

START

600  $\Omega$  OUTPUT INCORRECT  
(WRONG AMPLITUDE OR  
FREQUENCY).

MALFUNCTION OCCURS  
WITH:

FUNCTION SELECTOR

AMPLITUDE CONTROL

DC OFFSET CONTROL

VCO INPUT

OUTPUT  
FREQUENCY

GO TO A1TP13. CHECK  
FOR 4 V P-P TRIANGLE.

WITH NO VCO IN-  
PUT, DO FRE-  
QUENCY DIAL  
AND FREQUENCY  
OUT AGREE?

YES

TROUBLESHOOT A1Q37  
AND VCO INPUT CIRCUIT.

NO

GO TO OUTPUT FRE-  
QUENCY SECTION OF THIS  
TREE.

IS AMPLITUDE  
CORRECT?

YES

CHECK ALL RANGES AND  
NOTE WHICH ARE DE-  
FECTIVE.

TROUBLE EXISTS ON.

NO

GO TO A1TP6. CHECK FOR  
+7 V SQUARE WAVE.

IS AMPLITUDE  
CORRECT?

YES

GO TO A1TP2. CHECK FOR  
A 2 V P-P TRIANGLE.

IS AMPLITUDE  
CORRECT?

YES

TROUBLESHOOT TRI-  
ANGLE AMP. CHECK ALL  
DC VOLTAGES IN AMP.

NO

TROUBLESHOOT SQUARE  
WAVE GENERATOR.  
CHECK ALL DC VOLTAGES  
ON U7, Q19, Q21, Q31 AND  
Q33.

NO

TROUBLESHOOT INTE-  
GRATOR. CHECK DC VOLT-  
AGES AND WAVEFORMS.

# NOTE

1. ALWAYS CHECK POWER SUPPLY  
VOLTAGES AFTER THE COVERS  
HAVE BEEN REMOVED. BAD POWER  
SUPPLY VOLTAGES CAN CAUSE  
NUMEROUS PROBLEMS. TROUBLE-  
SHOOTING TREE NO. 3 WILL AID  
IN LOCATING A TROUBLE IN THE  
POWER SUPPLIES.

2.  $\approx$  MEANS APPROXIMATELY.

3. DISABLE THE SQUARE WAVE GEN-  
ERATOR BY WRAPPING A BARE  
WIRE AROUND THE LEADS OF Q19  
SO THAT THEY ARE SHORTED TO-  
GETHER. CONNECT THE 50  $\Omega$   
SOURCE (the MODEL 3310A RECOM-  
MENDED) AND ADJUST ITS DC OFF-  
SET SO THAT A +7 V SQUARE  
WAVE WITH NO OFFSET APPEARS  
ON THE OSCILLOSCOPE. A 7 V BAT-  
TERY CAN BE USED HERE. MONI-  
TOR THE VOLTAGE AT A1TP2 AND  
CONNECT -7 V (WITH RESPECT TO  
ASSEMBLY GROUND) TO THE AN-  
ODE OF A1C1. THE VOLTAGE AT  
A1TP2 SHOULD PASS THROUGH 0  
TO APPROXIMATELY -2 V. CON-  
NECT A CURRENT LIMITING RESIS-  
TOR (APPROXIMATELY 50  $\Omega$ ) IN  
SERIES WITH THE BATTERY.

4. DC VOLTAGES AND WAVEFORMS  
WERE OBSERVED WITH THE MODEL  
3311A. CONTROLS SET AS FOL-  
LOWS.

FREQUENCY DIAL 1  
RANGE (Hz) .... X100  
FUNCTION .....  
AMPLITUDE .. Full CW  
600  $\Omega$  OUTPUT .. TERM  
DC OFFSET ..... 0

Table 5-3. Frequency Error Symptoms.

Bad Range Indicated By X						Probable Cause
.1	1	10	100	1 K	10 K	100 K
X	X		X	X		
	X	X			X	
X	X	X	X	X	X	X

R17 and R1  
R1 and R2  
R5 and R1  
C23  
C1 and R2

ALL RANGES.

CHECK THE VOLTAGE AT  
THE EMITTER AND COL-  
LECTOR OF Q9. THE VOLT-  
AGE SHOULD BE +15.6  
AND -15.7, RESPEC-  
TIVELY.

ARE THESE  
VOLTAGES  
GOOD?

YES

NO

CHECK VOLTAGE AT  
A1TP7. IT SHOULD BE  
 $\approx$ 15.0 V.

IS THE VOLTAGE  
GOOD?

YES

NO

TROUBLESHOOT TUNING  
AMP. CHECK DIAL ADJ'S  
A1R131 AND A1R133.

SOME, BUT NOT ALL  
RANGES.

SEE TABLE 5.3.

Table 5-3. Frequency Error Symptoms.

Bad Range Indicated By X								Probable Cause
.1	1	10	100	1 K	10 K	100 K		
X			X					R17 and R19 R1 and R21 R5 and R3 C23 C1 and R25
X	X	X		X				
X	X	X	X	X	X	X		

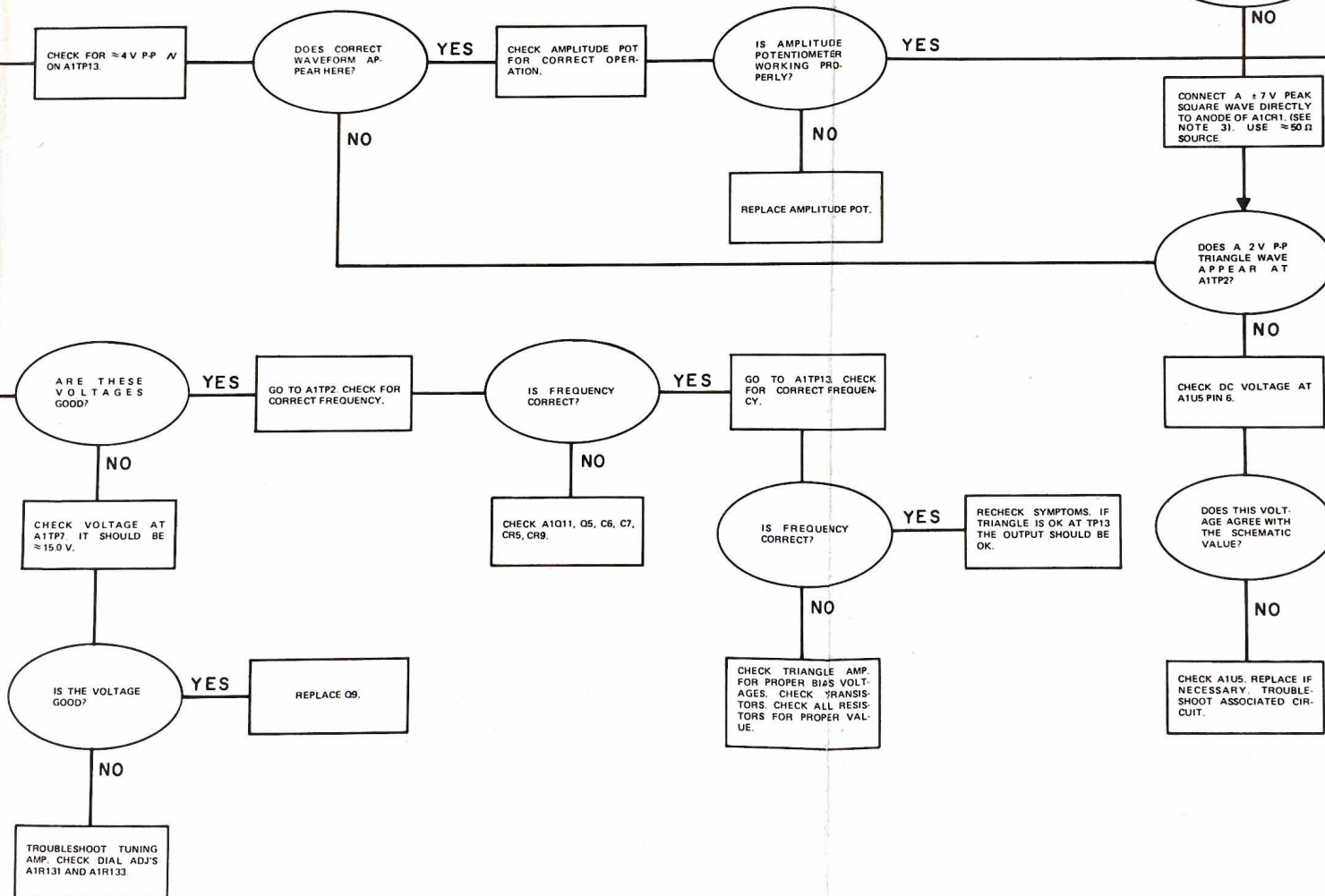
RMS  
DEL  
FOL

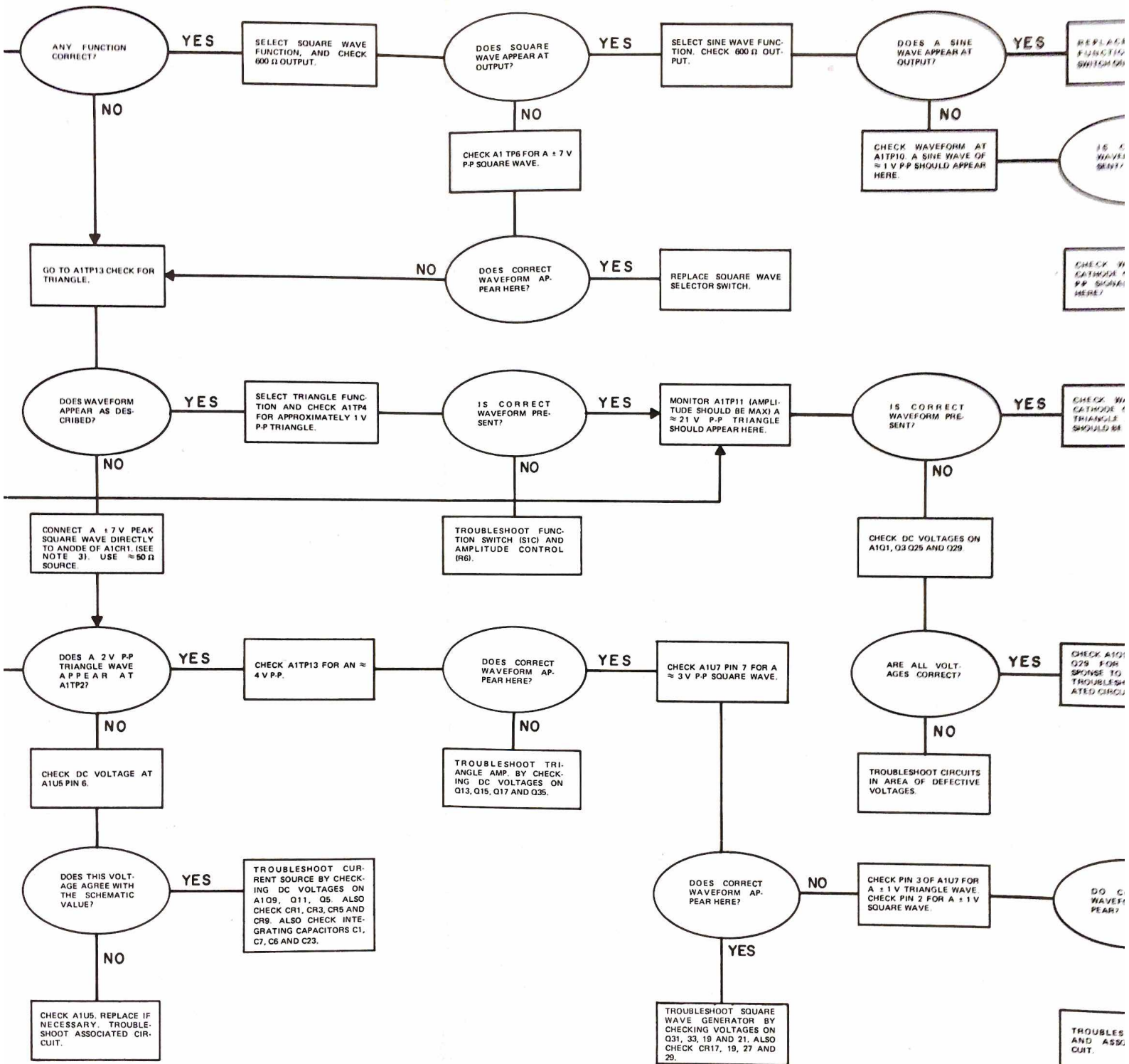
ET POTEN-  
ND ASSO-

TAGE AT  
ND COL  
HE VOLT-  
IE +15.6  
RESPEC-

3.

r TRI-  
K ALL  
MP.





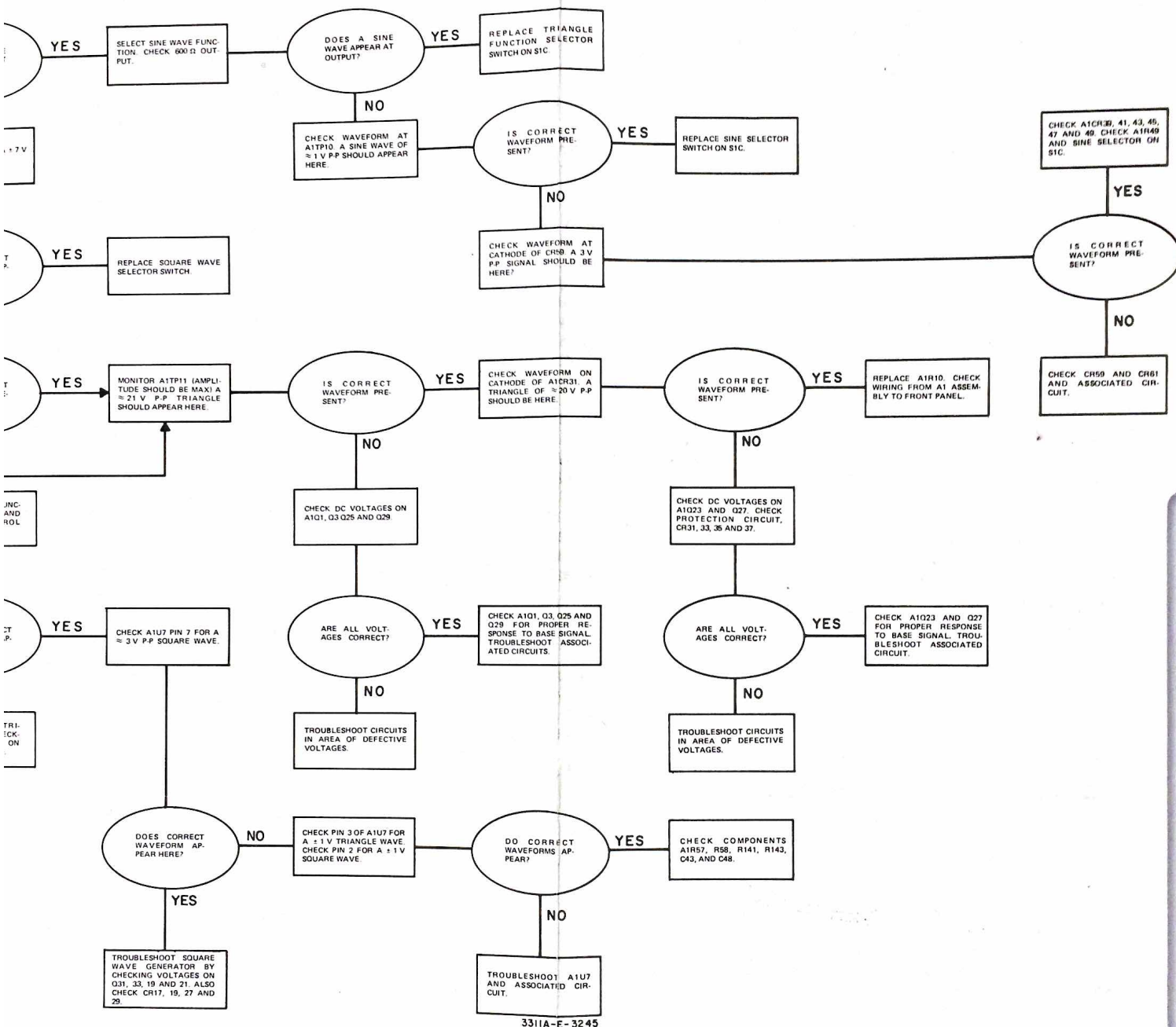


Figure 7-1. Sine, Square or Triangle Function Defective.



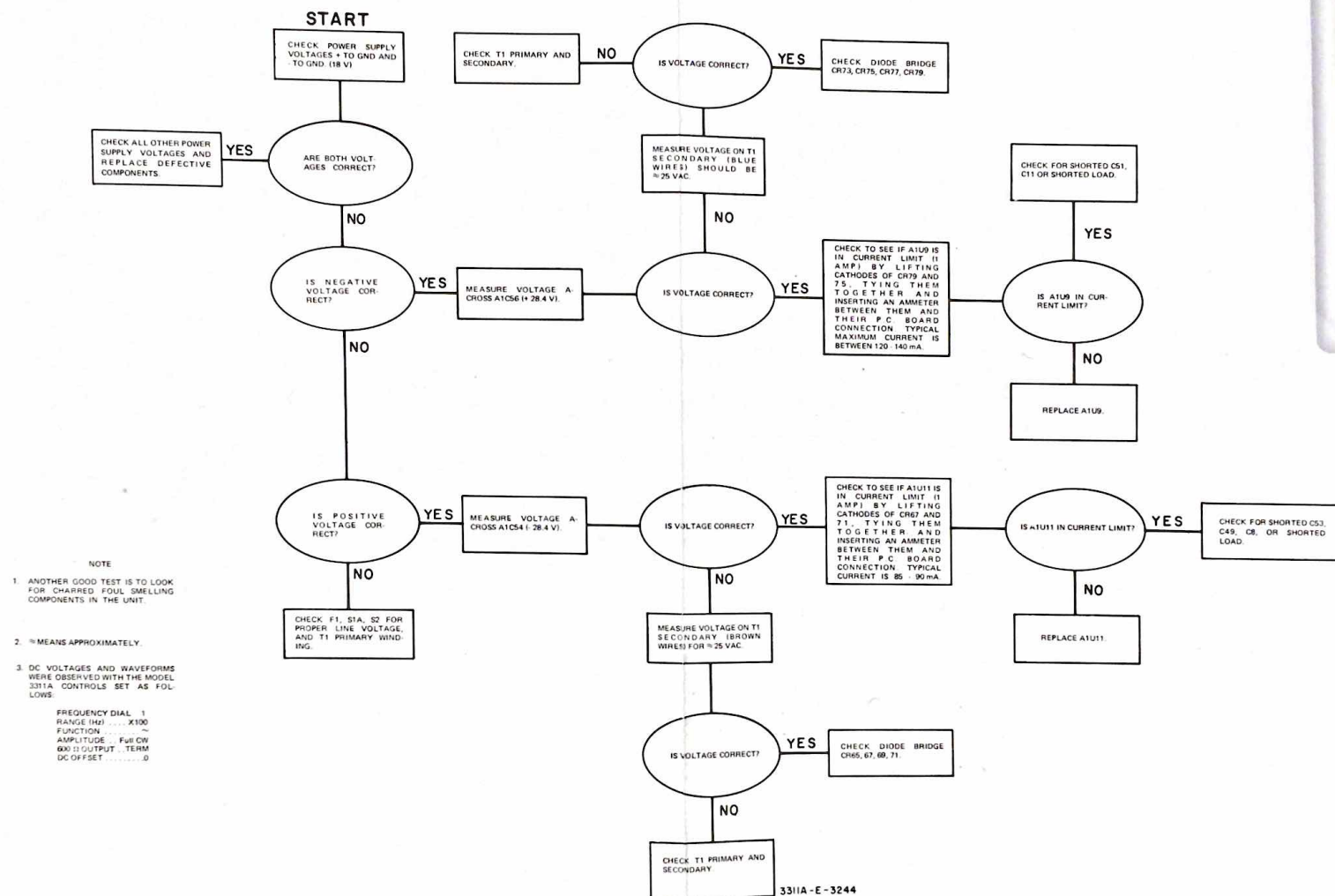
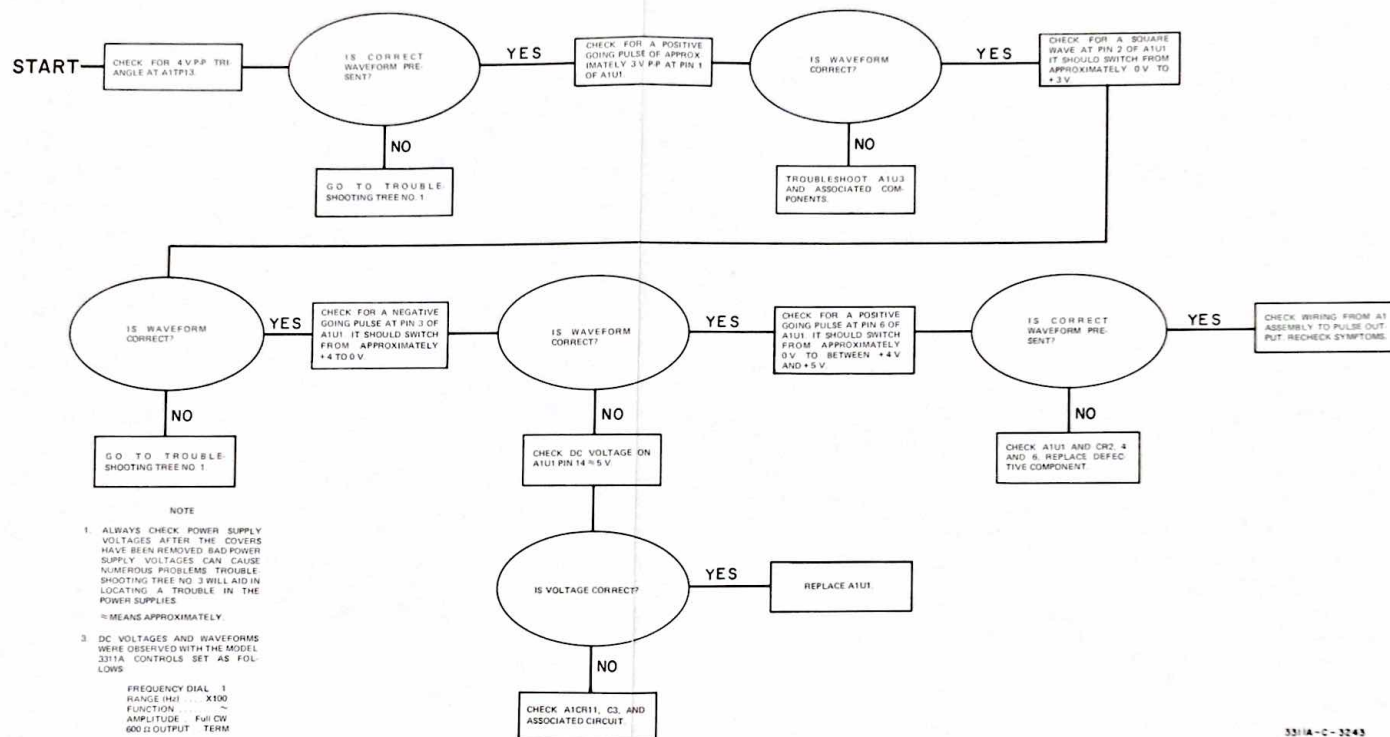
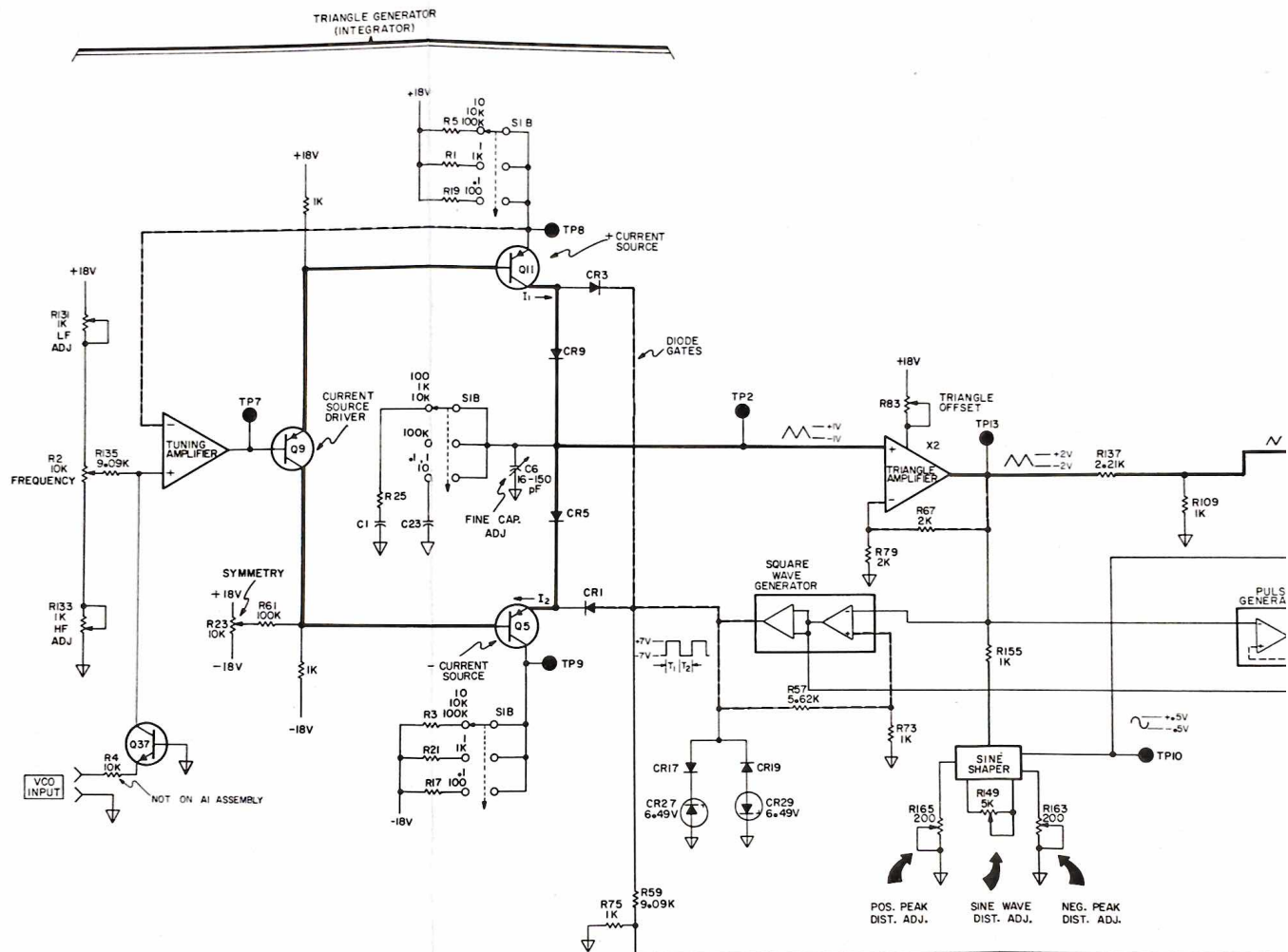


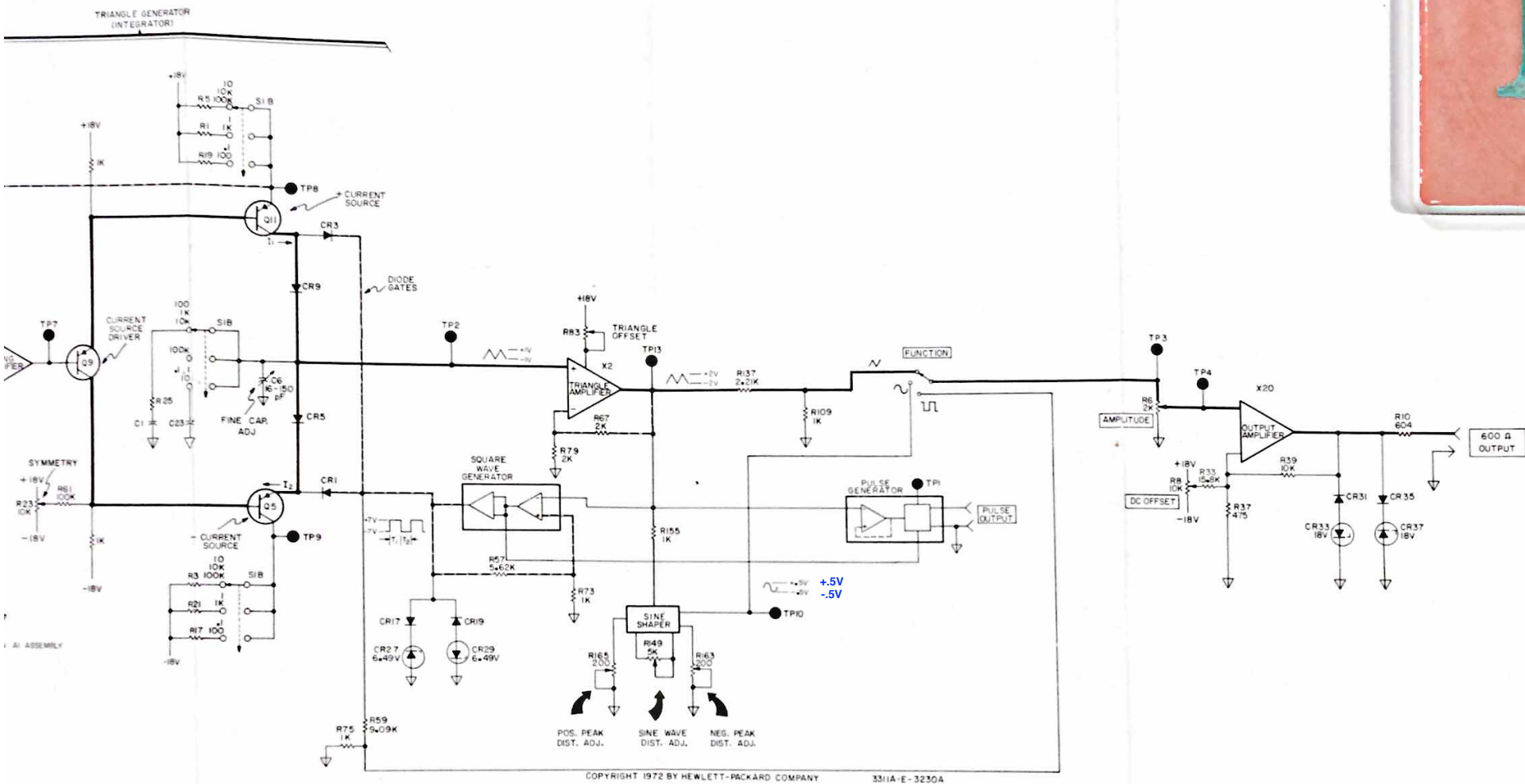
Figure 7-2. Power Supplies Defective.



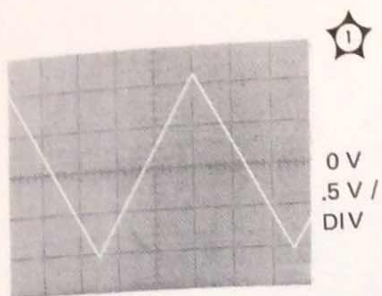
3311A-C-3243

Figure 7-3. Pulse Defective.

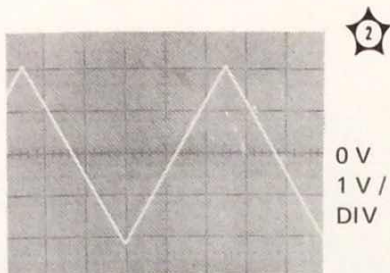




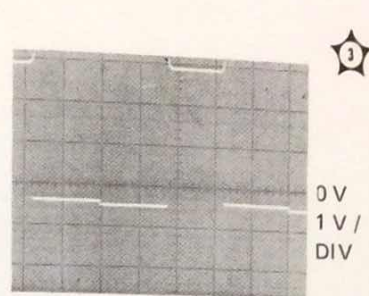




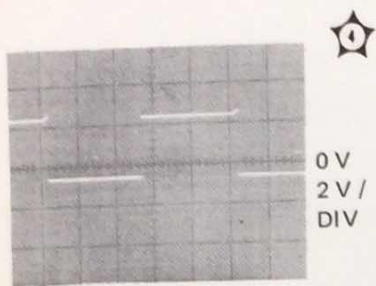
2 ms/DIV



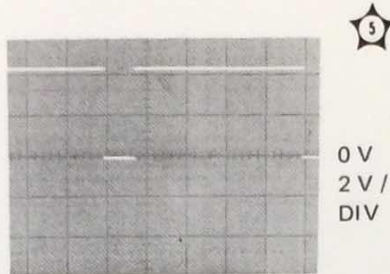
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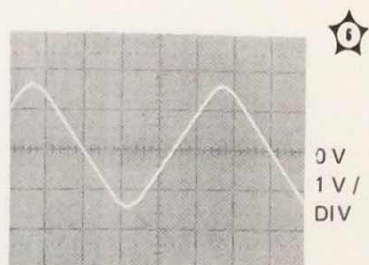
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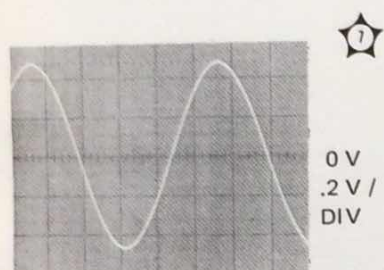
2 ms/DIV



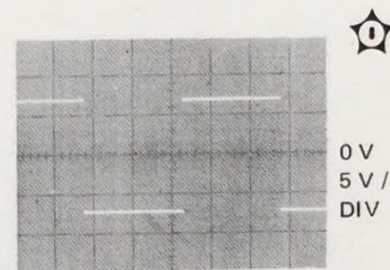
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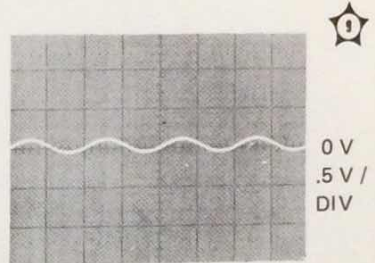
2 ms/DIV



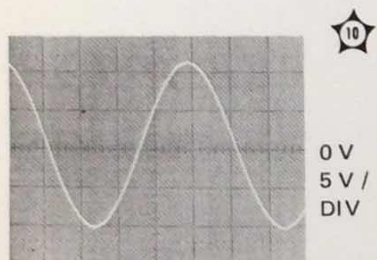
2 ms/DIV



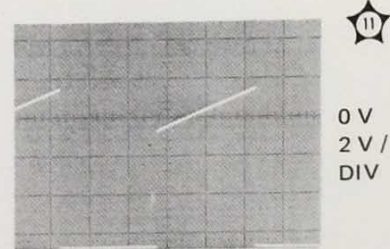
2 ms/DIV



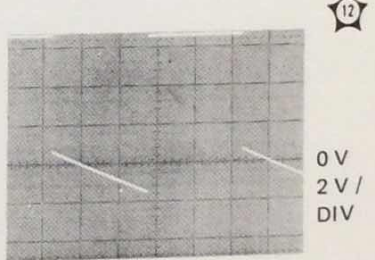
.05 V/DIV  
AC COUPLED



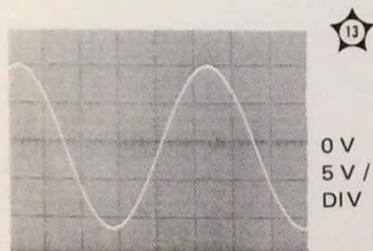
2 ms/DIV



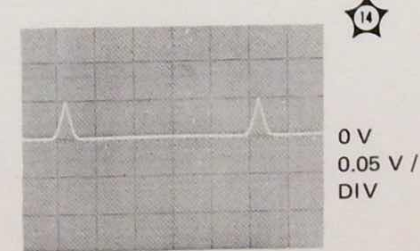
2 ms/DIV



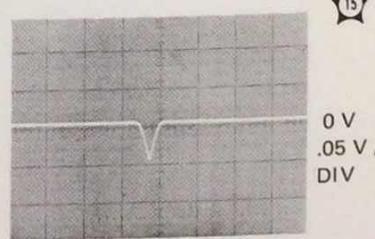
2 ms/DIV



2 ms/DIV



2 ms/DIV  
AC COUPLED



3311A-A-3233  
2 ms/DIV  
AC COUPLED





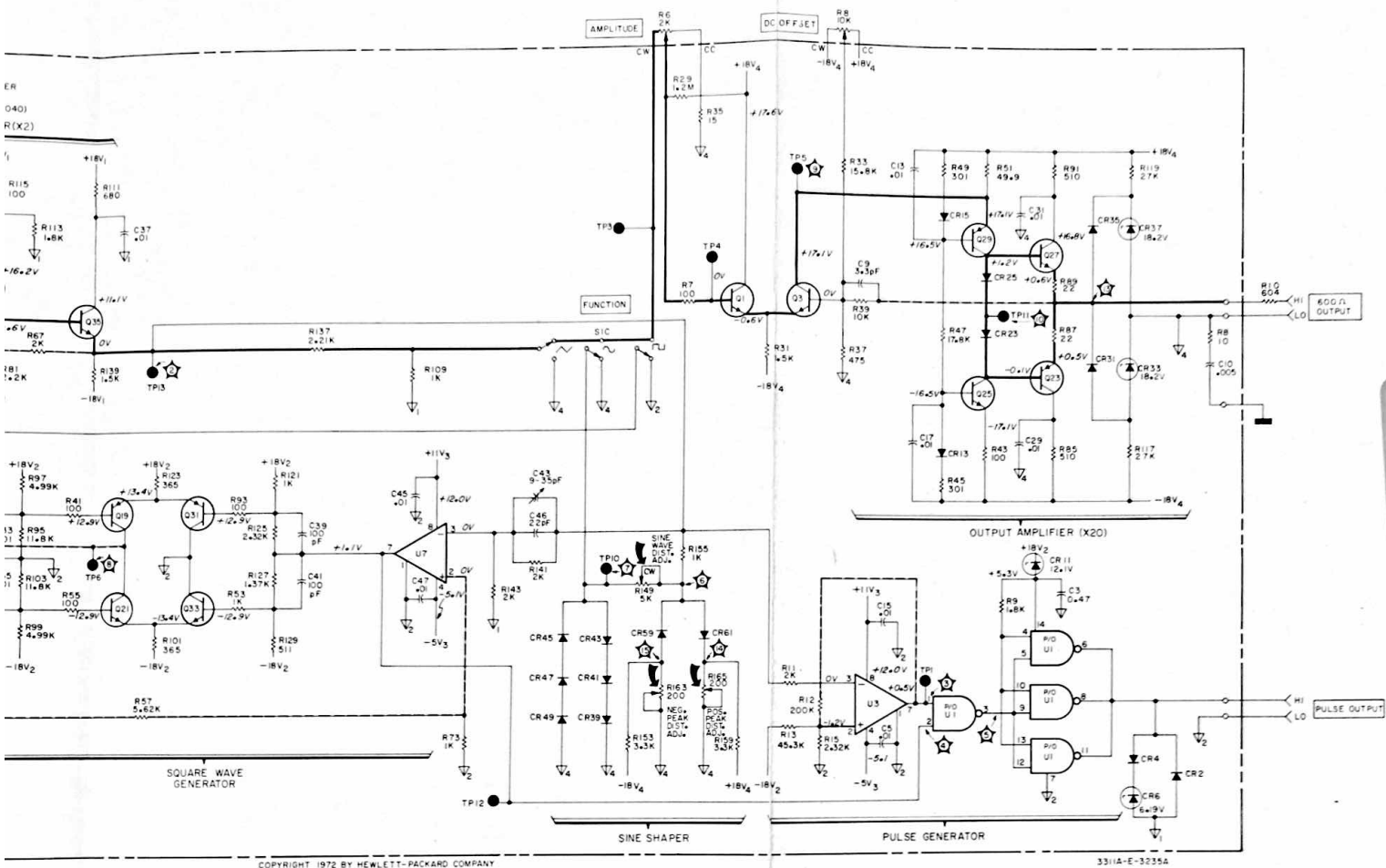


Figure 7-5. Function Generator Circuit Diagram (p/o A1).