

SECTION I

GENERAL INFORMATION

1-1. INTRODUCTION.

1-2. The -hp- Model 3440A Digital Voltmeter displays positive or negative dc voltages to four significant figures from 0.001 volt to 999.9 volts. A Plug-in unit must be installed in the front panel compartment of the Model 3440A for measurements. Six Plug-in units are presently available for use with the Model 3440A.

1-3. INSTRUMENT DESCRIPTION.

1-4. The Model 3440A Digital Voltmeter is designed to measure dc voltages from 1 millivolt to 1000 volts with an accuracy of $\pm 0.05\%$ ± 1 count for operating temperatures between $+15^{\circ}\text{C}$ and $+40^{\circ}\text{C}$. Accuracy is maintained for overrange voltages of 5% on all ranges, and polarity is automatically indicated. The last completed measurement is displayed until a new measurement cycle is completed. This display storage feature prevents flickering of the readout during the measurement cycle. Measurement sampling time is controlled by the front panel SAMPLE RATE control. Selection of range is controlled by the RANGE switch on the Plug-in unit (see Paragraph 1-6). Mode of operation is also controlled by Plug-in controls.

1-5. Solid state components in the Model 3440A reduce the power consumption and internal heat dissipation, and increase instrument ruggedness. Nearly all circuit components are mounted on plug-in etched circuit boards, allowing easier access for maintenance.

1-6. PLUG-IN UNITS.

1-7. A Plug-in unit is necessary for operation and is an integral part of the voltmeter circuit. Available Plug-ins are listed below. Table 1-2 is a comparison chart of the various Plug-ins.

- a. -hp- Model 3441A Range Selector provides manual selection of 10, 100 and 1000 volt range.

- b. -hp- Model 3442A Automatic Range Selector provides manual, automatic and remote selection of 10, 100 and 1000 volt range.
- c. -hp- Model 3443A High/Gain Auto Range Unit provides manual, automatic and remote selection of 100 and 1000 millivolt; 10, 100 and 1000 volt ranges.
- d. -hp- Model 3444A DC Multi-Function Unit provides a manual ranging dc voltmeter, dc milliammeter and ohmmeter. Five ranges are provided for each function. (Full scale voltage ranges from 100 millivolts to 1000 volts; full scale current ranges from 100 microamperes to 1000 milliamperes; and full scale resistance ranges from 1000 ohms to 10 megohms.
- e. -hp- Model 3445A AC/DC Range Unit provides manual, automatic, and remote selection of 10, 100, and 1000 volt ranges for both ac and dc voltages.
- f. -hp- Model 3446A AC/DC Remote Unit provides ac and dc measurements of 10 v, 100 v, and 1000 v full scale. Both range and function may be selected either manually or remotely.

1-9. INSTRUMENT AND MANUAL IDENTIFICATION.

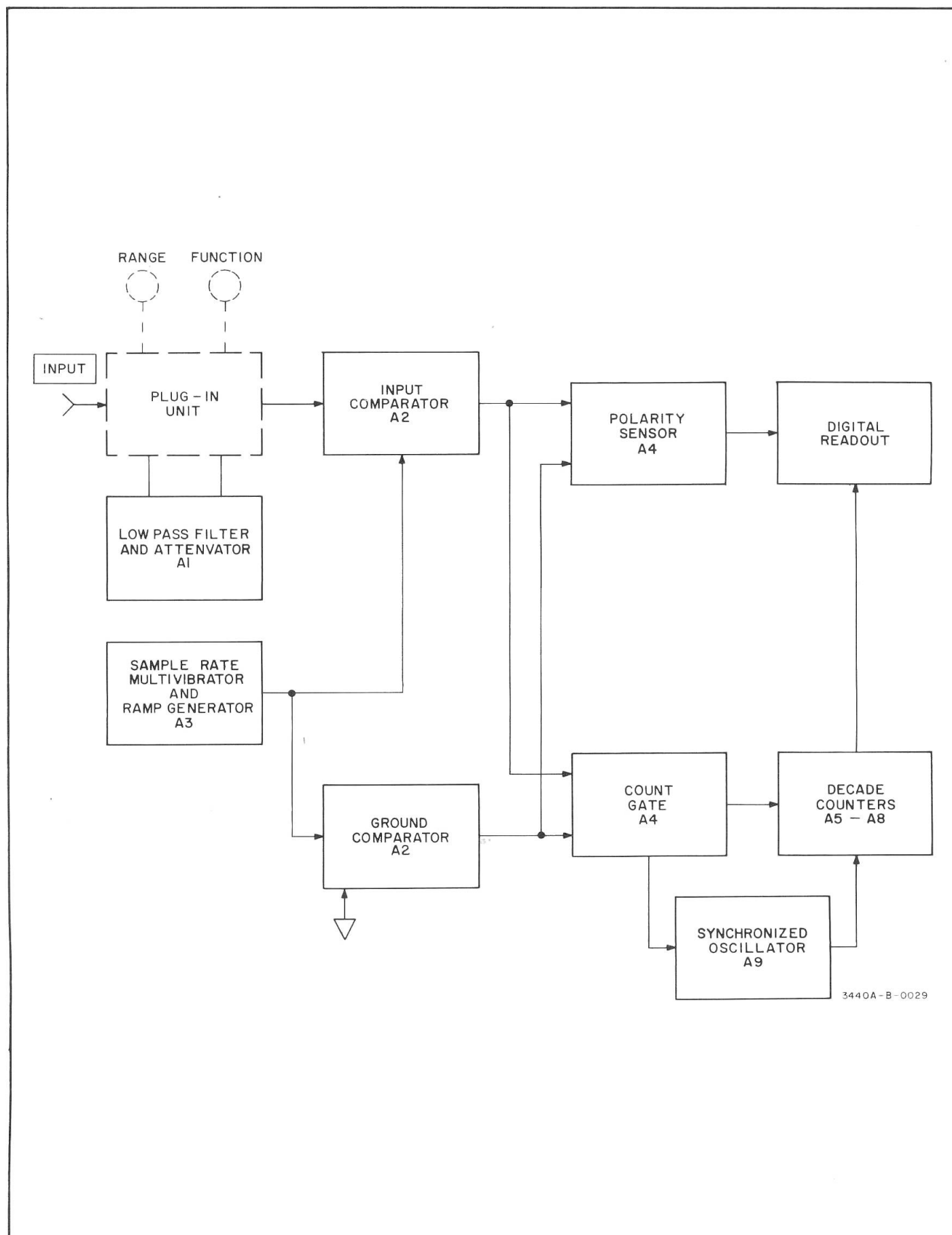
1-10. Hewlett-Packard uses a two-section eight-digit serial number (000-00000). If the first three digits of the serial number on your instrument do not agree with those on the title page of this manual, change sheets supplied with the manual will define differences between your instrument and the Model 3440A described in this manual.

1-11. If the first three digits of the serial number are prefixed with an E or a G, your instrument was produced in Europe. An E000-00000 serial number indicates that the instrument was manufactured in England; a G000-00000 serial number indicates that the instrument was manufactured in Germany.

Table 1-2. Plug-in Function Chart

PLUG IN	AC VOLTS 10V TO 1000V	DC VOLTS 10V TO 1000V	DC VOLTS 100 MV TO 1000V	DC AMPS	OHMS	REMOTE FUNCTION	AUTO RANGING	FLOATING INPUT	PRINTER OUTPUT	REMOTE RANGING	REMOTE TRIGGERING
3441A	*	✓						✓	✓		✓
3442A	*	✓					✓	✓	✓	✓	✓
3443A	*		✓				✓	✓	✓	✓	✓
3444A	*		✓	✓	✓			✓	✓		✓
3445A	✓	✓					✓	✓	✓	✓	✓
3446A	✓	✓				✓		✓	✓	✓	✓

* TRUE RMS VOLTAGE MEASUREMENTS: 1MV TO 300VOLTS (10CPS TO 10MC) USING THE  3400A.



3440A-B-0029

Figure 4-1. Simplified Block Diagram

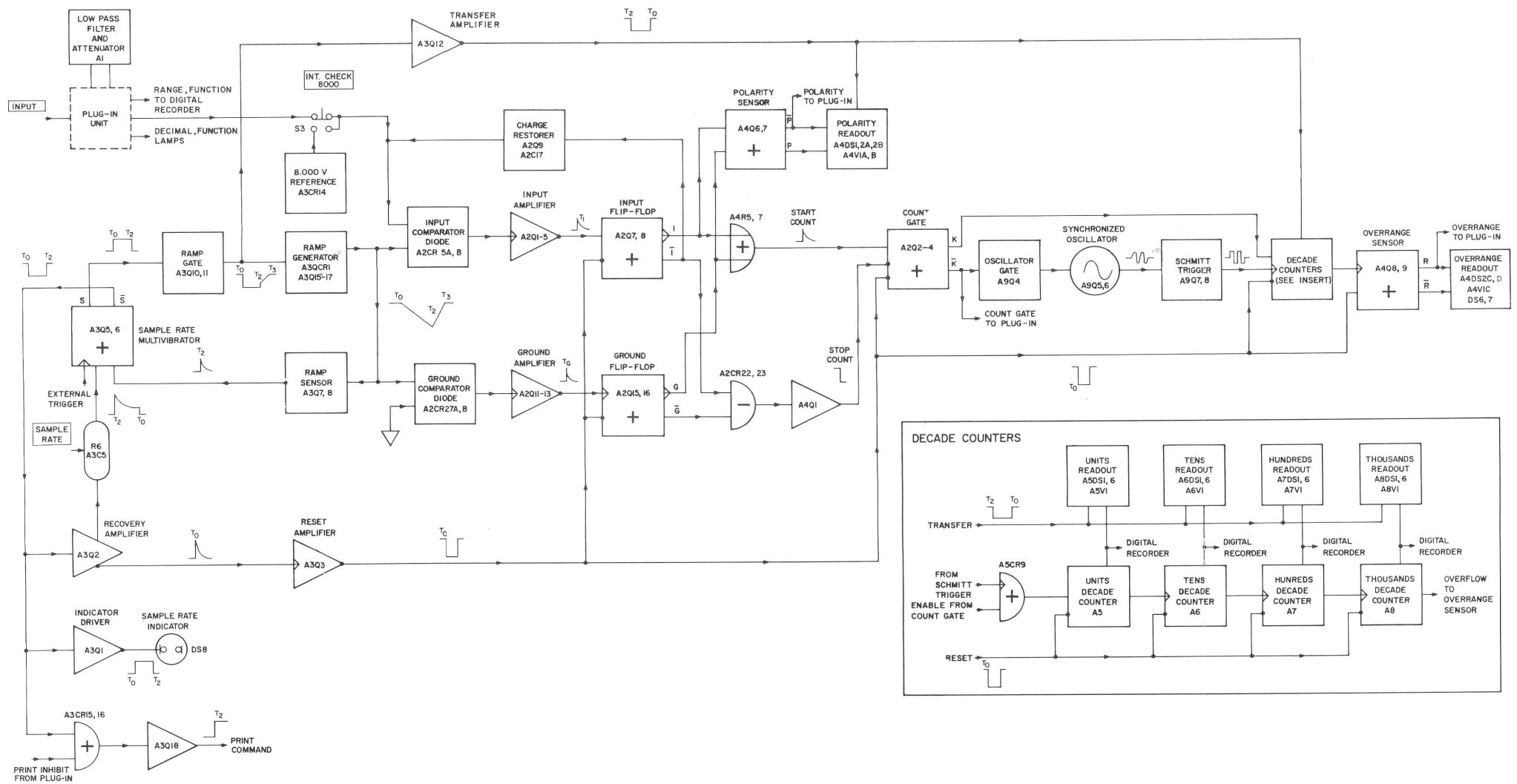
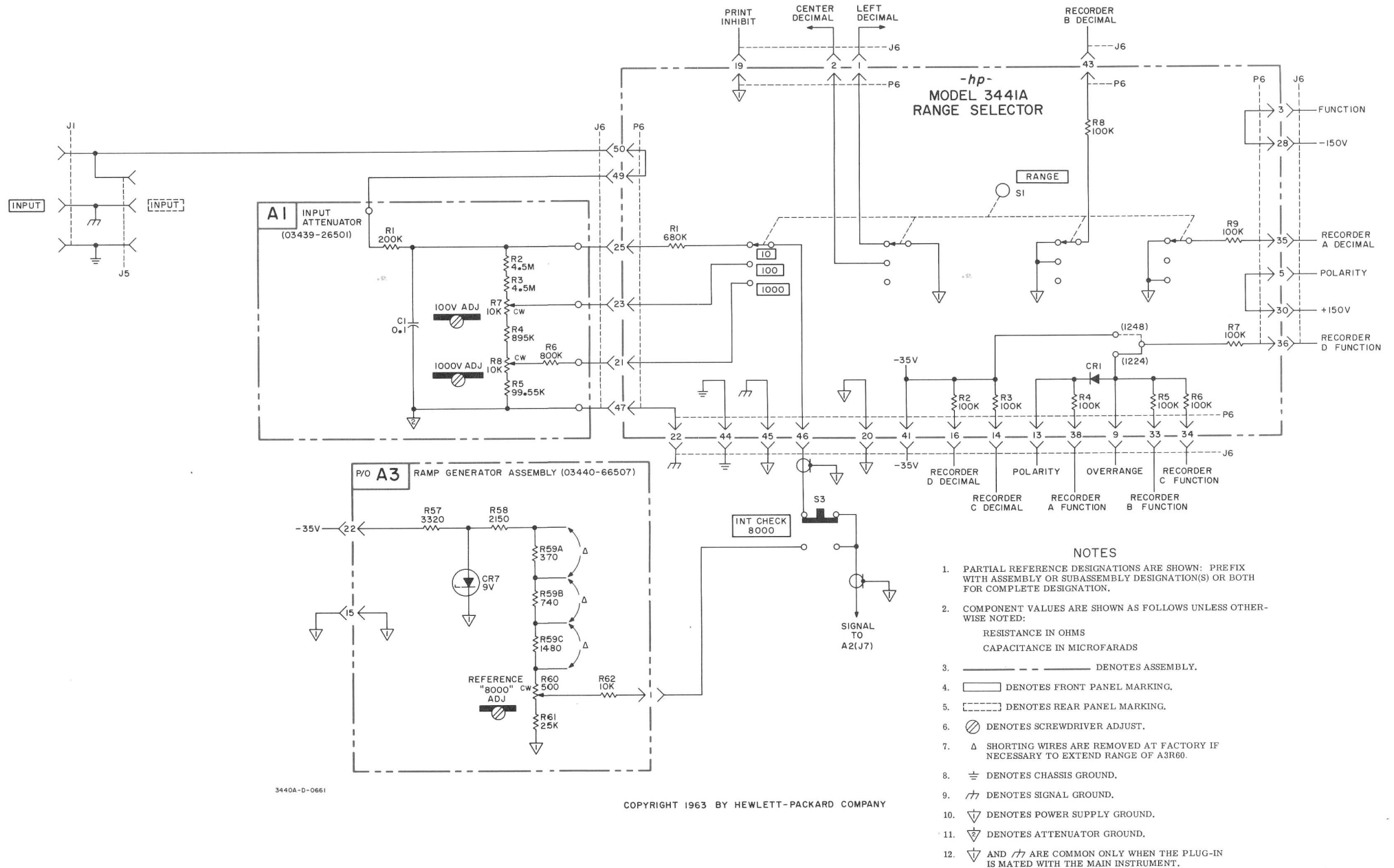


Figure 4-3. Detailed Block



3440A-D-0661

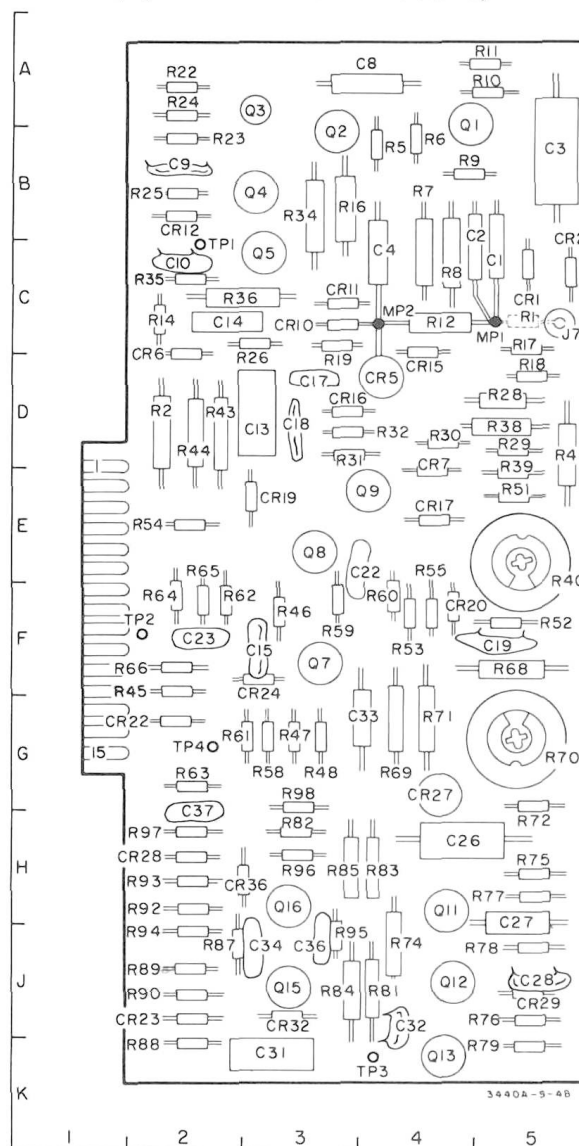
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Figure 6-1. (A1) Input Attenuator

A2 ASSEMBLY COMPONENT LOCATIONS

	C	CR	Q	R	TP		R		R
1	C5	C5	A5	C5	C2	40	E5	79	K5
2	B5	B5	B3	D2	F2	41	D5	80	--
3	B5	--	A3	--	K4	42	--	81	J4
4	C4	--	B3	--	G2	43	D2	82	H3
5	--	D4	C3	B4		44	D2	83	H4
6	--	C2	--	B4		45	F2	84	J3
7	--	D4	F3	B4		46	F3	85	H3
8	A4	--	E3	C4		47	G3	86	--
9	B2	--	E4	B4		48	G3	87	J2
10	C2	C3	--	A5		49	--	88	K2
11	--	C3	H4	A5		50	--	89	J2
12	--	B2	J4	C4		51	E5	90	J2
13	D3	--	K4	--		52	F5	91	--
14	C2	--	--	C2		53	F4	92	H2
15	F3	D4	J3	--		54	E2	93	H2
16	--	D3	H3	B3		55	E4	94	J2
17	D3	E4		C5		56	--	95	J3
18	D3	--		D5		57	--	96	H3
19	F5	E3		D3		58	G3	97	H2
20	--	F4		--		59	F3	98	G3
21	--	--		--		60	F4	99	
22	E4	G2		A2		61	G3		
23	F2	J2		B2		62	F2		
24	--	F3		A2		63	G2		
25	--	--		B2		64	F2		
26	H4	--		D3		65	E2		
27	H5	G4		--		66	F2		
28	J5	H2		D5		67	--		
29	--	J5		D5		68	F5		
30	--	--		D4		69	G4		
31	K3	--		D3		70	G5		
32	J4	J3		D4		71	G4		
33	G4	--		--		72	H5		
34	J3	--		B3		73	--		
35	--	--		C2		74	J4		
36	J3	H3		C2		75	H5		
37	G2			--		76	J5		
38				D5		77	H5		
39				D5		78	J5		

A2 (hp Part No. 03440-66503)



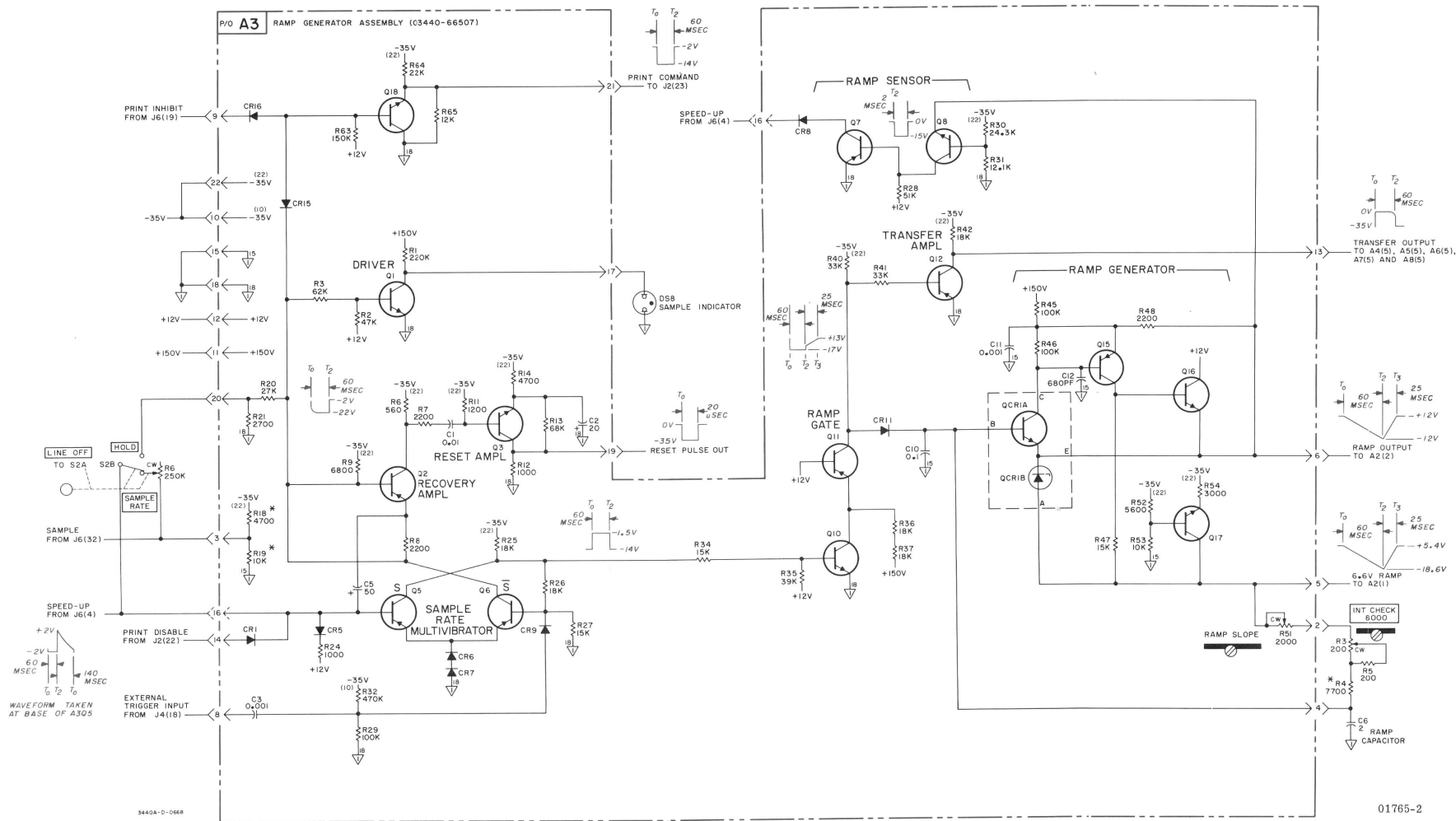


Figure 6-3. (A3) Ramp Generator

6-7/6-8

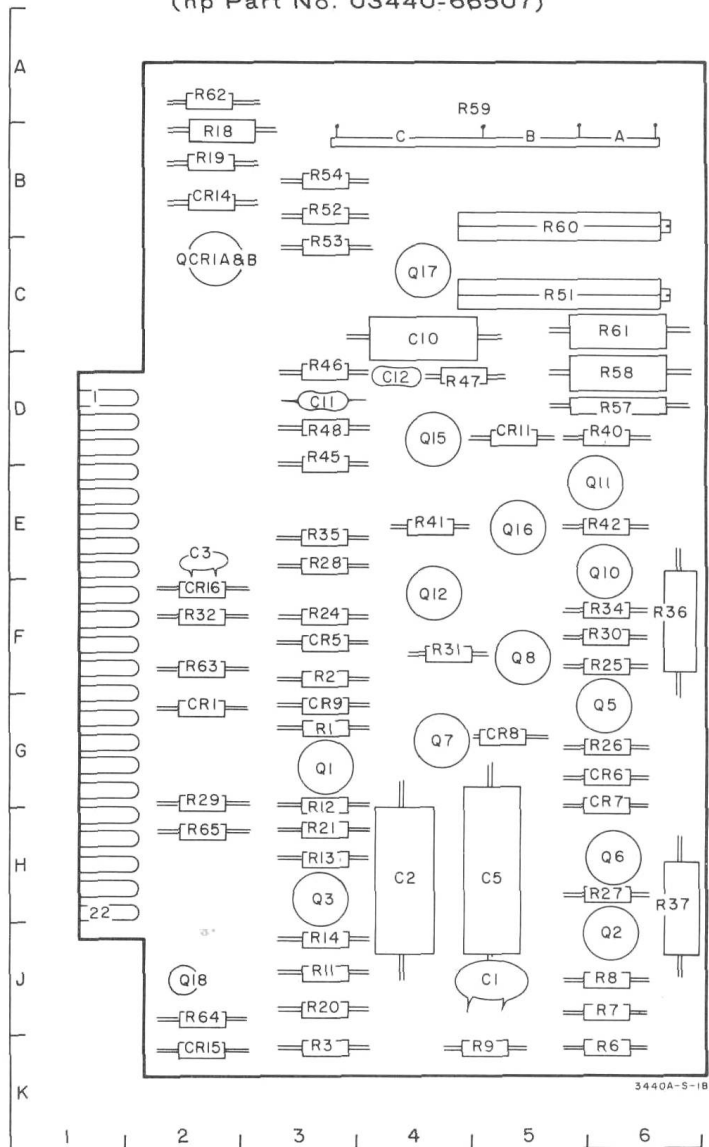
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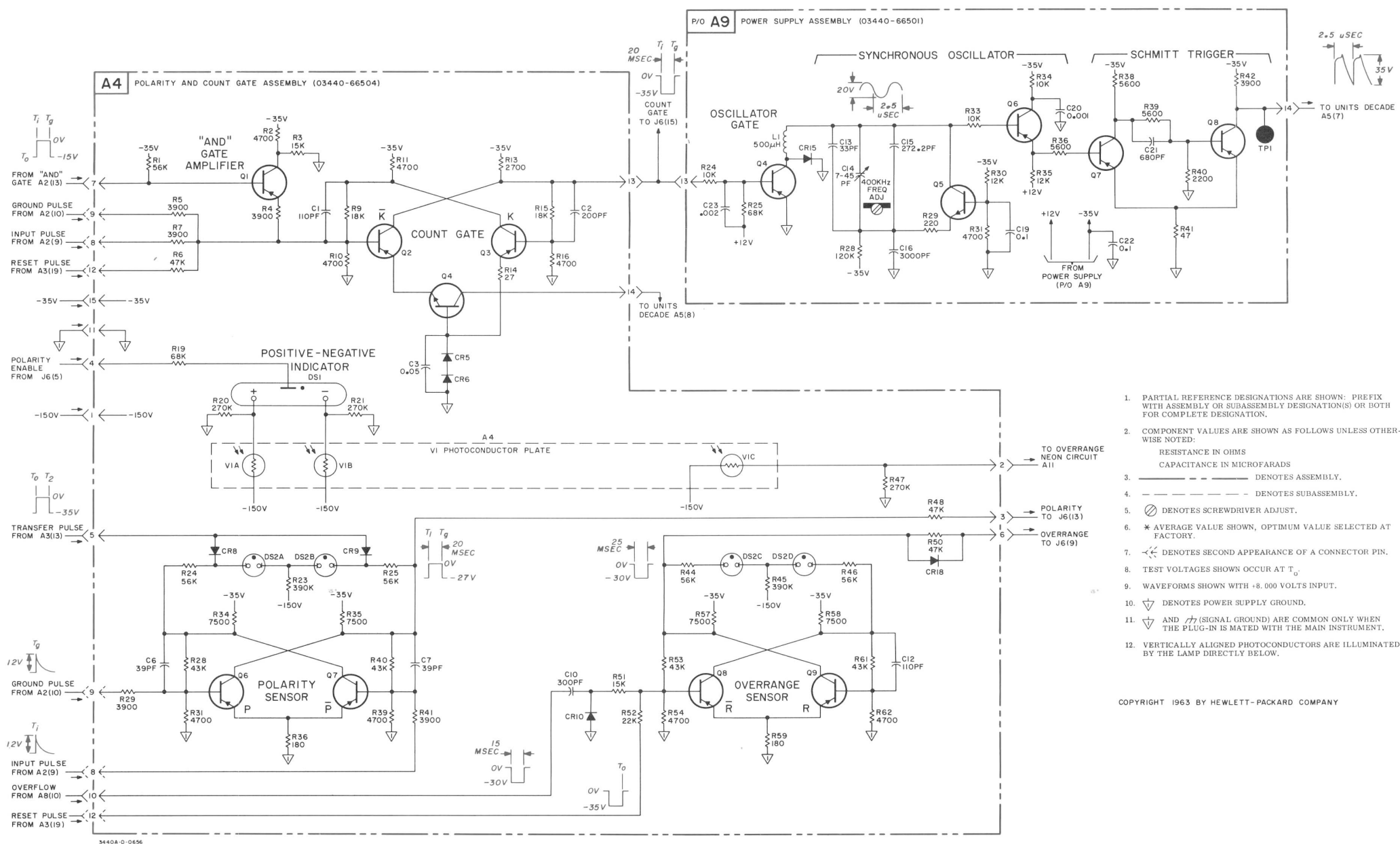
A3 ASSEMBLY COMPONENT LOCATIONS

	C	CR	Q	R		R
1	J5	G2	G3	G3	34	F6
2	H4	--	J6	F3	35	E3
3	E2	--	H3	K3	36	F6
4	--	--	--	--	37	H6
5	H5	F3	G6	--	38	--
6	--	G6	H6	K6	39	--
7	--	G6	G4	J6	40	D6
8	--	G5	F5	J6	41	E4
9	--	G3	--	K5	42	E6
10	C4	--	E6	--	43	--
11	D3	D5	E6	J3	44	--
12	D4	--	F4	G3	45	D3
13	--	--	--	H3	46	D3
14	--	B2	--	J3	47	D4
15	--	K2	D4	--	48	D3
16	--	F2	E5	--	49	--
17	--	--	C4	--	50	--
18	--	--	J2	B2	51	C5
19	--	--	--	B2	52	B3
20	--	--	--	J3	53	C3
21	--	--	--	H3	54	B3
22	--	--	--	--	55	--
23	--	--	--	--	56	--
24	--	--	--	F3	57	D6
25	--	--	--	F6	58	D6
26	--	--	--	G6	59	A5
27	--	--	--	H6	60	B5
28	--	--	--	E3	61	C6
29	--	--	--	G2	62	A2
30	--	--	--	F6	63	F2
31	--	--	--	F4	64	J2
32	--	--	--	F2	65	H2
33	--	--	--	--	66	--

QCR1 LOCATED AT C2

A3 (hp Part No. 03440-66507)





- PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. PREFIX WITH ASSEMBLY OR SUBASSEMBLY DESIGNATION(S) OR BOTH FOR COMPLETE DESIGNATION.
- COMPONENT VALUES ARE SHOWN AS FOLLOWS UNLESS OTHERWISE NOTED:
RESISTANCE IN OHMS
CAPACITANCE IN MICROFARADS
- DENOTES ASSEMBLY.
- - - DENOTES SUBASSEMBLY.
- ⊗ DENOTES SCREWDRIVER ADJUST.
- * AVERAGE VALUE SHOWN, OPTIMUM VALUE SELECTED AT FACTORY.
- ↖ DENOTES SECOND APPEARANCE OF A CONNECTOR PIN.
- TEST VOLTAGES SHOWN OCCUR AT T_0 .
- WAVEFORMS SHOWN WITH +8.000 VOLTS INPUT.
- ⏏ DENOTES POWER SUPPLY GROUND.
- ⏏ AND ⏏ (SIGNAL GROUND) ARE COMMON ONLY WHEN THE PLUG-IN IS MATED WITH THE MAIN INSTRUMENT.
- VERTICALLY ALIGNED PHOTOCONDUCTORS ARE ILLUMINATED BY THE LAMP DIRECTLY BELOW.

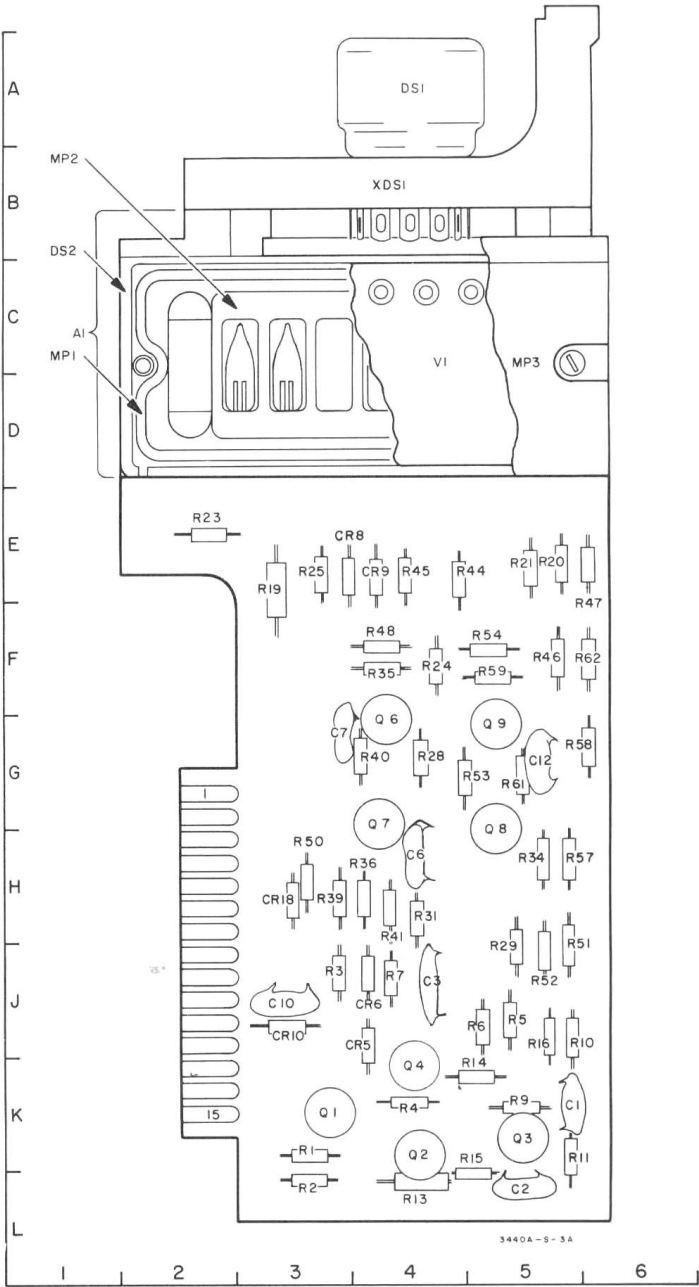
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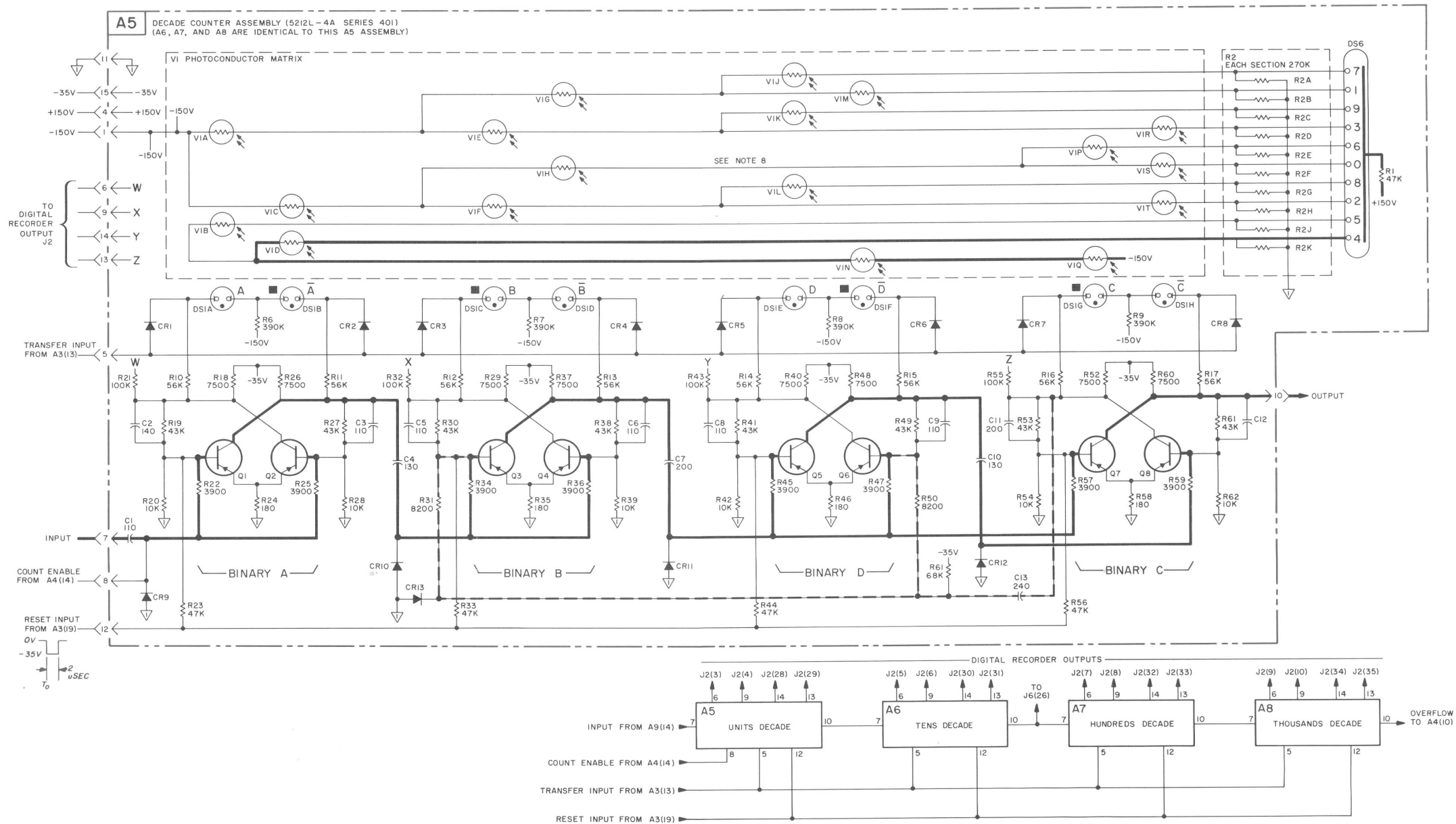
Figure 6-4. (A4)

A4 ASSEMBLY COMPONENT LOCATIONS

	C	CR	Q	R		R
1	K5	--	K3	K3	34	H5
2	L5	--	K4	L3	35	F4
3	J4	--	K5	J3	36	H4
4	--	--	K4	K4	37	--
5	--	J4	--	J5	38	--
6	H4	J4	G4	J5	39	H3
7	G3	--	G4	J4	40	G4
8	--	E4	G5	--	41	H4
9	--	E4	G5	K5	42	--
10	J3	J3		J6	43	--
11	--	--		K6	44	E5
12	G5	--		--	45	E4
13	--	--		L4	46	F5
14	--	--		K5	47	F6
15	--	--		K5	48	F4
16	--	--		J5	49	--
17	--	--		--	50	H3
18	H3	--		--	51	J6
19				E3	52	J5
20				E5	53	G5
21				E5	54	F5
22				--	55	--
23				E2	56	--
24				F4	57	H6
25				E3	58	G6
26				--	59	F5
27				--	60	--
28				G4	61	G5
29				J5	62	F5
30				--	63	
31				H4	64	
32				--	65	
33				--	66	

A4 (hp Part No. 03440-66504)

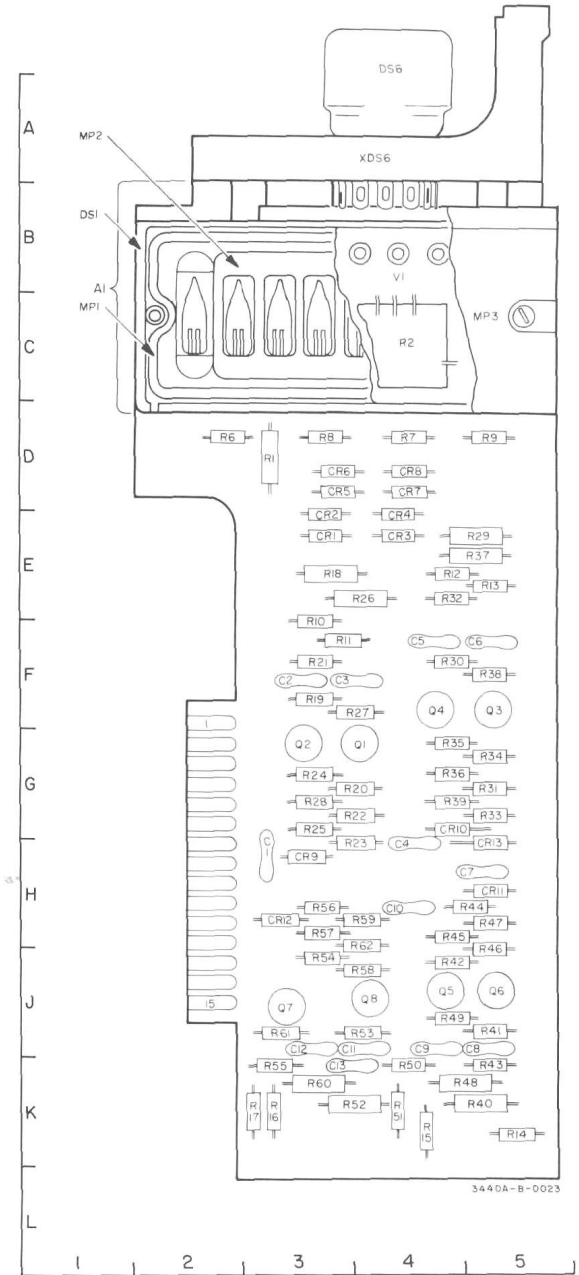




A5 thru A8 ASSEMBLY
COMPONENT LOCATIONS

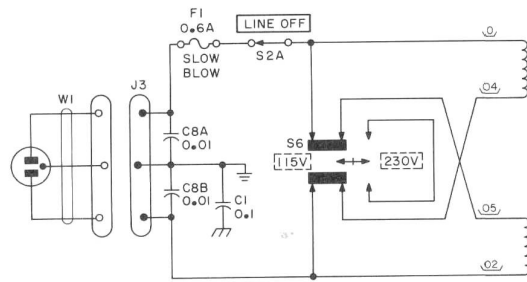
	C	CR	Q	R		R
1	H3	E3	G4	D3	34	G5
2	F3	E3	G3	C4	35	G4
3	F3	E4	F5	--	36	G4
4	H4	E4	F4	--	37	E5
5	F4	D3	J4	--	38	F5
6	F5	D3	J5	D2	39	G4
7	H5	D4	J3	D4	40	K5
8	J5	D4	J4	D3	41	J5
9	J4	H3		D5	42	J4
10	H4	G4		F3	43	K5
11	J3	H5		F3	44	H5
12	J3	H3		E4	45	H4
13	K3	H5		E5	46	J5
14				K5	47	H5
15				K4	48	K5
16				K3	49	J4
17				K3	50	K4
18				E3	51	K4
19				F3	52	K4
20				G4	53	J4
21				F3	54	J3
22				G4	55	K3
23				H4	56	H3
24				G3	57	H3
25				G3	58	J4
26				E4	59	H4
27				F4	60	K3
28				G3	61	J3
29				E5	62	H4
30				F4	63	
31				G5	64	
32				E4	65	
33				G5	66	

A5 thru A8
(hp Part No. 5212L-4A)



Model 3440A

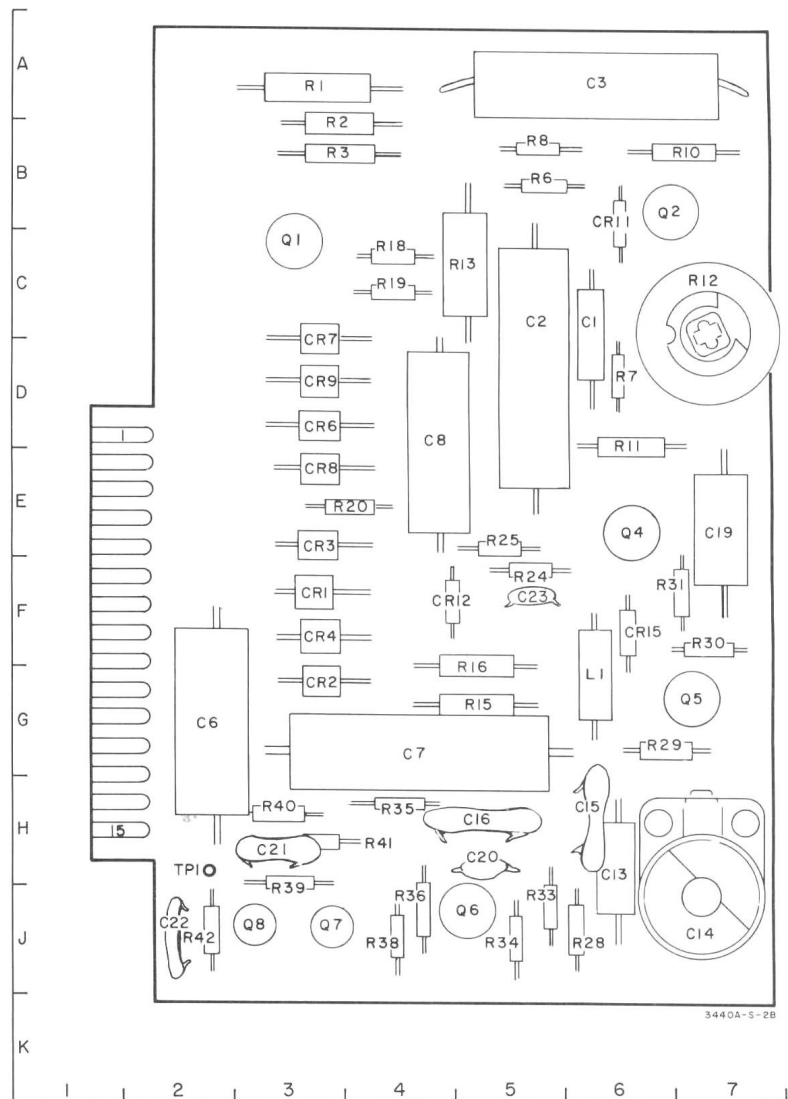
1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN: PREFIX WITH ASSEMBLY OR SUBASSEMBLY DESIGNATION(S) OR BOTH FOR COMPLETE DESIGNATION.
2. COMPONENT VALUES ARE SHOWN AS FOLLOWS UNLESS OTHERWISE NOTED:
RESISTANCE IN OHMS
CAPACITANCE IN MICROFARADS
3. --- DENOTES ASSEMBLY.
4. DENOTES FRONT PANEL MARKING.
5. DENOTES REAR PANEL MARKING.
6. DENOTES SCREWDRIVER ADJUST.
7. 918 DENOTES WIRE COLOR USING STANDARD COLOR CODE.
(e. g. 918 = WHITE, BROWN, GRAY)
8. DENOTES CHASSIS GROUND.
9. DENOTES POWER SUPPLY GROUND.
10. DENOTES SIGNAL GROUND.
11. AND ARE COMMON ONLY WHEN THE PLUG-IN IS MATED WITH THE MAIN INSTRUMENT.

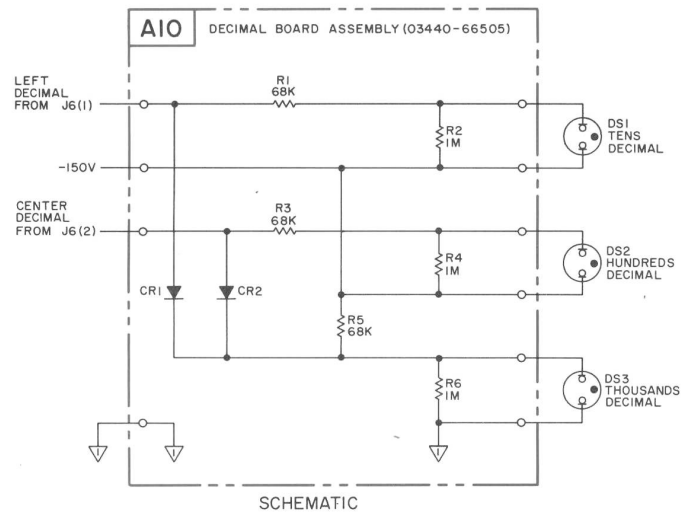


A9 ASSEMBLY COMPONENT LOCATIONS

	C	CR	Q	R	L	TP
1	C6	F3	C3	A3	G6	H2
2	C5	G3	B6	B3		
3	A6	E3	--	B3		
4	--	F3	E6	--		
5	--	--	G7	--		
6	G2	D3	J5	B5		
7	G4	D3	J3	D6		
8	D4	E3	J3	B5		
9	--	D3	--	--		
10	--	--	--	B7		
11	--	B6	--	D6		
12	--	F5	--	C7		
13	H6	--	--	C5		
14	J7	--	--	--		
15	H6	F6	--	G5		
16	H5	--	--	G5		
17	--	--	--	--		
18	--	--	--	C4		
19	E7	--	--	C4		
20	H5	--	--	E4		
21	H3	--	--	--		
22	J2	--	--	--		
23	F5	--	--	F5		
24	--	--	--	--		
25	--	--	--	E5		
26	--	--	--	--		
27	--	--	--	--		
28	--	--	--	J6		
29	--	--	--	G6		
30	--	--	--	F7		
31	--	--	--	F7		
32	--	--	--	--		
33	--	--	--	J5		
34	--	--	--	J5		
35	--	--	--	H4		
36	--	--	--	J4		
37	--	--	--	--		
38	--	--	--	J4		
39	--	--	--	J3		
40	--	--	--	H3		
41	--	--	--	H4		
42	--	--	--	J2		

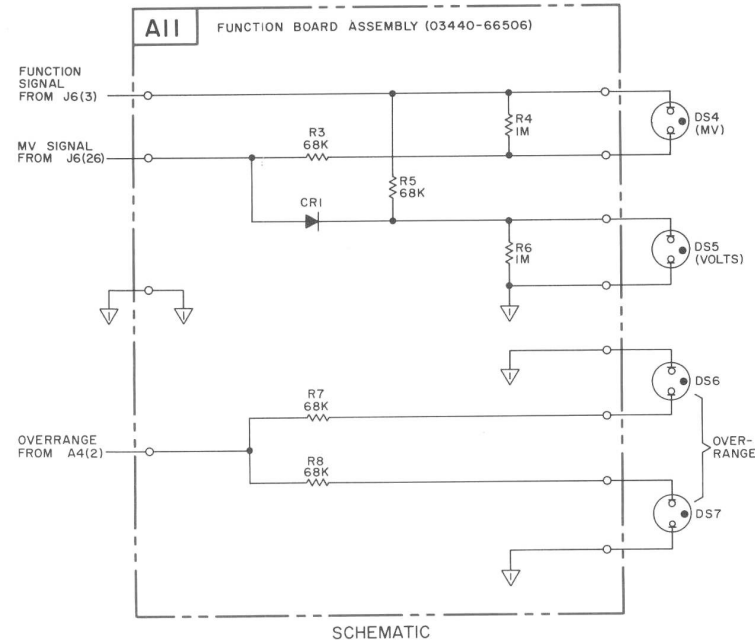
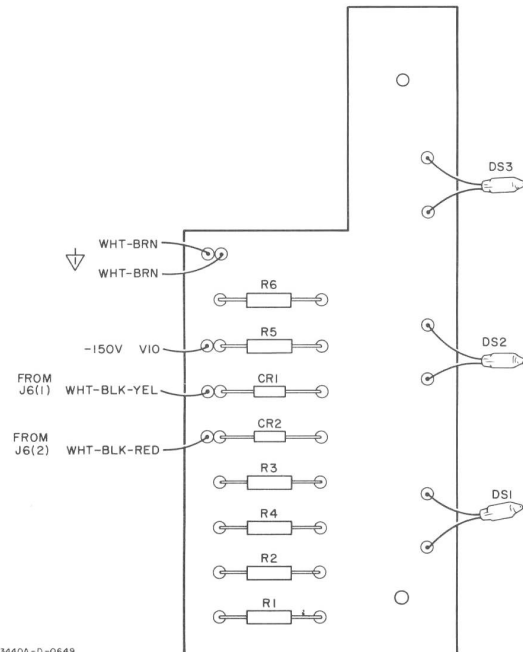
A9 (hp Part No. 03440-66501)





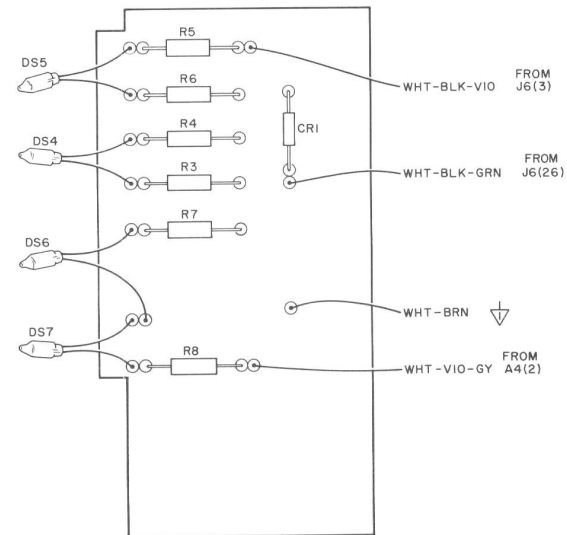
A10
DECIMAL BOARD ASSEMBLY

PICTORIAL



A11
FUNCTION BOARD ASSEMBLY

PICTORIAL



NOTES

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- DENOTES ASSEMBLY.
- ▽ DENOTES POWER SUPPLY GROUND.
- ▽ AND // (SIGNAL GROUND) ARE COMMON ONLY WHEN THE PLUG-IN IS MATED WITH THE MAIN INSTRUMENT.

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Figure 6-8. (A10 - A11) Decimal and Function Assemblies



6-17/6-18

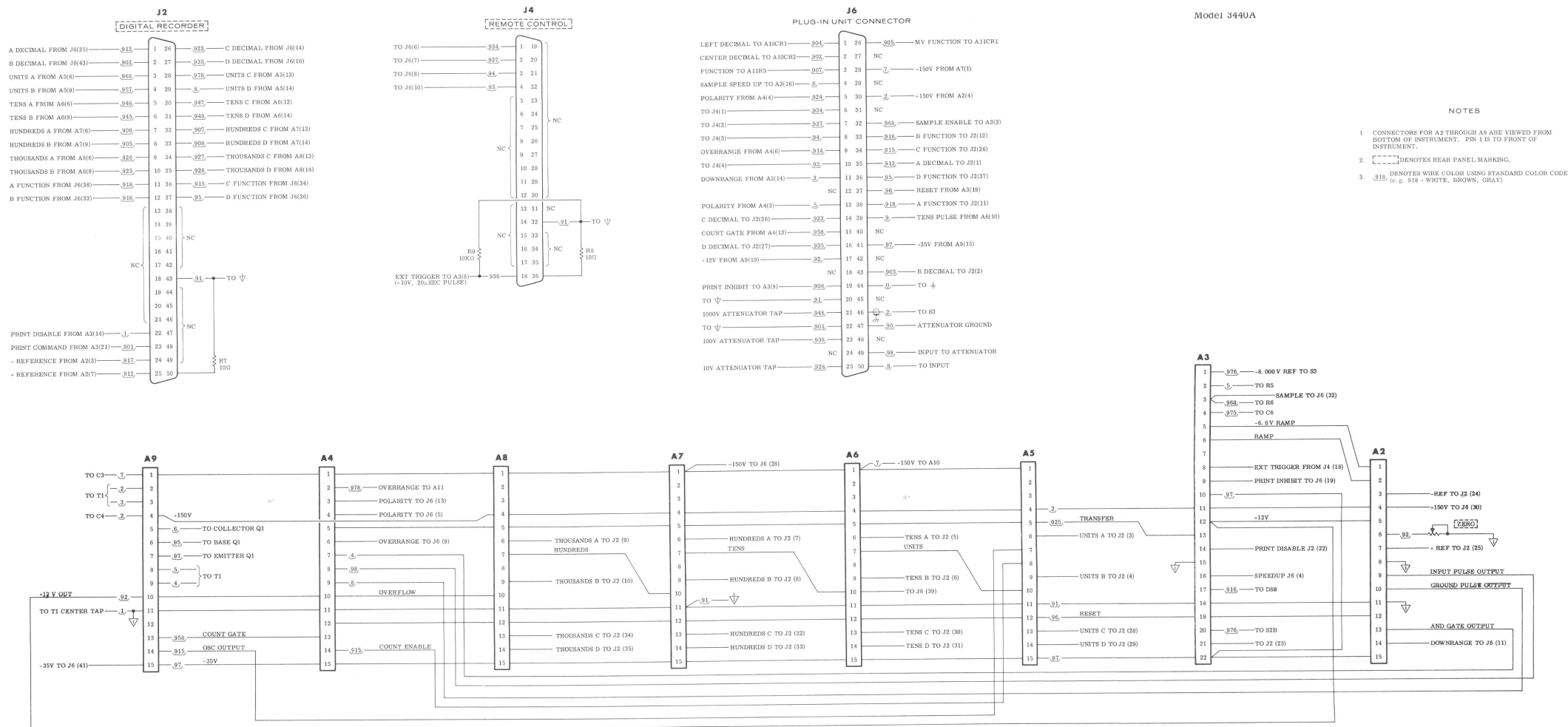


Figure 6-10. Wiring Diagram