard assembly
18		Keyword switch
19	650-6121	#10-32 x 3/8" Screw
20	655-0166	Control knob
21	655-0009	Plug button
22	650-6322W	#10-32 x 1" Screw
23	655-0012	Air vent
24	651-0021W	#8-32 x 1/2" Screw
25	452-2580	Mounting clamp
26	449-0158	Mini-floppy base
27	653-6018	#6 Washer
28	653-2002	#6 Lock washer
29	650-3240	#6-32 x 3/4" Screw

PCS-II
OUTER CHASSIS ASSEMBLY



CHANGE IN PROCESS
 PER ECN 9659
 DATE OCT 26 1978

QTY	NAME	MATERIAL	DESCRIPTION
1	TP1	7413	INVERTER
1	TP2	7413	INVERTER
1	TP3	7413	INVERTER
1	TP4	7413	INVERTER
1	TP5	7413	INVERTER
1	TP6	7413	INVERTER
1	TP7	7413	INVERTER
1	TP8	7413	INVERTER
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1	TP10	7413	INVERTER
1	TP11	7413	INVERTER
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1	TP17	7413	INVERTER
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1	TP96	7413	INVERTER
1	TP97	7413	INVERTER
1	TP98	7413	INVERTER
1	TP99	7413	INVERTER
1	TP100	7413	INVERTER

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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
7400	L85	1
7432	L87	1
7404	L90	3
7474	L50	1
7410	L62	1
7420	L94	1

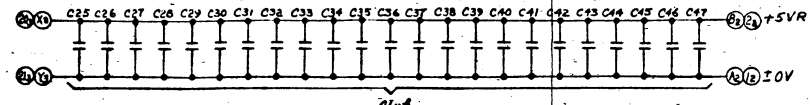
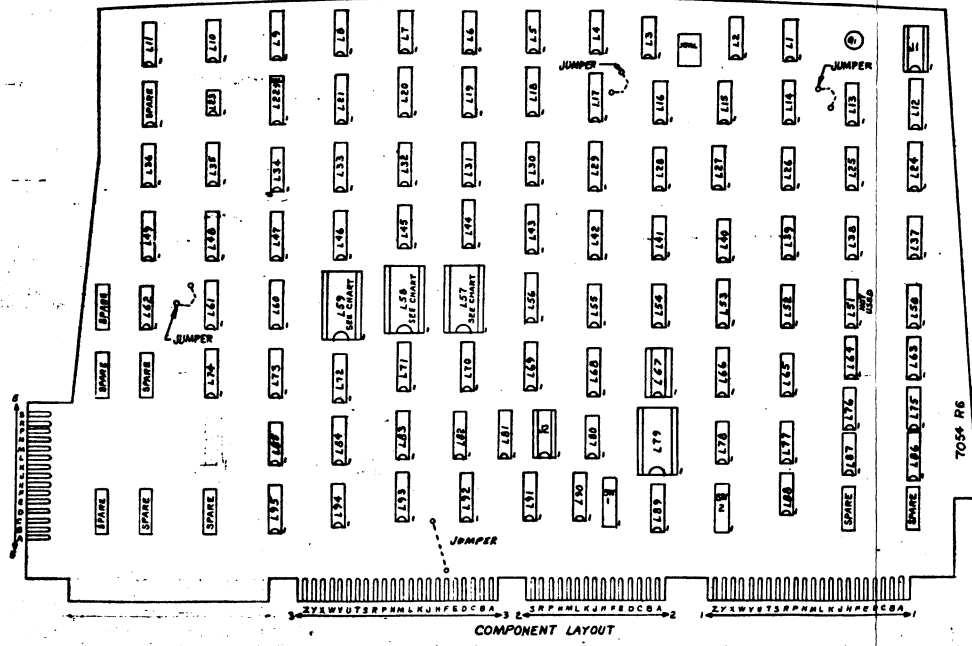
JUMPER VARIATION CHART				
	7054-1 60#	7054-1 50#	7054-2 60#	7054-3 50#
L10-2	V18	V26	V18	V26
L10-12	V6*	L10-2	V6*	L10-11
L10-4	V8	L10-11	V8	L10-11
L10-5	V4*	L10-4*	V4*	L10-4*
L10-6	V2	V1	V2	V1
L9-3	V32	V32	V32	V32
L9-4	V16	V16	V16	V16
L9-7	HIGH	HIGH	HIGH	HIGH
L9-12	20V	HIGH	20V	HIGH
L8-9	HIGH	20V	HIGH	20V
L8-10	20V	HIGH	20V	HIGH
L8-13	HIGH	20V	HIGH	20V
L49-9	L48-6	L48-7	L48-6	L48-7
R5, 6	LOAD	LOAD	LOAD	LOAD
R36-46	47K	47K	47K	47K
R62, 63	RESISTORS	RESISTORS	RESISTORS	RESISTORS

LOADING CHART				
MODEL	PC BOARD	L57	L58	L59
210-7054-1B	209-7054-1	378-2047	NOT LOADED	NOT LOADED
210-7054-1C	209-7054-1	378-2047	NOT LOADED	NOT LOADED
210-7054-1D	209-7054-1	378-2047	NOT LOADED	NOT LOADED
210-7054-1E	209-7054-1	378-2047	NOT LOADED	NOT LOADED
210-7054-1F	209-7054-1	378-2047	NOT LOADED	NOT LOADED
210-7054-1G	209-7054-1	378-2047	NOT LOADED	NOT LOADED
210-7054-1H	209-7054-1	378-2047	NOT LOADED	NOT LOADED
210-7054-1I	209-7054-1	378-2047	NOT LOADED	NOT LOADED
210-7054-1J	209-7054-1	378-2047	NOT LOADED	NOT LOADED
210-7054-1K	209-7054-1	378-2047	NOT LOADED	NOT LOADED
210-7054-1L	209-7054-1	378-2047	NOT LOADED	NOT LOADED
210-7054-1M	209-7054-1	378-2047	NOT LOADED	NOT LOADED
210-7054-1N	209-7054-1	378-2047	NOT LOADED	NOT LOADED
210-7054-1O	209-7054-1	378-2047	NOT LOADED	NOT LOADED
210-7054-1P	209-7054-1	378-2047	NOT LOADED	NOT LOADED
210-7054-1Q	209-7054-1	378-2047	NOT LOADED	NOT LOADED
210-7054-1R	209-7054-1	378-2047	NOT LOADED	NOT LOADED
210-7054-1S	209-7054-1	378-2047	NOT LOADED	NOT LOADED
210-7054-1T	209-7054-1	378-2047	NOT LOADED	NOT LOADED
210-7054-1U	209-7054-1	378-2047	NOT LOADED	NOT LOADED
210-7054-1V	209-7054-1	378-2047	NOT LOADED	NOT LOADED
210-7054-1W	209-7054-1	378-2047	NOT LOADED	NOT LOADED
210-7054-1X	209-7054-1	378-2047	NOT LOADED	NOT LOADED
210-7054-1Y	209-7054-1	378-2047	NOT LOADED	NOT LOADED
210-7054-1Z	209-7054-1	378-2047	NOT LOADED	NOT LOADED

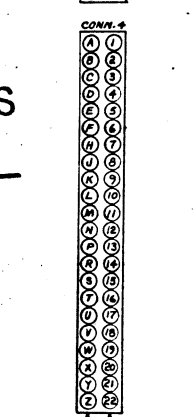
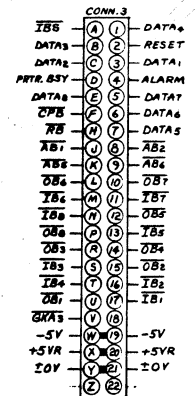
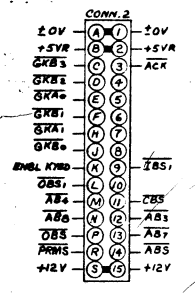
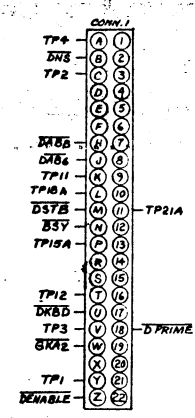
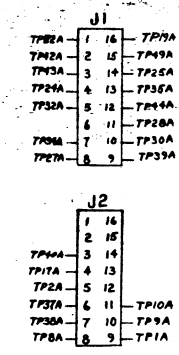
COMPONENT	W.L. PART NO.
R54	330-3010
R8, 9, 24	330-2047
R1, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	330-3022
R23	330-1047
R29	333-0017
R17, 18	331-1047
R22	331-2047
R20, 21, 45	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, 16	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
ELC. CONN.	350-2064 REF.

LOCATION	W.L. PART NO.	QTY	VAL. NO.	VAL. TYP.
L1, 7, 15, 27, 35, 38, 75	376-0006	7	14	
L2, 9, 6, 51, 52, 55	376-0002	7	14	
L3, 11, 16, 23, 34, 40, 77	376-0010	7	14	
L5, 24, 49, 76, 80, 83	376-0081	7	14	
L8, 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, 68	376-0016	7	14	
L37, 94	376-0004	7	14	
L43, 44, 46	376-0082	8	16	
L48	376-0008	8	16	
L47	376-9002	8	16	
L43	376-0051	7	14	
L54	376-0054	7	14	
L56, 61, 81, 82, 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	
L64	376-0098	8	16	
L47-74	377-0069	9	10	
L79	376-0090	12	24	
L82, 83, 91, 95	376-0189	8	16	
L78	376-0125	7	14	
L83, 90	376-0067	8	16	
L22 (REMOVED)	376-0094	8	16	

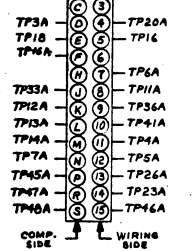
NOTE 1: L22 LOADED ON 7054-1 ONLY



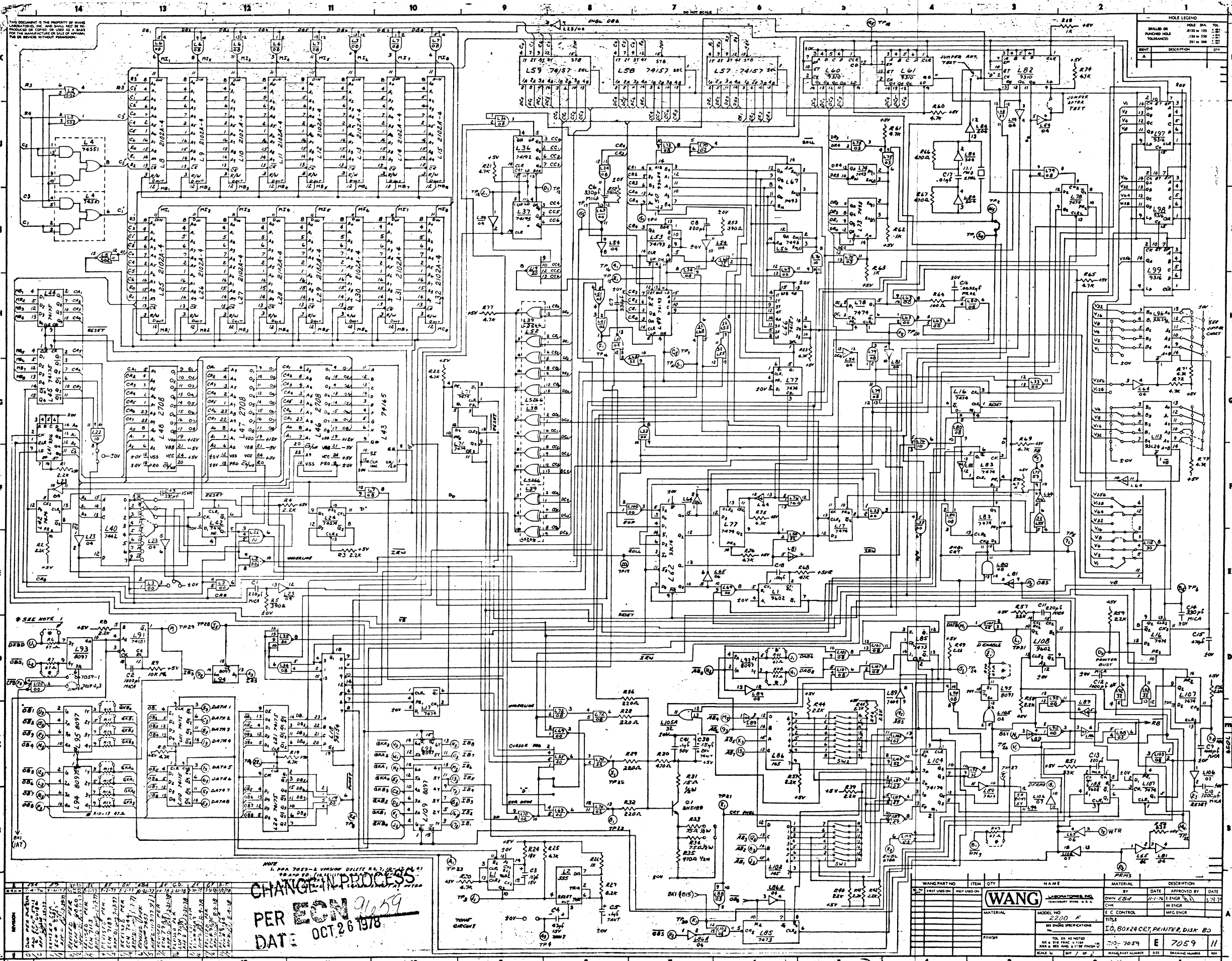
CHANGE IN PROCESS
PER ECN 9659
DATE OCT 26 1978



HOLE LEGEND		
DRILL DIA.	HOLE DIA.	TOL.
0.0625	0.0625	±0.001
0.125	0.125	±0.002
0.1875	0.1875	±0.003
0.25	0.25	±0.004



WANG PART NO.	ITEM	QTY	NAME	MATERIAL	DESCRIPTION
2200 EAF	WANG LABORATORIES, INC.				
	MODEL NO.				
	FINISH				
TITLE: CRT FLOPPY & PRINTER CONTROL					
DATE: OCT 26 1978					
DRAWING NUMBER: E 7054 / 7					



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HOLE LEGEND

DRILL NO.	HOLE DIA.	TOL.
DRILL 1	.125	±.005
PANCHED HOLE	.125	±.005
TOLERANCES	.125	±.005

SEE NOTE 1

CHANGE IN PROCESS
 PER *[Signature]*
 DATE: OCT. 26 1978

REV.	DATE	DESCRIPTION
1	10/26/78	CHANGE IN PROCESS
2	10/26/78	PER [Signature]
3	10/26/78	DATE: OCT. 26 1978

WANG PART NO.	ITEM	QTY	NAME	MATERIAL	DATE	APPROVED BY
74LS00	1	100	NAND GATE	74LS00	10/26/78	[Signature]
74LS04	1	100	INVERTER	74LS04	10/26/78	[Signature]
74LS10	1	100	DECODER	74LS10	10/26/78	[Signature]
74LS163	1	100	COUNTER	74LS163	10/26/78	[Signature]
74LS164	1	100	SHIFT REGISTER	74LS164	10/26/78	[Signature]
74LS245	1	100	TRI-STATE BUFFER	74LS245	10/26/78	[Signature]
74LS247	1	100	DECODER	74LS247	10/26/78	[Signature]
74LS277	1	100	TRI-STATE BUFFER	74LS277	10/26/78	[Signature]

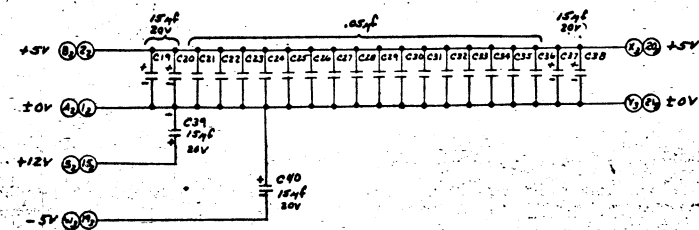
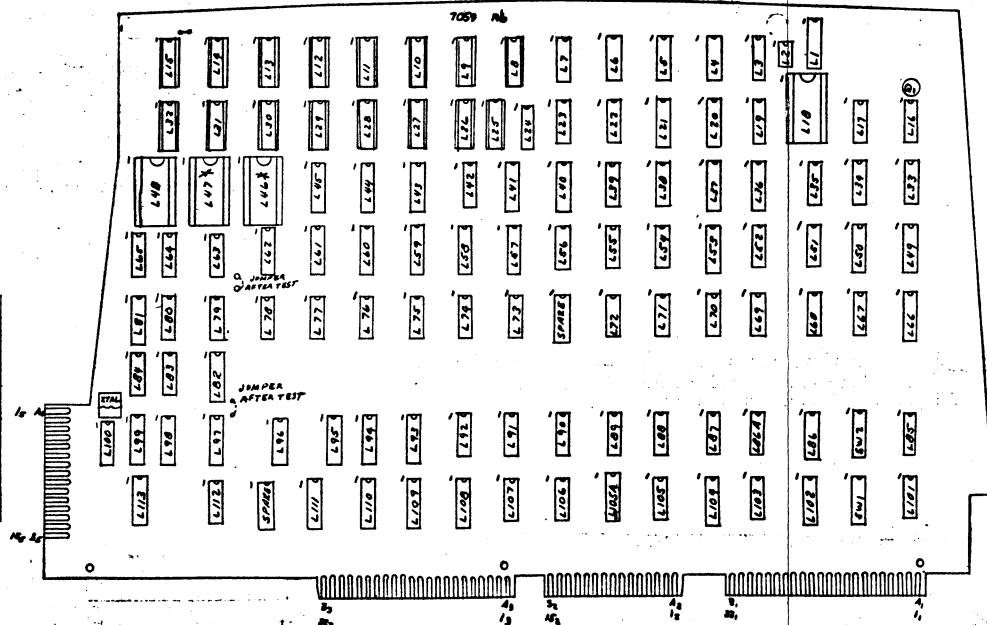
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LOCATION	W.L. PT. NO.	VCC	SHO
L1, 108	376-0104	76	D
L2	376-0126	8	1
L3, 33, 63, 65, 66, 100	376-0002	14	7
L4	376-0184	14	7
L5	376-0199	14	7
L6, 7, 24, 72, 75, 80, 86, 103	376-0081	14	7
L8-15, 25-32	377-0069	10	9
L16, 17, 42, 71, 72, 76, 82, 101	376-0004	14	7
L18	376-0090	24	12
L19, 28	376-0004	18	7
L20, 21, 49, 45, 106, 111	376-0119	16	8
L22, 76	376-0003	14	7
L23, 26, 81, 84, 89	376-0010	14	7
L24	376-0202	14	7
L26	376-0190	16	8
L28, 38, 42	376-0140	14	7
L30	376-0008	16	8
L31, 92, 98, 99	376-0165	16	8
L33	377-0333	24	12
L37, 49, 52	376-0053	16	8
L38, 74, 77	376-0120	16	8
L51, 70, 105	376-0016	14	7
L55, 63, 105A	376-0093	14	7
L58, 67, 73, 74	376-0011	5	10
L59, 69, 71, 66	376-0082	16	8
L60, 61, 82	376-0191	16	8
L62	376-0162	16	8
L64, 65	376-0055	14	7
L70, 88	376-0038	14	7
L84	376-0197	14	7
L85	376-0005	9	11
L86, 102	376-0069	16	8
L87	376-0125	14	7
L97	376-0051	14	7
L98, 99, 95, 107	376-0189	16	8
L104	376-0098	16	8
L106	376-0054	14	7
L112	376-0031	14	7

N L96, 97 NOT LOADED

LOCATION	TYPE	QTY
L3	7400	1
L22	7400	1
L23	7404	1
L24	74174	1
L57	7402	1
L66	7406	1
L65	7406	3
L72	7408	1
L79	7408	1
L81	7406	1
L86	7406	3
L86A	7406	4
L88	7403	2
L90	7408	1
L92	7412	1
L100	7400	2
L103	7408	1
L106	7407	2
L107A	7432	3

VARIATION CHART				
MODEL	P.C. BOARD	L 48	L	
210-7059-1B	209-7059-1	378-2044	NOT LOADED	NOT LOADED
210-7059-3B	209-7059-3			
210-7059-1C	209-7059-1	378-2044	NOT LOADED	NOT LOADED
210-7059-3C	209-7059-3			
210-7059-1A	209-7059-1	377-0323	NOT LOADED	NOT LOADED
210-7059-3A	209-7059-3			
210-7059-1A	209-7059-1	377-0323	NOT LOADED	NOT LOADED
210-7059-3A	209-7059-3			
210-7059-2B	209-7059-2	378-2044		



COMPONENT	W.L. PT. NO.
R1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20	330-3022
R21, 22, 23	330-2839
R4, 7, 10-17, 23, 24, 25, 26, 27, 28, 29, 30	330-1097
R9	333-0017
R10, 19, 24, 21, 22, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43	330-3047
R2, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43	330-4018
R20, 22, 28, 63	330-3010
R27	330-3022
R28, 29, 32, 36	330-2022
R30, 66, 67	330-2067
R31	331-1015
R32, 34, 35	331-1874
R35	331-2047
R51, 57	330-4033
R66	330-2010
R68	330-4047
L48	376-9803
SW1, 2	325-1508
Q1	375-1021
TP4L	321-0018
CL2, 7, 14	300-3007
C1, 4, 13	300-4004
C5	300-4002
CR1, 8	300-1903
CR6	300-2033
CR	300-1880
C4	300-4020
C19, 20, 37, 38, 39, 40, 41, 3	300-4022
C43	300-1390
C5, 9, 10, 12	300-4004
C45	300-1870
C41	300-1930
C, 31-36	300-1940

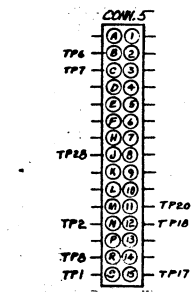
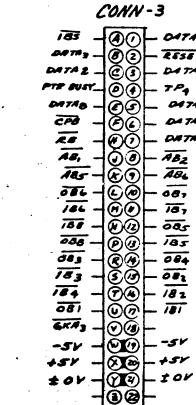
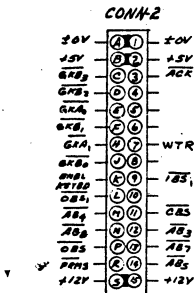
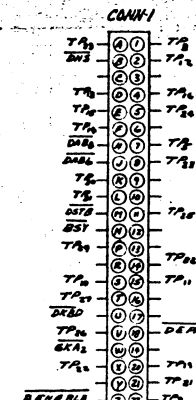
JUMPER	FUNCTION	LOAD
0	0	0
1	1	1

LOADING VARIATIONS				
	7059	7059-1	7059-2	7059-3
DATA JUMPERS	LOAD	DO NOT LOAD	LOAD	DO NOT LOAD
DATA JUMPERS	DO NOT LOAD	LOAD	DO NOT LOAD	LOAD
COMMON JUMPERS	LOAD	LOAD	LOAD	LOAD
DATA JUMPERS	LOAD	LOAD	LOAD	LOAD

E-REV

7059	7059-1	7059-2	7059-3
7	7	6	6

WANG PART NO.	ITEM	QTY	NAME	MATERIAL	DESCRIPTION										
2200 F															
<table border="1"> <tr> <td>DATE</td> <td>BY</td> <td>DATE</td> <td>APPROVED BY</td> <td>DATE</td> </tr> <tr> <td>CHK</td> <td>CHK</td> <td>CHK</td> <td>CHK</td> <td>CHK</td> </tr> </table>						DATE	BY	DATE	APPROVED BY	DATE	CHK	CHK	CHK	CHK	CHK
DATE	BY	DATE	APPROVED BY	DATE											
CHK	CHK	CHK	CHK	CHK											
<table border="1"> <tr> <td>MODEL NO</td> <td>2200 F</td> </tr> <tr> <td>TITLE</td> <td>IO, BOYACET, FRONT, DISK BD</td> </tr> <tr> <td>DATE</td> <td>210-7059</td> </tr> <tr> <td>WANG PART NUMBER</td> <td>E 7059</td> </tr> <tr> <td>SIZE</td> <td>11</td> </tr> </table>						MODEL NO	2200 F	TITLE	IO, BOYACET, FRONT, DISK BD	DATE	210-7059	WANG PART NUMBER	E 7059	SIZE	11
MODEL NO	2200 F														
TITLE	IO, BOYACET, FRONT, DISK BD														
DATE	210-7059														
WANG PART NUMBER	E 7059														
SIZE	11														



CHANGE IN PROCESS
PER ECN 9659
DATE OCT 26 1978

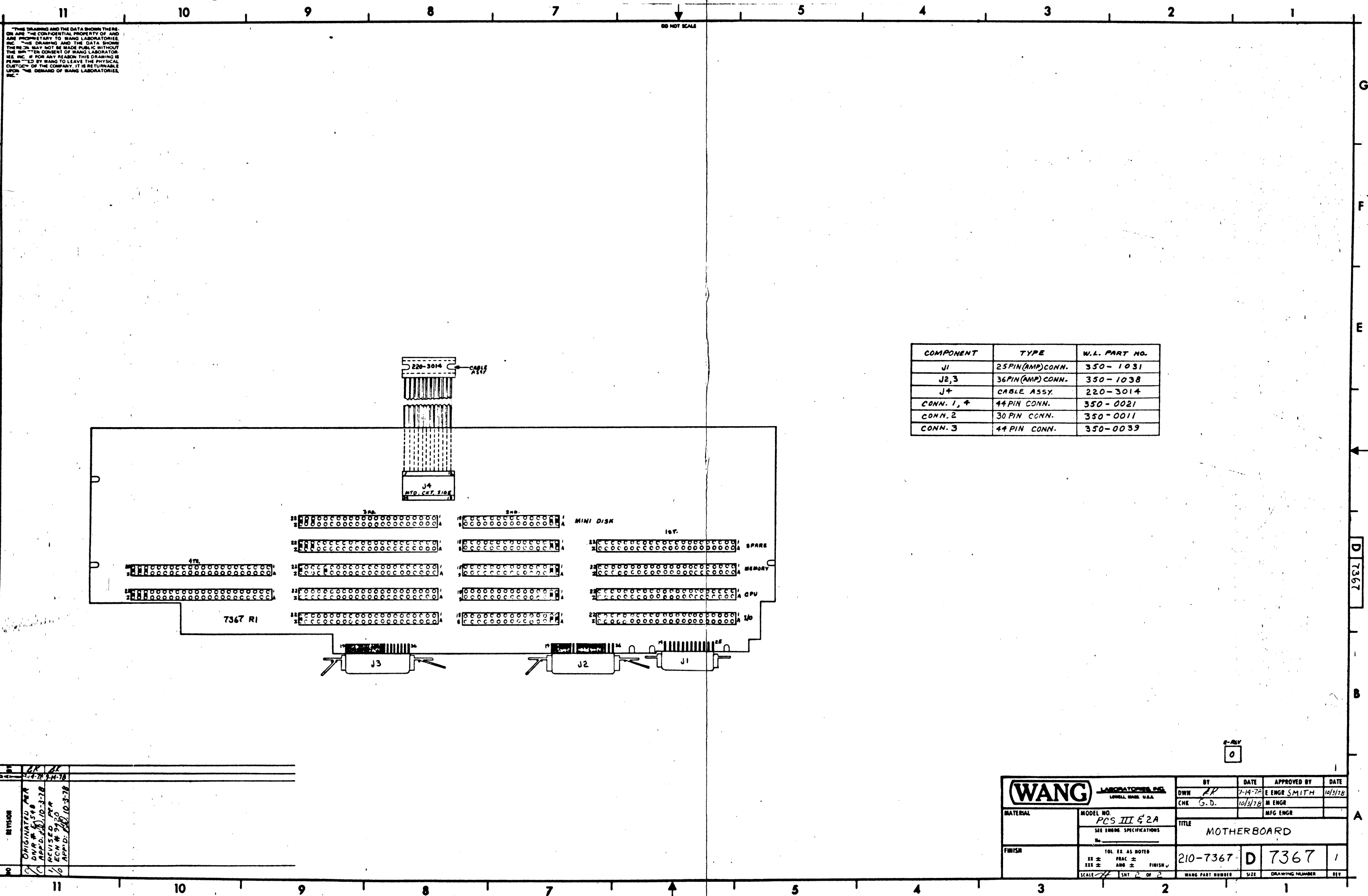
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SIGNAL	SPARE	MEM.	CPU	I/O	MINI-DISK CONTROL	J1	J2	J3	J4
A0		L+	L+						
A1		F+	F+						
A2		3+	3+						
A3		2+	2+						
A4		12+	12+						
A5		E+	E+						
A6		18+	18+						
A7		M+	M+						
A8		8+	8+						
A9		11+	11+						
A10		V+	V+						
A11		K+	K+						
A12		6+	6+						
A13		7+	7+						
A14		9+	9+						
A15		19+	19+						
AB1	J3		J3	J3	U3				
AB2	B3		B3	B3	B3				
AB3	122		122	122	122				
AB4	M2		M2	M2	M2				
AB5	K3		K3	K3	K3				
AB6	93		93	93	93				
AB7	132		132	132	132				
AB8	N2		N2	N2	N2				
AB9	142		142	142	142				
ACK				32				10	
ARI		B3,23							
BA	C1					2			
BB	A1					3			
BSY				N1			4		
CA	B1					4			
CB	11					5			
CBS	112		112	112	112				
CC	21					6			
CD	31					20			
CF	41					8			
CH1		H2	H2						
CH2		Z1	Z1						
CH4		171	171						
CH8		181	181						
CK	L2	N2							
CL2		Y1	Y1						
CL4		U1	U1						
CL8		V1	V1						
CPB	F3		F3	F3	F3				18
DAB6				J1			34		
DAB8				H1			16		
DAST	43	43							
DATA1				33				2	
DATA2				C3				3	
DATA3				B3				4	
DATA4				13				5	
DATA5				73				6	
DATA6				63				7	
DATA7				53				8	
DATA8				E3				9	
DB	F1					15			
DD	E1					17			
DENABLE				Z1			1		

SIGNAL	SPARE	MEM.	CPU	I/O	MINI-DISK CONTROL	J1	J2	J3	J4
DIR		A3,13							
DI0		16+	16+						
DI1		15+	15+						
DI2		14+	14+						
DI3		17+	17+						
DRBD				U1			15		
DN3				B1			18		
DPRIAME				181			36		
DSTB				M1				1	
ENBL KYBD				K2					13
GKA0				E2			10		
GKA1				H2			11		
GKA2				W1			12		
GKA3				V3			13		
GKB0				J2			7		
GKB1				F2			25		
GKB2				D2			8		
GKB3				C2			9		
HALT	33		33						17
IA1		S1	S1						
IA2		D1	D1						
IA3		C1	C1						
IA4		F1	F1						
IB1		T1	T1						
IB2		S1	S1						
IB3		R1	R1						
IB4		151	151						
IB1	173		173	173	173				6
IB2	163		163	163	163				7
IB3	53		53	53	53				24
IB4	T3		T3	T3	T3				8
IB5	133		133	133	133				23
IB6	M3		M3	M3	M3				21
IB7	113		113	113	113				20
IB8	N3		N3	N3	N3				22
IB9	13		13	13	13				16
IB5	A3		A3	A3	A3				15
IB51				92				14	
IC4		C2	C2						
ID1		L2	L2						
ID8		K2	K2						
Mc		V3,103							
MER		44	44						
MER0		141	141						
MHL		R2							
MOT		N1	N1						
MTF		P1	P1						
MXS		X1	X1						
OB1	U3		U3	U3	U3				
OB2	153		153	153	153				
OB3	R3		R3	R3	R3				
OB4	143		143	143	143				
OB5	123		123	123	123				
OB6	L3		L3	L3	L3				

SIGNAL	SPARE	MEM.	CPU	I/O	MINI-DISK CONTROL	J1	J2	J3	J4
CB7	103		103	103	103				
CB8	P3		P3	P3	P3				
CB9	P2		P2	P2	P2				
CB51				L2				17	
PRINTER BUSY				D3					11
PRMS	R2		R2	R2	R2				14
RB	H3		H3	H3	H3				19
R0		111	111						
R1		M1	M1						
R2		121	121						
R3		81	81						
R4		H1	H1						
R5		Z1	Z1						
R6		J2	J2						
R7		F2	F2						
R8		161	161						
R9		W1	W1						
R10		31	31						
R11		191	191						
R12		E2	E2						
R14		201	201						
R15		D2	D2						
R16		211	211						
R17		131	131						
R18		101	101						
R19		L1	L1						
SCA	D1,61							11,19	
SCF	71							12	
SF6	51							18	
ST1-3		U4	U4						
ST3-3		134	134						
WTR			T2						
-5V	W3,193	X4,204	X4,204	W3,193	W3,193				5
+5VR	B2,22	B2,22	B2,22	B2,22	B2,22				4
±20V	A2,13	A2,13	A2,13	A2,13	A2,13	7	19-24,26	16	1,2,3
-12V	Z3,223	Z3,223	Z3,223	Z3,223	Z3,223		-33,35		10
+12V	S2,152	S2,152	S2,152	S2,152	S2,152				11
+17V									9
CH. GND.						1		17	12

WANG LABORATORIES, INC.
 MODEL NO. PC5-102A
 TITLE: MOTHERBOARD
 BY: DWN
 DATE: 7-1-76
 APPROVED BY: E ENGR
 CHE: M ENGR
 MFG ENGR
 FINISH: 210-7367 D 7367 O
 SCALE: 1" = 1"



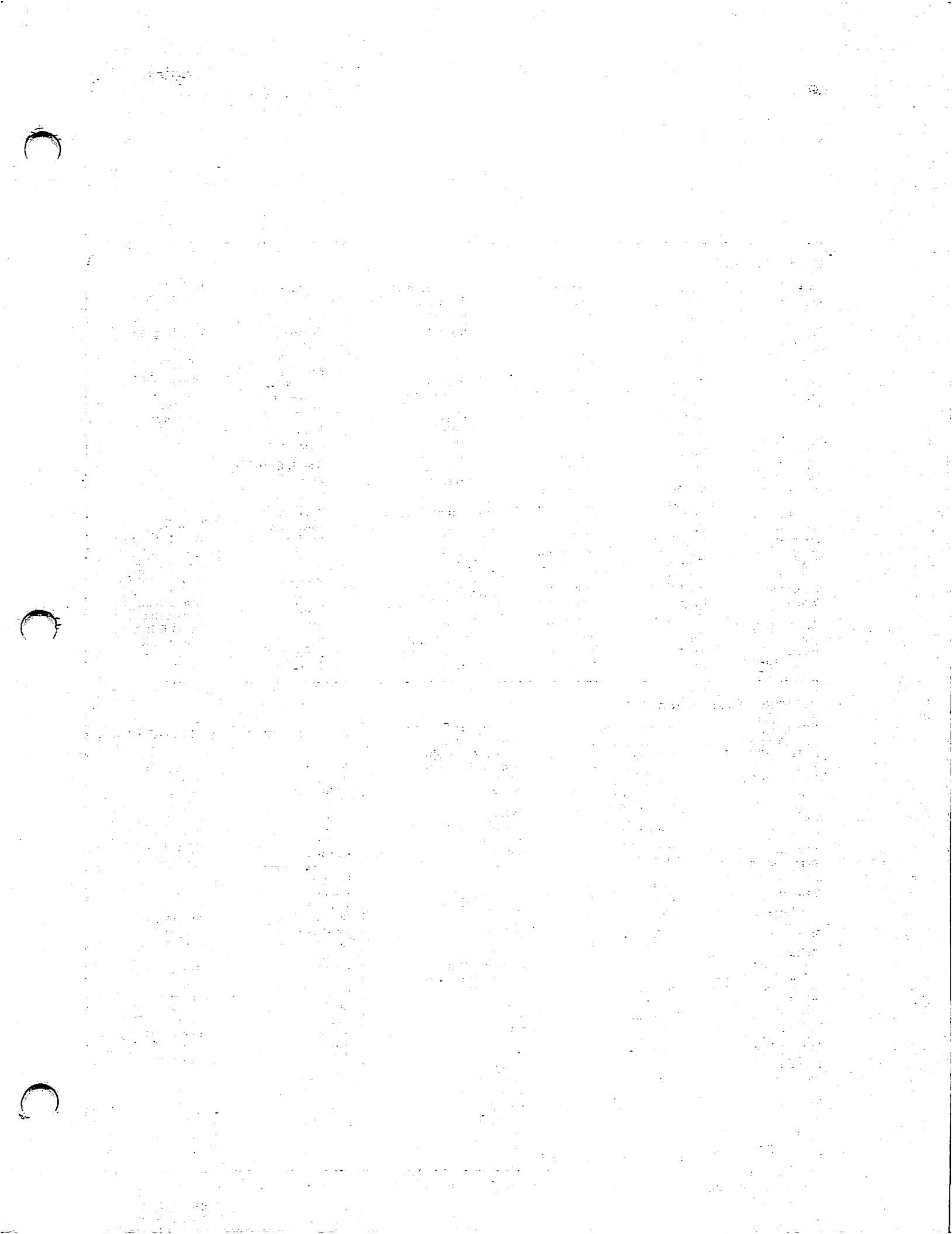
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DO NOT SCALE

COMPONENT	TYPE	W.L. PART NO.
J1	25 PIN (AMP) CONN.	350-1031
J2,3	36 PIN (AMP) CONN.	350-1038
J4	CABLE ASSY.	220-3014
CONN. 1, 4	44 PIN CONN.	350-0021
CONN. 2	30 PIN CONN.	350-0011
CONN. 3	44 PIN CONN.	350-0039

REV	DATE	BY	CHK	APP'D.
1	10-14-78	AK	AK	
2	10-14-78	AK	AK	
3	10-14-78	AK	AK	
4	10-14-78	AK	AK	
5	10-14-78	AK	AK	
6	10-14-78	AK	AK	
7	10-14-78	AK	AK	
8	10-14-78	AK	AK	
9	10-14-78	AK	AK	
10	10-14-78	AK	AK	
11	10-14-78	AK	AK	

WANG LABORATORIES, INC. LOWELL, MASS. U.S.A.		BY DWN CHK S.D.	DATE 7-19-78 10/3/78	APPROVED BY E ENGR SMITH M ENGR	DATE 10/3/78
MATERIAL	MODEL NO. PCS III & 2A SEE ENGR SPECIFICATIONS	TITLE MOTHERBOARD			
FINISH	TOL EX AS NOTED XX ± PRAC ± XXX ± ANG ± FINISH ✓	210-7367	D	7367	1
SCALE	SHT 2 OF 2	WANG PART NUMBER	SIZE	DRAWING NUMBER	REV



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Arizona Phoenix Tucson	Georgia Atlanta	Massachusetts Boston Burlington Littleton Lowell Tewksbury Worcester	New Mexico Albuquerque	Rhode Island Cranston	Wisconsin Brookfield Madison Milwaukee
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Connecticut New Haven Stamford Wethersfield	Indiana Indianapolis South Bend	Missouri Creve Coeur	Ohio Cincinnati Columbus Middleburg Heights Toledo	Texas Austin Dallas Houston San Antonio	
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WANG

LABORATORIES, INC.

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

PCS-II

IPB

Charles Wilkins X46928

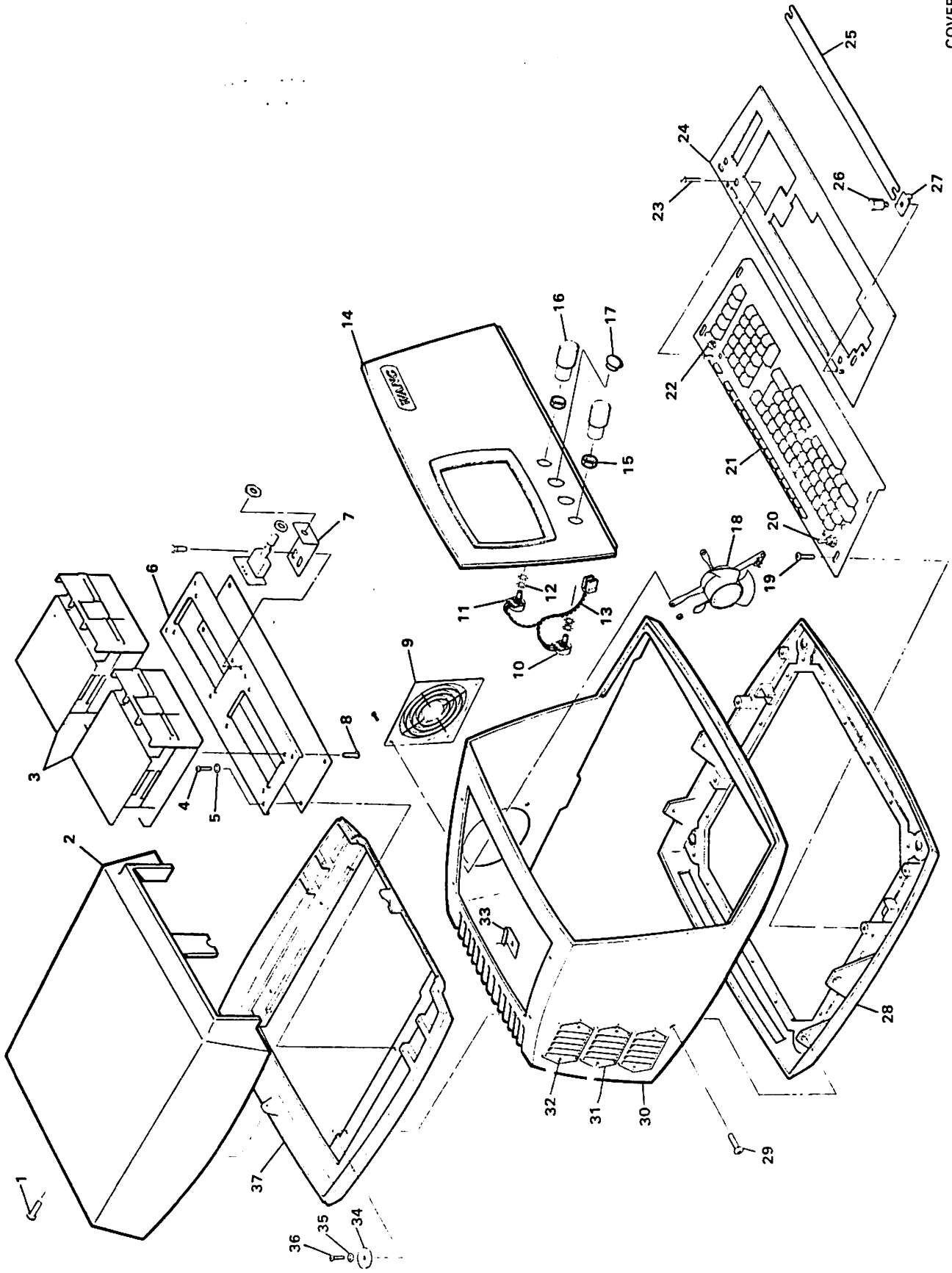
Mike Bahia

M/S 0126 Elect. Ave.

COVERS ASSEMBLY

177-2EE8-1A

ITEM	WLI#	DESCRIPTION
	1	650-3240 #6-32 X 3/4" PHILLIPS HEAD SCREW
	2	449-0159 MINI-FLOPPY COVER
278-4004	3	725-0057 MINI-FLOPPY DISK DRIVE
	4	650-4123 #8-32 X 3/8" SCREW
	5	653-3001 #8 LOCK WASHER
	6	461-0116 DISK MOUNTING PLATE
	7	451-4525 BRACKET, FORMAT SWITCH
	8	650-3120 #6-32 X 3/8" SCREW
	9	449-0101-9 FAN GUARD 4" WHITE
	10	336-0032 250K OHM POT (BRIGHTNESS)
	11	336-0035 250 OHM CONTRAST CONTROL
	12	653-0022 WASHER 3/8" INT. TH.
	✓ 13	220-0160 BRIGHTNESS POT. CABLE ASSEMBLY
	14	449-0184-5 BEZEL
	15	652-0036 NUT SM. PAT. 3/8"-32
	16	655-0166 CONTROL KNOB
	17	655-0009 PLUG BUTTON
EITHER 400-1009 OR 400-1011	18	400-1009/11 FAN, SKELETON (50CFM) ROTRON
	19	650-6121 #10-32 X 3/8" SCREW
	20	325-0020 SWITCH KEYBOARD
	21	271-1121 KEYBOARD ASSEMBLY
	22	325-0033 ON/OFF SWITCH
	23	650-6241 #10-32 X 3/4" FLAT HEAD SCREW
	24	452-2335/43 KEYBOARD FINISHING PLATE
	25	615-0359 FUNCTION STRIP
	26	478-0061 CLAMP NUT
	27	452-2517 PROGRAM CLAMP
	28	279-1026 WORK STATION BASE ASSEMBLY
	29	650-6322W #10-32 X 1" SCREW
	30	449-0176 PCSII COVER
	31	655-0012 AIR VENT
	32	651-0021W #8-32 X 1/2" SCREW
	33	452-2580 MOUNTING CLAMP
	34	653-6018 #6 WASHER
	35	653-2002 #6 LOCK WASHER
	36	650-3240 #6-32 X 3/4" SCREW
	37	449-0158 MINI-FLOPPY BASE
NOT SHOWN	452-2552	SHIELD PLATE FOR FLOPPY DRIVE (MOUNTS ON BOTTOM OF DRIVE)

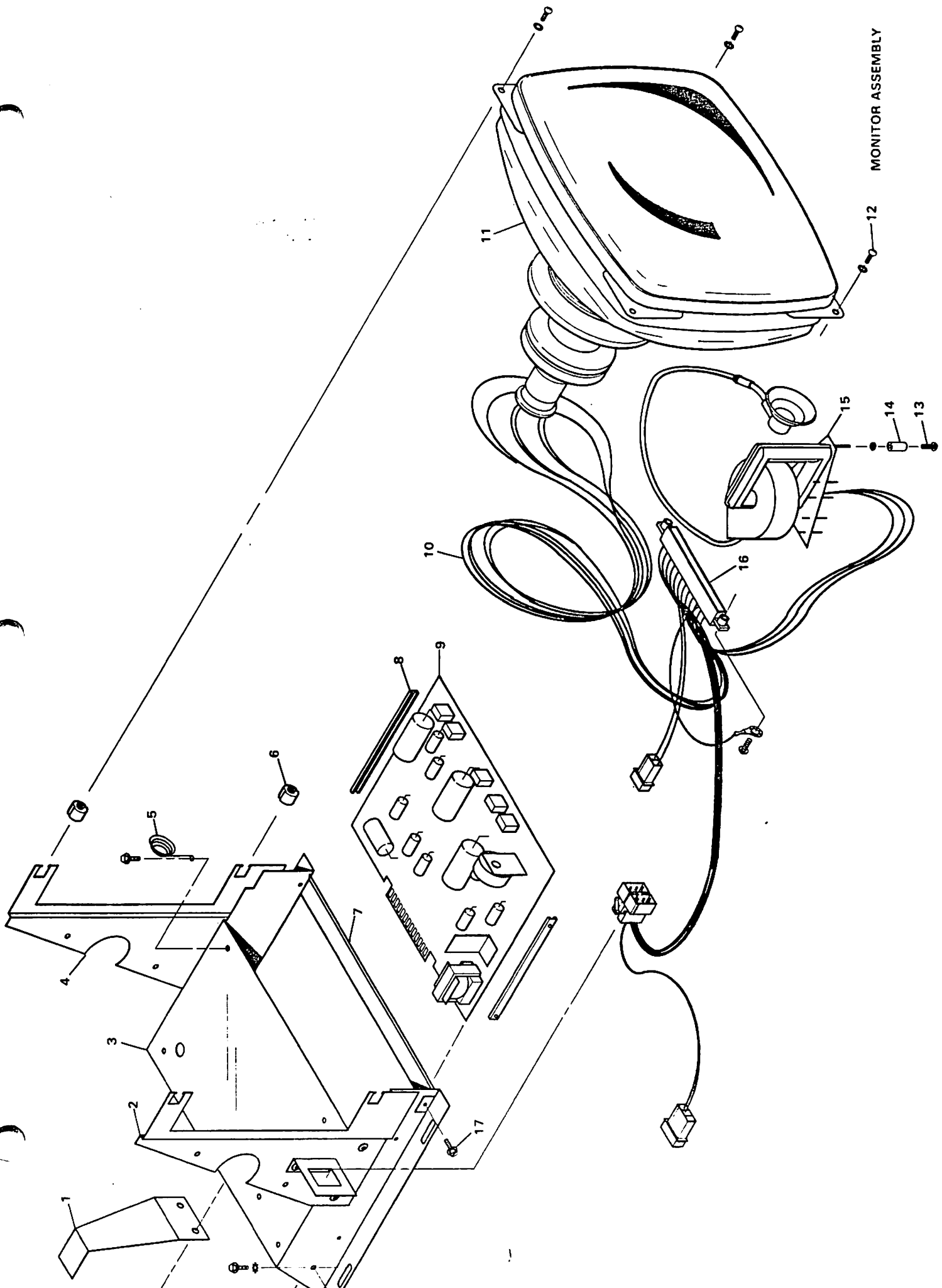


COVERS ASSEMBLY

MONITOR ASSEMBLY

ITEM	WLI#	DESCRIPTION
SEE NOTE	270-0367	9" WANG MONITOR ASSEMBLY
1	451-4513	BRACKET, NECK SAVER
2	451-3861	PANEL, SIDE LH
3	451-1109	CHASSIS (9" MONITOR)
4	451-3862	PANEL, SIDE RH
5	465-1643	SPRING, GROUNDING (12" MONITOR)
6	462-0293	SPACER, DELRIN 3/8 DIA 4-40 TAP
7	451-4519	BRACKET, SUPPORT
8	452-4125	GUIDE, CARD
✓ 9	210-7456-1	PCA 9" MONITOR ELECTRONICS BOARD
10	220-1068	CRT CABLE ASSEMBLY (2200)
11	340-0102	CATHODE RAY TUBE 9"
12	651-0030	SCREW, SELF TAP T-8 4-40 X 1/2" PNHD PHL
13	650-2120	4-40 X 3/8" PAN HD PHL MS SS SEMS
14	462-0413	SPACER, 4-40 .250 OD .750L HX A
15	410-1008	FLYBACK TRANSFORMER
16	350-0008	30 PIN CONNECTOR, SOLDER TYPE
17	651-0024	#8 X 1/4 HEX HEAD SLOT TAP SCREW TYPE B

NOTE: SOME MODELS USE THE 9" MOTOROLA CRT ASSEMBLY. 785-0045E. 9" MOTOROLA BRD. 726-069
 THE CRT ASSY TYPES (WANG OR MOTOROLA) SHOULD NOT BE ~~BE~~ REPLACED BY THE OTHER TYPE
 AS THE P.S. REGULATOR IS MATCHED TO THE CRT ASSEMBLY.

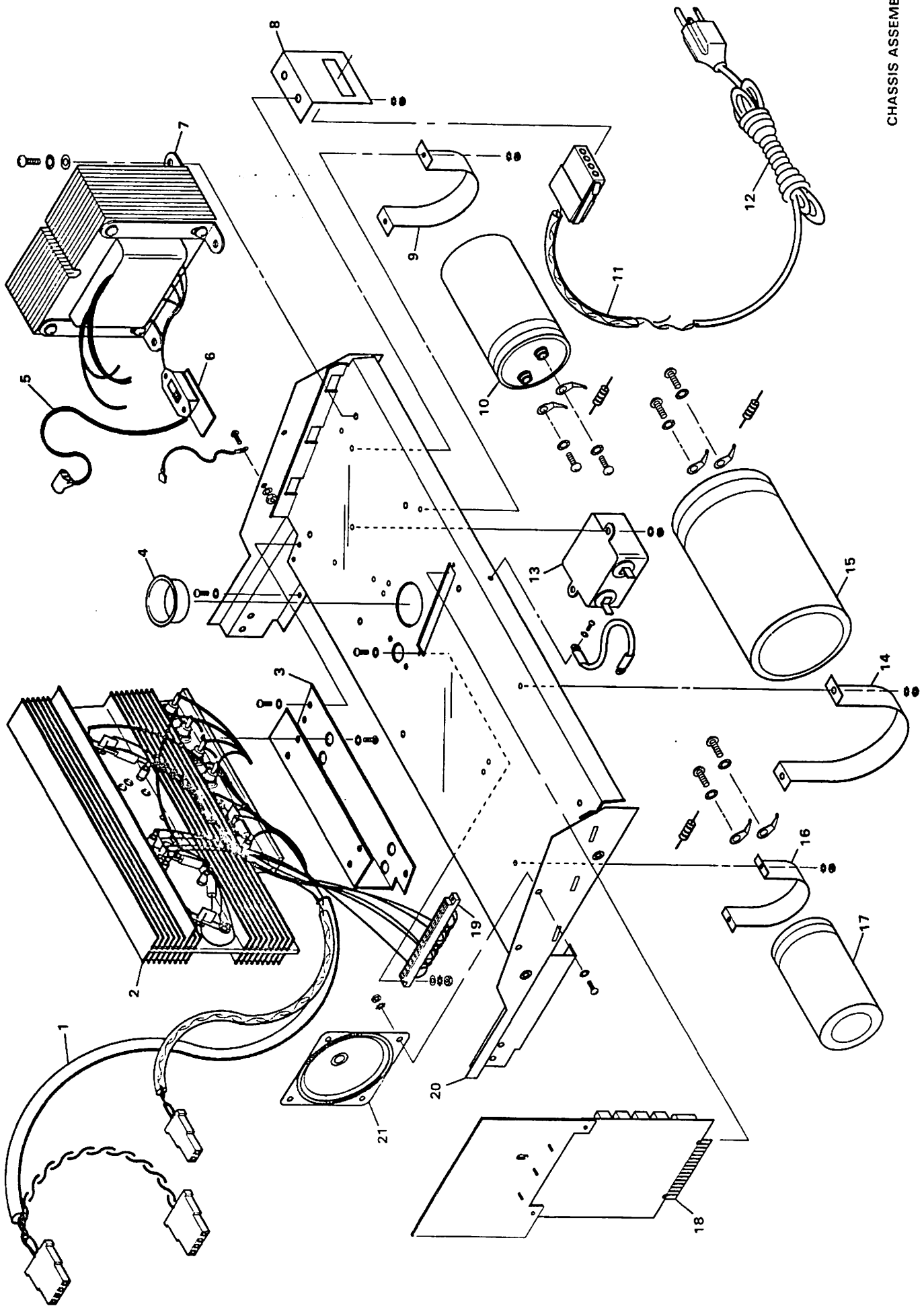


MONITOR ASSEMBLY

CHASSIS ASSEMBLY

ITEM	WLI#	DESCRIPTION
1	220-1113/4	CABLE ASSEMBLY, DC POWER FOR DISK DRIVES
2	270-0381	HEATSINK & HARNESS ASSEMBLY
3	458-0417	SUPPORT, HEATSINK
4	462-0141	SPACER, PHENOLIC CURRENT
5	420-1005	POWER CORD, ROTRON FAN
6	325-2117	SLIDE SWITCH 115/230 VAC
7	410-0119	POWER TRANSFORMER 50/60 Hz
8	451-4445	BRACKET, AC CONNECTOR
9	452-2563	CLAMP, CAPACITOR 2.00 DIA.
✓ 10	300-3069	2700 UF 30V ELECTROLYTIC CAPACITOR
11	220-1073	AC SWITCH CABLE
12	420-1096	CORD POWER 3 COND. - 10 FT.
13	410-2005	LINE FILTER 5 AMP CORCOM
14	452-2564	CLAMP, CAPACITOR 2.50 DIA.
✓ 15	300-3074	7300 UF 40V ELECTROLYTIC CAPACITOR
16	452-2565	CLAMP, CAPACITOR 1.38 DIA.
✓ 17	300-3050	124K UF 15V ELECTROLYTIC CAPACITOR
SBE NOTE * 18	210-7067-2/7156-2	REGULATOR PCB (WITH WANG MONITOR ASSEMBLY)
19	350-0008	30 PIN CONNECTOR, SOLDER TYPE
20	451-1111	CHASSIS WELDMENT
21	320-0300	SPEAKER, 3" RECTANGULAR FILMOR

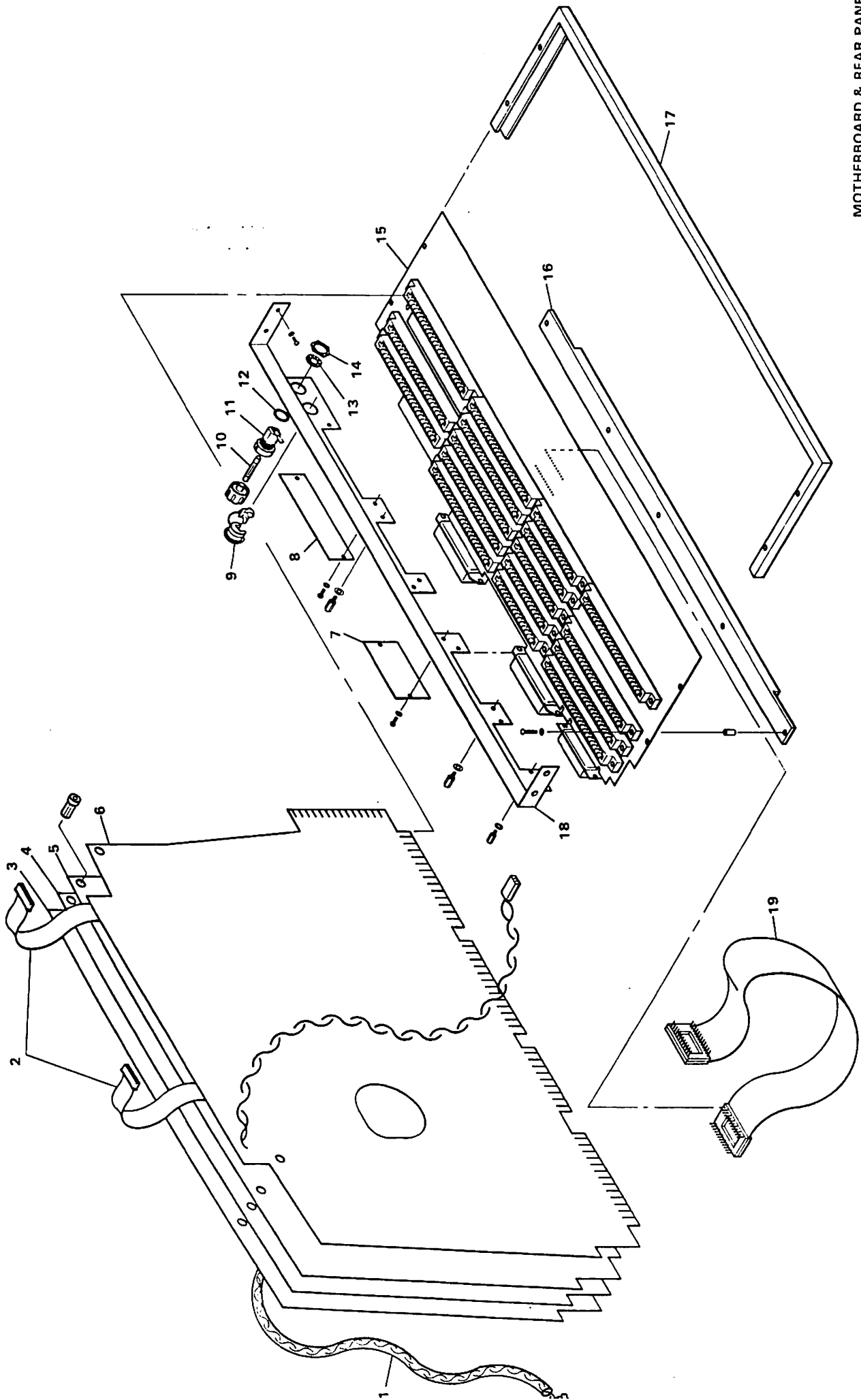
* NOTE: IF USING A PCS II W/ A MOTOROLA CRT MUST USE 210-7067 OR 210-7156 REGULATOR.



CHASSIS ASSEMBLY

MOTHERBOARD & REAR PANEL

ITEM	WLI#	DESCRIPTION
1	220-1068	VIDEO SIGNAL CABLE
2	220-3025	DISK SIGNAL CABLE
3	210-7159/7058-A/7059	MODULE, I/O (USE SAME BRD. AS FOUND IN UNIT)
4	✓ 210-7051-A	MODULE, CPU
5	✓ 210-7052-2A/4A/6A/8A	MODULE, MEMORY 8k/16k/24k/32k
6	✓ 210-7180-A	MODULE, DISK I/O
7	452-2152	COVER PLATE, SPARE
8	452-2151	COVER PLATE, BNC
9	654-1238	HEYCO STRAIN RELIEF
10	360-1150	15 AMP 32V PICO FUSE LITTLEFU
11	360-0000	FUSE HOLDER 90 DEGREE CONTACT
12	360-9000	RUBBER WASHER
13	360-9003	LOCK WASHER
14	360-9002	HEX NUT
15	210-7056	MOTHERBOARD
16	478-0723	SUPPORT BRACKET, MOTHERBOARD
17	452-2562	STIFFENER, MOTHERBOARD
18	451-3626	REAR PANEL
19	220-3014	24 COND 14" FLAT CABLE
NOT SHOWN	210-7172	CARD READER CONTROLLER BRD.



MOTHERBOARD & REAR PANEL