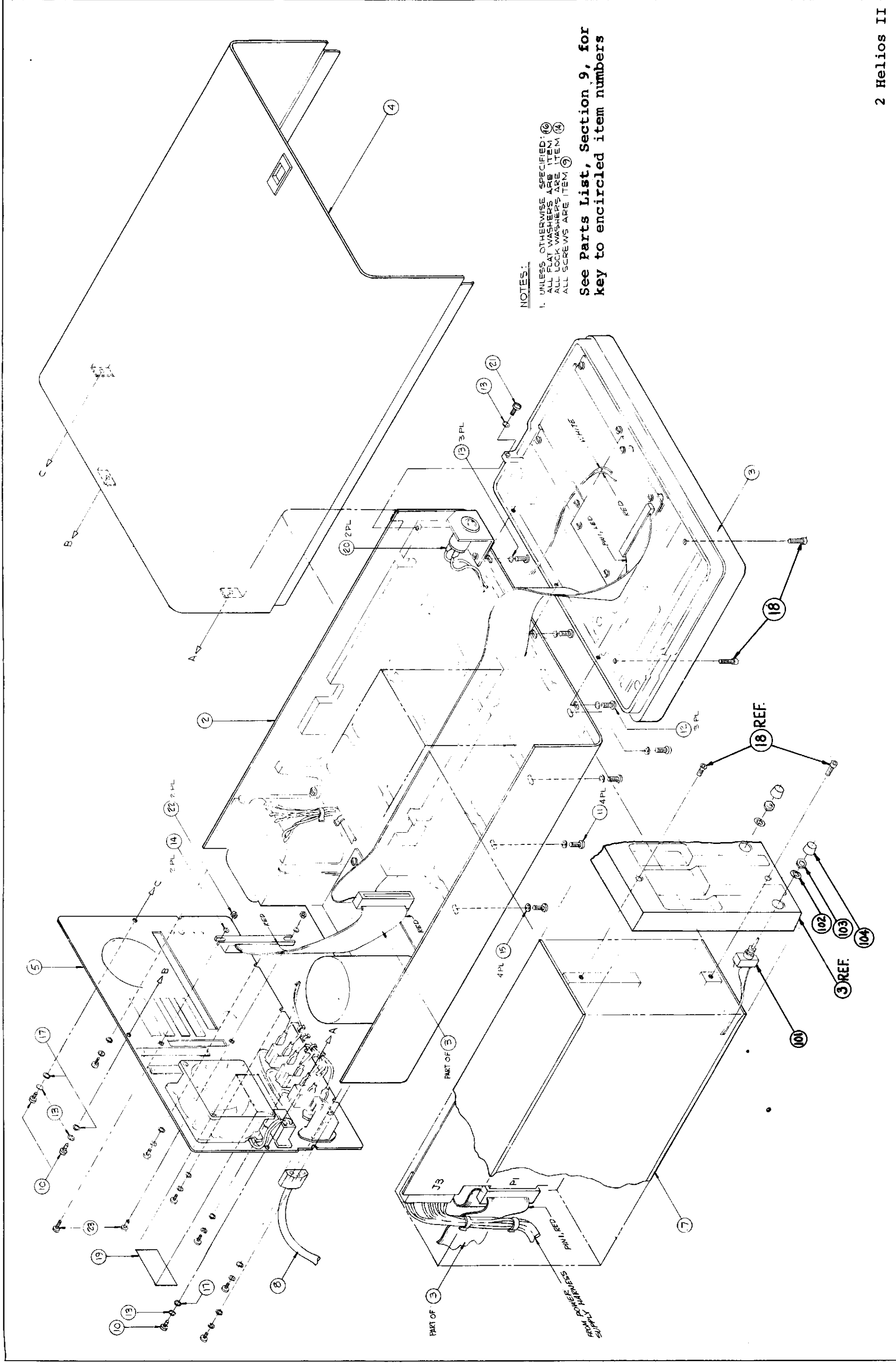


Fig. 8-1 System Assembly, Interconnect Diagram (I-2-78)



NOTES:

- 1. UNLESS OTHERWISE SPECIFIED:
 - ALL FLAT WASHERS ARE ITEM 16
 - ALL LOCK WASHERS ARE ITEM 14
 - ALL SCREWS ARE ITEM 9

See Parts List, Section 9, for key to encircled item numbers

Fig. 8-2 Cabinet Assembly, Model 2, Exploded (300000+I-2-78)

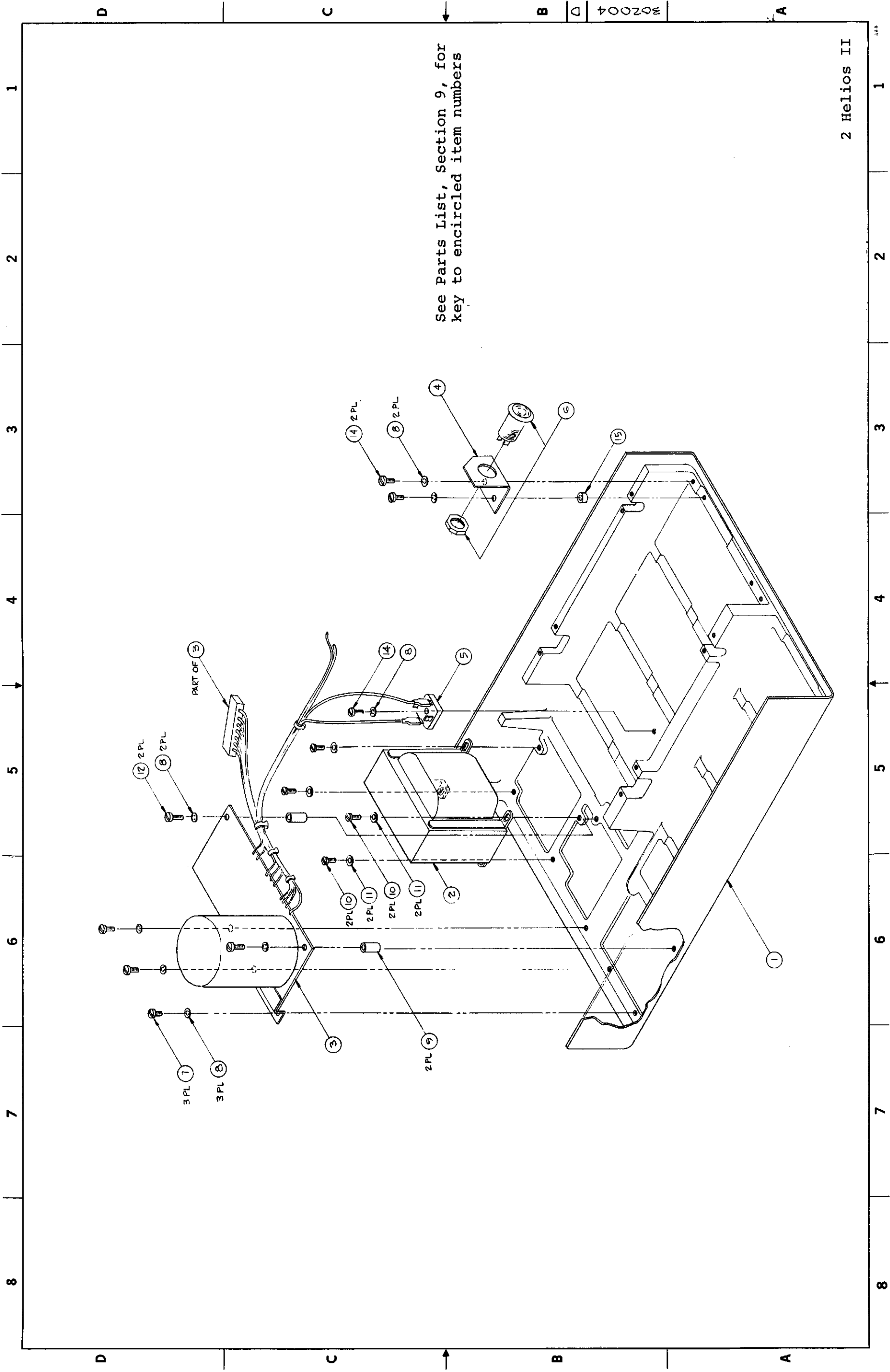
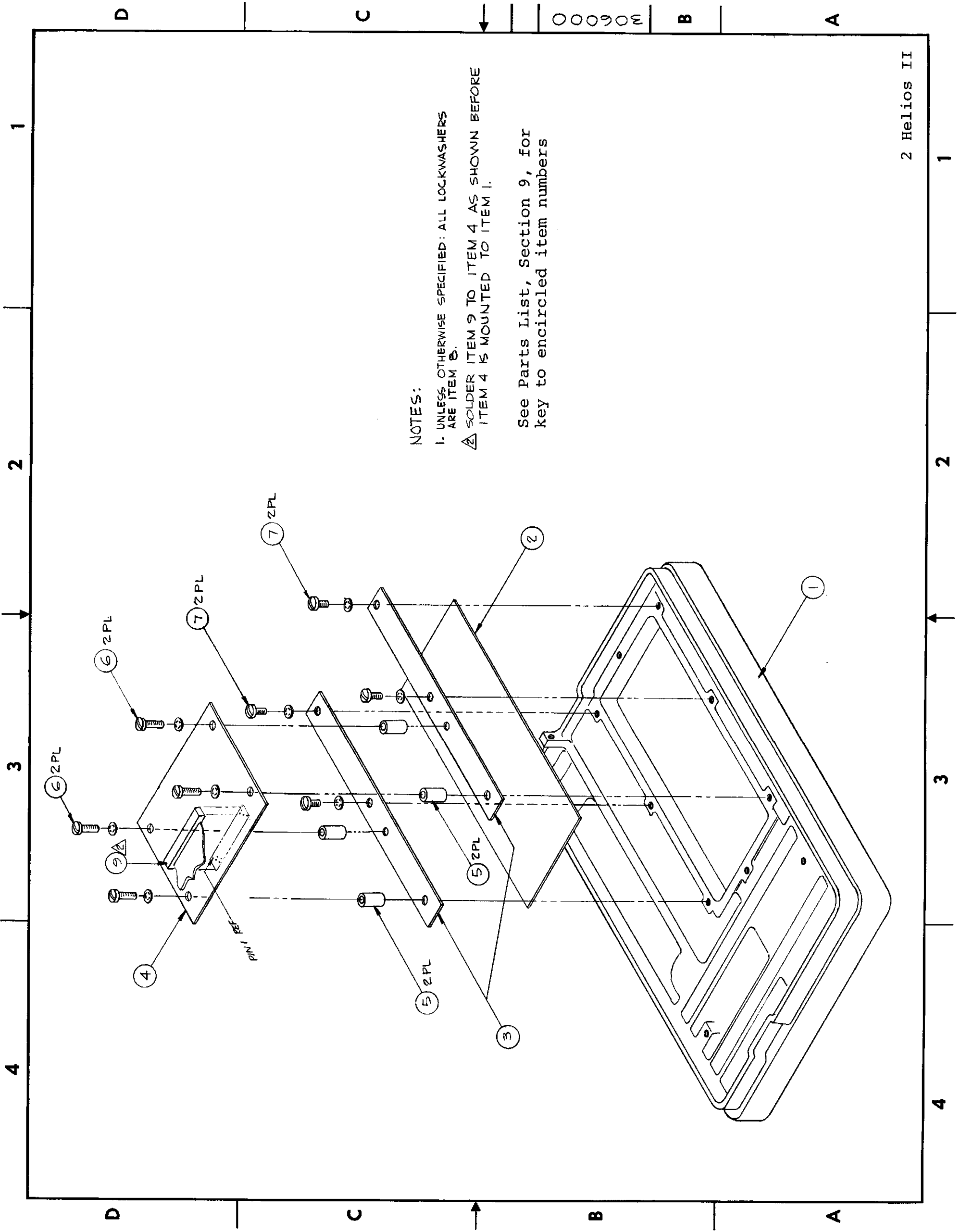


Fig. 8-3 Base Assembly, Model 2, Exploded



NOTES:

- 1. UNLESS OTHERWISE SPECIFIED: ALL LOCKWASHERS ARE ITEM 8.
- △ SOLDER ITEM 9 TO ITEM 4 AS SHOWN BEFORE ITEM 4 IS MOUNTED TO ITEM 1.

See Parts List, Section 9, for key to encircled item numbers

00090E

Fig. 8-4 Bezel Assembly, Model 2, Exploded (306000E)

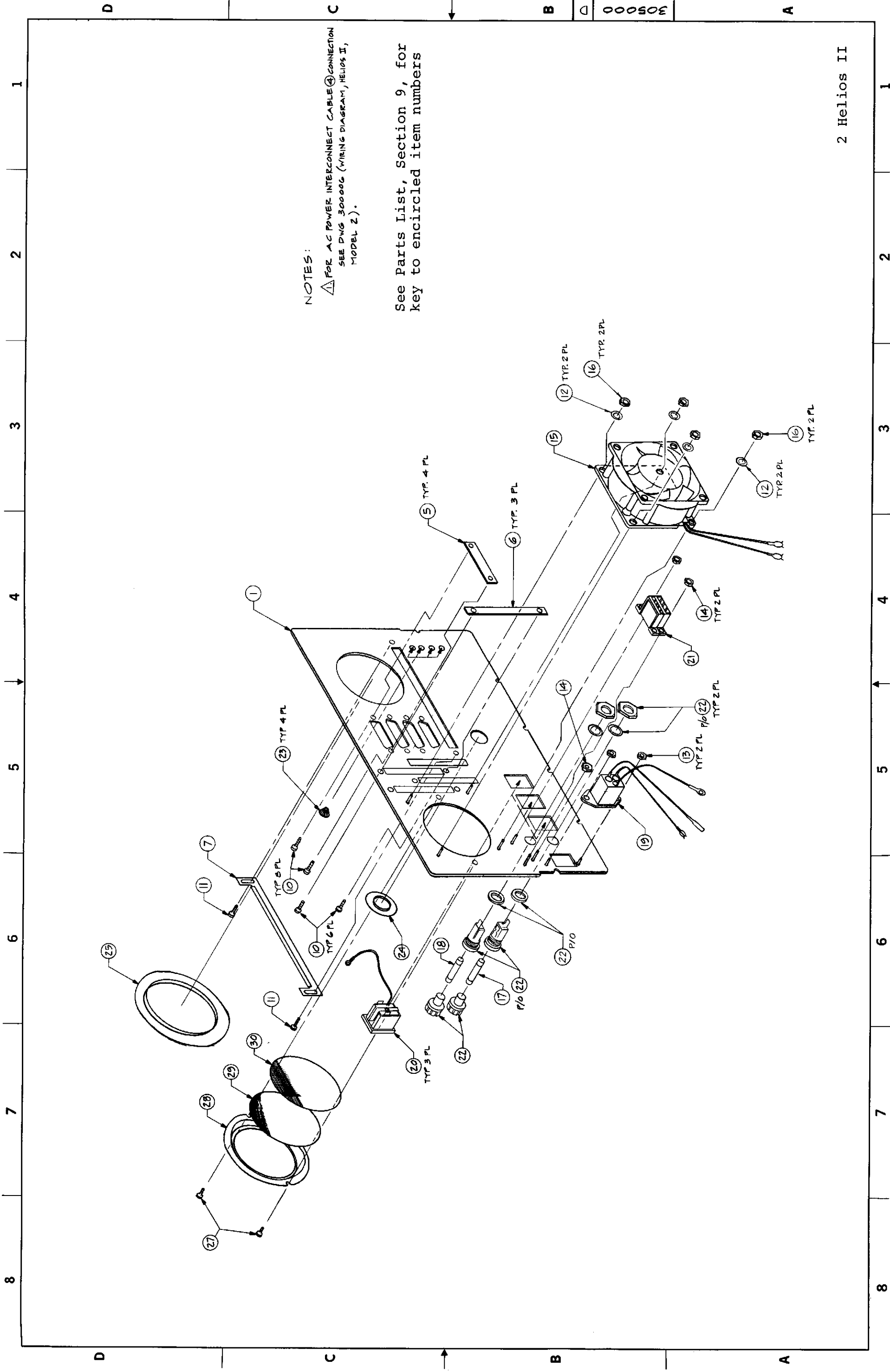
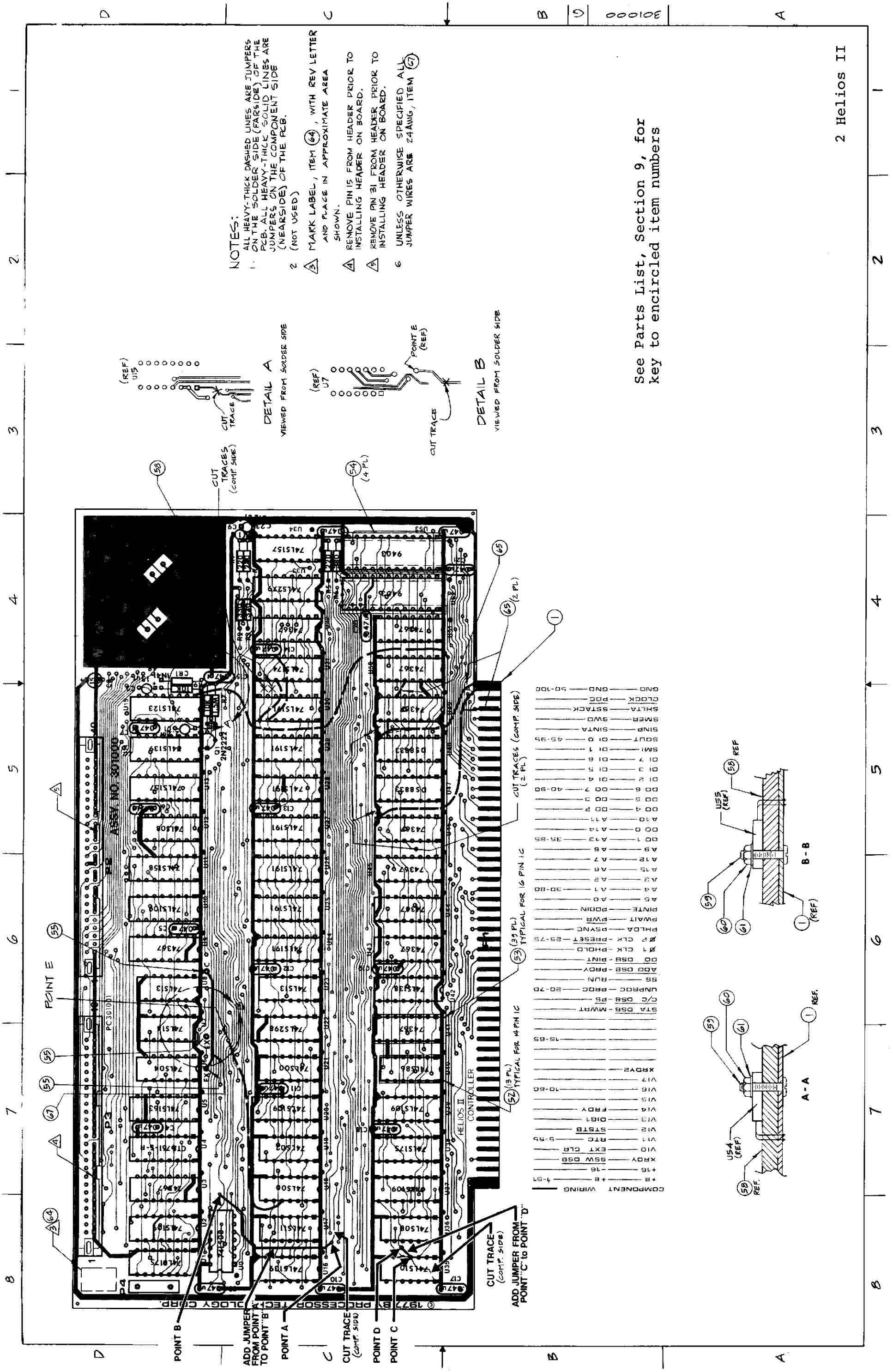
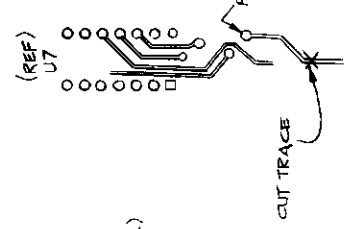
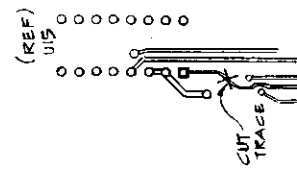


Fig. 8-5 Rear Panel Assembly, Model 2, Exploded



- NOTES:**
- 1 ALL HEAVY-THICK DASHED LINES ARE JUMPERS ON THE SOLDER SIDE (FAR SIDE) OF THE PCB. ALL HEAVY-THICK SOLID LINES ARE JUMPERS ON THE COMPONENT SIDE (NEAR SIDE) OF THE PCB.
 - 2 (NOT USED)
 - 3 MARK LABEL, ITEM (64), WITH REV LETTER AND PLACE IN APPROXIMATE AREA SHOWN.
 - 4 REMOVE PIN 15 FROM HEADER PRIOR TO INSTALLING HEADER ON BOARD.
 - 5 REMOVE PIN 31 FROM HEADER PRIOR TO INSTALLING HEADER ON BOARD.
 - 6 UNLESS OTHERWISE SPECIFIED ALL JUMPER WIRES ARE 24AWG, ITEM (67)

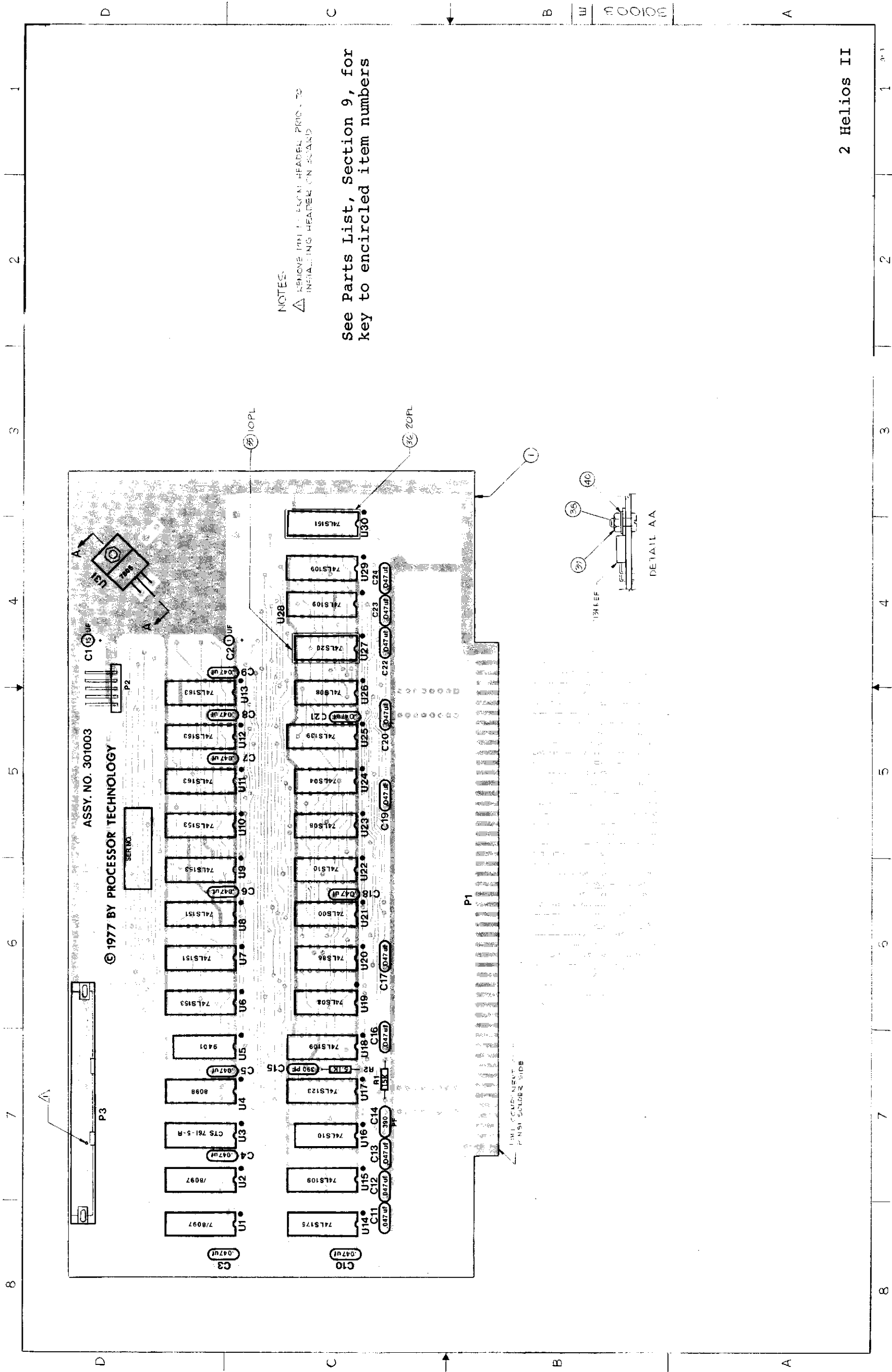


COMPONENT WIRING

+	B	
+	16	
+	18	
+	19	EXT CLR
+	20	EXT CLR
+	21	RTC
+	22	STB
+	23	DIG1
+	24	FRDY
+	25	10-B0
+	26	XRDY2
+	27	
+	28	
+	29	
+	30	
+	31	
+	32	
+	33	
+	34	
+	35	
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+	88	
+	89	
+	90	
+	91	
+	92	
+	93	
+	94	
+	95	
+	96	
+	97	
+	98	
+	99	
+	100	

See Parts List, Section 9, for key to encircled item numbers

Fig. 8-6 Controller PCB Assembly (C/G)

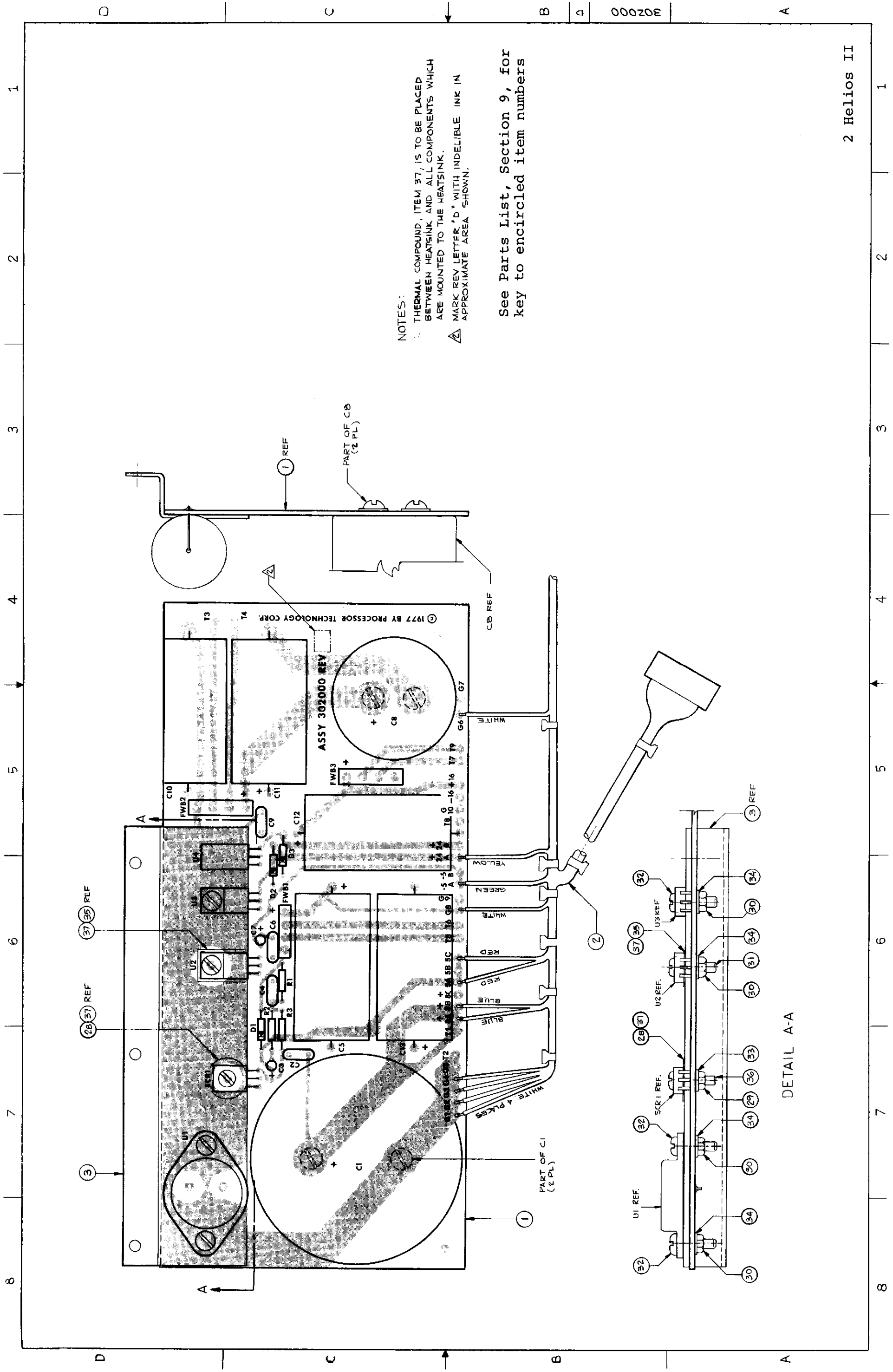


NOTES:
 ▲ REMOVE PIN 1 FROM HEADER PRIOR TO
 INSTALLING HEADER ON BOARD

See Parts List, Section 9, for
 key to circled item numbers

2 Helios II

Fig. 8-7 Formatter PCB Assembly (C/E)



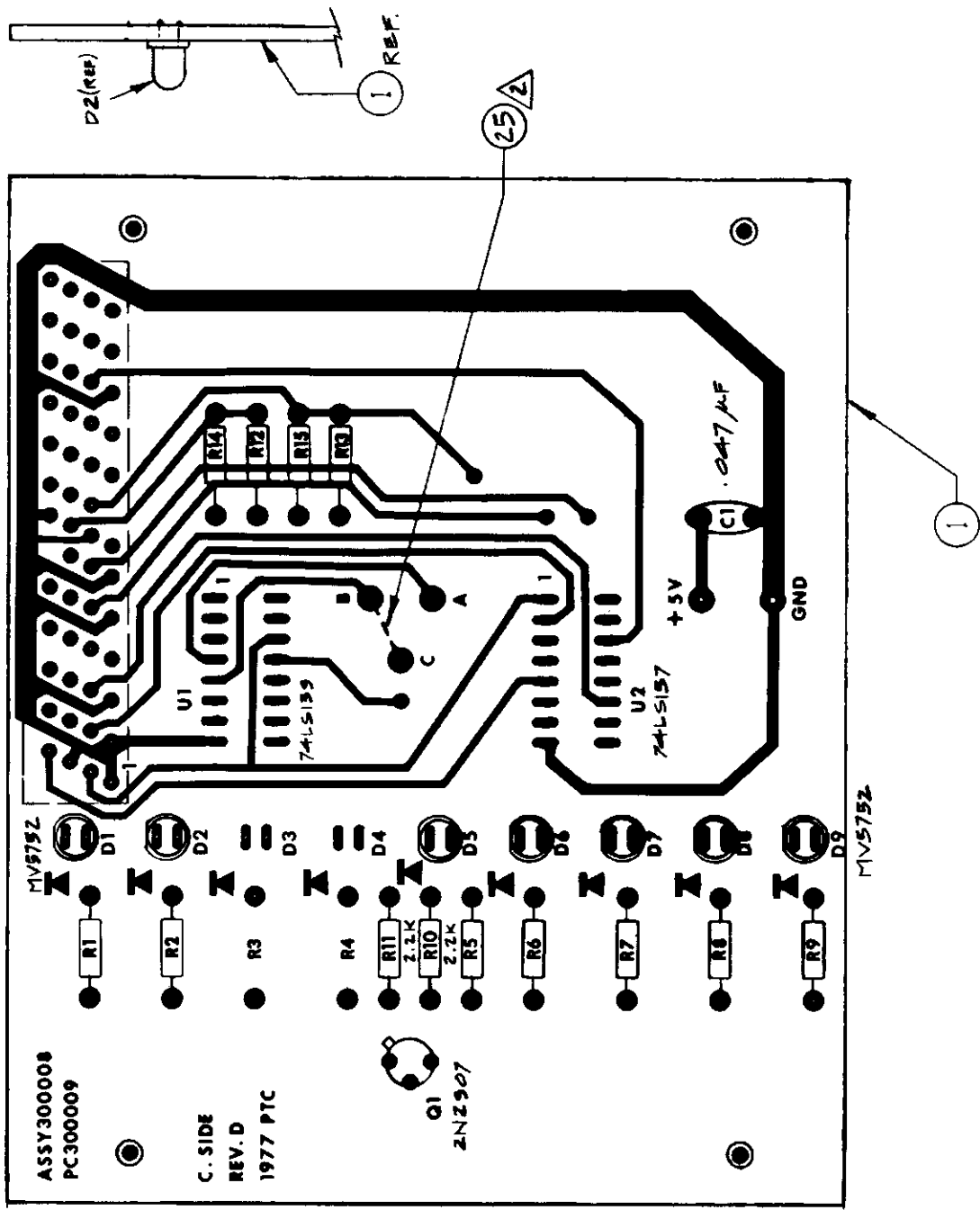
NOTES:
 1. THERMAL COMPOUND, ITEM 37, IS TO BE PLACED BETWEEN HEATSINK AND ALL COMPONENTS WHICH ARE MOUNTED TO THE HEATSINK.
 MARK REV LETTER 'D' WITH INDELIBLE INK IN APPROXIMATE AREA SHOWN.

See Parts List, Section 9, for key to encircled item numbers

DETAIL A-A

2 Helios II

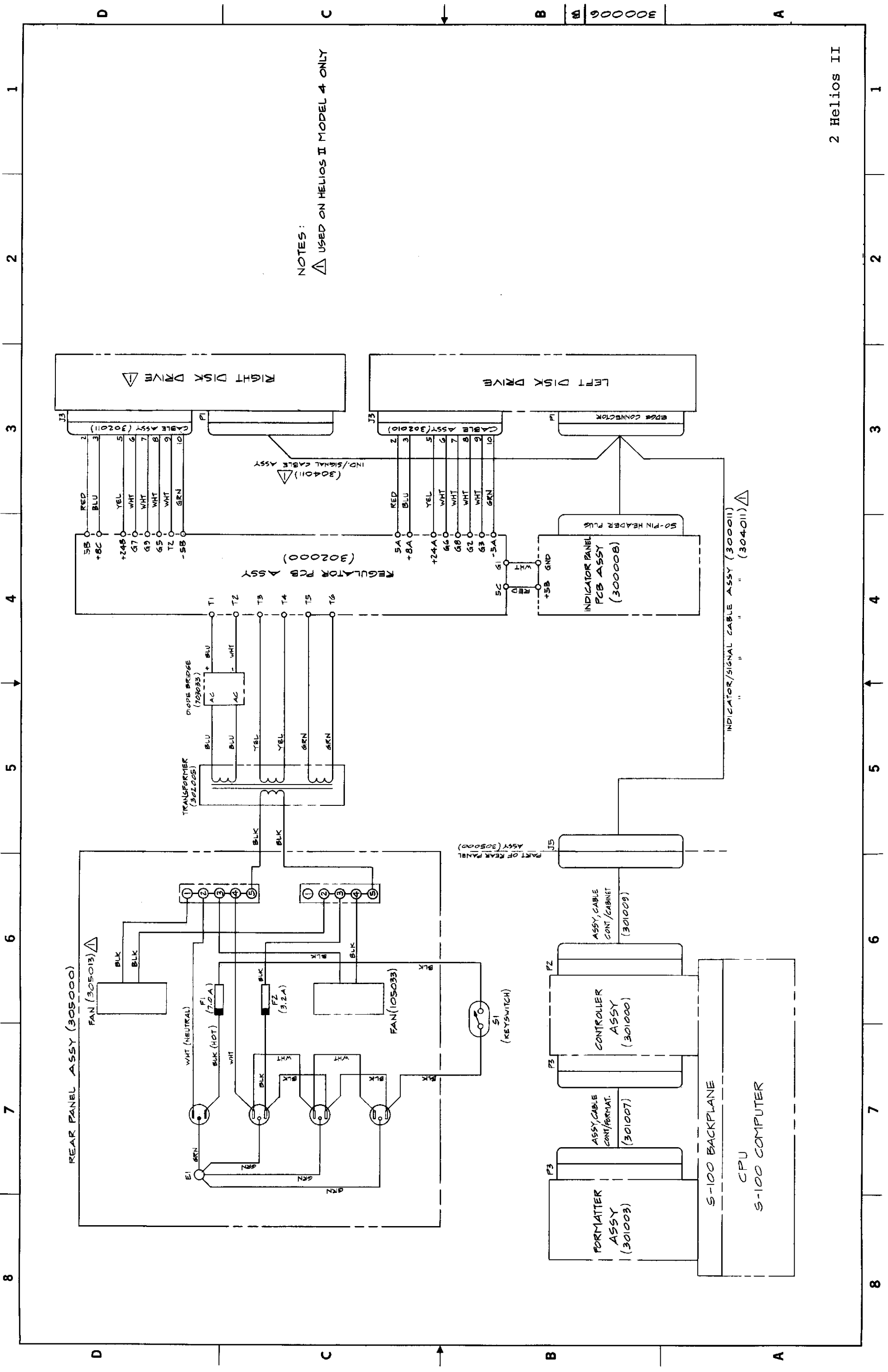
Fig. 8-8 Regulator PCB Assembly, Model 2 (C/D)



NOTES:
 UNLESS OTHERWISE SPECIFIED:
 1. RESISTOR VALUES ARE 220 OHMS.
 2. SOLDER A #24 SOLID BUS WIRE JUMPER BETWEEN B & C ON THE REVERSE (SOLDER SIDE) OF PCB.

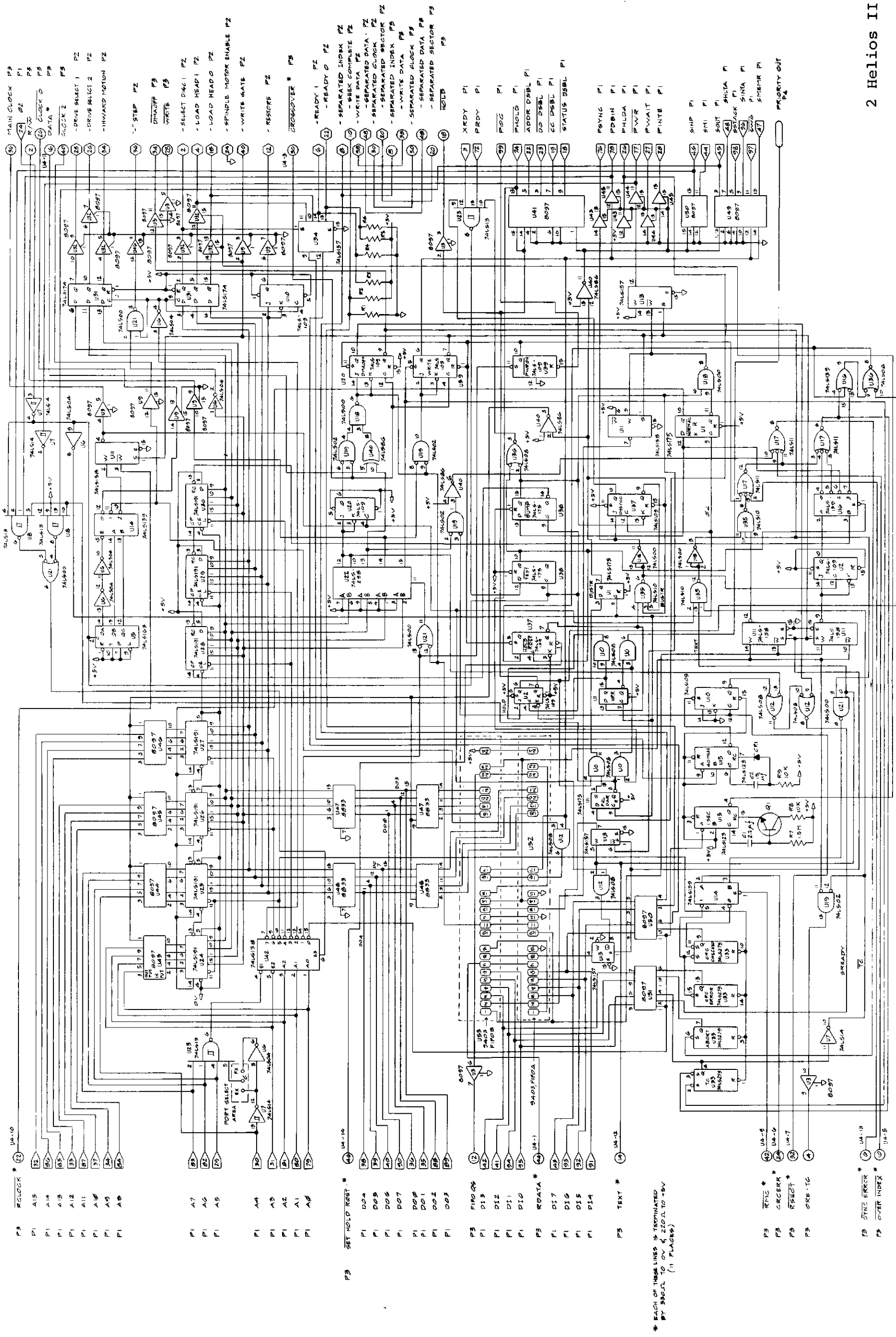
See Parts List, Section 9, for key to encircled item numbers

Fig. 8-9 Indicator Panel PCB Assembly (300008 D/F)



NOTES:
 ▲ USED ON HELIOS II MODEL 4 ONLY

Fig. 8-10 System Wiring Diagram

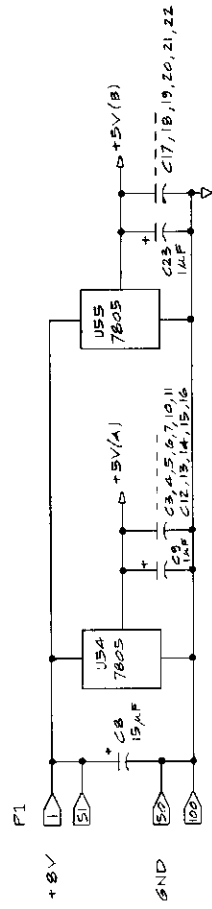


- P3 P1 24 MAIN CLOCK P2 P1
- P3 P1 25 R/W P2 P1
- P3 P1 26 CLOCK 0 P3 P3
- P3 P1 27 DATA P3 P3
- P3 P1 28 CLOCK 2 P3 P3
- P3 P1 29 DRIVE SELECT 1 P2 P2
- P3 P1 30 DRIVE SELECT 2 P2 P2
- P3 P1 31 INWARD MOTION P2 P2
- P3 P1 32 STEP P2 P2
- P3 P1 33 DMARPP P3 P3
- P3 P1 34 WRITE P3 P3
- P3 P1 35 SELECT 0/4/1 P2 P2
- P3 P1 36 LOAD HEAD 1 P2 P2
- P3 P1 37 LOAD HEAD 0 P2 P2
- P3 P1 38 SPINDLE MOTOR ENABLE P2 P2
- P3 P1 39 WRITE RATE P2 P2
- P3 P1 40 RESUME P2 P2
- P3 P1 41 CROSSOVER P3 P3
- P3 P1 42 READY 1 P2 P2
- P3 P1 43 READY 0 P2 P2
- P3 P1 44 SEPARATED INDEX P2 P2
- P3 P1 45 SEBK COMPLETE P2 P2
- P3 P1 46 WRITE DATA P2 P2
- P3 P1 47 SEPARATED DATA P2 P2
- P3 P1 48 SEPARATED CLOCK P2 P2
- P3 P1 49 SEPARATED SECTOR P2 P2
- P3 P1 50 SEPARATED INDEX P3 P3
- P3 P1 51 WRITE DATA P3 P3
- P3 P1 52 SEPARATED CLOCK P3 P3
- P3 P1 53 SEPARATED DATA P3 P3
- P3 P1 54 SEPARATED SECTOR P3 P3
- P3 P1 55 HOLDS P3 P3
- P3 P1 56 XRDY P1 P1
- P3 P1 57 PRDY P1 P1
- P3 P1 58 HOLD P1 P1
- P3 P1 59 ADDR DSBL P1 P1
- P3 P1 60 DS DSBL P1 P1
- P3 P1 61 CC DSBL P1 P1
- P3 P1 62 STATUS DSBL P1 P1
- P3 P1 63 PSYNG P1 P1
- P3 P1 64 PBDIN P1 P1
- P3 P1 65 PHLDA P1 P1
- P3 P1 66 PWR P1 P1
- P3 P1 67 PWAIT P1 P1
- P3 P1 68 PINT P1 P1
- P3 P1 69 SIMP P1 P1
- P3 P1 70 SMI P1 P1
- P3 P1 71 SOUT P1 P1
- P3 P1 72 SHLTA P1 P1
- P3 P1 73 STACK P1 P1
- P3 P1 74 SINTA P1 P1
- P3 P1 75 SINTB P1 P1
- P3 P1 76 PRIORITY OUT P4 P4

- P3 P1 77 SET HOLD RESE *
- P3 P1 78 DOA
- P3 P1 79 DOB
- P3 P1 80 DO6
- P3 P1 81 DO7
- P3 P1 82 DO8
- P3 P1 83 DO1
- P3 P1 84 DO2
- P3 P1 85 DO3
- P3 P1 86 FREQ
- P3 P1 87 D13
- P3 P1 88 D12
- P3 P1 89 D11
- P3 P1 90 D10
- P3 P1 91 RDATA *
- P3 P1 92 D17
- P3 P1 93 D16
- P3 P1 94 D15
- P3 P1 95 D14
- P3 P1 96 TEXT *
- P3 P1 97 RNIC *
- P3 P1 98 CRCERR *
- P3 P1 99 RSECT *
- P3 P1 100 GRE-TC
- P3 P1 101 SYNC ERROR *
- P3 P1 102 OVER INDEX *

* EACH OF THESE LINES IS TERMINATED BY 300Ω TO GND & 220Ω TO +5V (1 PLACES)

Fig. 8-11 Controller PCB, Schematic (301002E)

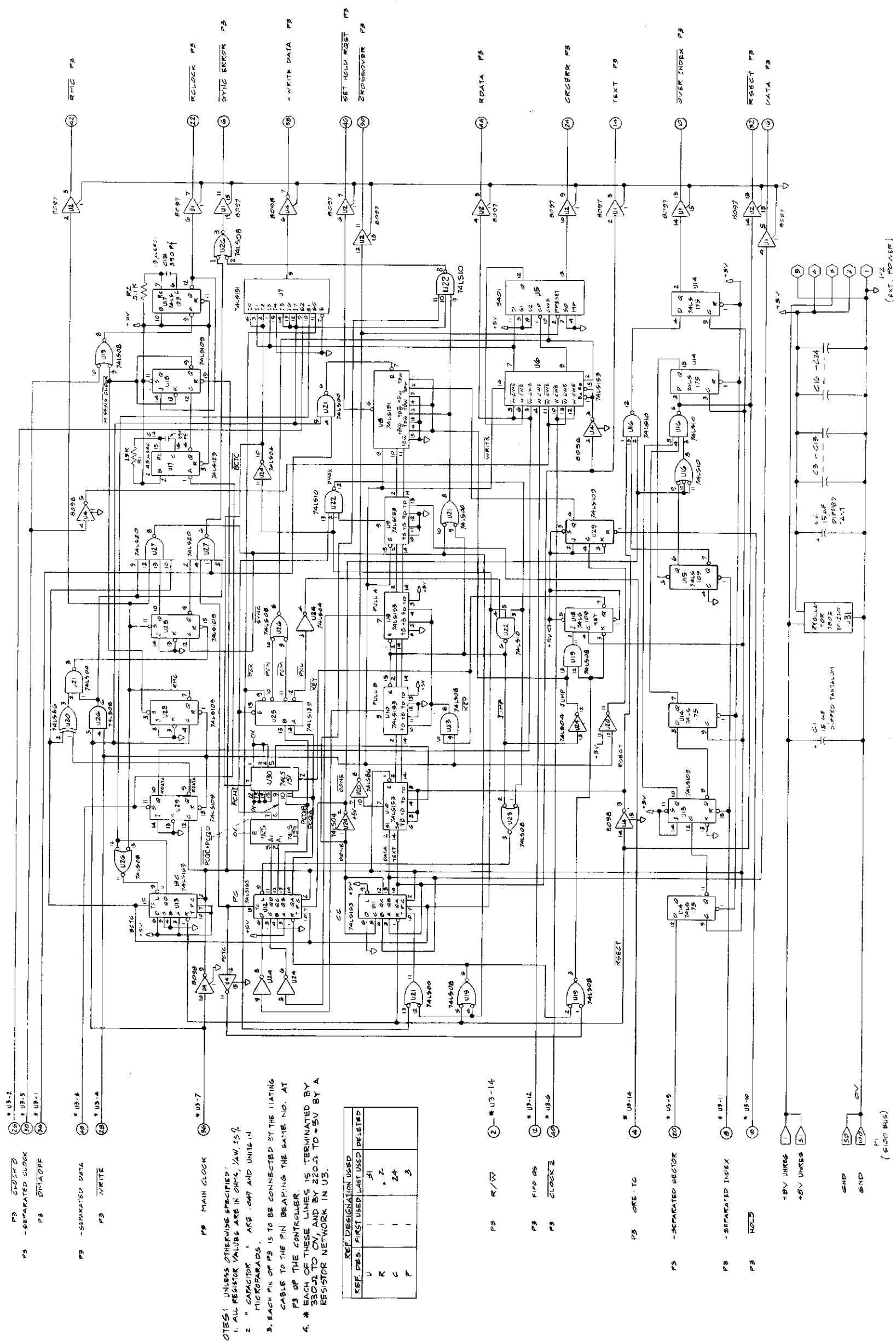


POWER SUPPLY

NOTES:

1. UNLESS OTHERWISE SPECIFIED:
 - A ALL CAPACITOR VALUES ARE .047 AND UNITS IN μF.
 - B ALL RESISTOR VALUES ARE IN OHM, $\frac{1}{4}W$, 5%,

REF. DESIGNATION TABLE			
REF. DESIGNATION	LAST USED	NOT USED	DELETED
U1	U55		
R1	R9		
P1	P4		
C1	C23		
CRI			
34		J1-13	



P3 CLOCK
 P3 -SEPARATED CLOCK
 P3 DATA
 P3 -SEPARATED DATA
 P3 WRITE
 P3 MAIN CLOCK

P3 R/W
 P3 R/O
 P3 CLOCK 2
 P3 ONE TO

P3 -SEPARATED SECTOR
 P3 -SEPARATED INDEX
 P3 HOLD

+5V UNREG
 +5V UNREG
 GND
 GND

NOTES: UNLESS OTHERWISE SPECIFIED:
 1. ALL RESISTOR VALUES ARE IN OHMS, μ W, μ S, μ F.
 2. CAPACITORS ARE .047 AND UNITS IN MICROFARADS.
 3. EACH PIN OF P3 IS TO BE CONNECTED BY THE MATING CABLE TO THE PIN BEARING THE SAME NO. AT P3 OF THE CONTROLLER.
 4. EACH OF THESE LINES IS TERMINATED BY 220 Ω TO GND, AND BY 220 Ω TO +5V BY A RESISTOR NETWORK IN U3.

REF. DES.	FIRST USED	LAST USED	DELETED
U		31	
R		2	
C		24	
F		3	

P3 UNREG
 P3 UNREG
 GND
 GND

+5V UNREG
 +5V UNREG
 GND
 GND

+5V UNREG
 +5V UNREG
 GND
 GND

+5V UNREG
 +5V UNREG
 GND
 GND

+5V UNREG
 +5V UNREG
 GND
 GND

+5V UNREG
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 GND
 GND

+5V UNREG
 +5V UNREG
 GND
 GND

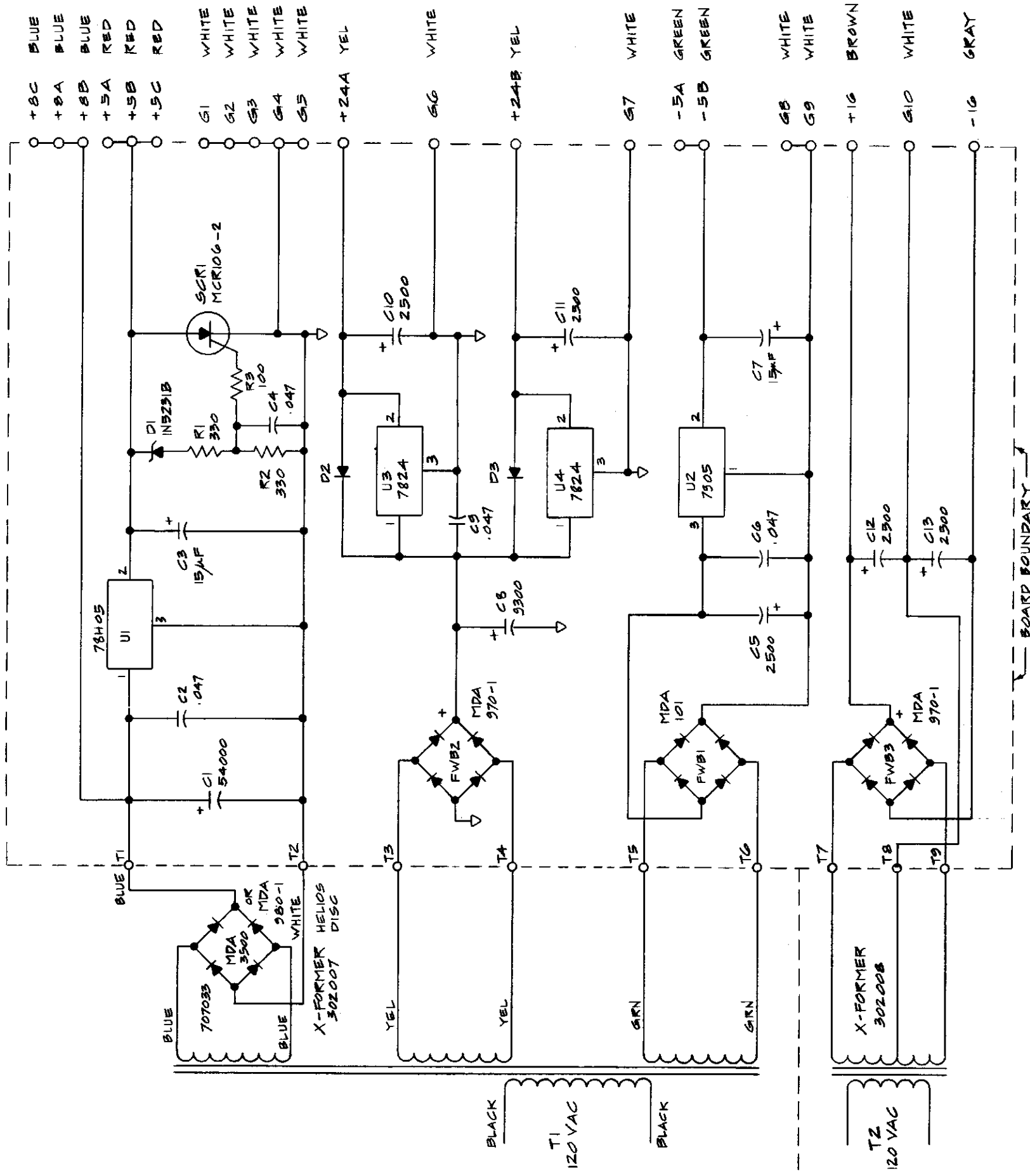
+5V UNREG
 +5V UNREG
 GND
 GND

+5V UNREG
 +5V UNREG
 GND
 GND

+5V UNREG
 +5V UNREG
 GND
 GND

+5V UNREG
 +5V UNREG
 GND
 GND

Fig. 8-12 Formatter PCB, Schematic (301005D)

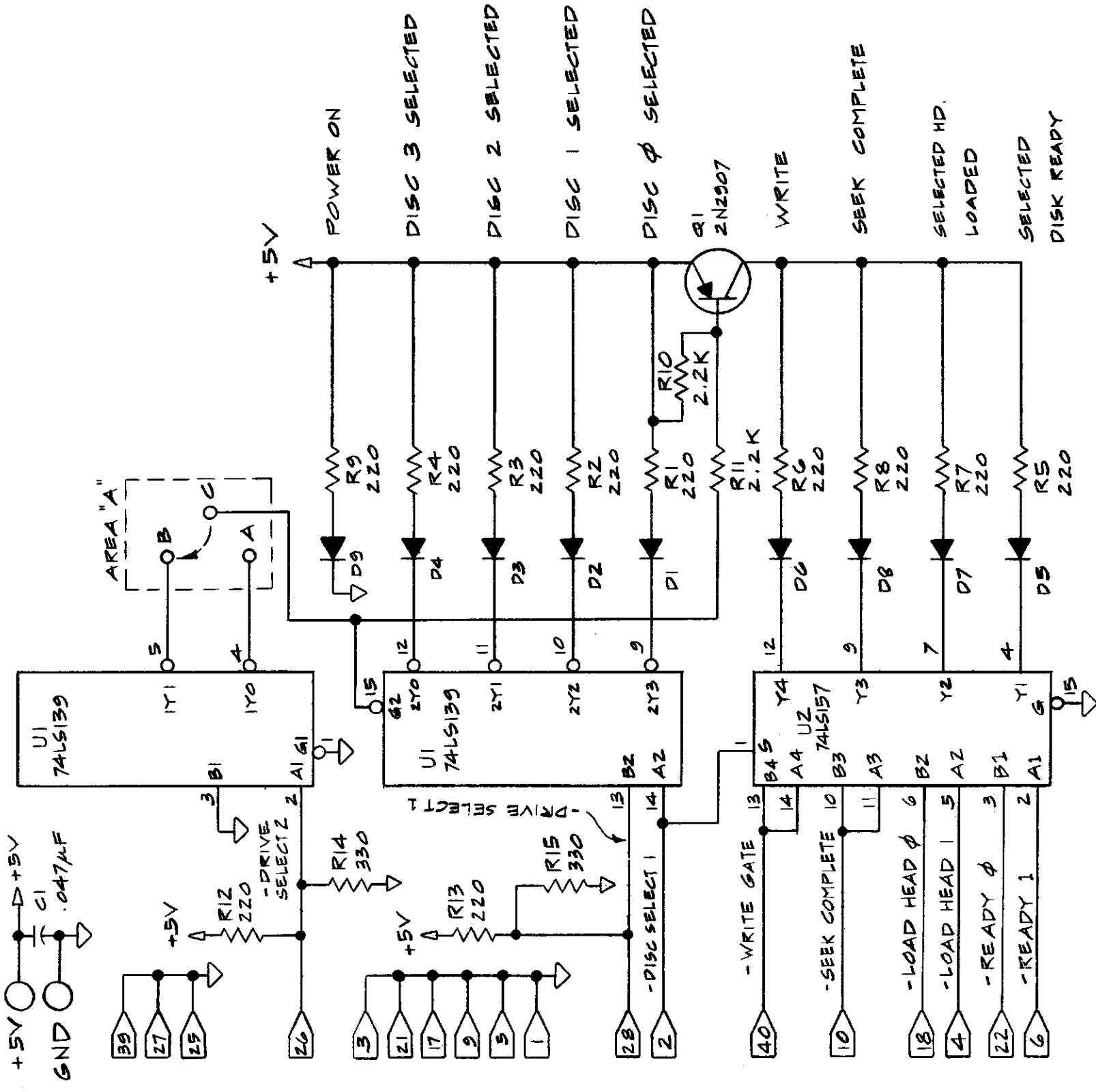


NOTES:

1. UNLESS OTHERWISE SPECIFIED

A. ALL RESISTOR VALUES ARE GIVEN IN OHMS (Ω)

B. ALL CAPACITOR VALUES ARE GIVEN IN MICROFARADS (μ F)



NOTES:

- A. UNLESS OTHERWISE SPECIFIED
 - 1. ALL DIODES ARE LED, MYS75Z, RED
 - 2. ALL RESISTOR VALUES IN OHMS, 1/4 W, 5%
 - 3. ALL CAPACITOR VALUES IN MICROFARADS
- B. I.C. PWR & GND PIN CONNECTION

REF DES.	IC NO.	PIN NO. +5V	PIN NO. GND
U1	74LS139	16	8
U2	74LS157	16	8

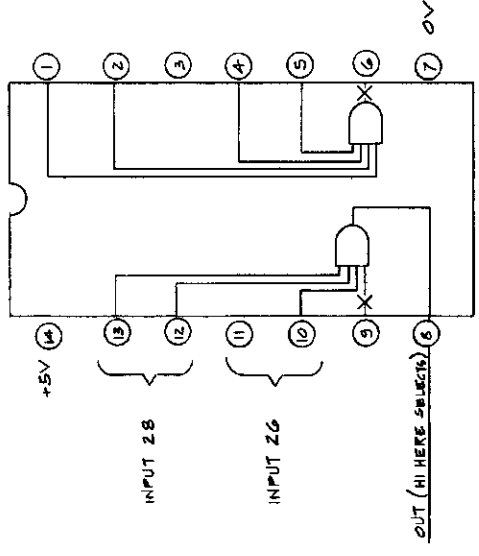
C. COMPONENT REF DESIGNATION

LAST USED	DESIGNATION
UZ	DELETED
Q1	DELETED
D9	D3 & D4 ON SINGLE DRIVE (-01 & -02) ONLY
R15	R3 & R4 " " " "
C1	" " " "

- D. JUMPER B TO C FOR SINGLE OR #1 HELIOS CABINET
- JUMPER A TO C FOR 2DP HELIOS CABINET

Fig. 8-14 Indicator Panel PCB, Schematic (300007E)

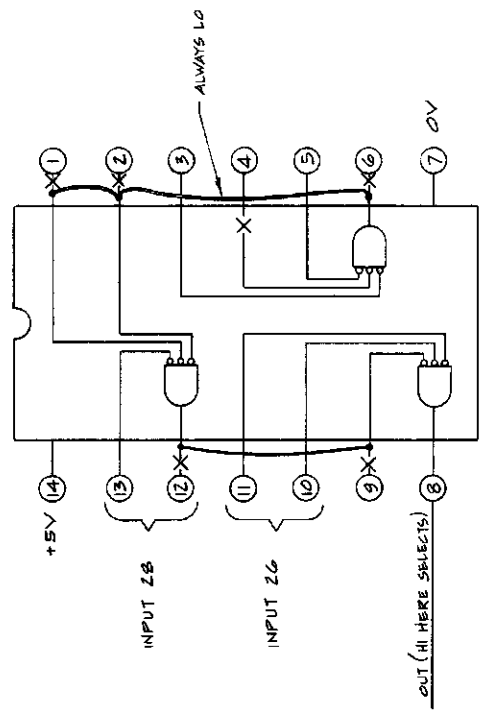
A DUAL FLOPPY DISC DRIVE CONTAINING THIS SELECTOR
IN U11 WILL RESPOND AS UNITS 0 & 1



- TO MAKE THIS DEVICE
1. GET A 74LS21
 2. CUT OFF PINS 6, 9
 3. REMOVE PREVIOUS NOMENCLATURE
 4. MARK WITH PT PART NUMBER AND "0-1"

INPUT Z8	INPUT Z6	OUT
LO	LO	LO
LO	HI	LO
HI	LO	LO
HI	HI	HI

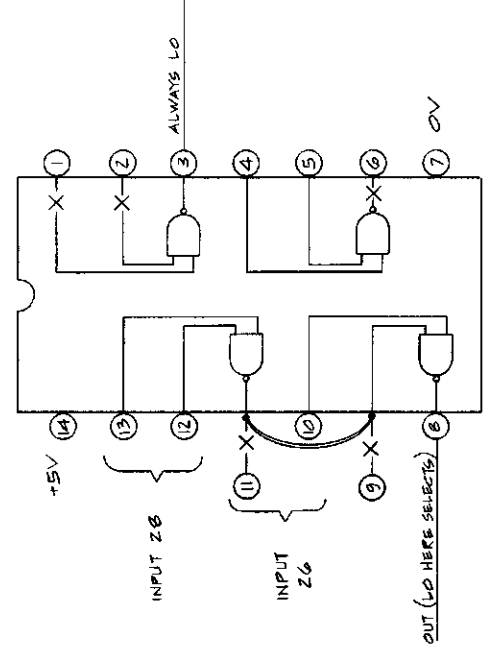
A DUAL FLOPPY DISC DRIVE CONTAINING THIS SELECTOR
IN U11 WILL RESPOND AS UNITS 4 & 5



- TO MAKE THIS DEVICE
1. GET A 74LS27
 2. CUT OFF PIN 4
 3. BEND UP PINS 1, 2, 6 & CONNECT THEM TOGETHER
 4. BEND UP PINS 9, 12 & CONNECT THEM TOGETHER
 5. REMOVE PREVIOUS NOMENCLATURE
 6. MARK WITH PT PART NUMBER AND "4-5"

INPUT Z8	INPUT Z6	OUT
LO	LO	LO
LO	HI	LO
HI	LO	HI
HI	HI	LO

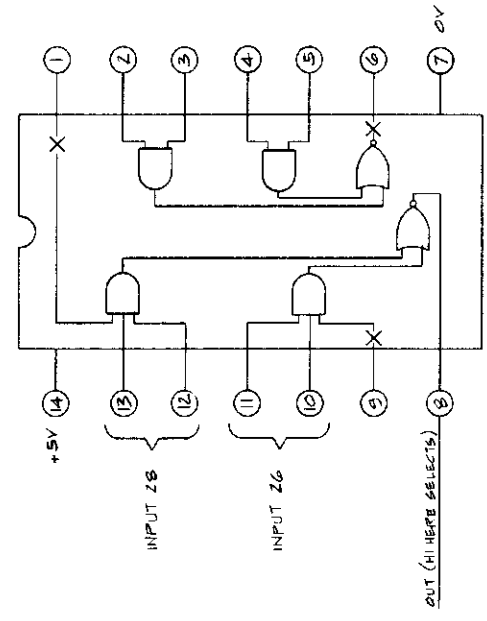
A DUAL FLOPPY DISC DRIVE CONTAINING THIS SELECTOR
IN U11 WILL RESPOND AS UNITS 2 & 3



- TO MAKE THIS DEVICE
1. GET A 74LS37
 2. CUT OFF PINS 1, 2, 6
 3. BEND UP PINS 9, 11 & CONNECT THEM TOGETHER
 4. REMOVE PREVIOUS NOMENCLATURE
 5. MARK WITH PT PART NUMBER AND "2-3"

INPUT Z8	INPUT Z6	OUT
LO	LO	HI
LO	HI	LO
HI	LO	HI
HI	HI	HI

A DUAL FLOPPY DISC DRIVE CONTAINING THIS SELECTOR
IN U11 WILL RESPOND AS UNITS 6 & 7



- TO MAKE THIS DEVICE
1. GET A 74LS51
 2. CUT OFF PINS 1, 6, 9
 3. REMOVE PREVIOUS NOMENCLATURE
 4. MARK WITH PT PART NUMBER AND "6-7"

INPUT Z8	INPUT Z6	OUT
LO	LO	HI
LO	HI	LO
HI	LO	LO
HI	HI	LO

Table 8-1 Numerical Pin-to-Pin Assignments, Controller P3/Formatter P3 (Cable Assy. 301007, Model 2 and 4)
Note: All odd numbered pins are ground.

PIN #	SIGNAL NAME	PIN #	SIGNAL	CON-TROLLER P2	DRIVE P1	INDI-CATOR PANEL
2	R/W	2	-DISK SELECT 1	X	X	X
4	ORE·TC	4	-LOAD HEAD 1	X	X	X
6	SYNC ERROR	6	-READY 1	X	X	X
8	-SEPARATED INDEX	8	-SEPARATED INDEX	X	X	-
10	OVER INDEX	10	-SEEK COMPLETE	X	X	X
12	FIFO QS	12	-RESTORE	X	X	-
14	TEXT	18	-LOAD HEAD \emptyset	X	X	X
16	DATA	20	-SEPARATED SECTOR	X	X	-
18	HOLD	22	-READY \emptyset	X	X	X
20	-SEPARATED SECTOR	24	-SPINDLE MOTOR ENABLE	X	X	-
22	RCLOCK	26	-DRIVE SELECT 2	X	X	X
24	CRCERR	28	-DRIVE SELECT 1	X	X	X
26	CLOCK \emptyset	34	-INWARD MOTION	X	X	-
28	WRITE	36	-STEP	X	X	-
30	CROSSOVER	38	-WRITE DATA	X	X	-
32	RSECT	40	-WRITE GATE	X	X	X
34	DMAOFF	48	-SEPARATED DATA	X	X	-
36	MAIN CLOCK	50	-SEPARATED CLOCK	X	X	-
38	-WRITE DATA					
40	CLOCK 2					
42	RMC					
44	RDATA					
46	SET HOLD RQST					
48	-SEPARATED DATA					
50	-SEPARATED CLOCK					

*NOTES

1. See Table 8-1, 8-2 and 7-7 for numerical pin-to-pin assignments.
2. Among the controller, formatter, drive, and indicator panel, all odd numbered pins are ground. Some indicator panel pins are grounded by the interconnect cable to controller ground.
3. For system wiring see Fig. 8-10, System Wiring Diagram.
4. Signals among the controller, formatter, drive and indicator panel are unidirectional.
5. Only those signal/pins on the CPU which are used by the controller are listed on this drawing.
6. P1 and P2 on the formatter are alternative DC power sources. (See Section 3, Unpacking and Assembly Tips.)

Table 8-2 Numerical Pin-to-Pin Assignments, Controller/Drive/Indicator Panel (Cable Assys. 301009 and 300011, Model 2)
Note: All odd numbered pins are ground.

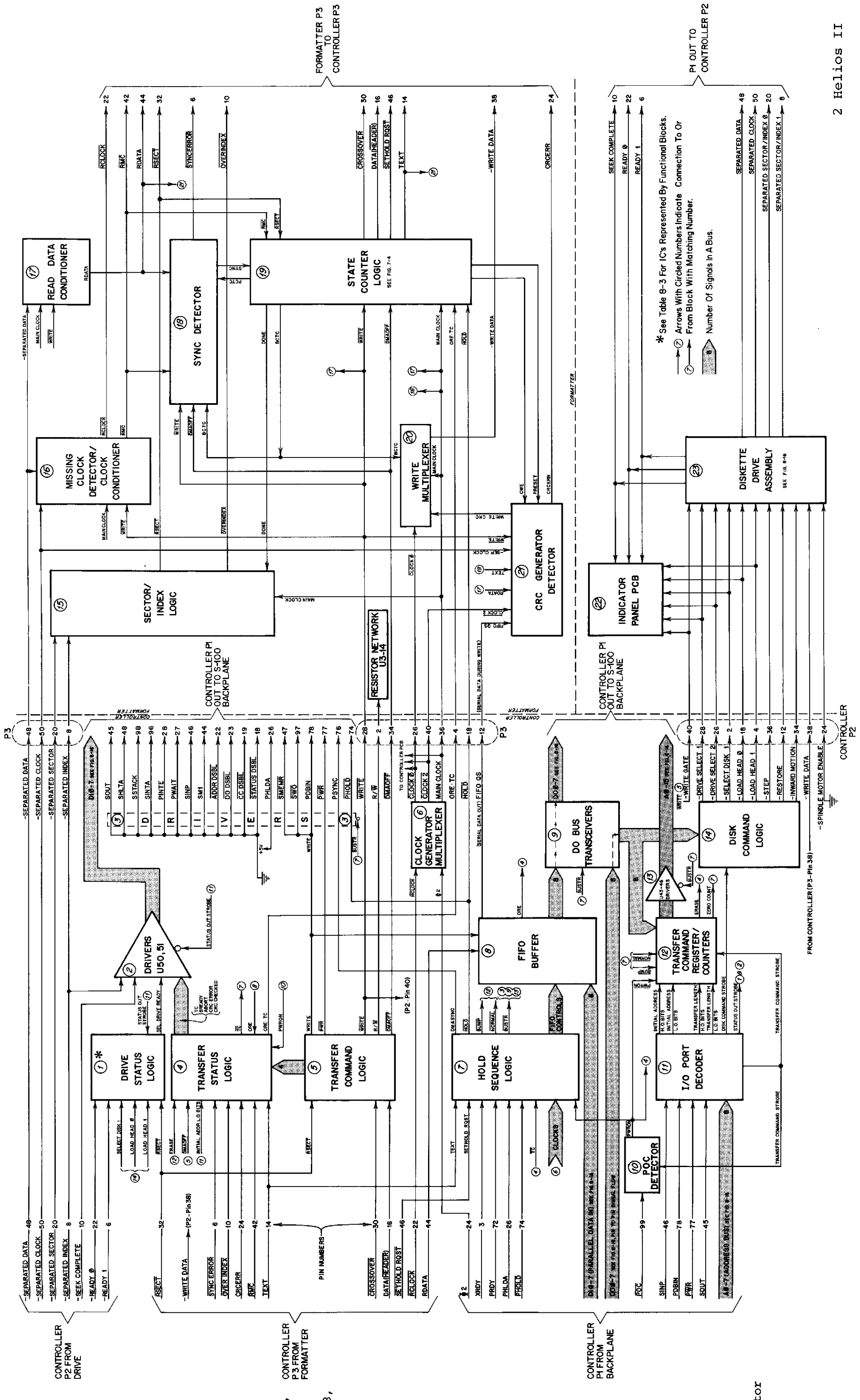


Fig. 8-17 System Block Diagram (I-3-78)

Table 8-3 Key to System Functional Block Diagram

(The encircled key numbers refer to matching numbers on Fig. 8-17, System Block Diagram.)

CONTROLLER PCB

(Refer to Fig. 8-11, Controller PCB Schematic.)

KEY #	NAME OF FUNCTIONAL BLOCK	ICS REPRESENTED
①	Drive Status Logic	U10-9, U12-8, 11, U15, U34
②	S-100 Tri-state Bus Drivers	U50, U51
③	S-100 Tri-state Bus Drivers	U41, U43, U44, U45, U49, U50
④	Transfer Status Logic	U14, U19, U21, U33
⑤	Transfer Command Logic	U13, U18-6, U19-1, 4, 10, U20, U21-11, U39-3, U40-8
⑥	Clock Generator/Multiplexer	U5, U6, U7, U11, U14
⑦	Hold Sequence Logic	U0, U1, U2, U3, U11, U12, U13, U16, U17, U18, U23, U35, U36, U37, U38, U40; Abort Logic: U35-8, 12, U17-8, 12, U18-3

⑧	FIFO Buffer	U52, U53
⑨	DO Bus Transceivers	U47, U48
⑩	PWR ON Detector/Clear Generator	U39
⑪	I/O Port Decoder	U6, U7, U8, U21, U23, U42
⑫	Transfer Command Register/Counters	U22, U24 through U30
⑬	S-100 Tri-state Address Bus Drivers	U41, U43 through U46, U49, U50
⑭	Disk Command Logic	U10-6, U21-3, U31

FORMATTER PCB

(Refer to Fig. 8-12, Formatter PCB Schematic.)

KEY #	NAME OF FUNCTIONAL BLOCK	ICS REPRESENTED
⑮	Sector/Index Logic	U14, U15, U16
⑯	Clock Detector/Conditioner	U17, U18, U19, U28
⑰	Read Data Conditioner	U29
⑱	Sync Detector	U20, U21, U22, U26, U27, U28
⑲	State Counter Logic	(Refer to Fig. 7-4.)
⑳	Write Multiplexer	U7
㉑	CRC Generator/Detector	U4, U5, U6

⑳ Indicator Panel PCB

(Refer to Fig. 8-14, Indicator Panel PCB, Schematic.)

㉑ Diskette Drive Assembly

(Refer to schematics in the Helios II Service Manual.)

-SEPARATED D.
-SEPARATED C.
-SEPARATED S.
-SEPARATED IN
-SEEK COMPLETE
-READY 0
-READY 1

CONTROLLER P2 FROM DRIVE

RESCT
-WRITE DATA
SYNC ERROR
OVER INDEX
CRCERR
RMC
TEXT

CONTROLLER P3 FROM FORMATTER

PIN NUM

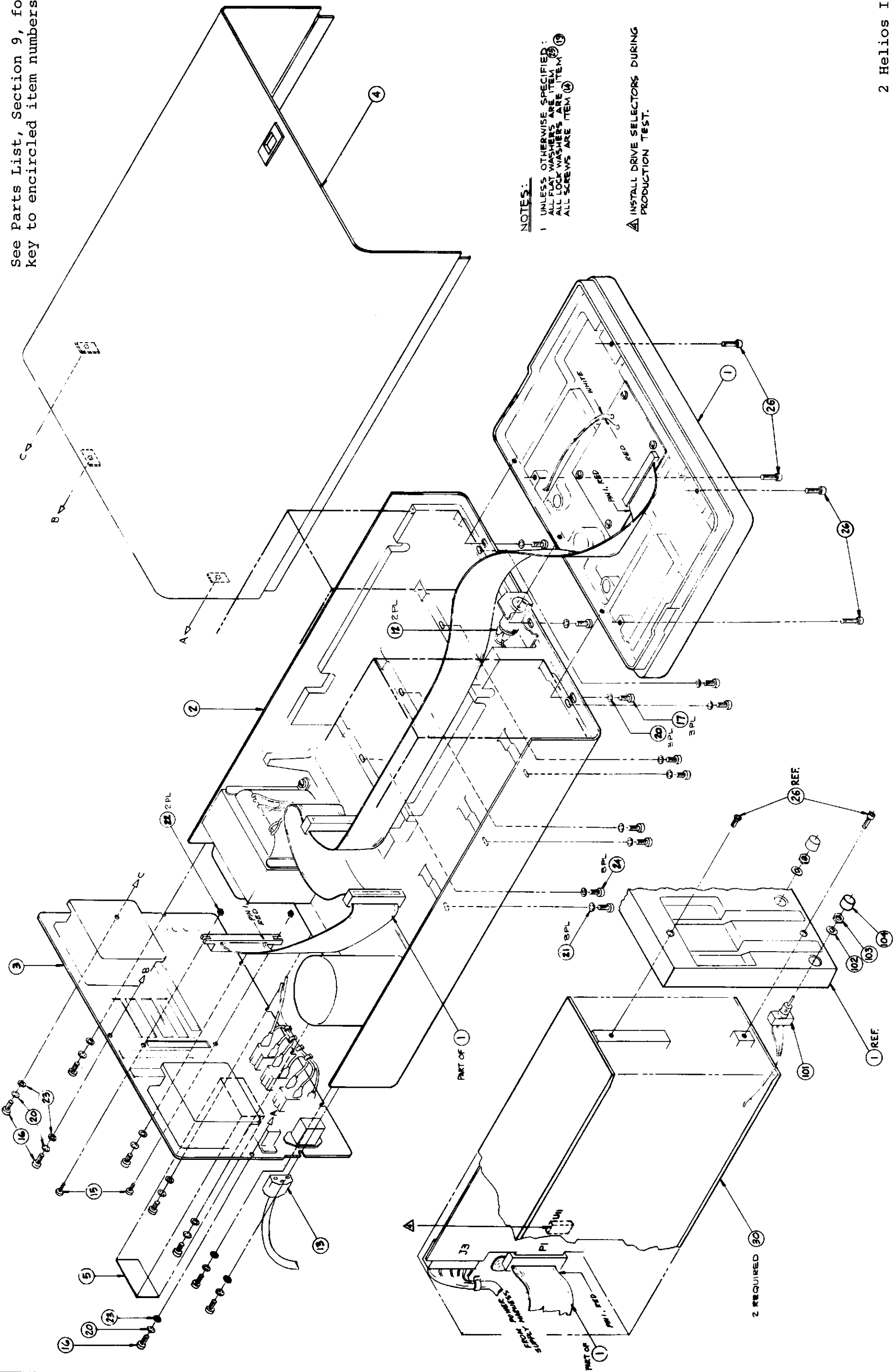
CROSSOVER
DATA/HEADER
SETHOLD RG
RCLOCK
RDATA

2
XRDY
PRDY
PHLDA
FHOLD

CONTROLLER P1 FROM BACKPLANE

FOE
SIMP
PDBIN
PWR
SCOUT
A0-7 (ADUIN)

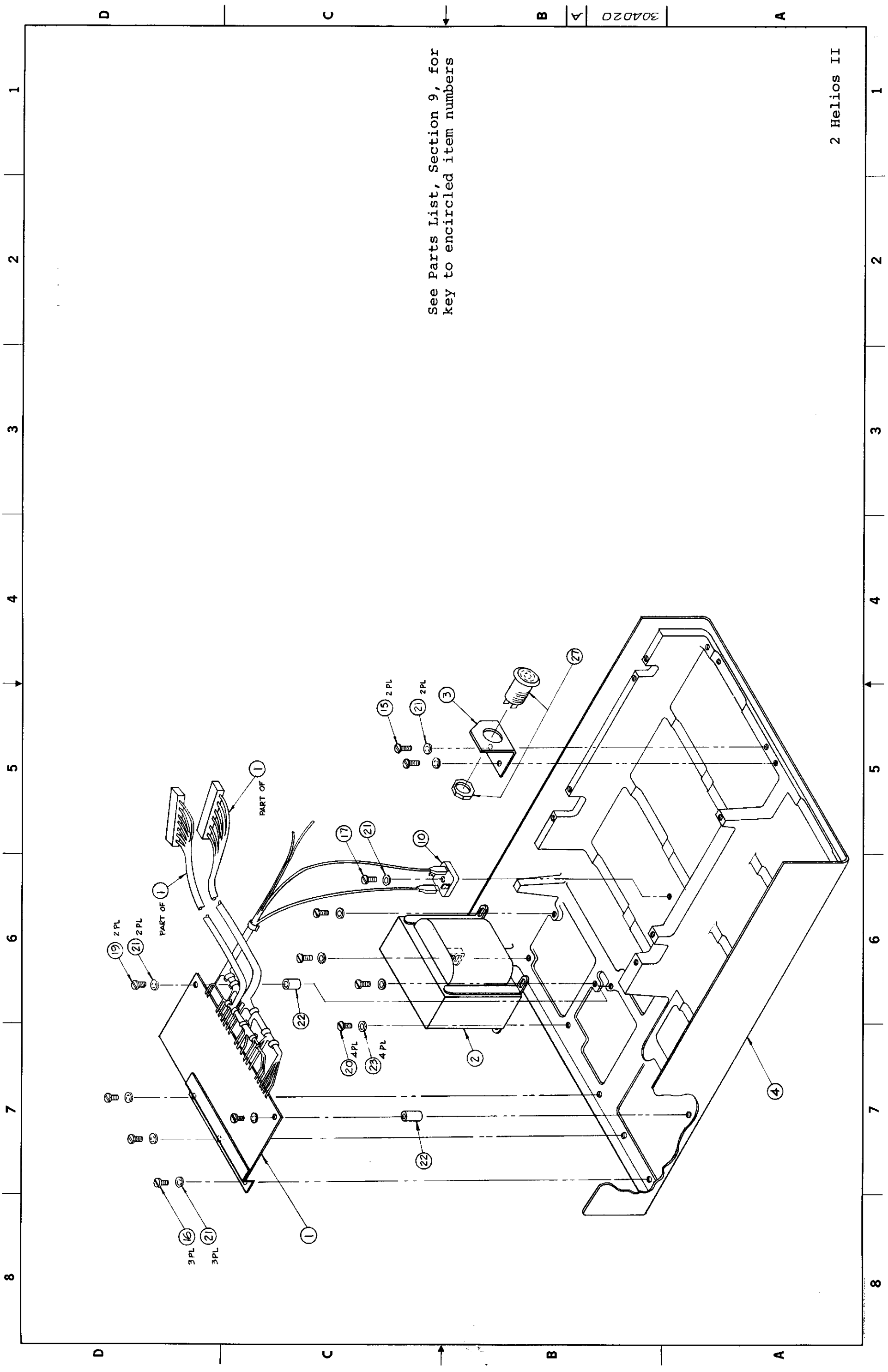
See Parts List, Section 9, for key to encircled item numbers



NOTES:
 1 UNLESS OTHERWISE SPECIFIED:
 ALL FLAT WASHERS ARE ITEM 25
 ALL LOCK WASHERS ARE ITEM 19
 ALL SCREWS ARE ITEM 14

▲ INSTALL DRIVE SELECTORS DURING PRODUCTION TEST.

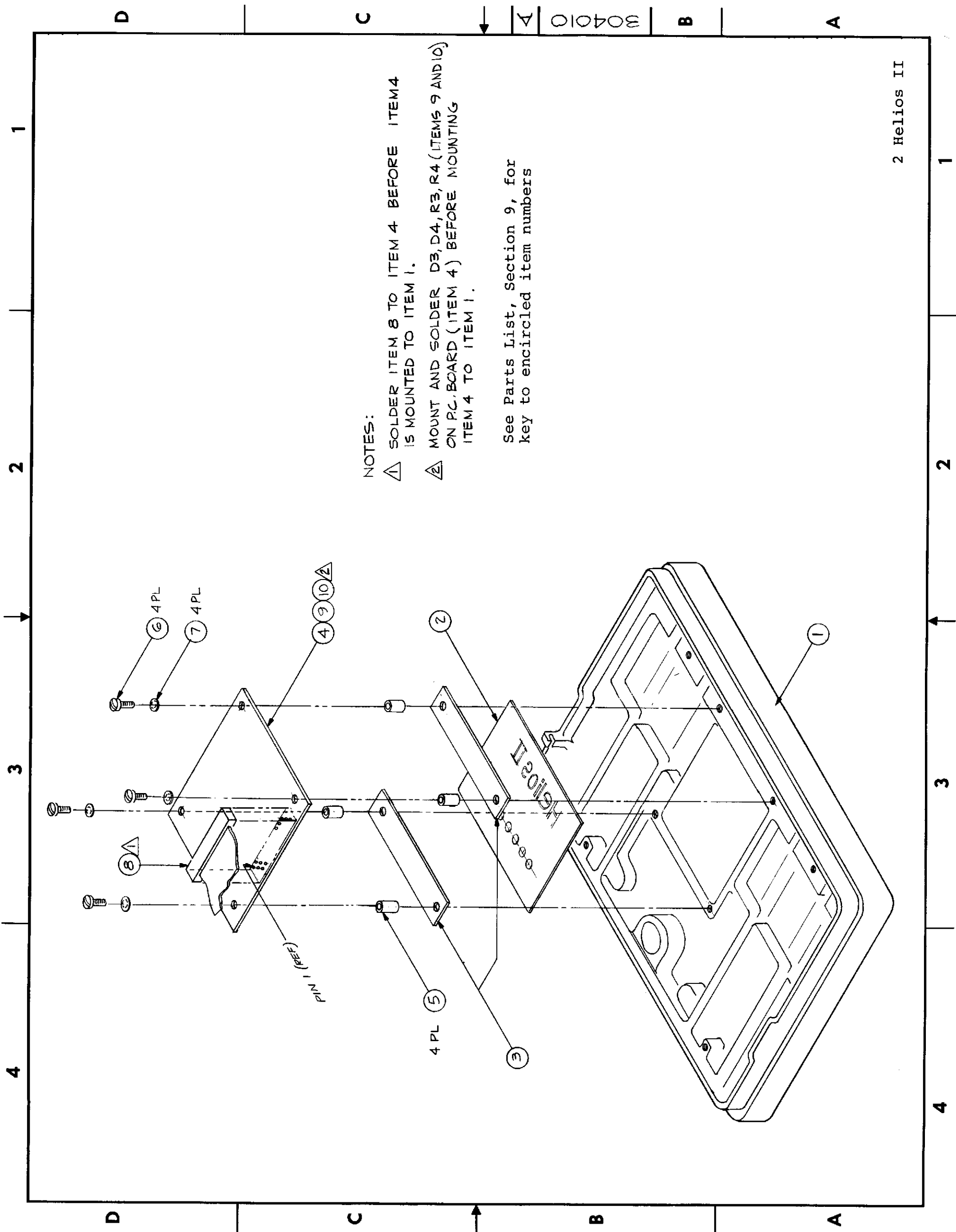
Fig. 8-18 Cabinet Assembly, Model 4, Exploded



See Parts List, Section 9, for key to encircled item numbers

2 Helios II

Fig. 8-19 Base Assembly, Model 4, Exploded



NOTES:

- ⚠ SOLDER ITEM 8 TO ITEM 4 BEFORE ITEM 4 IS MOUNTED TO ITEM 1.
- ⚠ MOUNT AND SOLDER D3, D4, R3, R4 (ITEMS 9 AND 10) ON P.C. BOARD (ITEM 4) BEFORE MOUNTING ITEM 4 TO ITEM 1.

See Parts List, Section 9, for key to encircled item numbers

2 Helios II

Fig. 8-20 Bezel Assembly, Model 4, Exploded

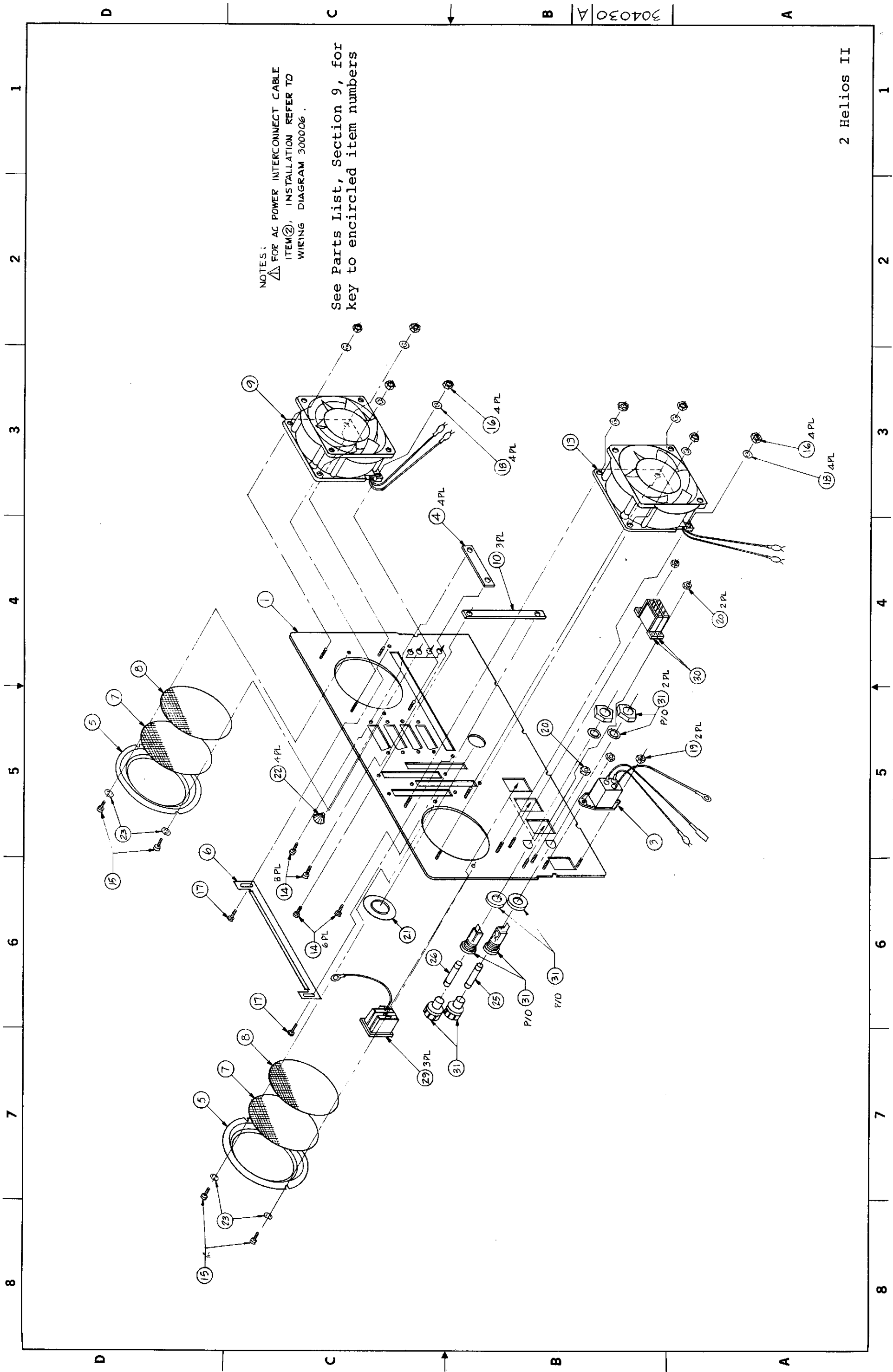
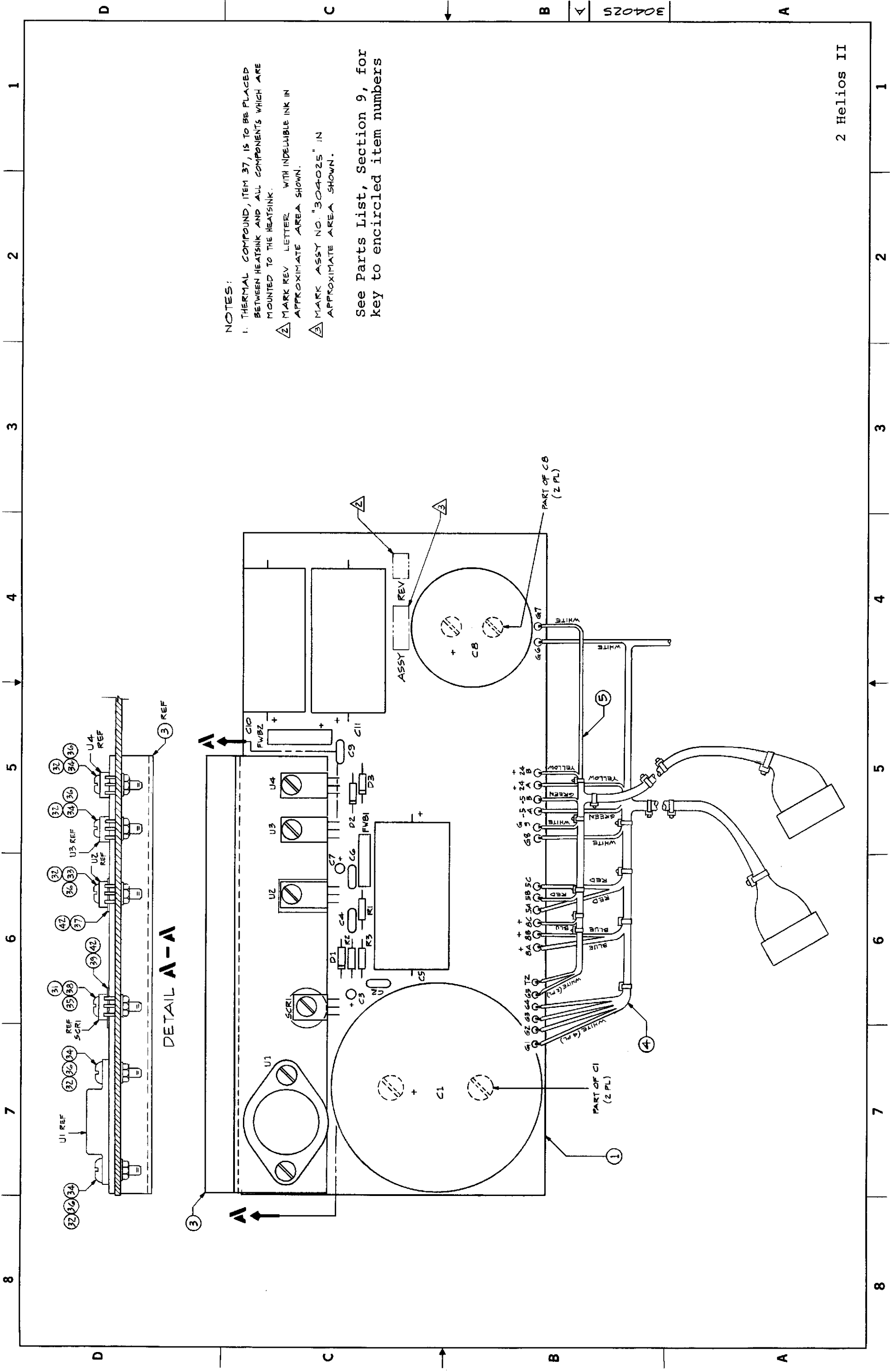


Fig. 8-21 Rear Panel Assembly, Model 4, Exploded



NOTES:

- 1. THERMAL COMPOUND, ITEM 37, IS TO BE PLACED BETWEEN HEATSINK AND ALL COMPONENTS WHICH ARE MOUNTED TO THE HEATSINK.
- 2. MARK REV LETTER WITH INDELEIBLE INK IN APPROXIMATE AREA SHOWN.
- 3. MARK ASSY NO. "304025" IN APPROXIMATE AREA SHOWN.

See Parts List, Section 9, for key to encircled item numbers

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Fig. 8-22 Regulator PCB Assembly, Model 4