

SECTION VII

SCHEMATIC DIAGRAMS

7-1. INTRODUCTION.

7-2. This section contains schematic and component locations diagrams. Figure 7-2 lists notes and symbols which apply to all schematic diagrams. For clarity, some of the symbols used are also explained here. Figure 7-4 is a functional block diagram which includes the schematic location of circuit sections by page number. Each schematic diagram has been presented following the general guide lines listed below.

a. Schematics in this manual show electrical circuit operation and are not intended as wiring diagrams. Switch and circuit board assemblies often appear in part on several different schematics. To find a specific instrument component or circuit section, refer to Figure 7-4 or the "REFERENCE DESIGNATION" box on each schematic where the reference designators are listed for all components.

b. Special notes that only refer to one circuit section of the instrument are given on the schematic of the circuit section only.

c. Circuit assemblies are outlined and shown as shaded areas. The component reference designations within these shaded assemblies are abbreviated. Full component designation includes assembly number (see Schematic Information illustration shown below).

7-3. REPLACEMENT INFORMATION

7-4. For repair and replacement information, refer to the REPAIR AND REPLACEMENT information which is included in Section V. For specific component descriptions and/or ordering information refer to page 6-1.

NOTE

See inside rear cover
for overall schematic.

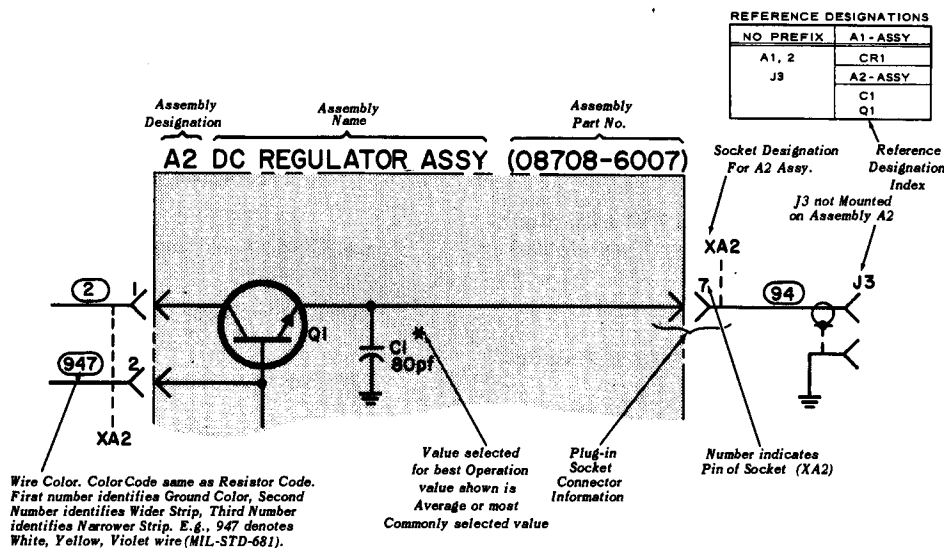


Figure 7-1. Explanations of General Information on Schematic Diagrams

1. Resistance in ohms, capacitance in microfarads unless otherwise noted.

* asterisk denotes a factory selected part.

2.  screwdriver adjustment

 panel control

3.  encloses front panel designation

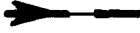
 encloses rear panel designation

4.  circuit assembly borderline

 other assembly borderline

5.  encloses wire color code. Wire color code (MIL-STD-681) same as resistor color code. First number identifies ground color, second number identifies wide stripe, third number identifies narrow stripe. E.g., (947) denotes white ground, yellow wide stripe, violet narrow stripe.

6.  heavy line with arrows indicates path and direction of main signal.

 heavy dashed line with arrows indicates path and direction of main feedback.

 heavy dotted line indicates path and direction of sampling pulse.

7.  wiper moves toward CW with clockwise rotation of control as viewed from shaft or knob.

 small triangle indicates a matched set of diodes.

 voltage regulator (breakdown) diode

 step recovery diode

 field effect transistor with P-material base

8. CONDITIONS FOR MEASUREMENTS

a. Power Supply Currents

- (1) For +20V supplies:

FREQ RANGE-MHz 1-4MHz range
PHASE METER OFFSET -80
Other control settings optional

- (2) For -20V supplies: control settings optional

- (3) For both +20V and -20V supplies:

ac line voltage - 115
current meter - HP 428B
no connection to input probes

b. Dual Voltages in Equalizer and VTO

- (1) FREQ RANGE MHz 1-4MHz range
probe A input 1MHz (2MHz for voltages in parenthesis) and (2MHz) at level that extinguishes APC UNLOCKED

- (2) Voltages taken with HP 414A DC Voltmeter

c. All Other DC Voltages

- (1) No RF signal applied to input probes, probes unterminated.

- (2) Control settings optional.

- (3) Line voltage: 115.

- (4) Voltages taken with HP 414A DC Voltmeter.

Figure 7-2. Schematic Diagram Notes

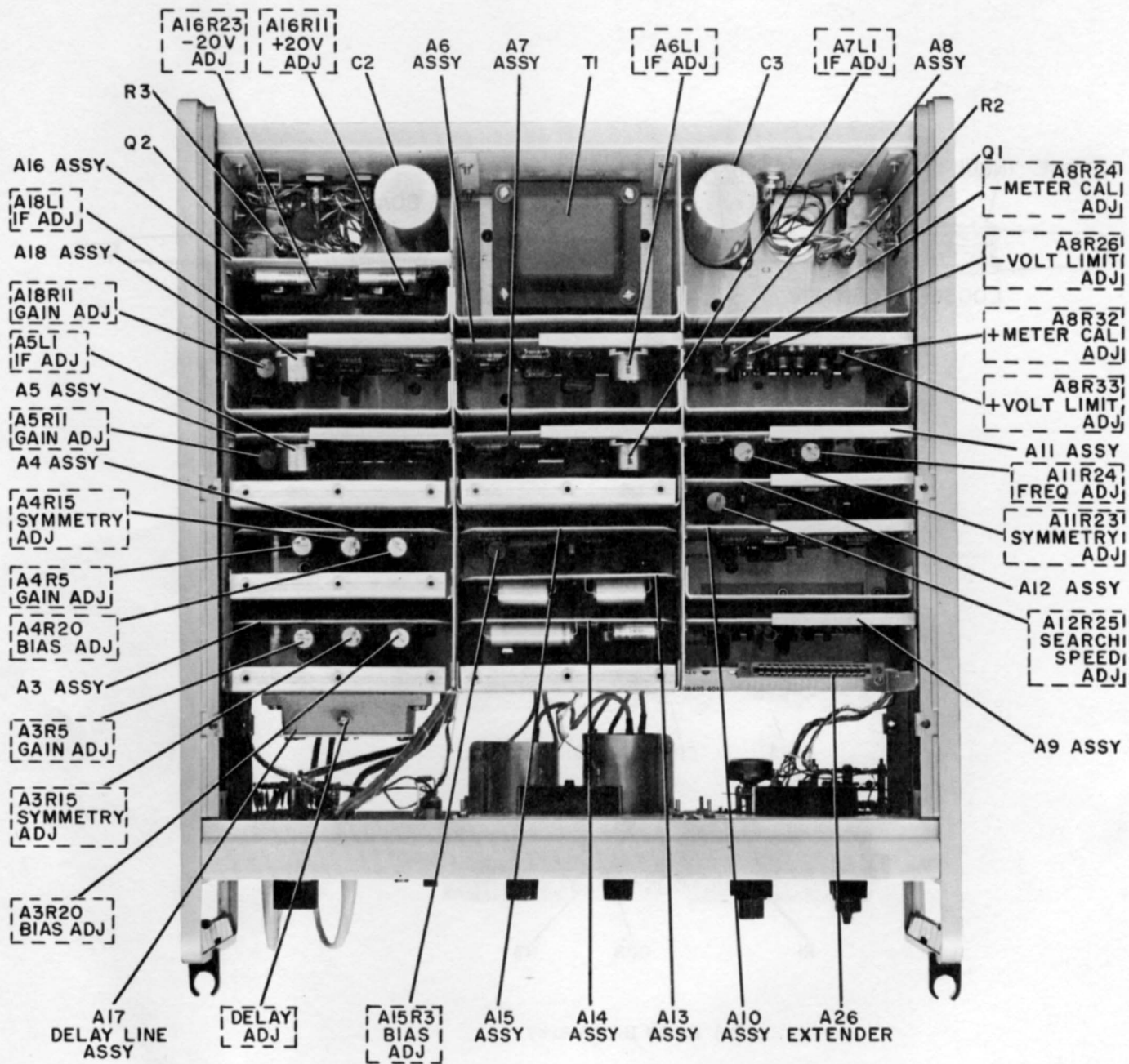


Figure 7-3. Component Identification, Top View

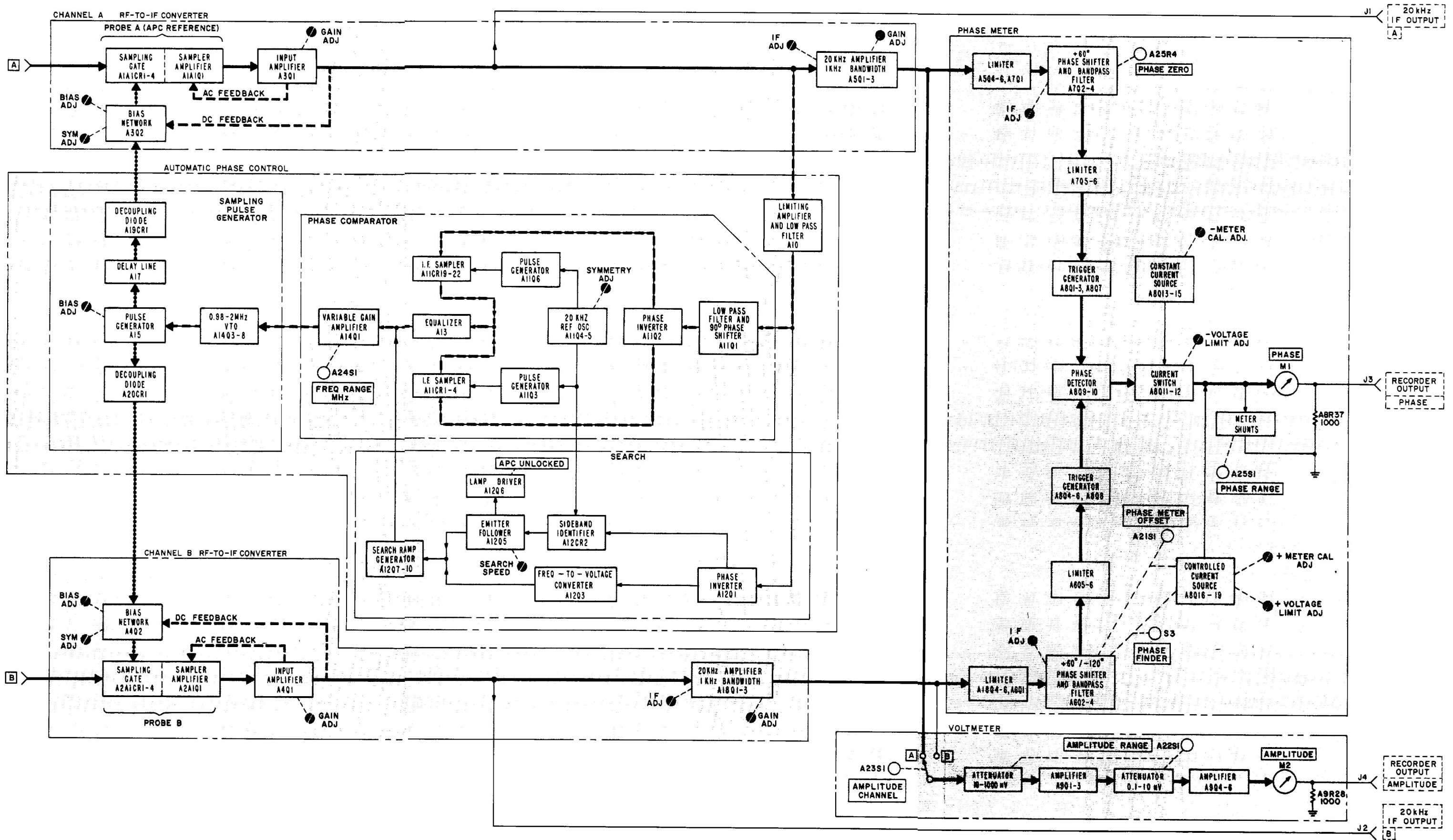
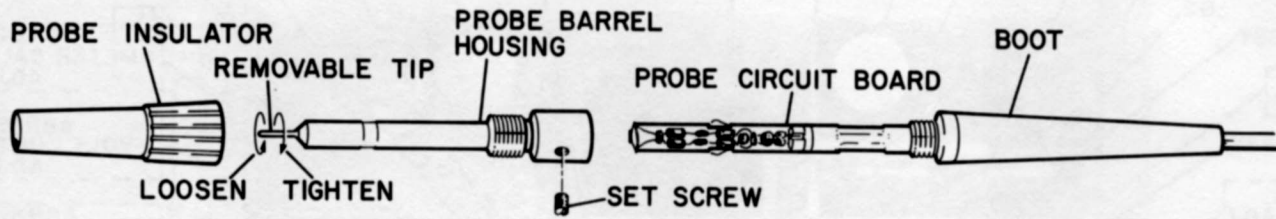
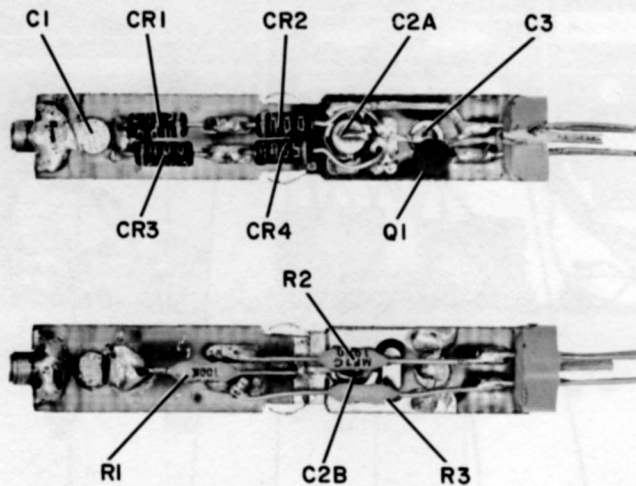


Figure 7-4. Functional Block Diagram



(a.) Probe Housing Assy



(b.) Probe Board Assy

Figure 7-5. Probe Assembly; (a.) Probe Housing Assy, (b.) Probe Board Assy

REFERENCE DESIGNATIONS				
NO PREFIX	A1 ASSY	A2 ASSY	A3 ASSY	A4 ASSY
C6-9 L1-4 XA3,4 W8,9	A1 W1 XA1	A1 W1 XA1	C1-13 Q1,2 R1-26 T1	C1-13 Q1,2 R1-26 T1
	A1A1 ASSY	A2A1 ASSY		
	C1-3 CRI-4 Q1 R1-3	C1-3 CRI-4 Q1 R1-3		

Figure 7-6

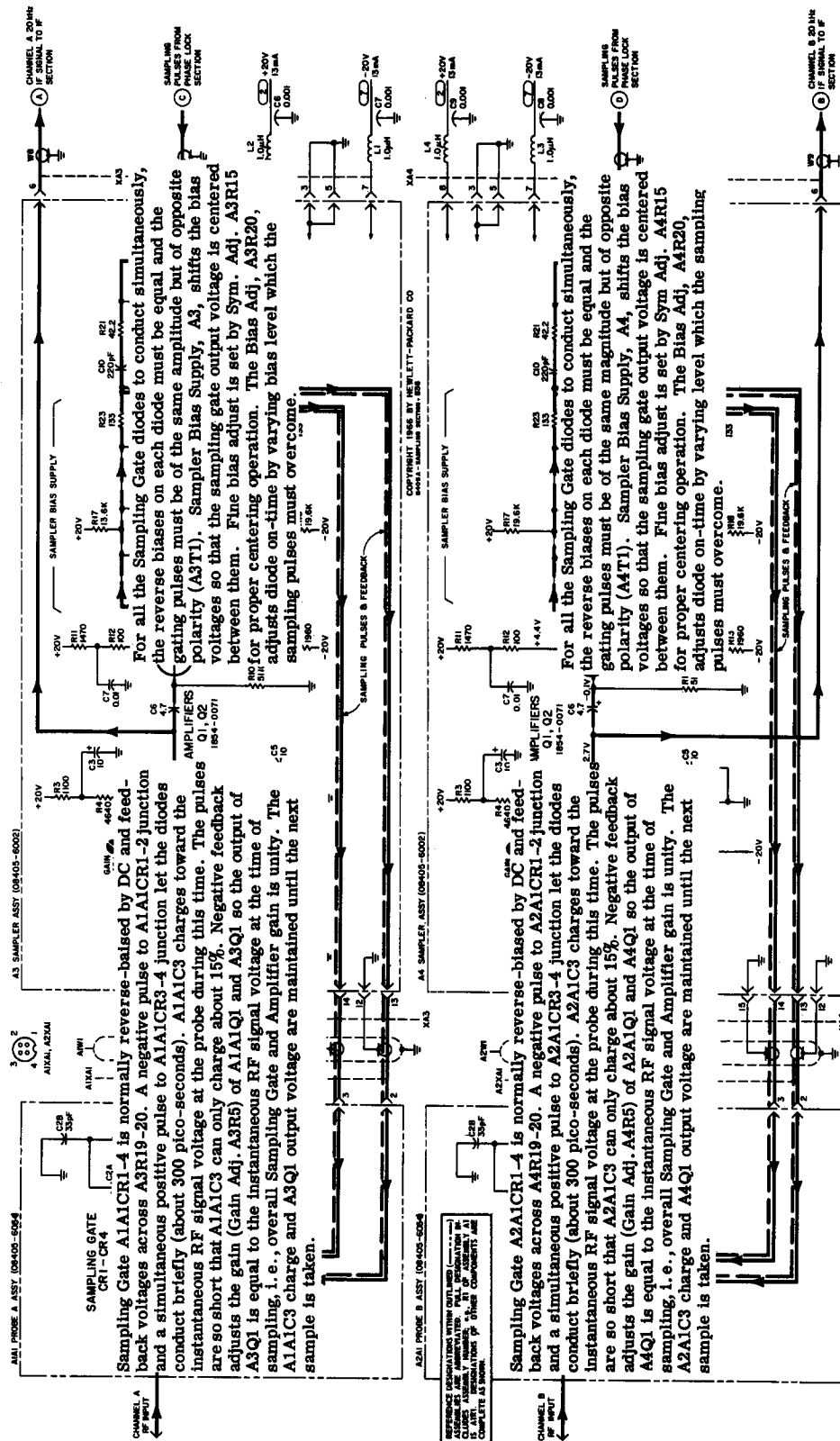


Figure 7-6(a). RF Sampling (Circuit Description)

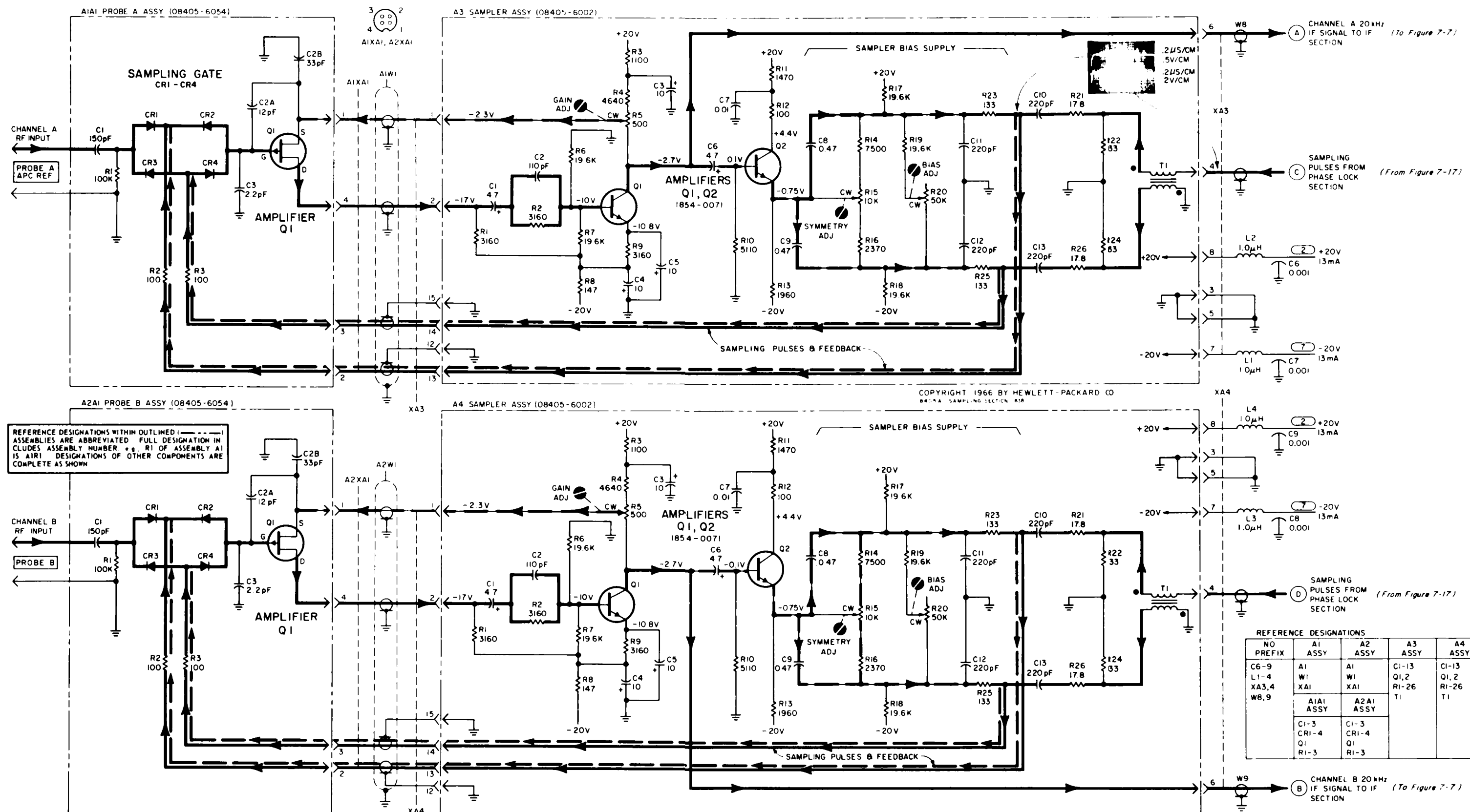


Figure 7-6(b). Schematic Diagram. RF Sampling Section

REFERENCE DESIGNATIONS

NO PREFIX	A5 ASSY	A18 ASSY	A23 ASSY
C10-12	CI-17	CI-17	S1 WI-3
J1, 2	CR1, 2	CR1, 2	
L5, 6	L1, 2	L1, 2	
W3, 5, 6, 8, 9	Q1-6	Q1-6	
XA5	RI-8, 10-30	RI-8, 10-30	
XA18			

NOT ASSIGNED
A5R9, A18R9

Figure 7-7

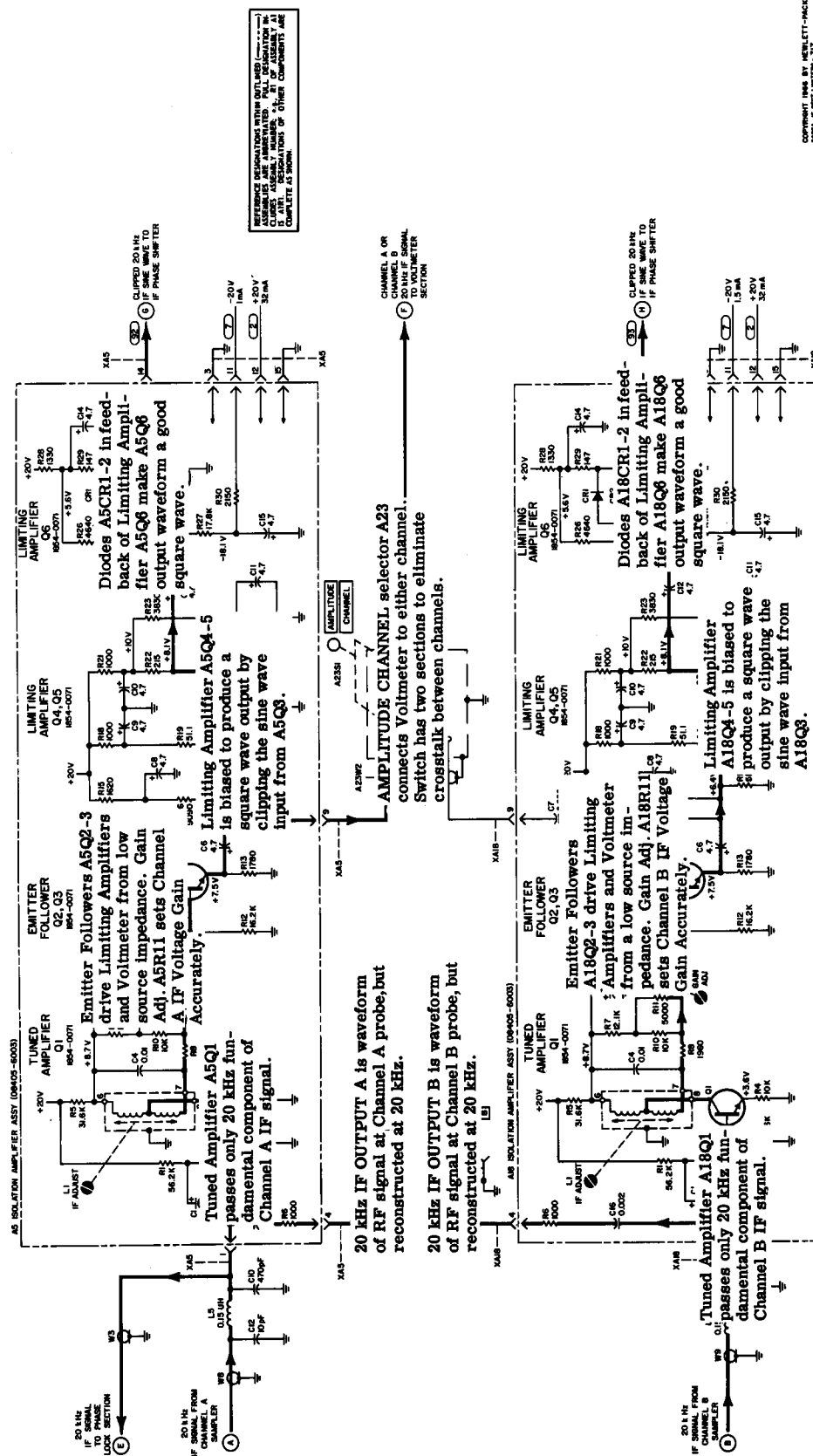


Figure 7-7(a). IF Section Limiters (Circuit Description)

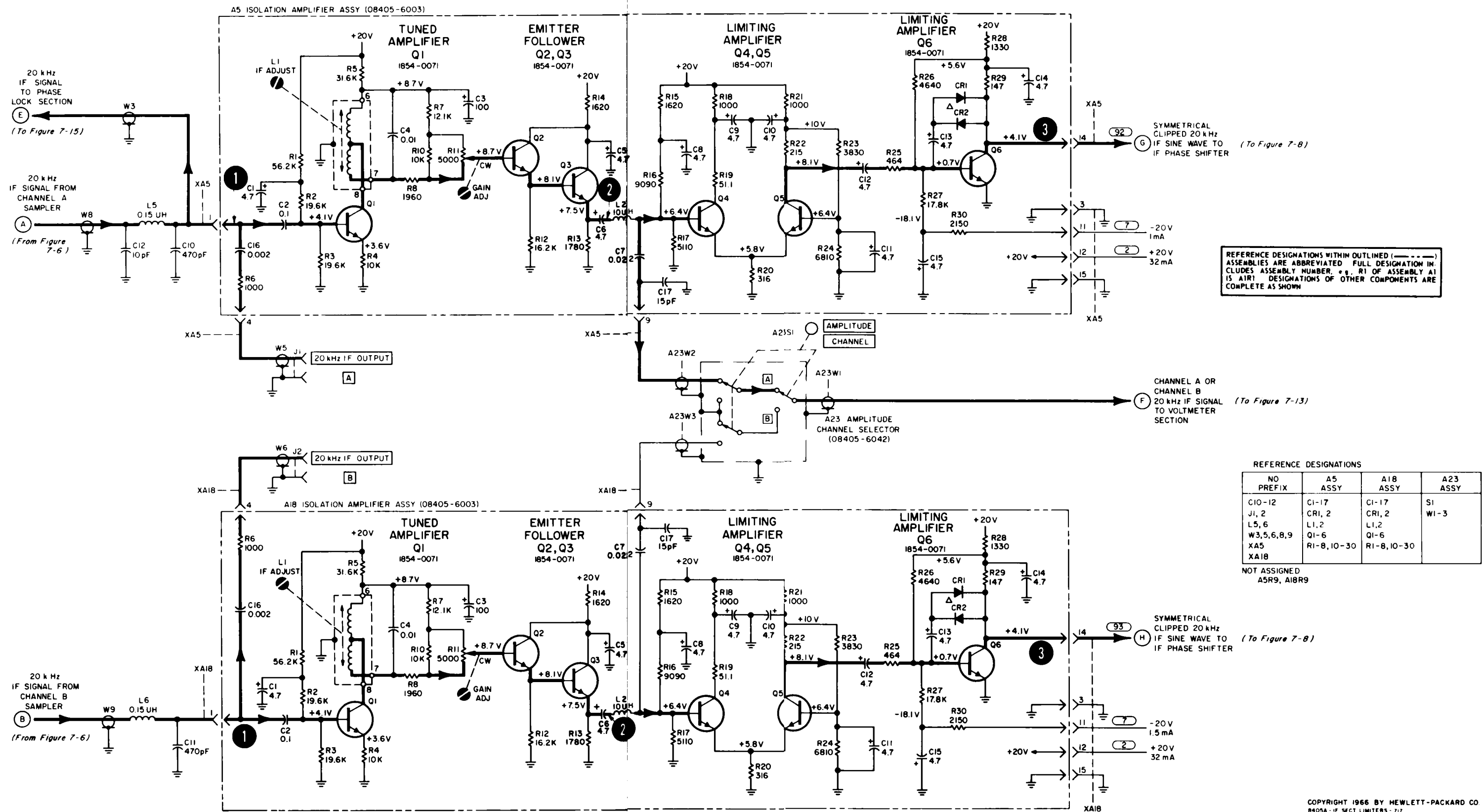


Figure 7-7(b). Schematic Diagram, IF Section Limiters

REFERENCE DESIGNATIONS

NO PREFIX	A6 ASSY	A7 ASSY	A21 ASSY	A25 ASSY
S3	CI-20	CI-19	SI	R4
XA6	CRI-4	CRI-4		
XA7	LI-2	LI		
	QI-6	QI-6		
	RI-30	RI-32		

Figure 7-8

◀ IF SECTION PHASE SHIFTERS

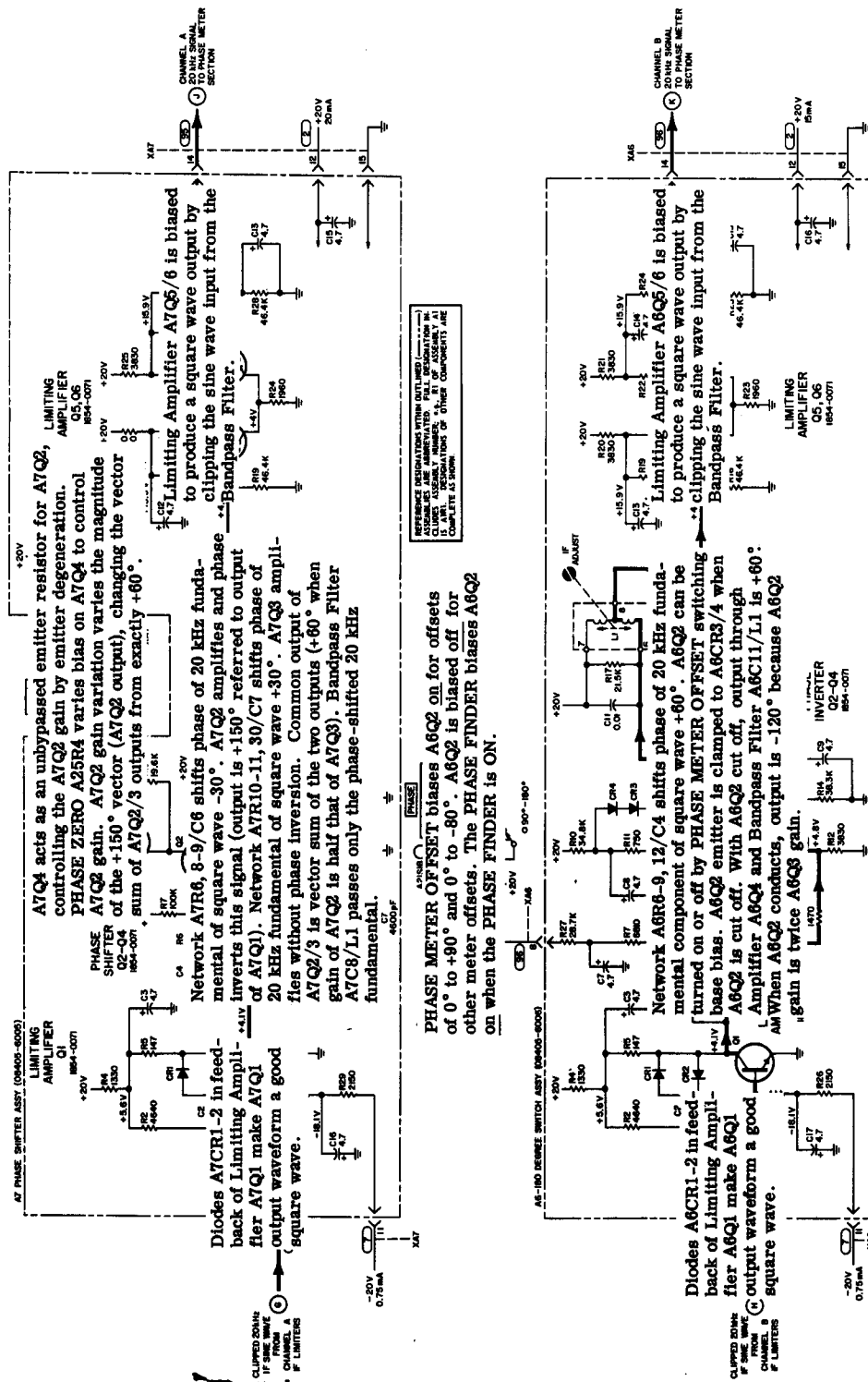


Figure 7-8(a). IF Section Phase Shifters (Circuit Description)

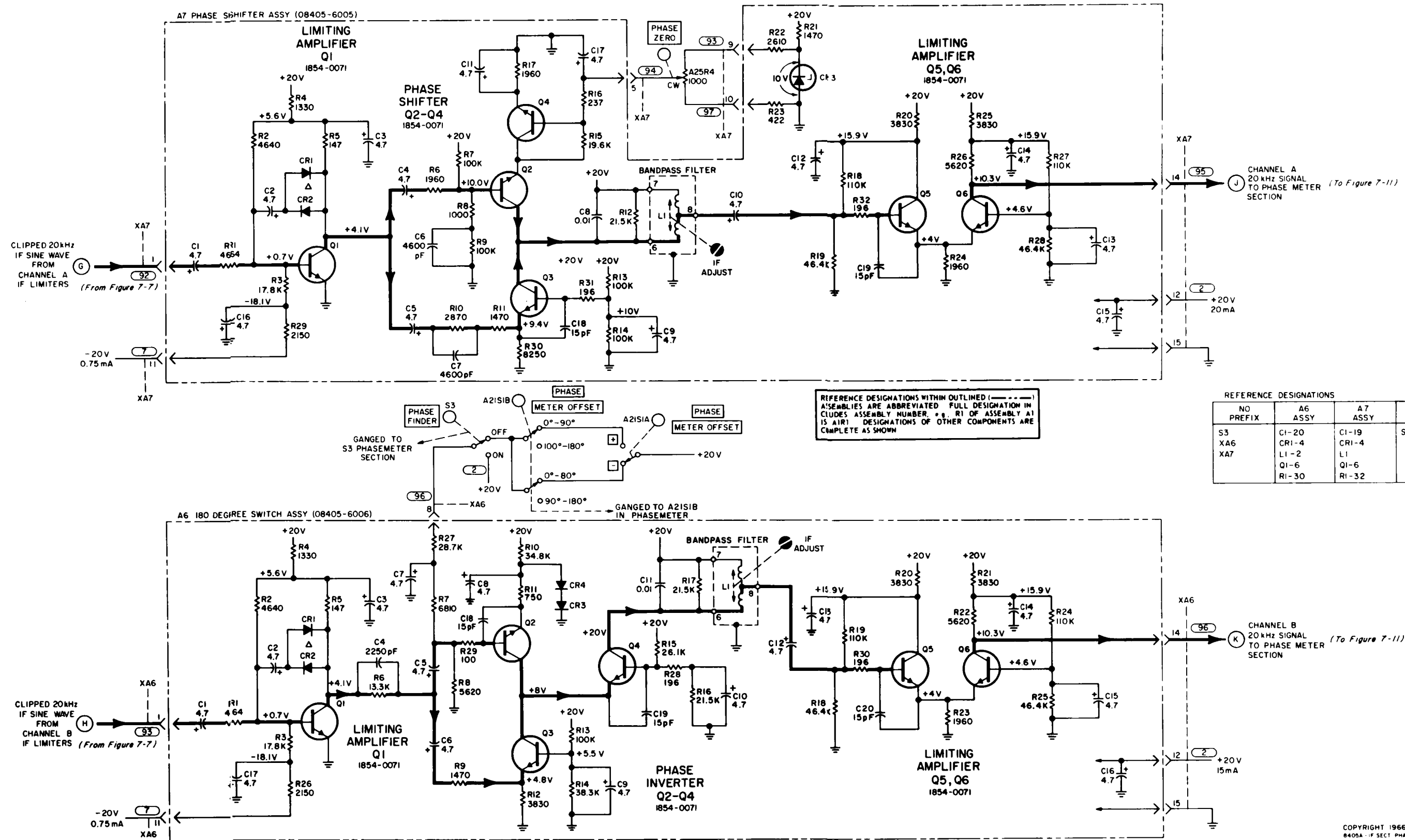


Figure 7-8(b). Schematic Diagram, IF Section Phase Shifters

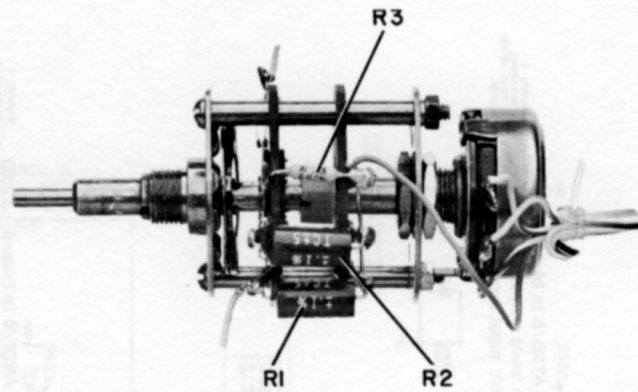


Figure 7-9. Phase Range Switch Component Location

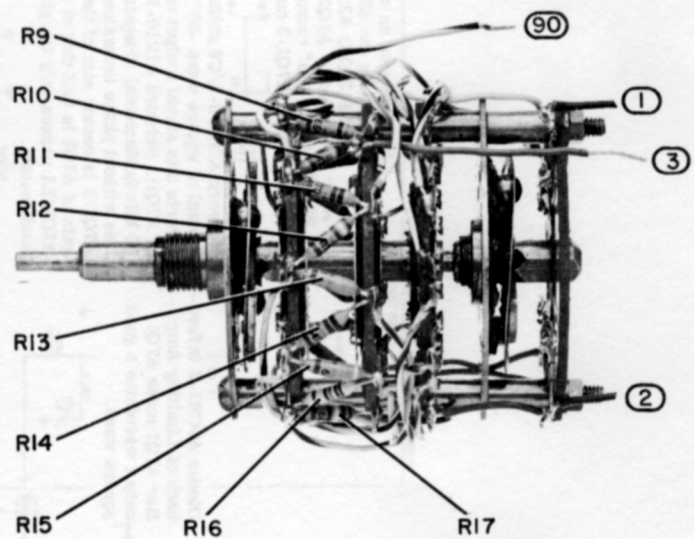
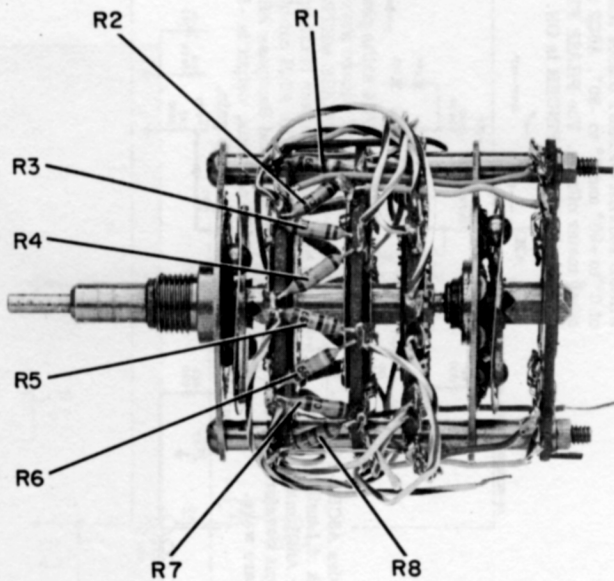


Figure 7-10. Phase Offset Switch Component Location

REFERENCE DESIGNATIONS

NO PREFIX	A8 ASSY	A21 ASSY	A25 ASSY
J3	CI-3, 5-12	RI-17	RI-3
MI	CR1-5	SI	SI
S3	LI-5		
XA8	Q1-19		
	RI-27, 29-34		
	36-38		

NOT ASSIGNED

A8C4, A8L1, A8L2, A8R28, A8R35

Figure 7-11

◀ PHASE METER

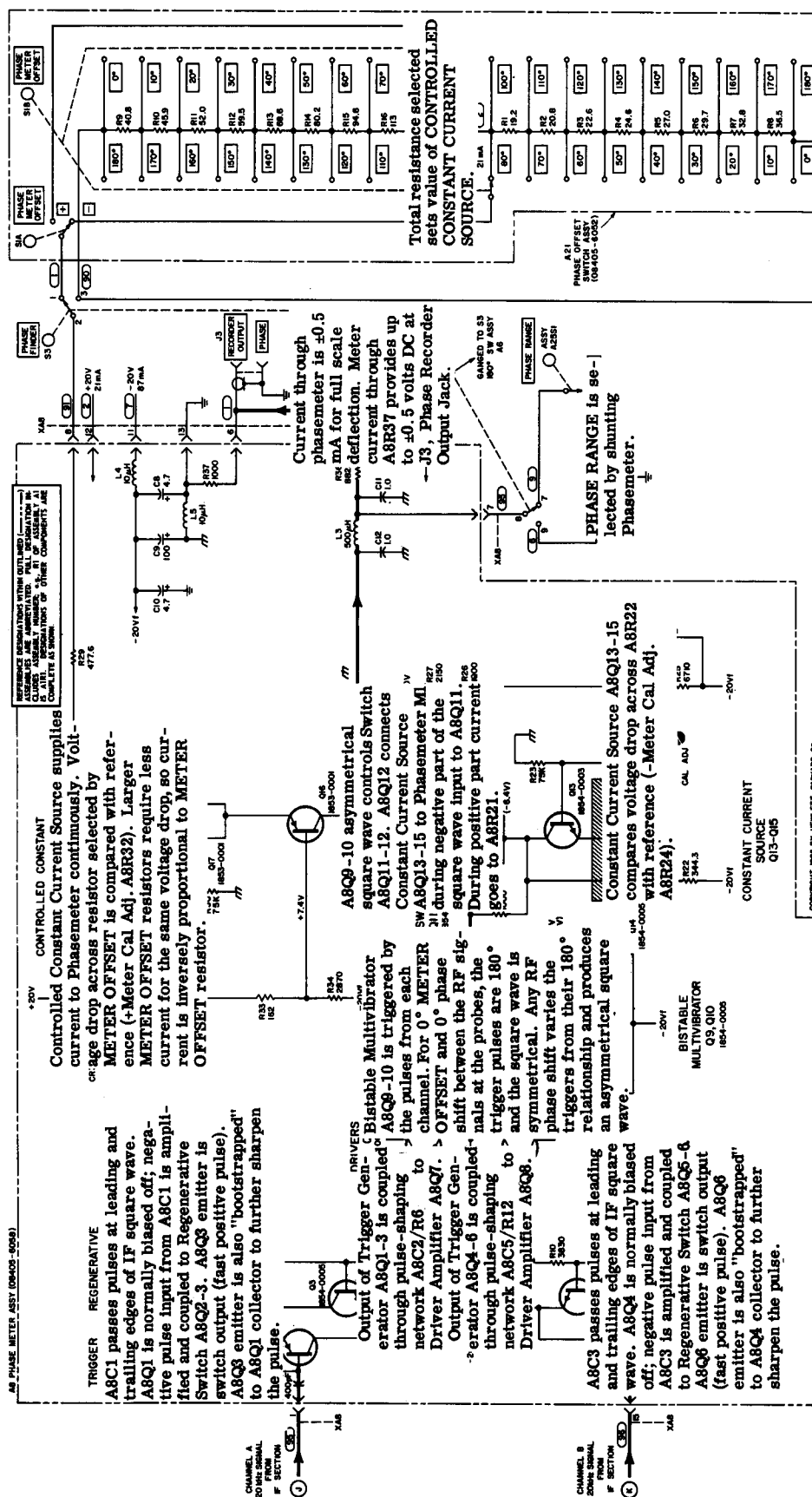


Figure 7-11(a). Phase Meter (Circuit Description)



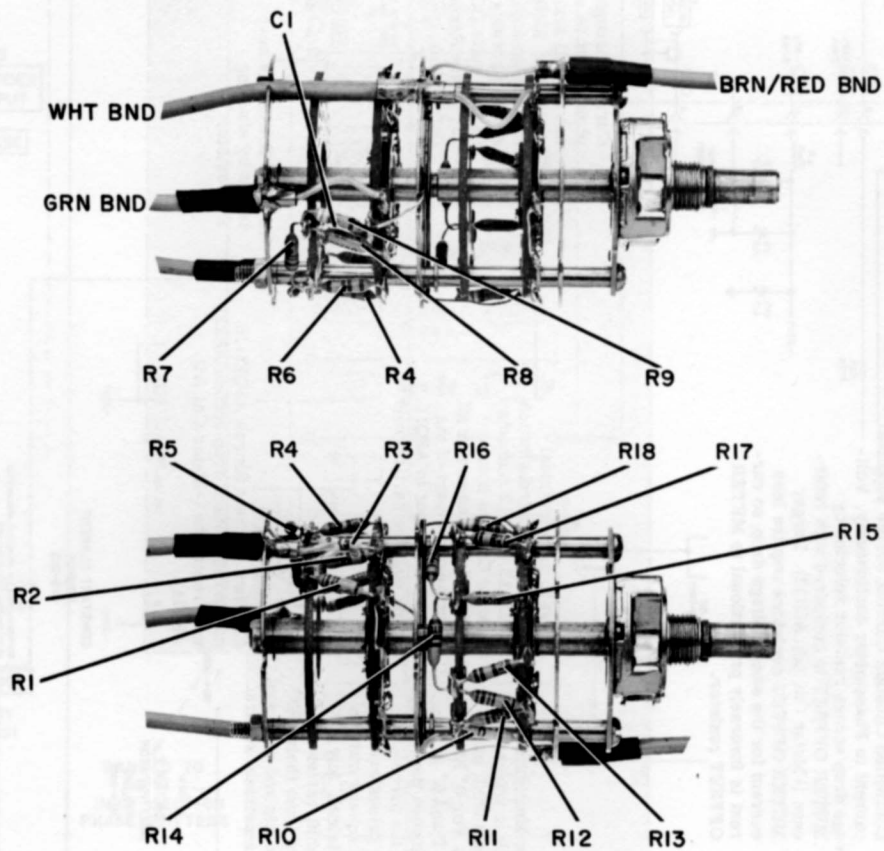


Figure 7-12. Amplitude Range Switch Component Location

REFERENCE DESIGNATIONS

NO PREFIX	A9 ASSY	A22 ASSY	A23 ASSY
J4 M2	CI-17 CRI, 2 LI QI-6 RI-28	RI-18 WI-3	WI

Figure 7-13

◀ **VOLTMETER**

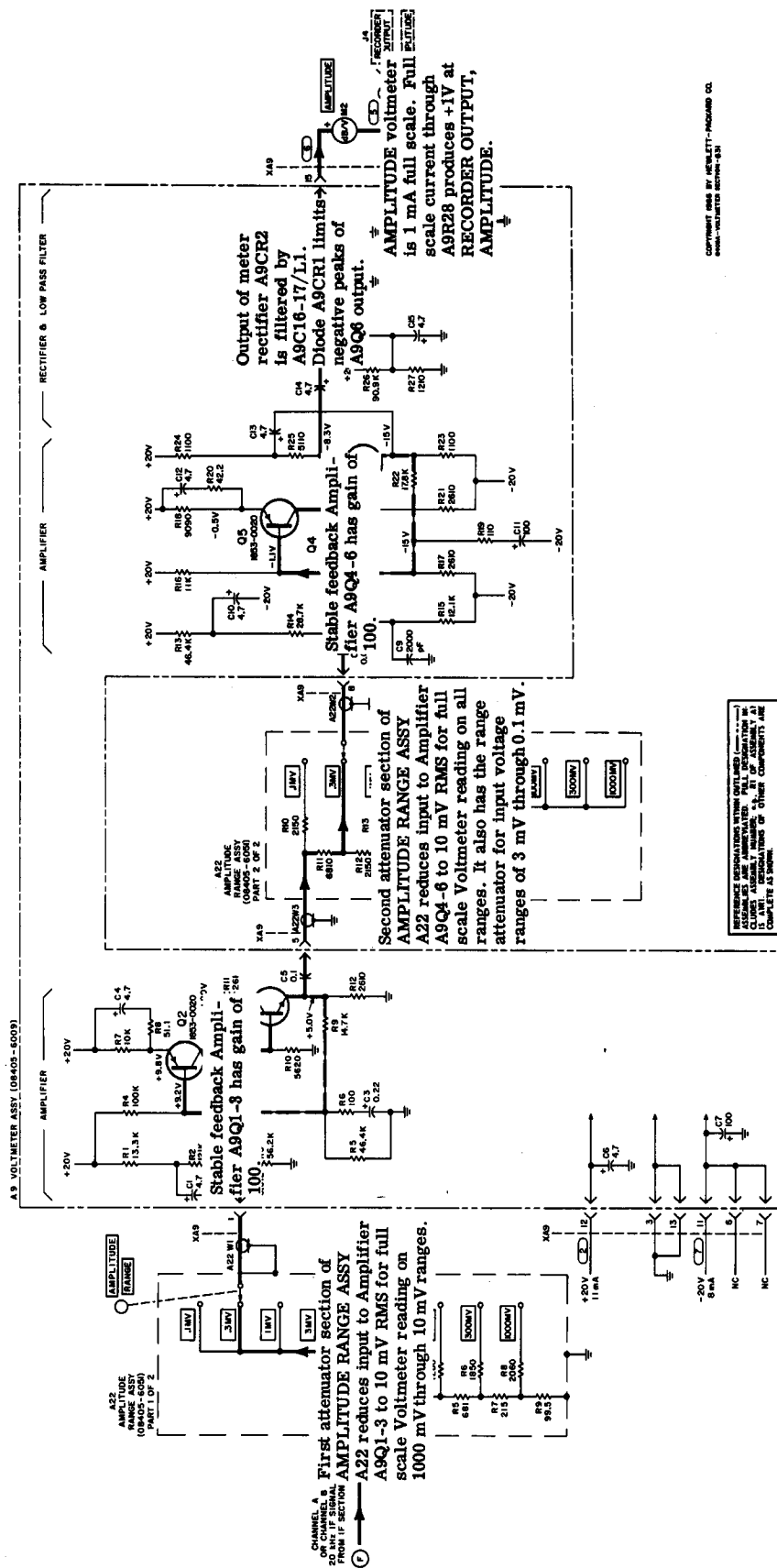


Figure 7-13(a). Voltmeter (Circuit Description)

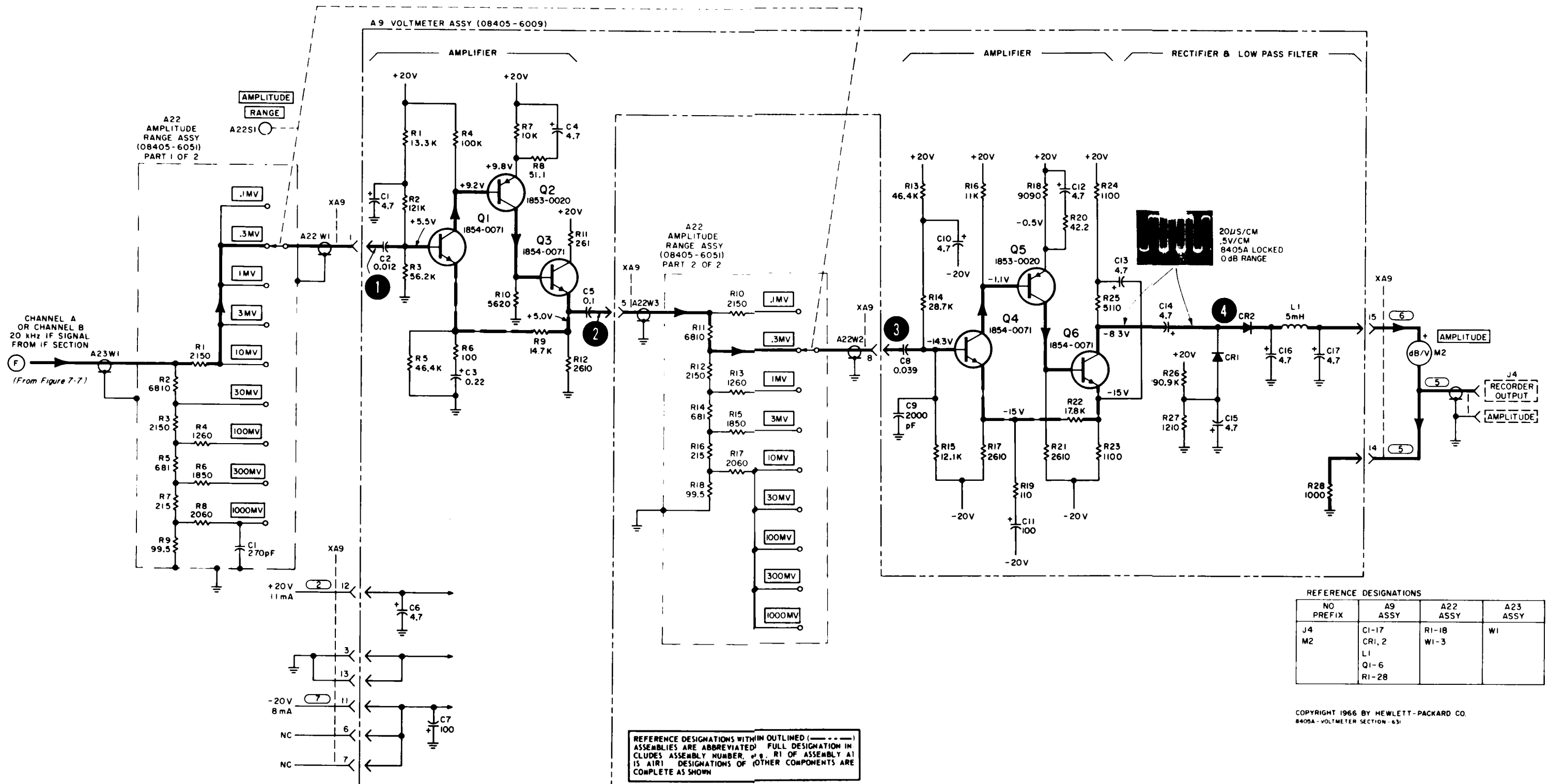
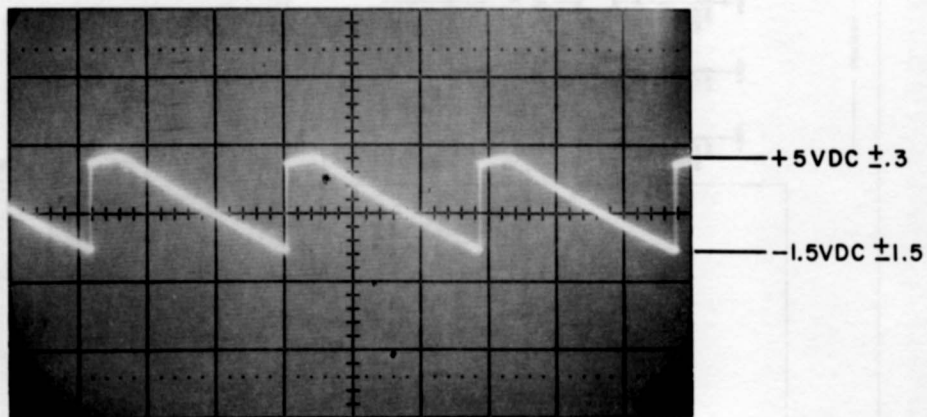


Figure 7-13(b). Schematic Diagram, Voltmeter
7-13



APC UNLOCKED LIGHT "ON"

XAI2 PIN 1

8V P-P
(SWEEP: 20MSEC/CM)

Figure 7-14. Search Section Output Waveform

REFERENCE DESIGNATIONS

NO PREFIX	A10 ASSY	A11 ASSY	A12 ASSY
DS2 W1,3,7 XA10,11,12	C1-17 C1-6 L1 Q1-4 R1-24	C1-8,11-13,16,17,19,20 C1-22 Q1-7 R1-13,15,18-26,28,31 T1,2	C1-15 C1-3 Q1-10 R1-44

Figure 7-15

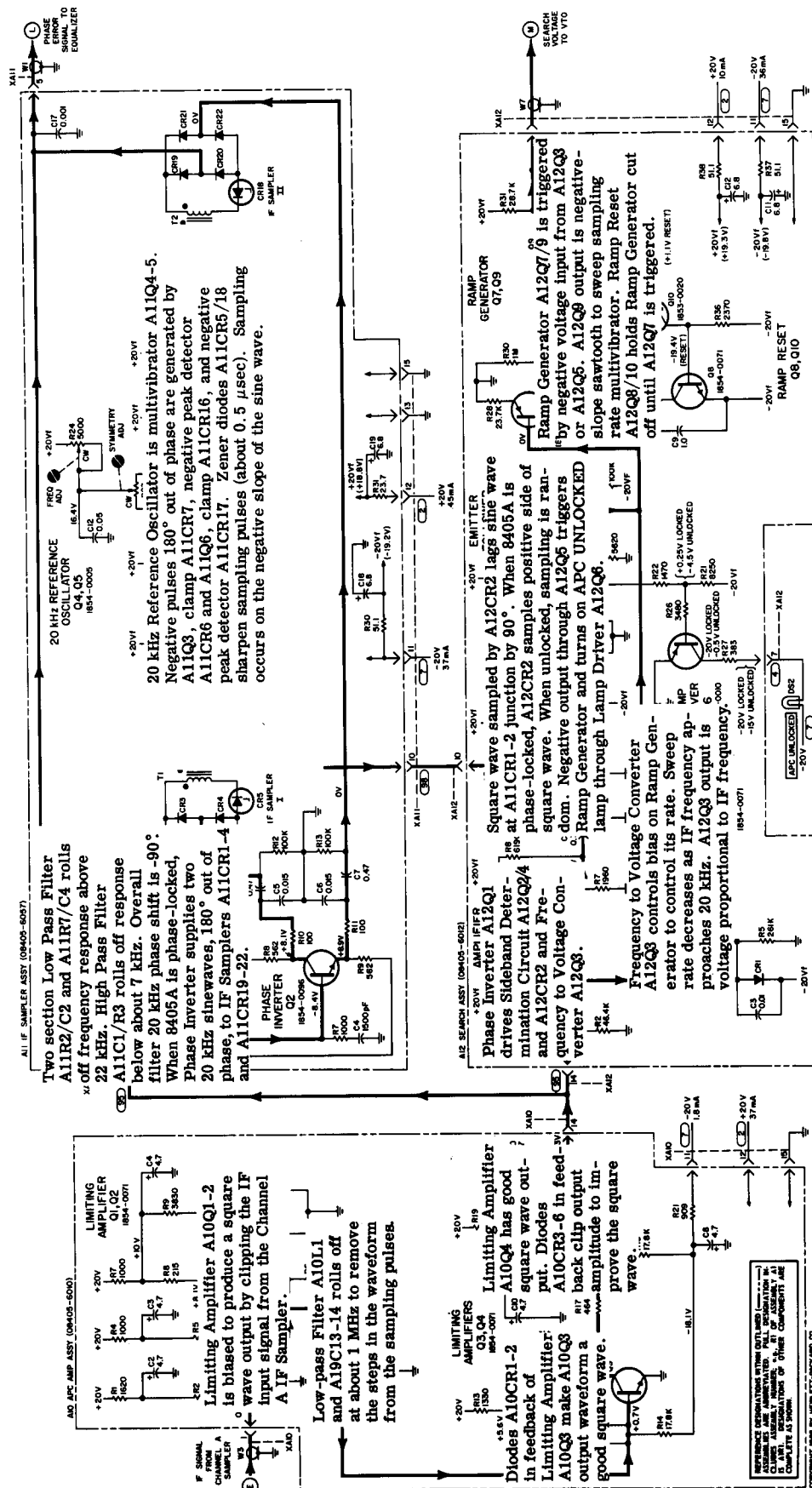


Figure 7-15(a). Automatic Phase Control Section (Circuit Description)



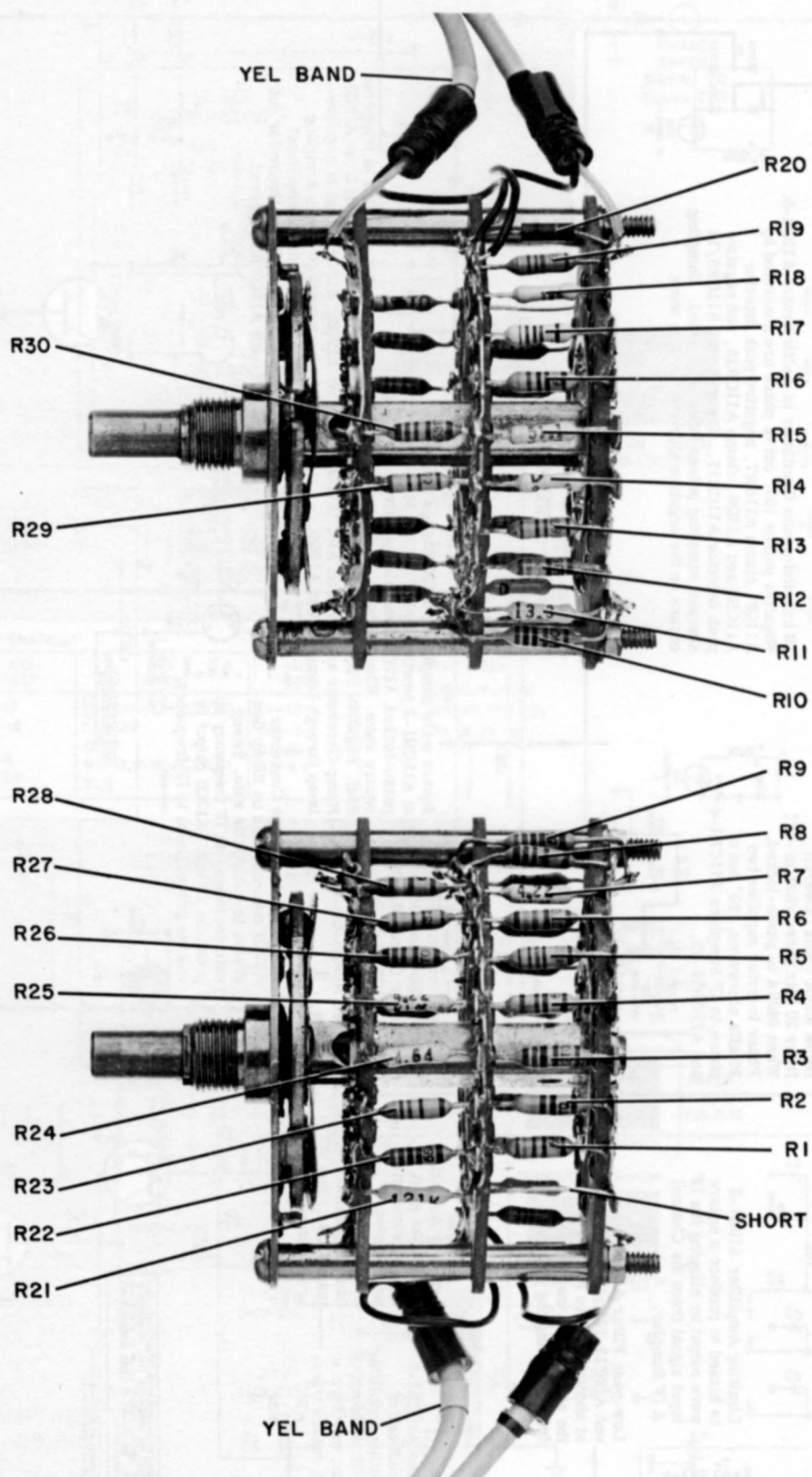


Figure 7-16. Frequency Range Switch Component Location

AM ASSY VTO (08405-004)

AT ASSY PHA/PTG (08405-001)

REFERENCE DESIGNATIONS							
NO PREFIX	A13 ASSY	A14 ASSY	A15 ASSY	A17 ASSY	A19 ASSY	A20 ASSY	A24 ASSY
C4,5	CI-9	CI-17	CI-7	DL	CRI	CRI	RI-30
WI,7,10	LI	CRI-8	CRI-4				SI
XA13-15	QI-3	LI-3	LI-5				WI,2
R4	RI-22	QI-8	QI,2				
		RI-24	RI-9				
			TI				

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8405A-AUTO PHASE CONT SECT B SAMPLE PULSE GEN-813

Figure 7-17

◀ **AUTOMATIC PHASE CONTROL SECTION (PART 2)**
SAMPLING PULSE GENERATOR

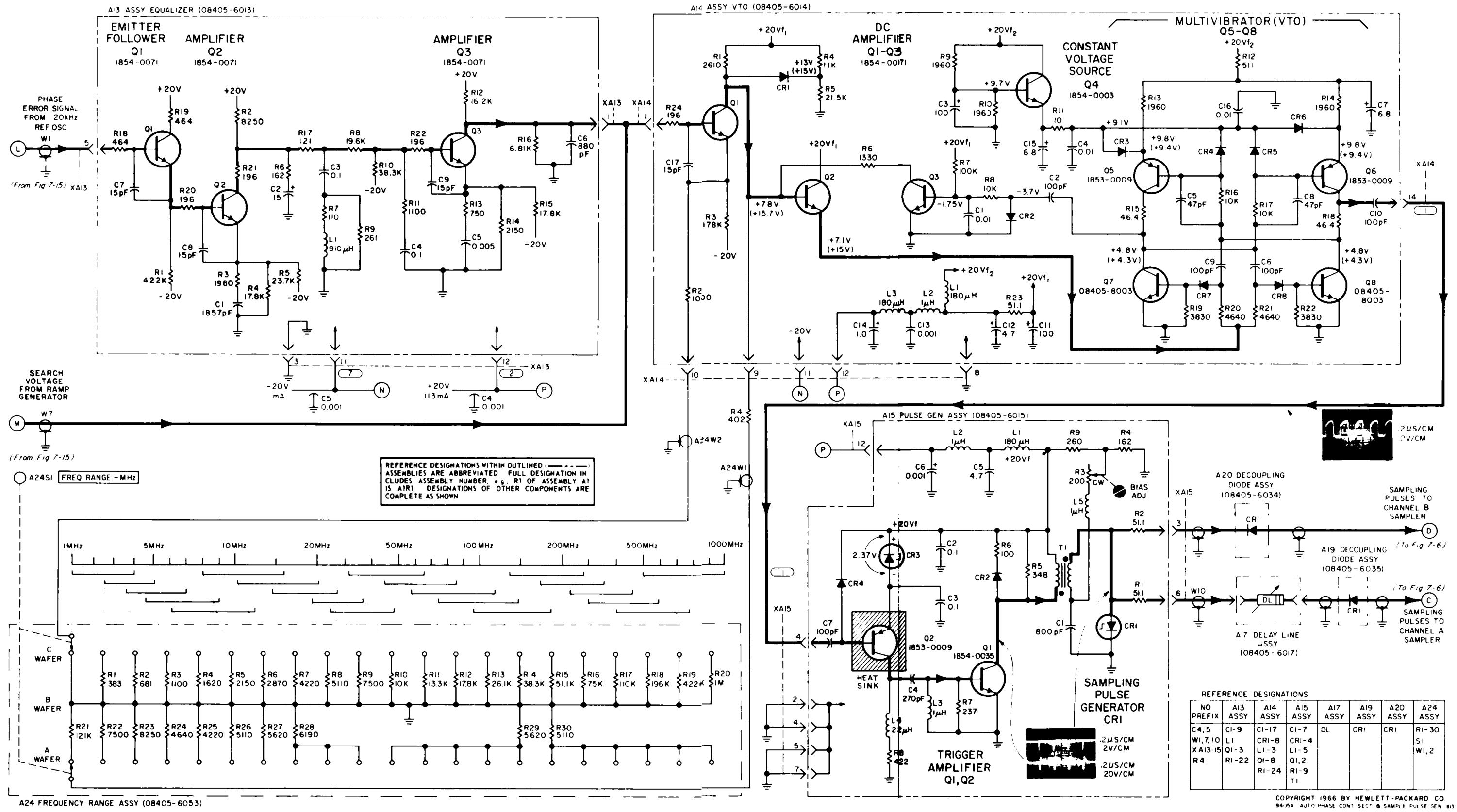


Figure 7-17(b). Schematic Diagram, Automatic Phase Control Section (Part 2) Sampling Pulse Generator 7-17/7-18

AM ASSY VTO (08405-004)

AI ASSY PHASE LOCK (08405-001)

REFERENCE DESIGNATIONS							
NO PREFIX	A13 ASSY	A14 ASSY	A15 ASSY	A17 ASSY	A19 ASSY	A20 ASSY	A24 ASSY
C4,5	CI-9	CI-17	CI-7	DL	CRI	CRI	RI-30
WI,7,10	LI	CRI-8	CRI-4				SI
XA13-15	QI-3	LI-3	LI-5				WI,2
R4	RI-22	QI-8	QI,2				
		RI-24	RI-9				
			TI				

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8405A-AUTO PHASE CONT SECT B SAMPLE PULSE GEN-813

Figure 7-17

◀ **AUTOMATIC PHASE CONTROL SECTION (PART 2)**
SAMPLING PULSE GENERATOR

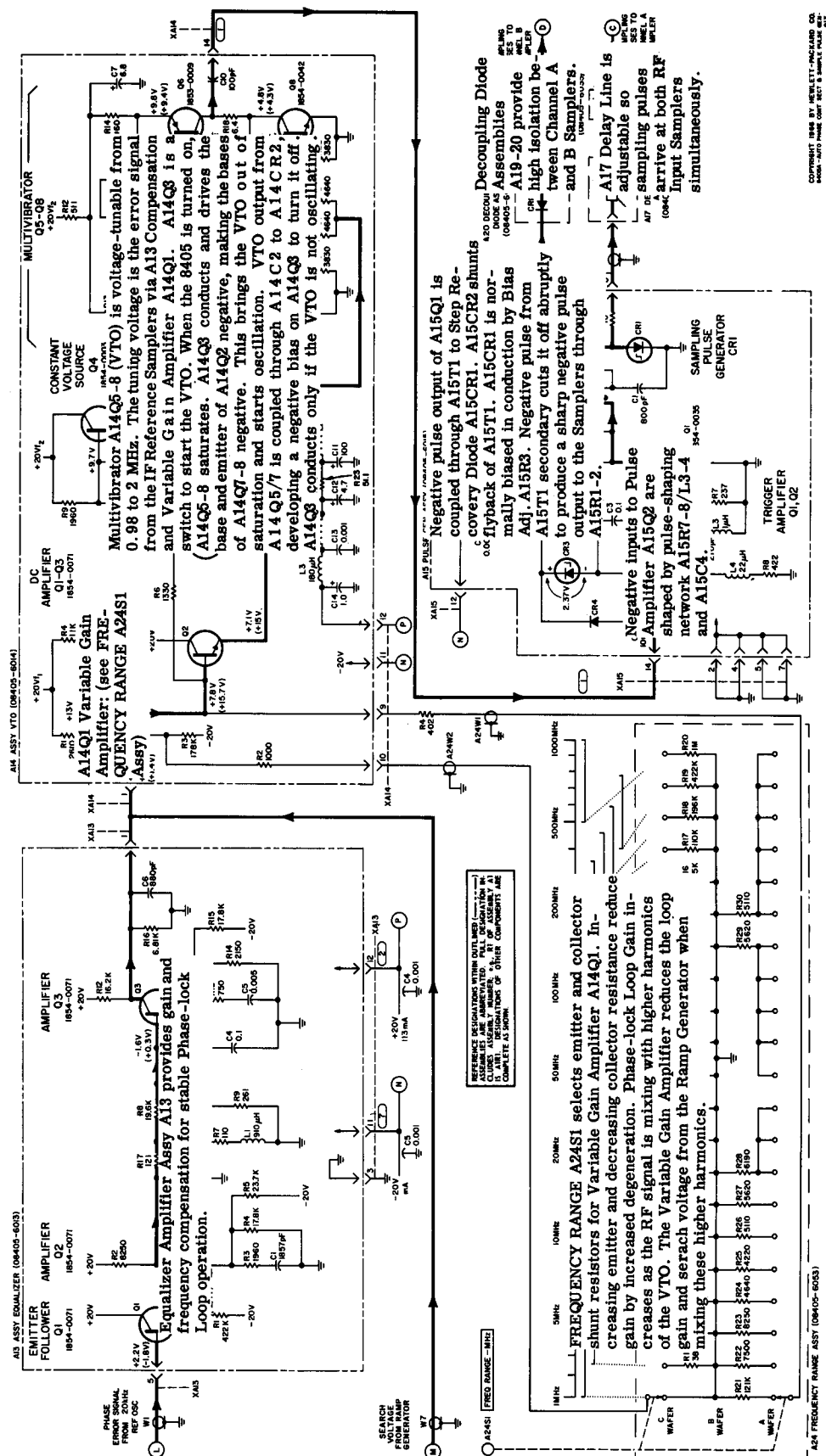


Figure 7-17(a). Automatic Phase Control Section (Circuit Description)

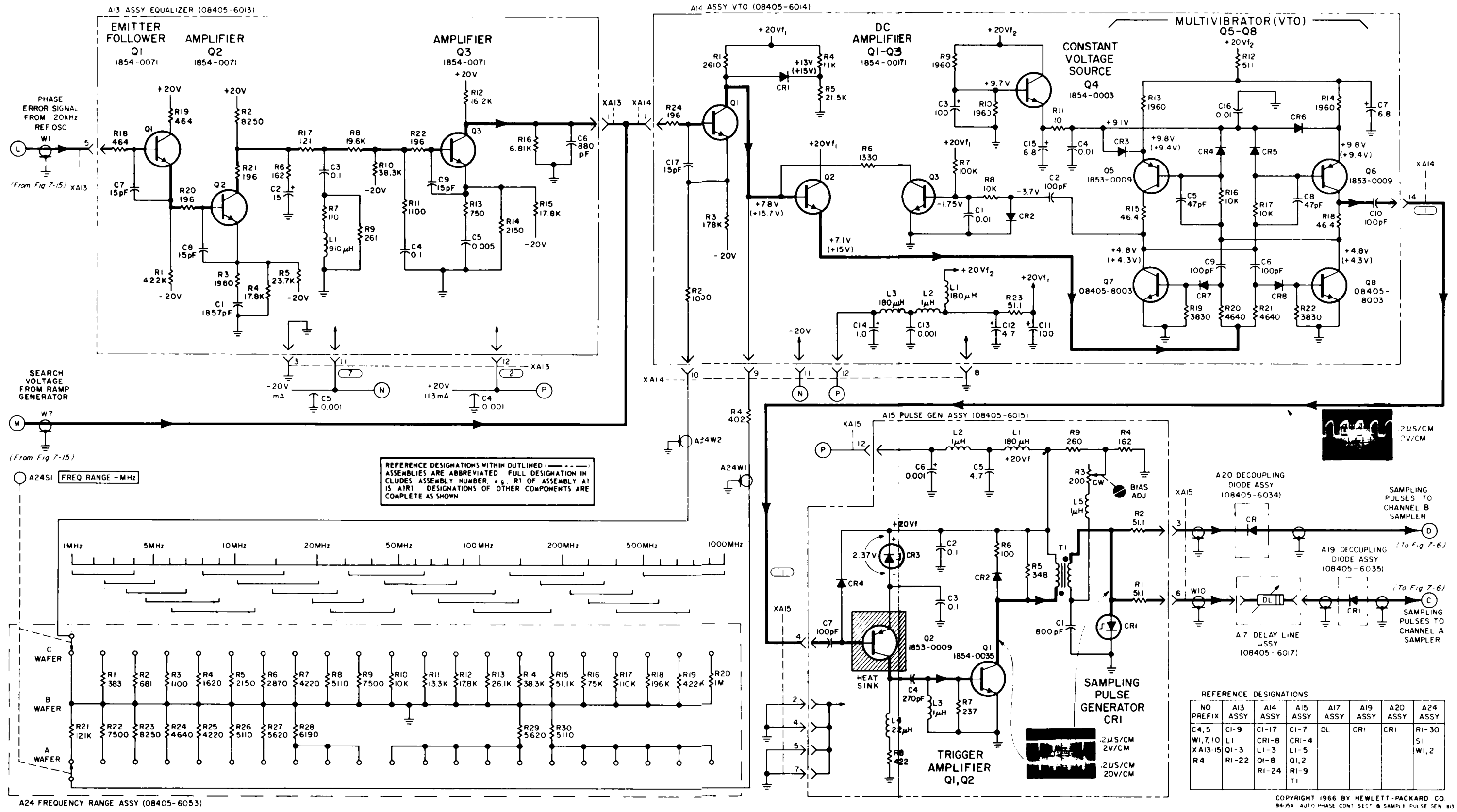
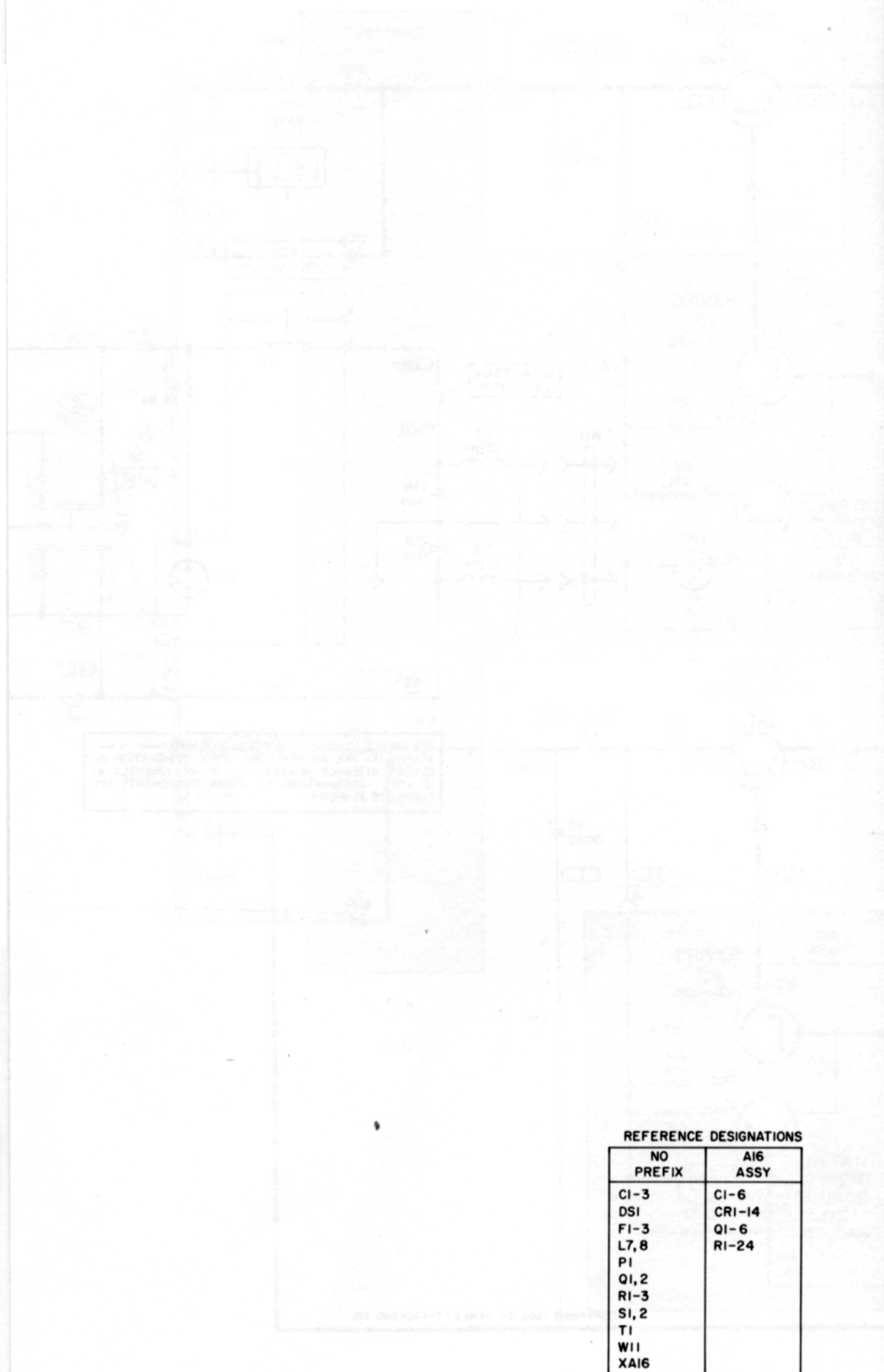


Figure 7-17(b). Schematic Diagram, Automatic Phase Control Section (Part 2) Sampling Pulse Generator 7-17/7-18



REFERENCE DESIGNATIONS

NO PREFIX	AI6 ASSY
CI-3	CI-6
DSI	CR1-14
FI-3	QI-6
L7,8	RI-24
PI	
QI,2	
RI-3	
SI,2	
TI	
WII	
XAI6	

Figure 7-18

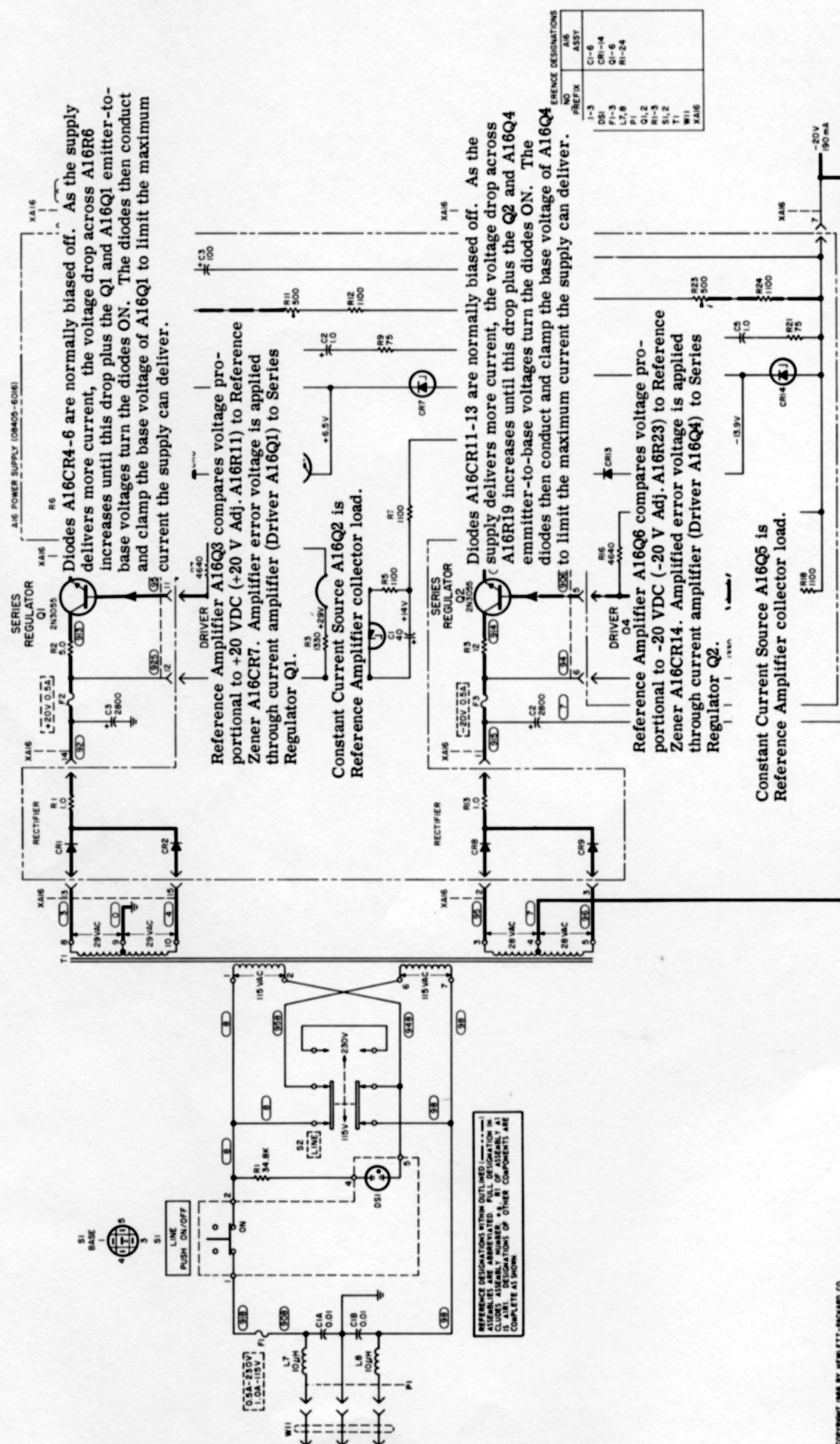
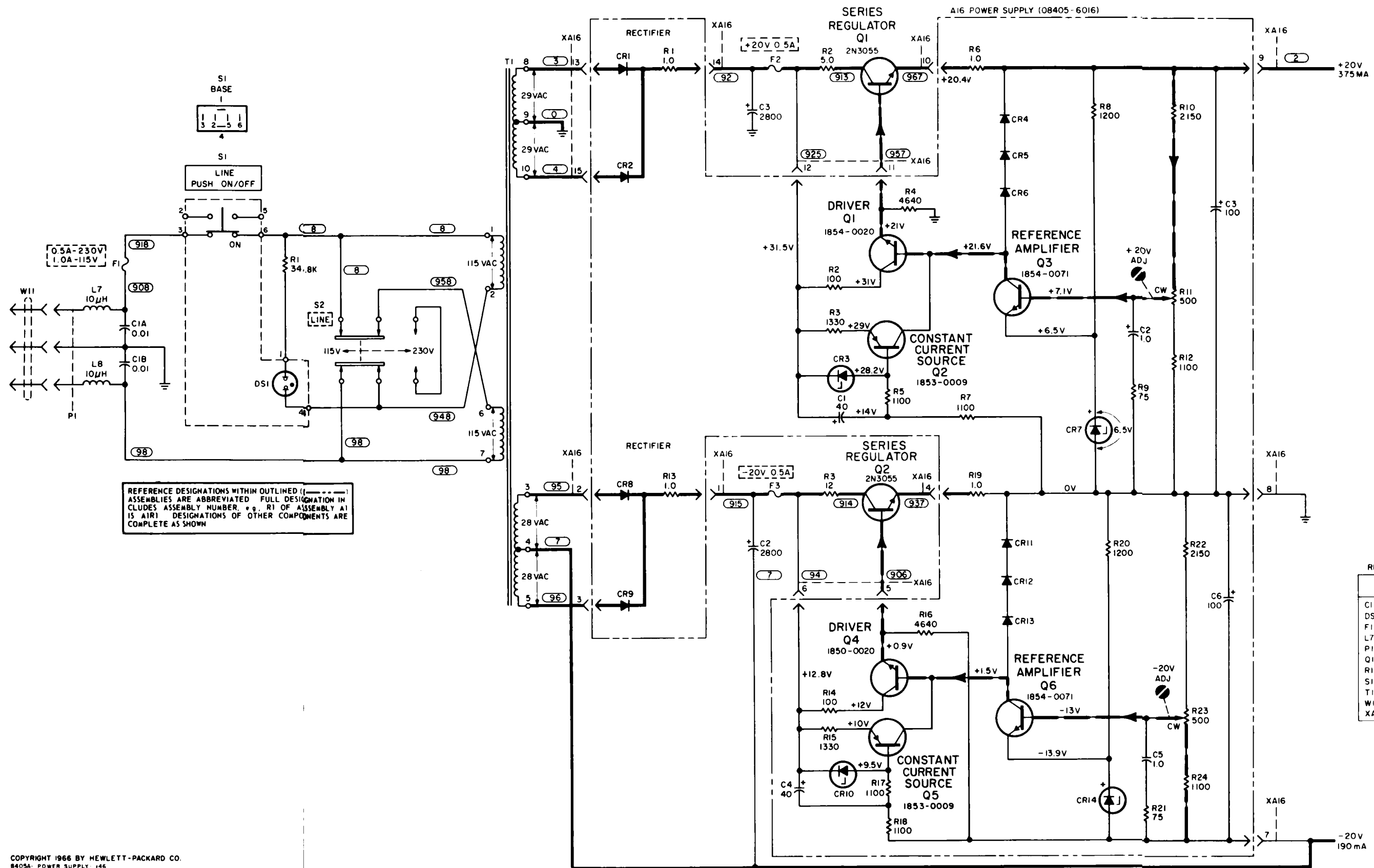


Figure 7-18(a). Power Supplies (Circuit Description)



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8405A- POWER SUPPLY, J46

Figure 7-18(b). Schematic Diagram. Power Supplies