Moog Model 55

Modules

902(x5)
903A
904A
904B
911(x5)
911A
914
921A(x2)
921B(x6)
921
951
960
961
962
992
993*
994*
995
CP2*
CP3A(x3)
CP8*
CP35*

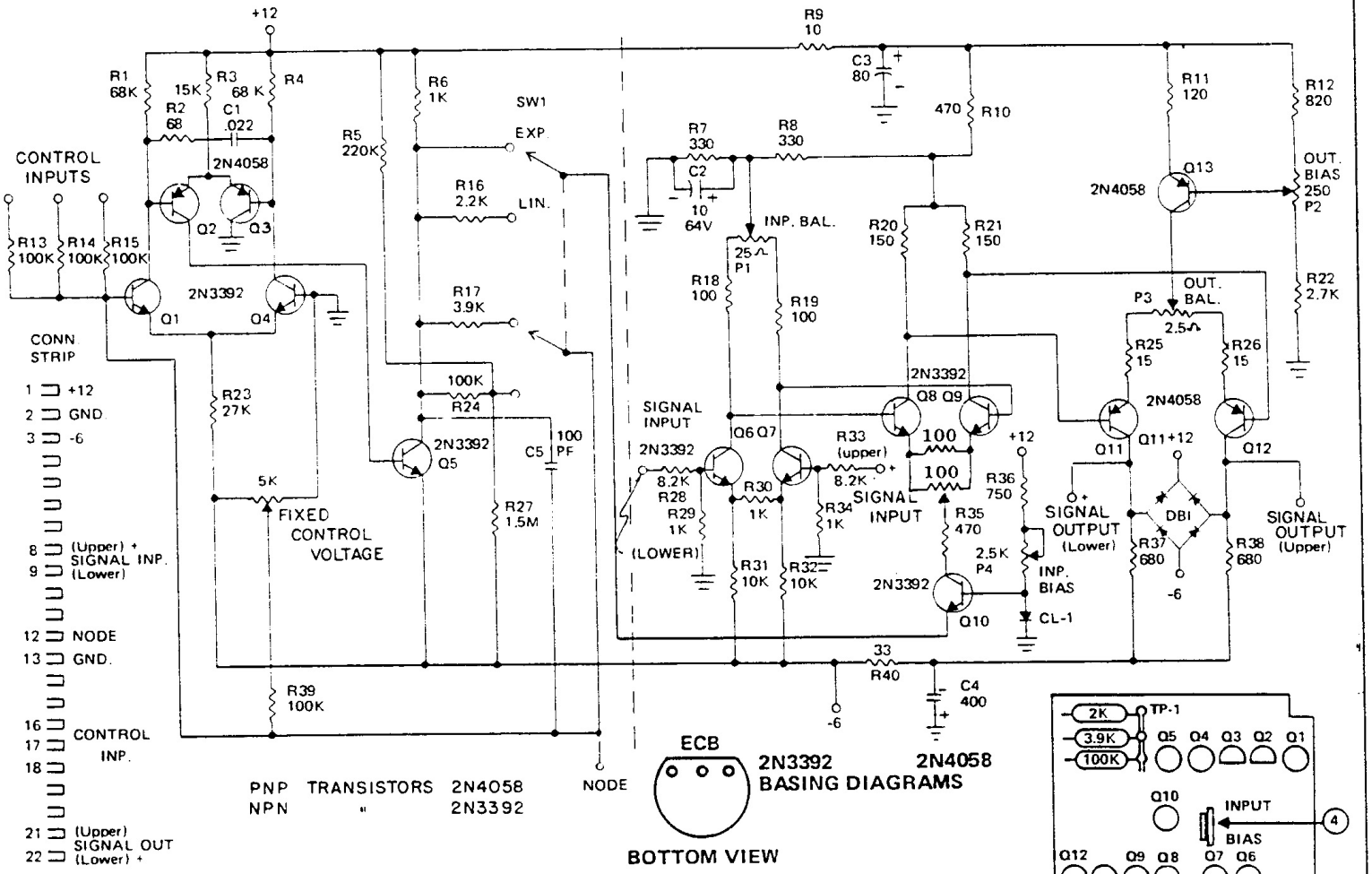
(*) Doesn't appear in schematics

902 VOLTAGE CONTROLLED AMPLIFIER TEST PROCEDURE

1. Connect dc voltmeter to TP-L (collector of Q5); low side to ground.
2. Turn FIXED CONTROL VOLTAGE pot to 6 and set CONTROL MODE switch to "EXP." DC voltage should read approximately zero.
3. Rotate FIXED CONTROL VOLTAGE pot to 0. DC voltage should read approximately +0.24V.
4. Set CONTROL MODE switch to LIN. DC voltage should read approximately +1.2V.
5. Rotate FIXED CONTROL VOLTAGE pot to 6. DC voltage should read approximately -4.8V.

NOTE
If the above voltages are observed, the adder section (Q1 thru Q5) is operating properly.

6. With FIXED CONTROL VOLTAGE in 6 and dc voltmeter connected between one of the SIGNAL OUTPUTS jacks and ground, adjust OUTPUT BIAS trimpot for zero volts.
7. Connect dc voltmeter across positive terminals of SIGNAL OUTPUTS jacks. Connect jumper between collectors of Q8 and Q9 and adjust OUTPUT BALANCE trimpot for 0 VDC.
8. Remove jumper across collectors of Q8 and Q9 and connect across collectors of Q6 and Q7. Adjust Q8 and Q9 BALANCE trimpot for 0 VDC.
9. Remove jumper and adjust INPUT BALANCE trimpot for 0 VDC.
10. Turn FIXED CONTROL VOLTAGE pot and ascertain that there is no large offset. If necessary, repeat steps 7, 8 and 9.
11. Turn FIXED CONTROL VOLTAGE pot to 6. Apply 0db 1kHz sine wave to one of the SIGNAL INPUTS. Signal output should be approximately +5db to +7db.
12. Note the output level. Set the CONTROL MODE switch to "EXP." Adjust INPUT BIAS to obtain a level equal to that noted in the "LIN" position.
13. Slowly turn FIXED CONTROL VOLTAGE pot from 6 to 0 and check for linear action in the LIN mode and exponential action in the EXP mode. At 0, signal output should be -60db maximum.
14. Turn FIXED CONTROL VOLTAGE pot to 6. With a dc bias, check each control input for proper voltage control. 0 volts should have no effect, -6 volts should cut the amplifier off completely.
15. With no signal input and FIXED CONTROL VOLTAGE set at 6, output noise should be -60db maximum.



(1) Adjusts ± output balance for exponential dc voltages with FIXED CONTROL VOLTAGE CONTROL fully counterclockwise.

(2) Adjusts zero output offset with FIXED CONTROL VOLTAGE control fully counterclockwise.

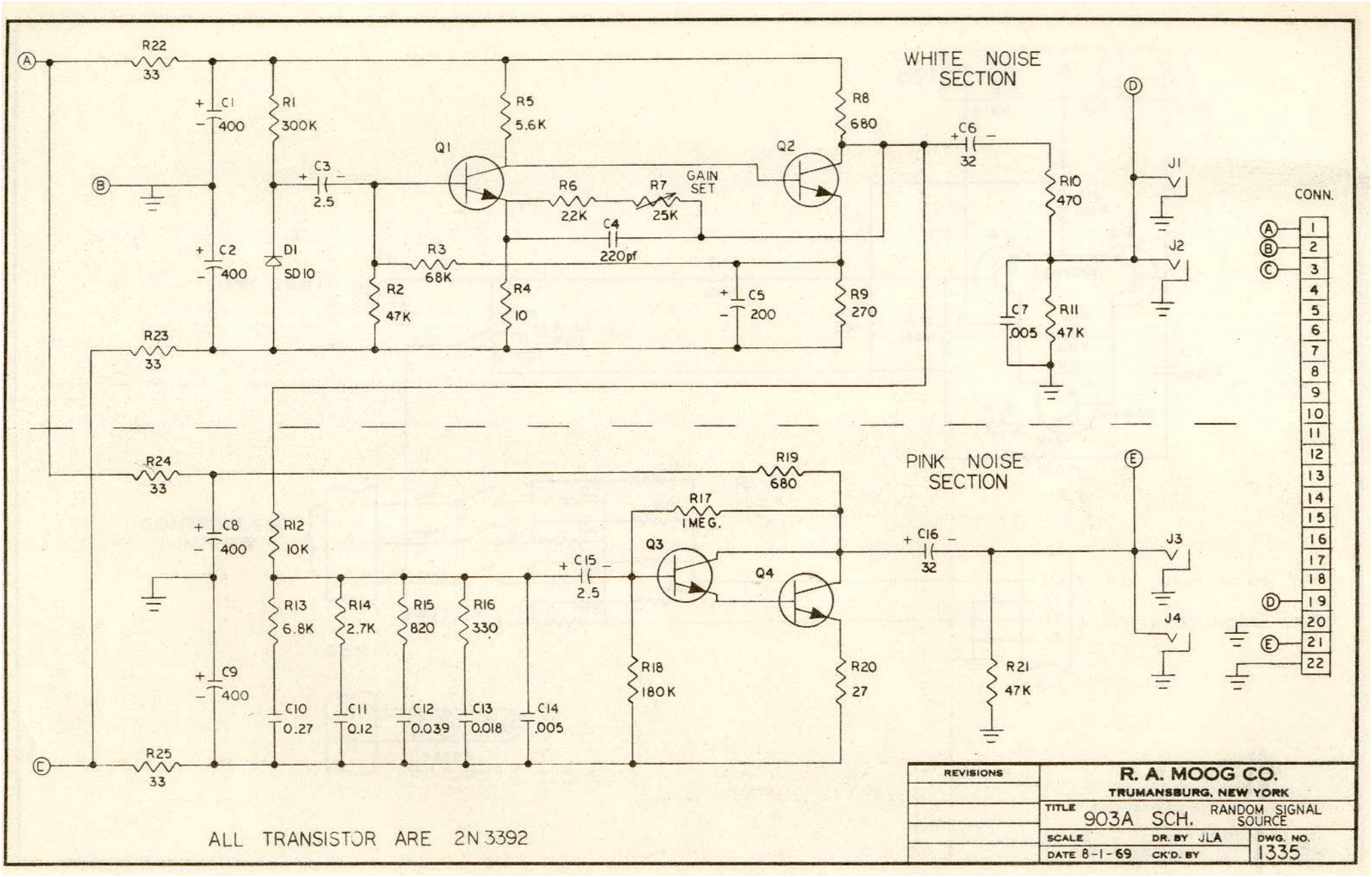
(3) Adjusts zero output offset with FIXED CONTROL VOLTAGE control fully clockwise.

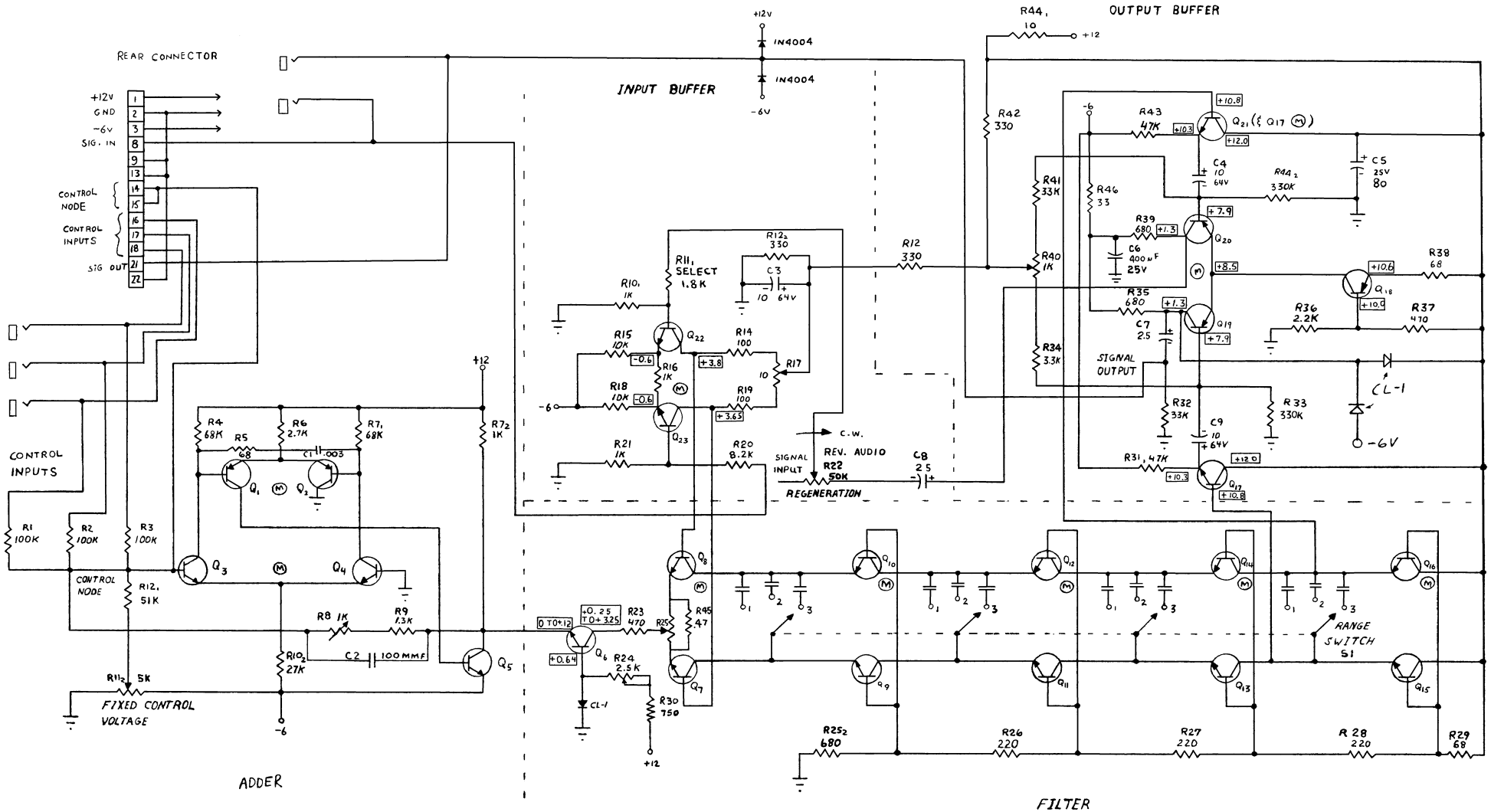
(4) Adjusts amplitude level balance between linear and exponential mode with FIXED CONTROL VOLTAGE control full clockwise.

VOLTAGE CONTROLLED AMPLIFIER ALIGNMENT PROCEDURE AND ADJUSTMENT LOCATION DIAGRAM

MOOG MUSIC INC.
SCHEMATIC, 902 VOLTAGE CONTROLLED AMPLIFIER
993-041813 1068

FIGURE 9 VOLTAGE CONTROLLED AMPLIFIER MODEL 902


WHITE NOISE SECTION
PINK NOISE SECTION
R22 33
C1 400
R1 300K
C3 2.5
Q1
R5 5.6K
R6 22K
R7 GAIN SET 25K
C4 220pf
Q2
R8 680
C6 32
R10 470
J1
J2
CONN.
C2 400
D1 SD10
R3 68K
R2 47K
R4 10
C5 200
R9 270
C7 .005
R11 47K
R23 33
R24 33
R19 680
R17 1 MEG.
C8 400
R12 10K
C15 2.5
Q3
Q4
C16 32
J3
J4
R13 6.8K
R14 2.7K
R15 820
R16 330
C9 400
C10 0.27
C11 0.12
C12 0.039
C13 0.018
C14 .005
R18 180K
R20 27
R21 47K
R25 33
ALL TRANSISTOR ARE 2N3392
REVISIONS
R. A. MOOG CO.
TRUMANSBURG, NEW YORK
TITLE 903A SCH. RANDOM SIGNAL SOURCE
SCALE
DR. BY JLA
DWG. NO. 1335
DATE 8-1-69
CK'D. BY



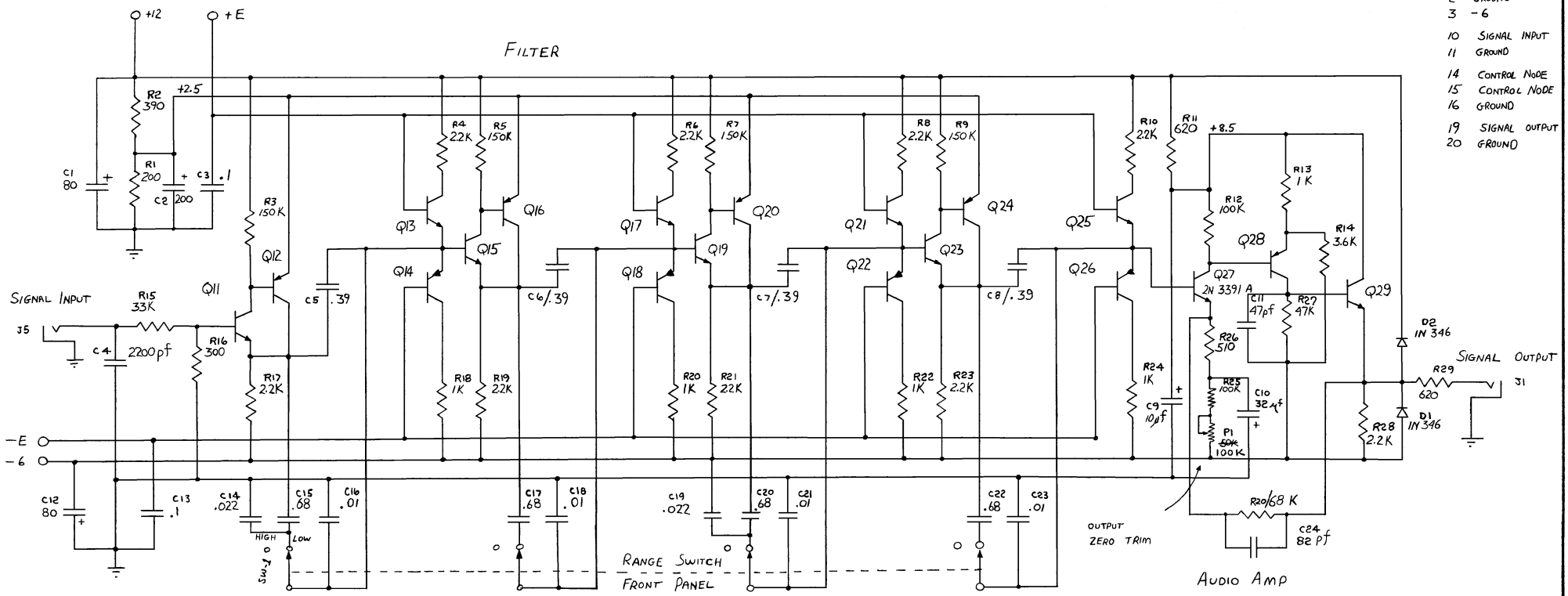
NOTES:

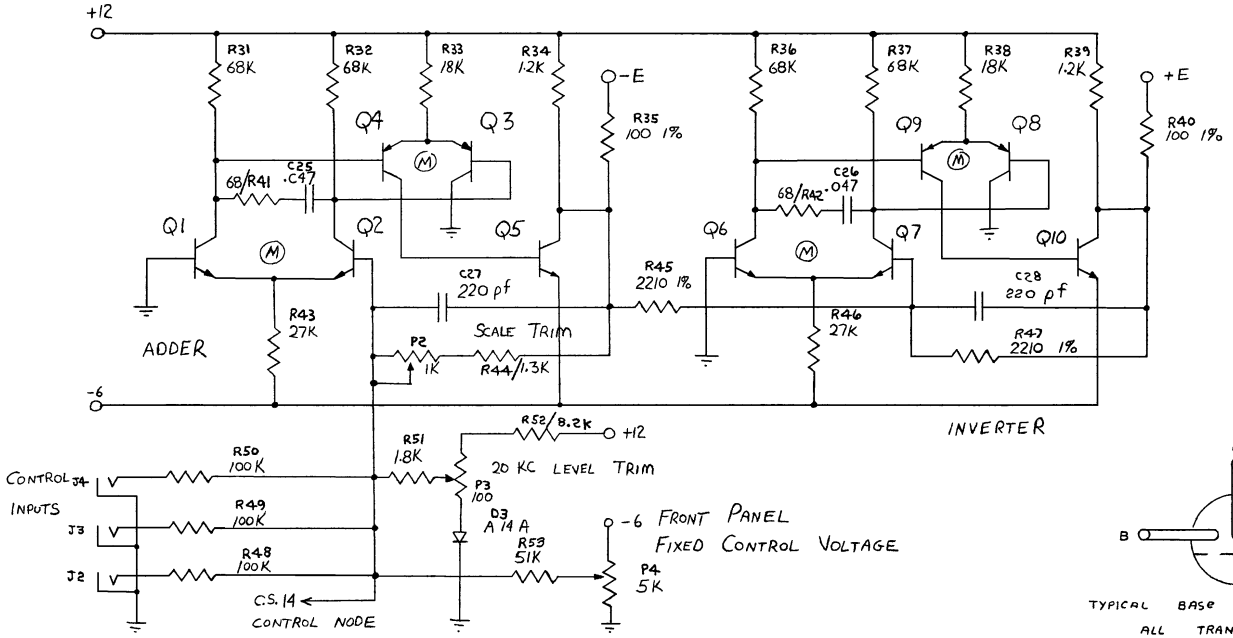
1. ALL NPN TRANSISTORS: 2N 3392
2. ALL PNP TRANSISTORS: 2N 4058
3. (M) ⇒ MATCHED PAIR
4. RANGE CAPACITOR SIZES

1	1.2 μF
2	0.3 μF
3	0.075 μF

904-A VOLTAGE CONTROLED LOW PASS FILTER		
DRAWN BY P.Y.		SCHEMATIC
APPR. BY		
DATE 7-25-67	DRAWING NUMBER SUPERCEDES NO. 1089	1149
A. A. MOOG CO. TRUMANSBURG, N.Y.		

REV. E	
REV. D	
REV. C 11/10/70 W/GS	REV.-B ~ECN-003 12-19-69
REV. A 9-8-69 - JLA	

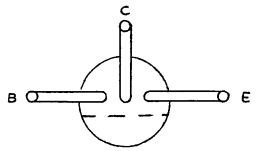




CONNECTOR STRIP

1	+12
2	GROUND
3	-6
10	SIGNAL INPUT
11	GROUND
14	CONTROL NODE
15	CONTROL NODE
16	GROUND
19	SIGNAL OUTPUT
20	GROUND

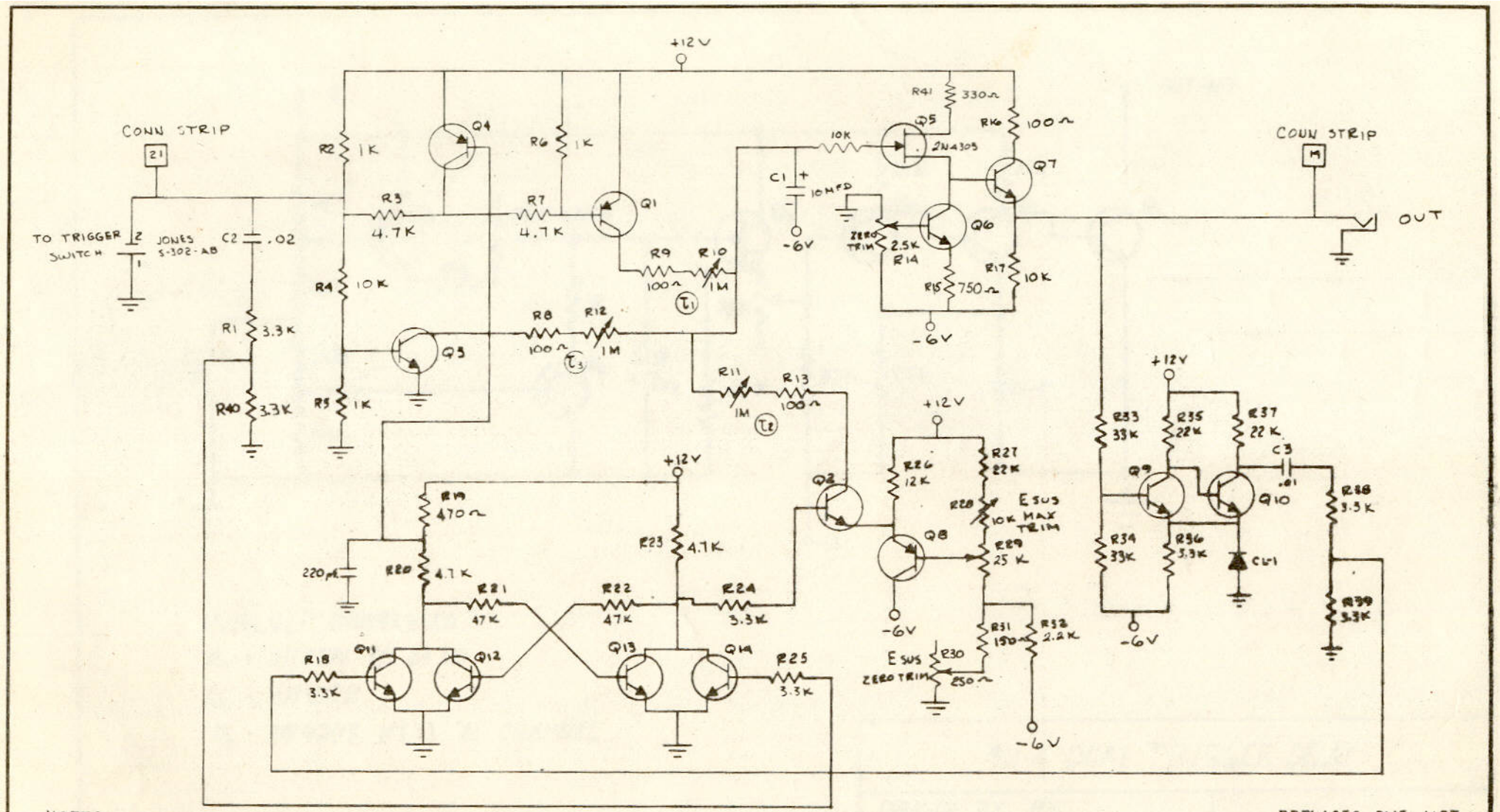
ALL NPN TRANSISTORS 2N 3392 EXCEPT Q 27
ALL PNP TRANSISTORS 2N 4058
(M) INDICATES MATCHED PAIR
ALL RESISTORS ½ WATT 5% CARBON } UNLESS OTHERWISE MARKED
ALL CAPACITORS IN µF
Q 13, 17, 21, 25 ARE A MATCHED SET
Q 14, 18, 22, 26 " " " "



TYPICAL BASE LAY-OUT FOR ALL TRANSISTORS USED IN CIRCUITRY.

THIS DWG. APPLIES TO MODULES WITH SERIAL NUMBERS 194 AND ABOVE

REVISIONS		R. A. MOOG CO.	
C	COMPLETE REDRAWING *	TRUMANSBURG, NEW YORK	
*	OLD DWG DATED 12/12/66 OBSOLETED	TITLE 904 B NEW VERSION	
		SCALE	DR. BY Scott
		DATE 6/23/70	CK'D. BY
			DWG. NO. 1118



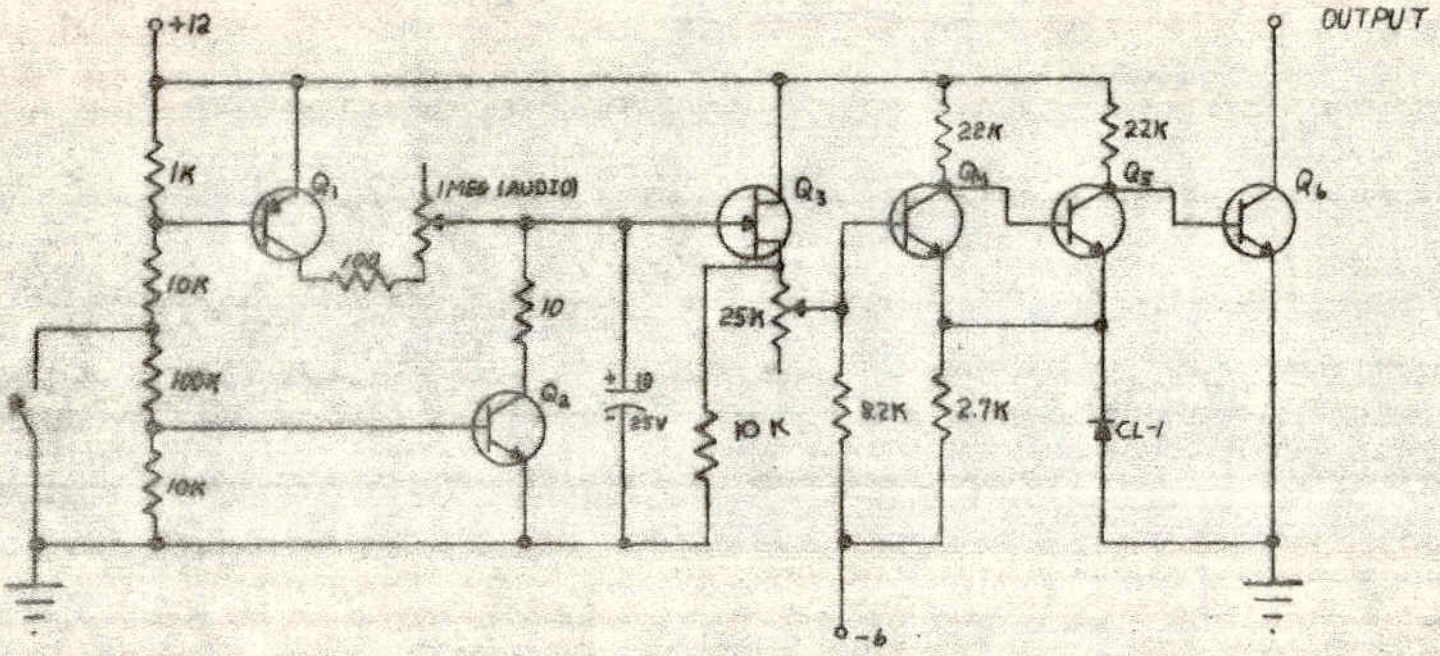
NOTES:

I. ALL PNP TRANSISTORS ARE 2N4058

II. ALL NPN TRANSISTORS ARE 2N3392

REPLACES DWG 1103

C-ECN-004 1-12-69 WRH	REVISIONS	R. A. MOOG CO.
	A- R15 From 1.5K To 820Ω	TRUMANSBURG, NEW YORK
	A- R41 FROM Q5 TO 6.2K	TITLE 911 ENVELOPE GENERATOR
	B - ECN-002	SCALE DR. BY RER DWG. NO. 1220
		DATE 8-14-68 CK'D. BY



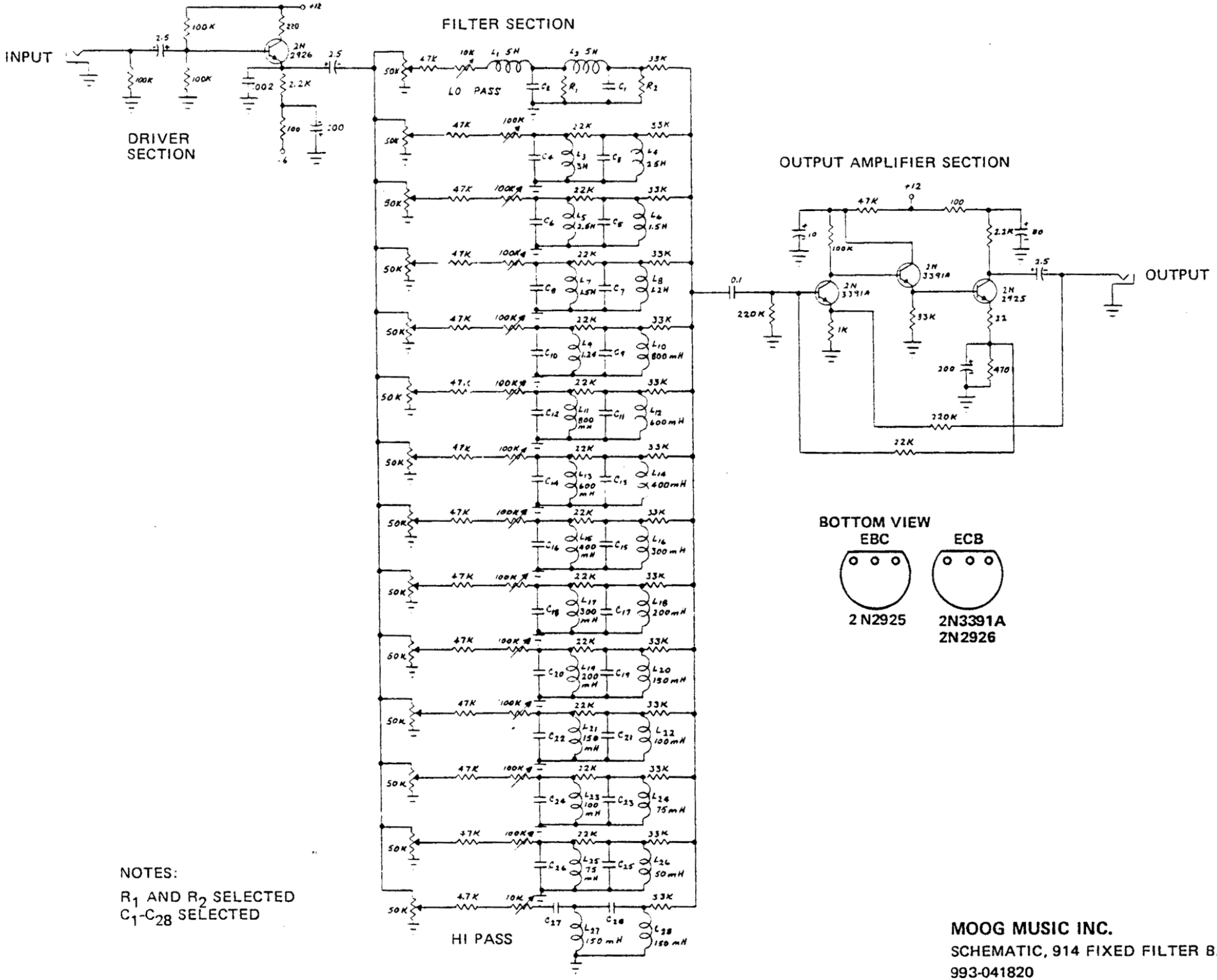
Q_1, Q_4, Q_5 - 2N2926 (1)

Q_2 - 2N2926 (M) OR (S)

Q_3 - 2N4058

Q_6 - 2N4303 (FET) "N" CHANNEL

911-A DUAL TRIGGER DELAY	
DRAWN BY P.Y.	SCHEMATIC
APPR. BY	
DATE 7-13-67	DRAWING NUMBER 1146 — 1146
R. A. MOOG CO. TRUMANSBURG, N. Y.	



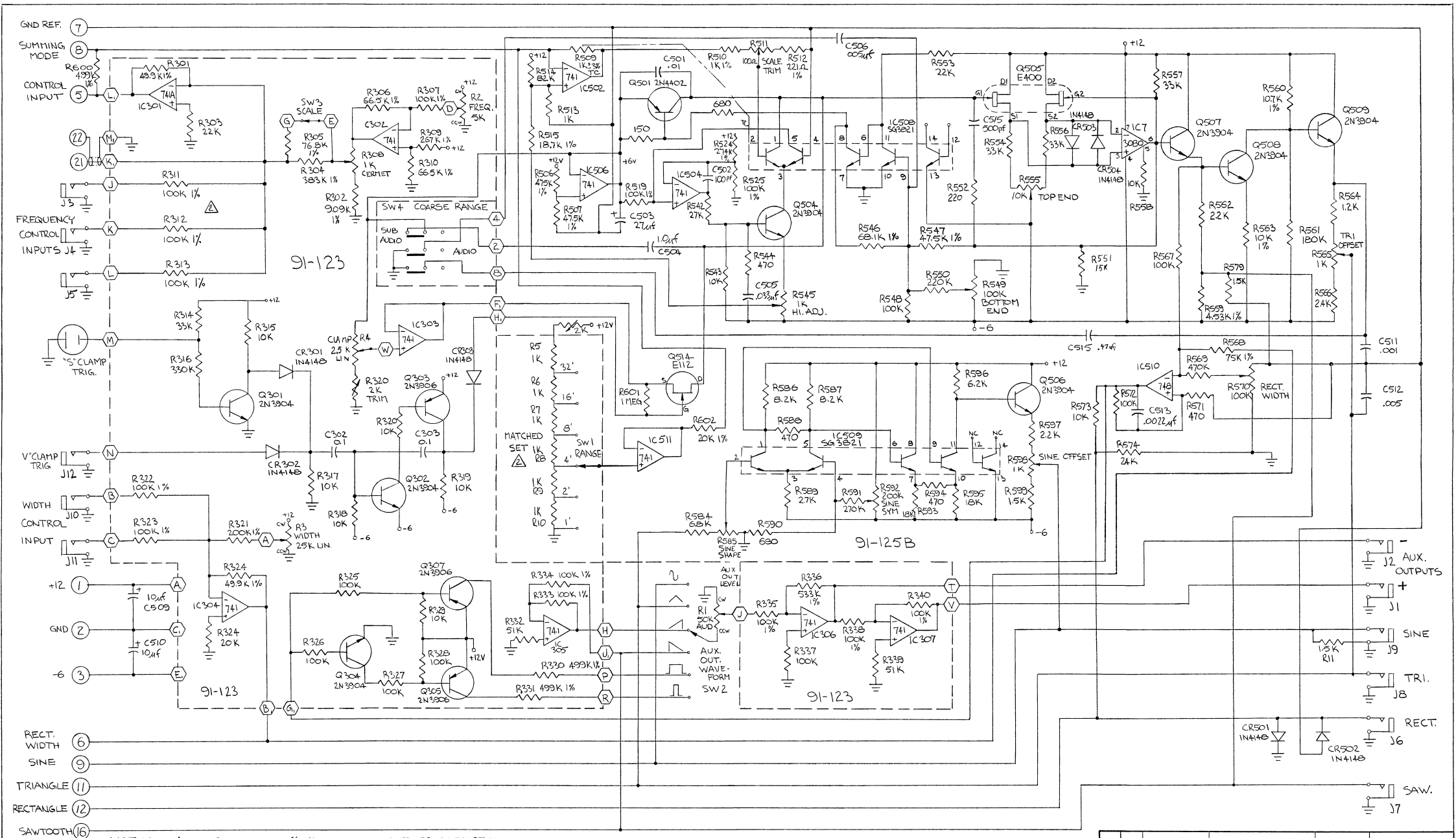
NOTES:

R_1 AND R_2 SELECTED
C_1-C_{28} SELECTED

MOOG MUSIC INC.

SCHEMATIC, 914 FIXED FILTER BANK

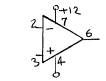
993-041820 1142



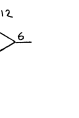
NOTES:

1. ALL RESISTORS 5%, ½ WATT UNLESS OTHERWISE NOTED
2. 1% RESISTORS MATCHED TO 0.1%
3. (X) DESIGNATES REAR CONNECTOR NUMBER (PCB 91-125)
4. (X) DESIGNATES P/C BOARD INTERCONNECTIONS

TYP. 741/748 IC



TRANSISTOR TOP VIEWS



E 400

E 112

2N3904, 2N3906

COMPONENT DESIGNATORS

NO PREFIX → FRONT PANEL
3XX → 93-123 PCB ASST
5XX, 6XX → 93-125 PCB ASST

ITEM	PART NUMBER	DESCRIPTION	MATERIAL

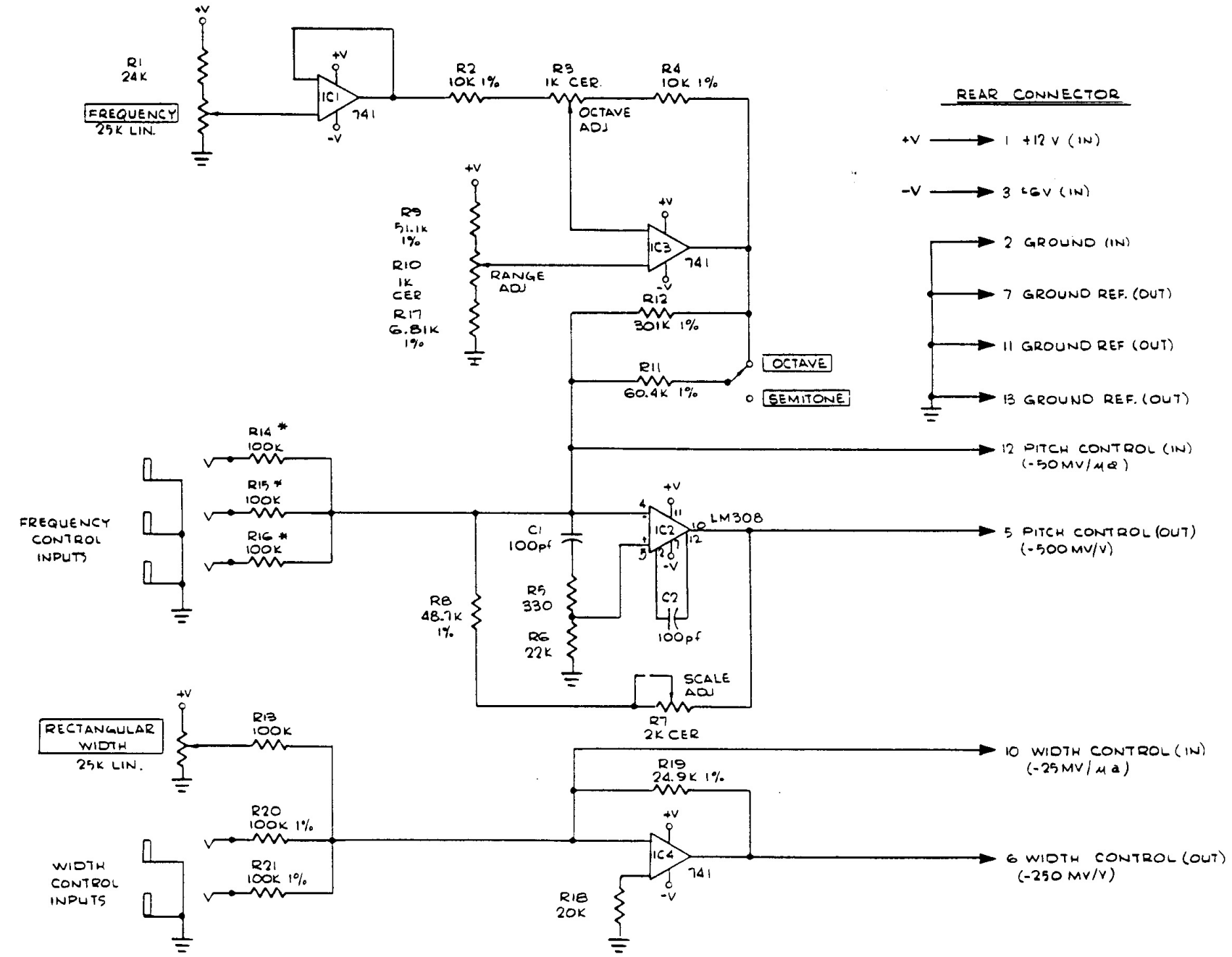
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCE FRACTIONS ± 1/64. ANGLES ± 1°. 2 PLACE DECIMALS ± .01. 125 FINISH ON ALL SURFACES. DRILLED HOLE TOL .040 – .125 DIA ±.002 TOL; .126 – .228 DIA ±.003 TOL; .229 – .500 DIA ±.004 TOL; .501 – .750 DIA ±.005 TOL

DRAWN BY	JRB 7/11/74
CHECK	
GRP ENGR.	
REVIEW QC.	
SUPERVISOR	

moog MUSIC INC. WILLIAMSVILLE, NEW YORK

921 OSCILLATOR SCHEMATIC DIAGRAM

NEXT ASSY	MODEL NO.	SIZE	CODE IDENT	
	921	C		08-036
APPLICATION		SCALE ——	WT.	SHEET 1 OF 1



NOTES:

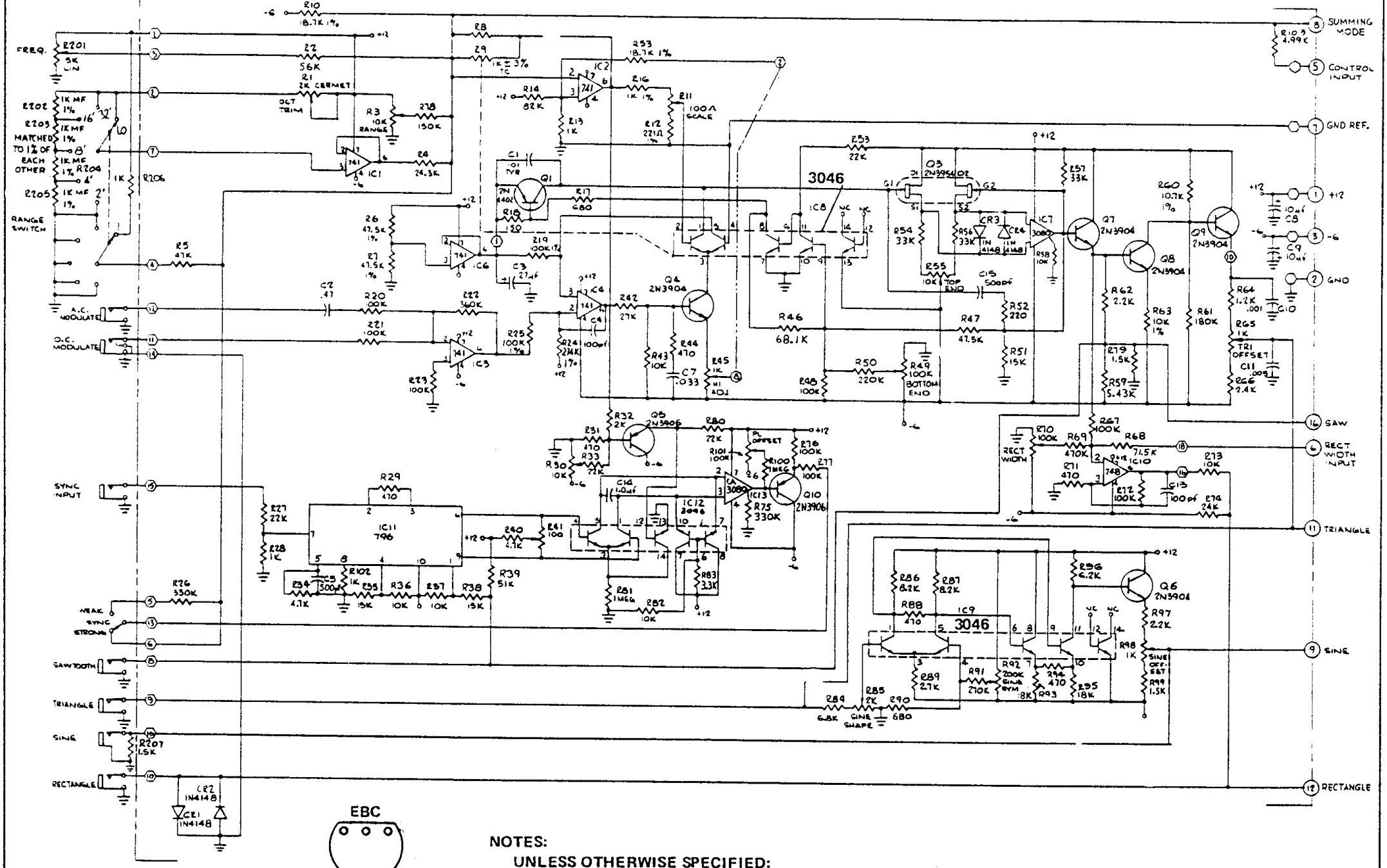
1. UNLESS OTHERWISE SPECIFIED ALL RESISTORS ARE ±5%, 1/2 W.
2. ALL 1% RESISTORS ARE 1/4 W.
3. * MATCHED TO 0.1%

MOOG MUSIC INC.

SCHEMATIC, 921A-OSCILLATOR DRIVER

993-041835 08-009

FIGURE 22. OSCILLATOR DRIVER MODEL 921A



EBC

BOTTOM VIEW
2N3904
2N4402
2N3906

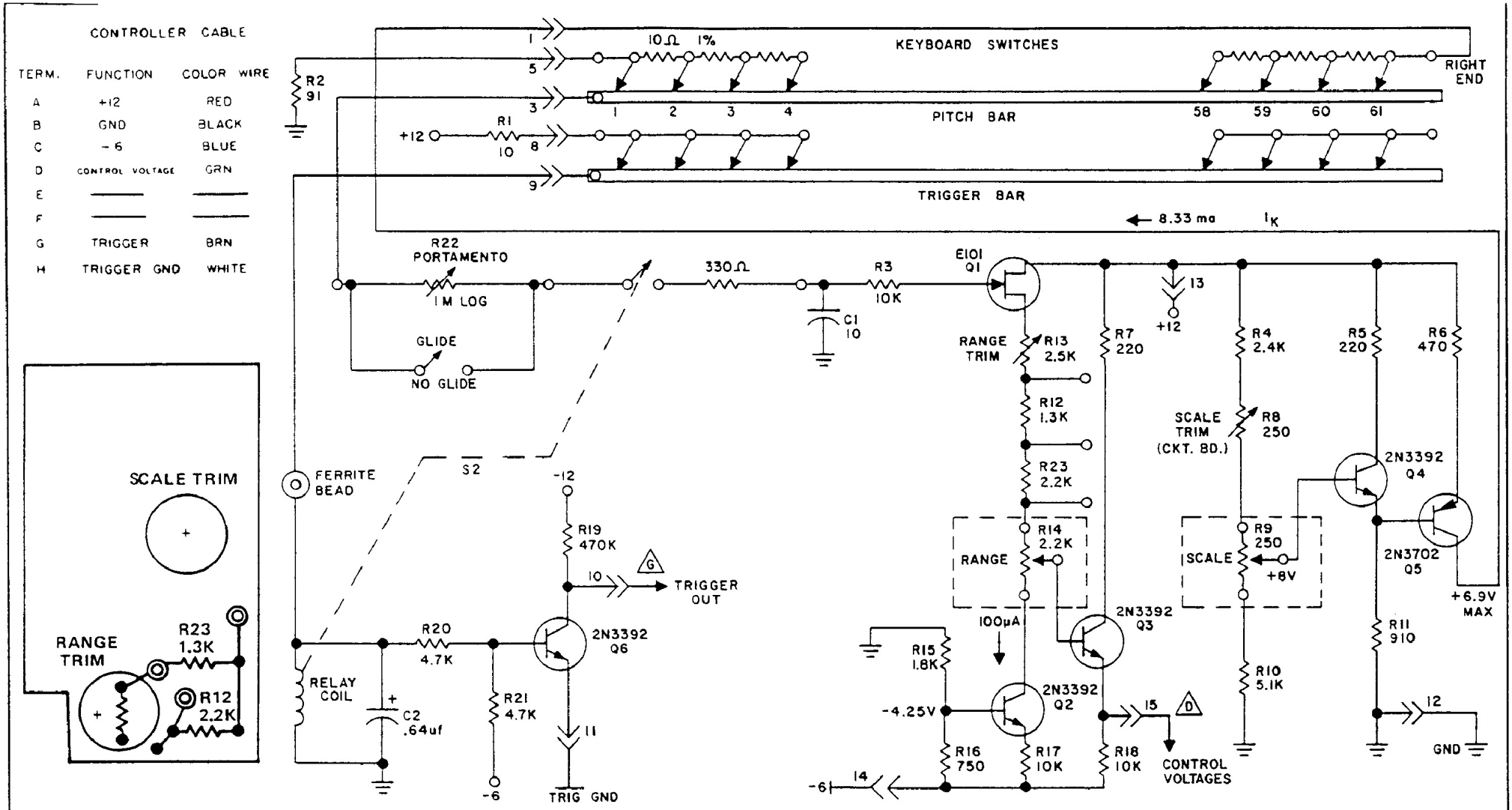
NOTES:

UNLESS OTHERWISE SPECIFIED:

1. ALL RESISTOR VALUES IN OHMS, 1/4 OR 1/2W
2. ALL CAPACITOR VALUES IN MFD.
3. ⬡ DESIGNATES PLUG PIN
4. ○ DESIGNATES REAR CONNECTOR FINGER

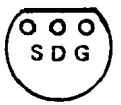
MOOG MUSIC INC.
SCHEMATIC, OSCILLATOR 921B
993-041875 08-013

FIGURE 23. OSCILLATOR MODEL 921B

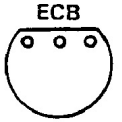


951 KEYBOARD TUNING

1. The keyboard has two adjustments to be made. The scale adjustment adjusts the current source so that the total drop across the resistor string is 5.000 volts. The range adjustment fixes the lowest key at zero volts. Adjustments are made with the external range and scale controls on the five mark.
2. Adjust the range setting with the trimpot. If adjustment cannot be made within the range of the trimpot, it may be necessary to short one or both of the two resistors in series with it.
3. Adjust the scale trimmer so that the keyboard spans five volts. If zero shifts, for example to .04, then adjust the top for 5.04. That is, always adjust for a five volt span.
4. Now readjust range trim so that first key is zero. Check to see that scale still gives 0 to 5.000 volts.



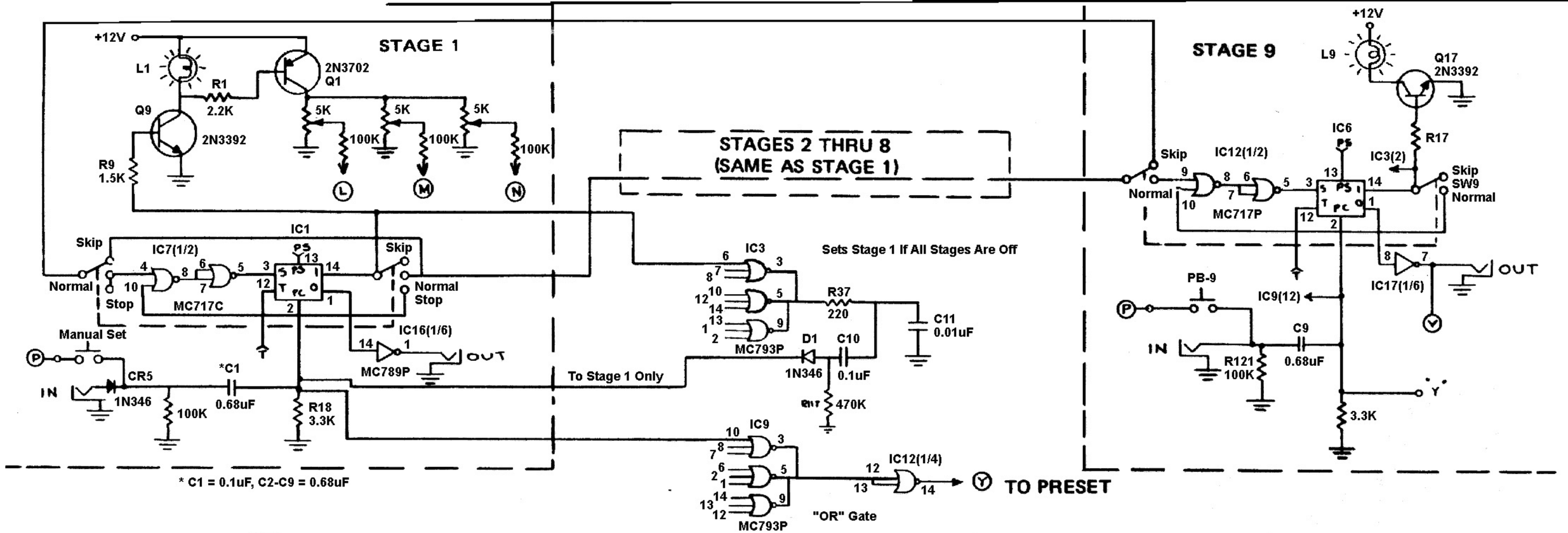
E101
TOP
VIEW



2N3702
2N3392
BOTTOM VIEW

MOOG MUSIC INC.
SCHEMATIC, 951, KEYBOARD
993-041831 1266

FIGURE 28 KEYBOARD MODEL 951



MOOG MUSIC INC.

SCHEMATIC, SEQUENTIAL CONTROLLER 960

993-041823 **1188**

FIG 32 SEQUENTIAL CONTROLLER (CIRCUIT BOARD 2) MODEL 960

SCHMIDT TRIGGER

+12V
R52 22K
R53 22K
Q27 2N3392
Q26 2N3392
Q25 2N3392
R51 27K
R54 4.7K
C21 .047
EXT SHIFT
R59 10K
R85 680K
R60 1.5K
R61 220
R63 22K
R62 10K
-6V
-6V
TO CLOCK PULSE ONE SHOT (W)

SCHMIDT TRIGGER

GENERATES 90% DUTY CYCLE PULSE

+12V
Q28 2N4303
(A)
R48 22K
R49 22K
R50 10K
R47 12K
Q24
Q51
Q23 2N3392
2N3392
Q22 2N3392
R118 1.5K
OSC. OUT
R58 4.7K
TRIM FOR 90% DUTY CYCLE OUTPUT
R55 25K
R56 1.5K
R57 220
-6V
-6V

SCHMIDT TRIGGER

OP AMP
TYP. AMP A-C
AMP C SHOWN

POINTS (L) & (M) ARE INPUTS OF OP AMPS A & B RESPECTFULLY

+12V
R65 120K
Q38
Q37 2N4058
OP. AMP "C" ONLY
OFF
ON (U)
SW 14
3RD ROW CONTROL OF TINING
3RD CONTROL ROW BUSS (N)
Q32 2N3392 Q31
10K
R 167
X1 R162
X2 R163 3.55K
X4 R164 16.7K
43.3K
220
R119
R70 100Ω
OUTPUT
CONTROL VOLTAGE
OUTPUT
+12V
1.0H R66
R67
100K ZERO OFFSET
-6V
1.3K R165
R68 300K
-6V
R166 SEL.
R64 1K
R69 2.2K
C22 0.1
-6V

OSC. FLIP-FLOP SWITCH
IC18

OSC ON (P)
CR4 IN946
C17 .01
R130 100K
+3.6
R120 6.8K
R38 3.3K
MC 793P
C19 .01
OSC. OFF (P)
R43 3.3K
R131 100K

OSCILLATOR
(A)
+12V
OSC. RANGE SWITCH
Q29 2N2646
R46 1K
R44 27
R45 1K
SW 10
C34 27
C33 5.6
C32 1.5
C31 .39
C30 .09
C29 .022
(2)
TO AUTO SHIFT ONE-SHOT

TO TIMING CAPACITOR OF OSC.
(A)
Q21
R40 1.5K
4.7K
D3 IN346
2N3392
4.7K
L10
+12V
Q20
2N3392
R39 1.5K
C18 .001
(V) TO OUTPUT OF STAGE 9
R42 1.1K
C20 10
+3.6V
R41 2K

NOTE:
1. Q28 & Q29 MUST BE PUSHED DOWN SECURELY IN THEIR SOCKETS FOR PROPER OPERATION
2. WHEN REPLACING Q28, USE OUTSIDE SOCKET HOLES.

2N2646
1 - EMITTER
2 - BASE 1
3 - BASE 2

ECB
BOTTOM VIEW
2N3392
2N4058
2N2646

MOOG MUSIC INC.

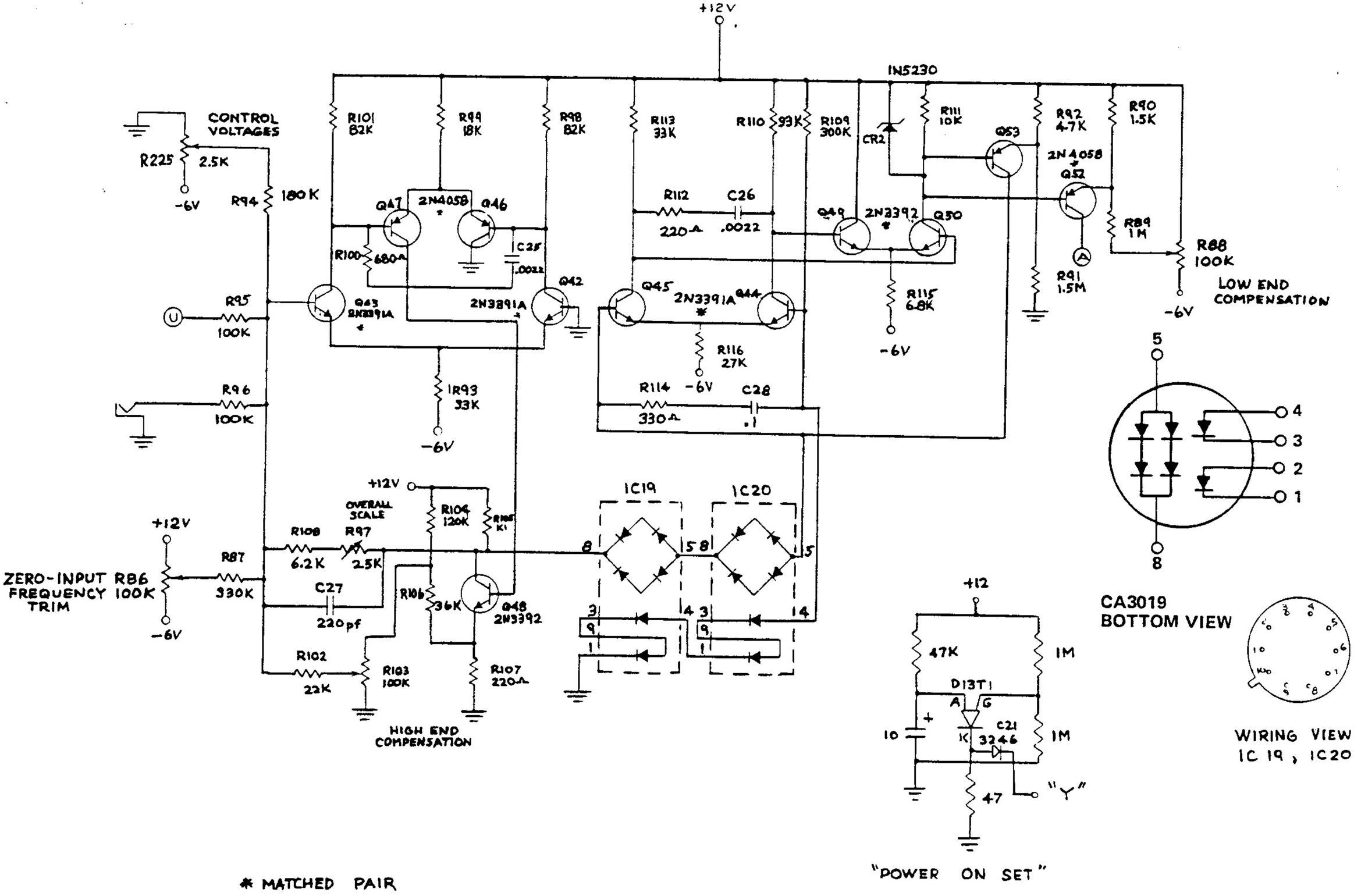


FIGURE 33. SEQUENTIAL CONTROLLER (CIRCUIT BOARD 3) MODEL 960

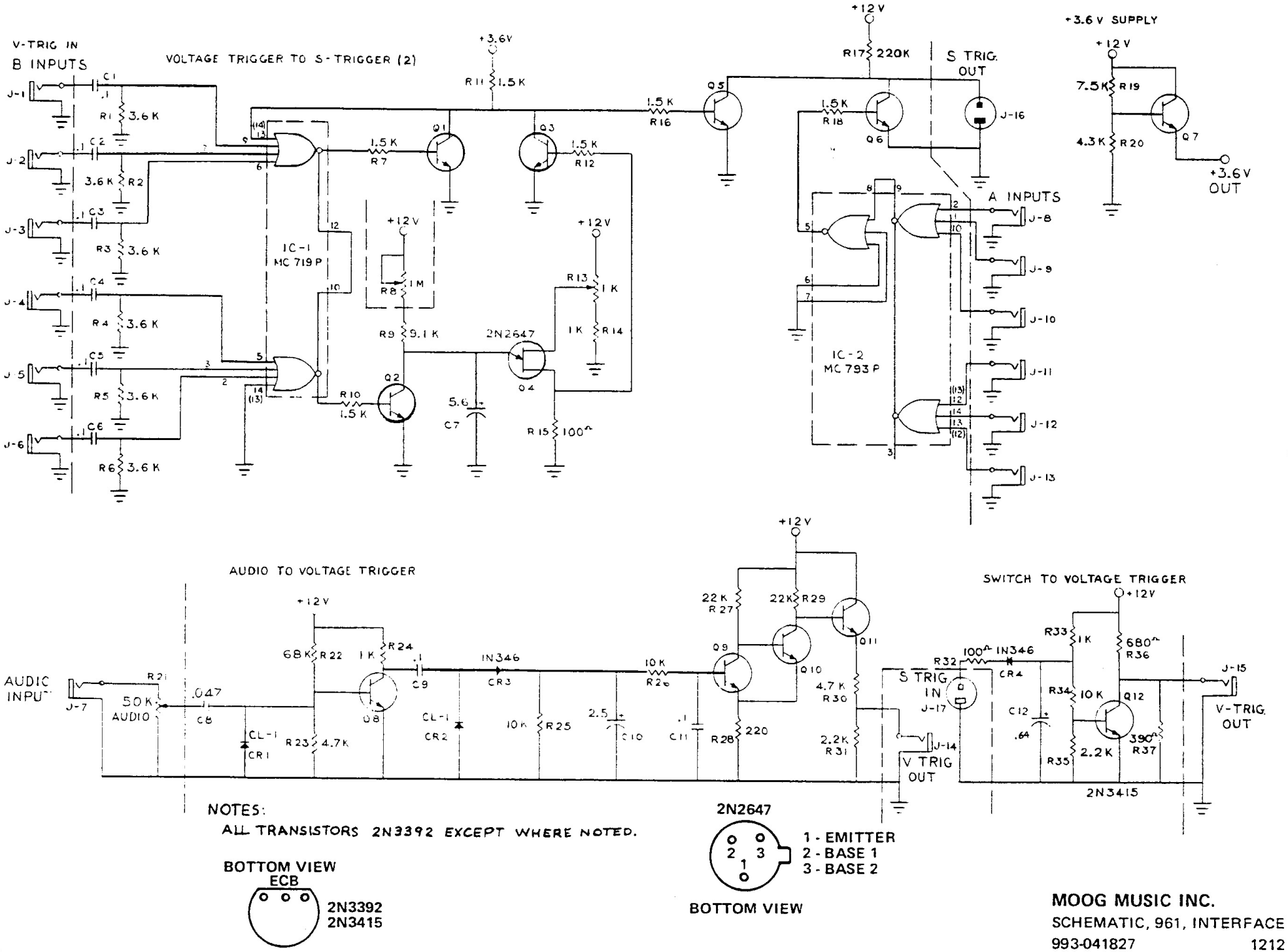


FIGURE 34 INTERFACE MODEL 961

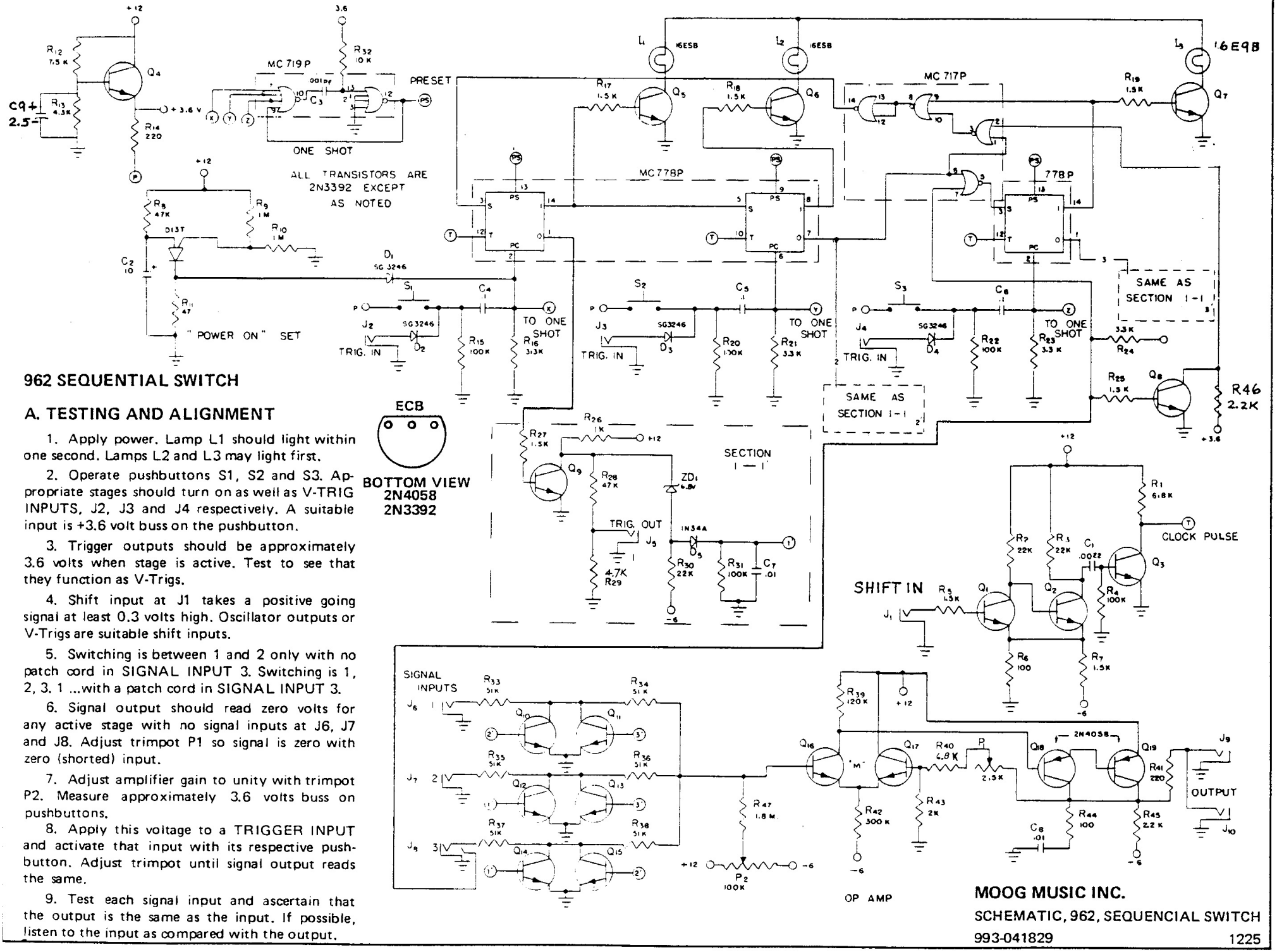


FIGURE 35. SEQUENTIAL SWITCH MODEL 962

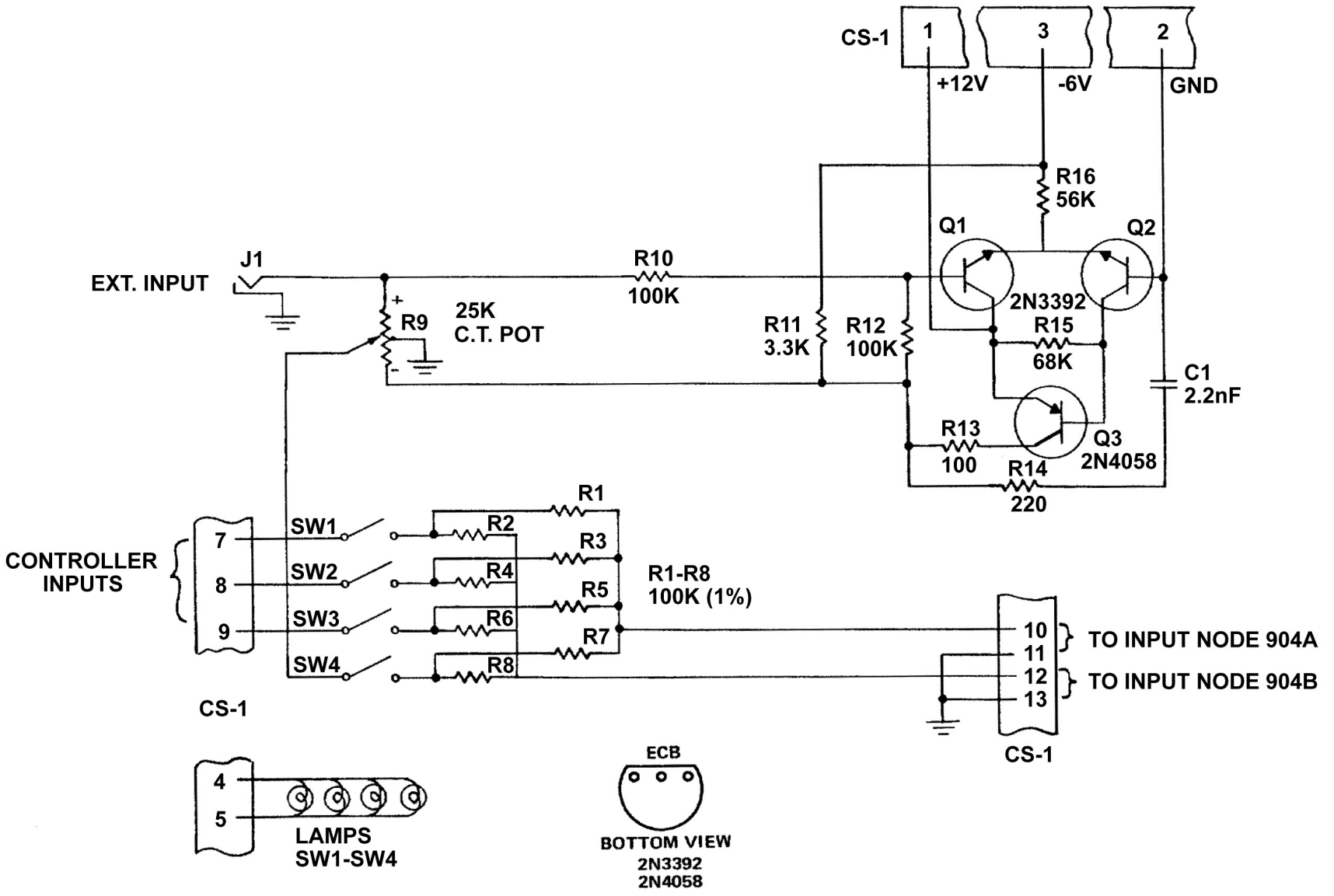
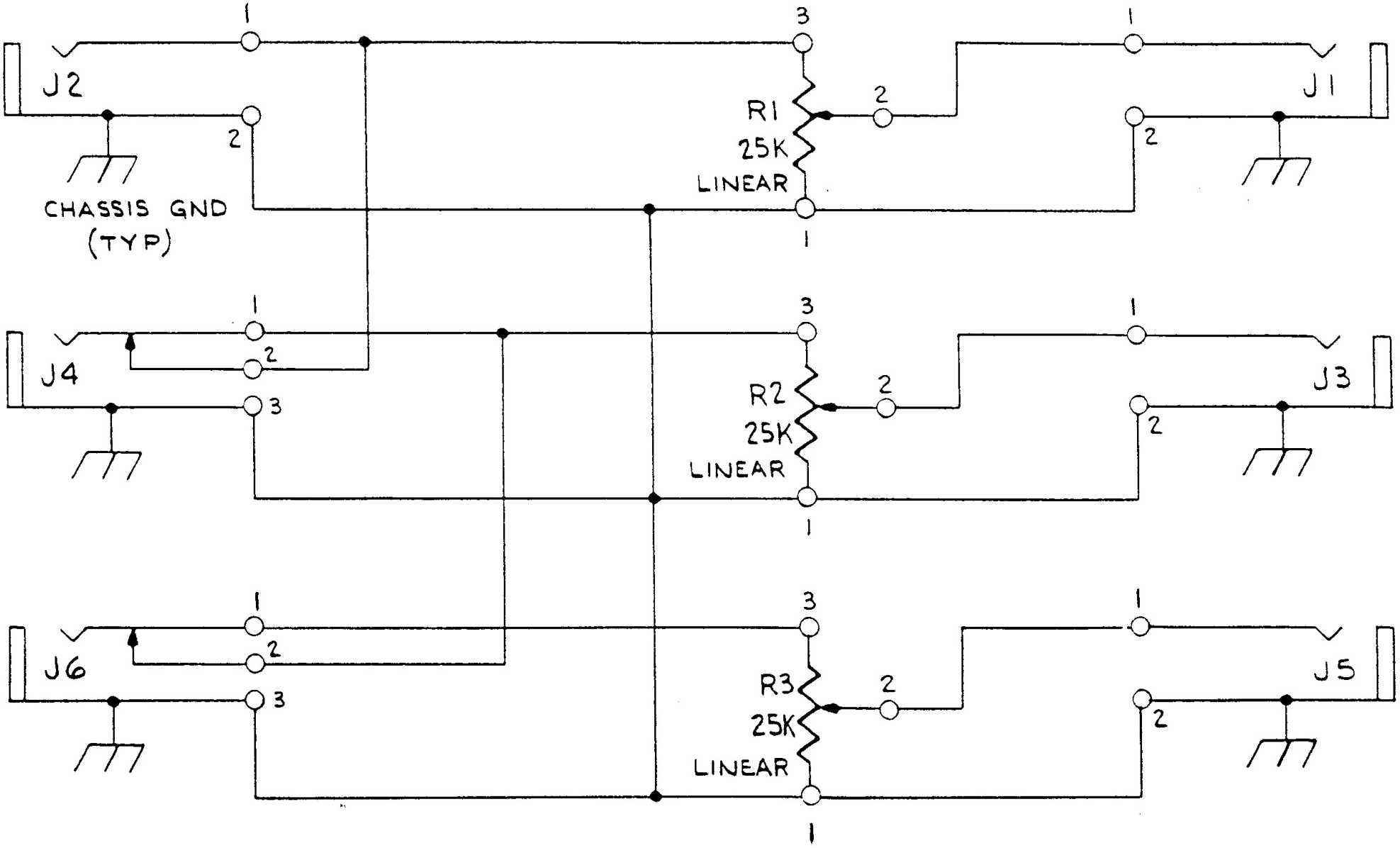
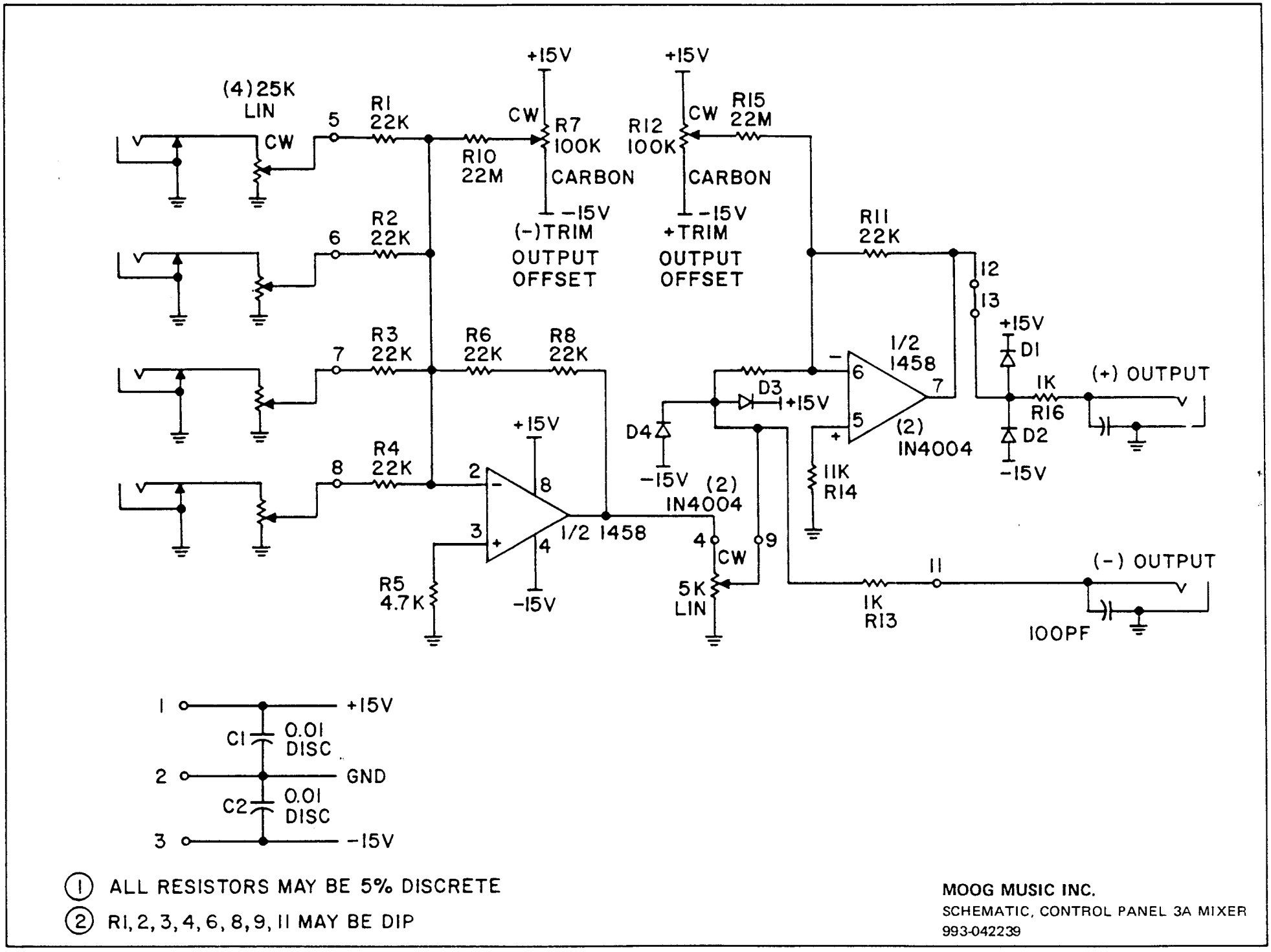


FIGURE 37 CONTROLLER MODEL 992 FOR MODEL 904S



MOOG MUSIC INC.
SCHEMATIC, ATTENUATORS MODULE 995
993-041812 08-024

FIGURE 38 ATTENUATORS MODEL 995



(1) ALL RESISTORS MAY BE 5% DISCRETE

(2) R1, 2, 3, 4, 6, 8, 9, 11 MAY BE DIP

MOOG MUSIC INC.
SCHEMATIC, CONTROL PANEL 3A MIXER
993-042239

FIGURE 3 CONTROL PANEL MIXER MODEL 3A