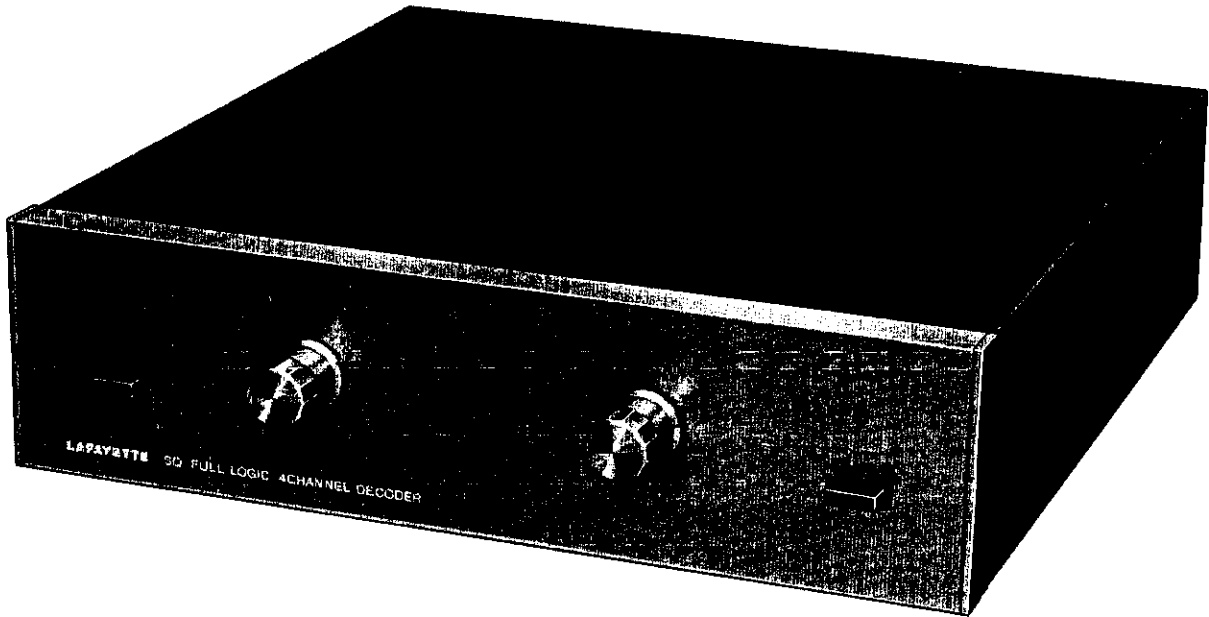


# Lafayette

## Model SQ-W

[Stock No. 99-03311]

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### **SQ** **Full-Logic** **4-Channel** **Decoder**

# **SERVICE MANUAL**

## CONTENTS

	PAGE
1. SPECIFICATIONS .....	3
2. ADJUSTMENT PROCEDURES .....	5
A. Phase Check .....	5
B. AGC Adjustment .....	5
C. DC Balance Adjustment .....	5
D. Gain Control Adjustment .....	6
E. Separation Adjustment .....	6
F. Full Logic Adjustment .....	7
3. BLOCK DIAGRAM .....	8
4. EXPLODED VIEW .....	9
5. ELECTRICAL PARTS LOCATION [P.C. Board].....	11
6. PARTS LIST .....	13
7. SCHEMATIC DIAGRAM .....	(Separate Sheet)
8. PARTS LAYOUT .....	(Separate Sheet)

## 1. SPECIFICATIONS

FUNCTIONS .....	[1] SQ Matrix Decoder with full-logic system [including rear Channel "Vari-Blend"].
	[2] Matrix Decoder for systems other than SQ, and for "derived" 4-channel sound from conventional stereo sources.
	[3] Inputs for discrete 4-channel sources.
INPUT SENSITIVITY [for 1 volt output*] .....	SOURCE/TAPE INPUTS: 100 mV [High] 500 mV [Low] DISCRETE INPUTS: 500 mV
MATRIX PHASE SHIFT CHARACTERISTIC .....	90° ± 10° from 50-20,000 Hz.
AGC CHARACTERISTIC [Logic Circuits] .....	± 3 dB for 35 dB input level change [at 2 KHz].
DECODER CHANNEL SEPARATION [at 2 KHz] .....	LF to RF: 20 dB. LF to LB: 20 dB. RF to RB: 20 dB. LF to RB: 20 dB. RF to LB: 20 dB. CF to CB: 15 dB. LB to RB: 12 dB.
DECODER OUTPUTS .....	[1] Front left and right, Rear left and right Outputs [decoded or discrete].
	[2] Front left and right, Rear left and right Tape Outputs [decoded or discrete].
	[3] 2-channel Tape Outputs.
OUTPUT VOLTAGE* .....	1 volt at rated input [Master Volume at max].
SIGNAL/NOISE RATIO .....	70 dB.
HARMONIC DISTORTION .....	0.2%

CONTROLS ..... SOURCE/TAPE Selector, FUNCTION  
MASTER VOLUME, POWER ON/OFF,  
INPUT SENSITIVITY SWITCHES [SOURCE /  
TAPE].

POWER REQUIREMENTS ..... 105 - 120 volts, 50/60 Hz AC.

DIMENSIONS ..... 14 1/2" W x 3" H x 11 1/8" D.

NET WEIGHT ..... 5 lbs.

\* This output voltage is only for "front" channels when decoder is the Composer A or B, modes.  
Rear channel output voltage will vary in accordance with the program content of the 2-channel  
input source.

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BECAUSE ITS PRODUCTS ARE SUBJECT TO CONTINUOUS IMPROVEMENT, THE LAFAYETTE RADIO ELECTRONICS CORPORATION RESERVES THE RIGHT TO MAKE DESIGN CHANGES OR MODIFICATIONS AT ANY TIME WITHOUT INCURRING ANY OBLIGATION TO INCORPORATE THEM IN PRODUCTS PREVIOUSLY SOLD.

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## 2. ADJUSTMENT PROCEDURES

The adjustments for this unit must be performed in the sequence indicated below:

- [A] PHASE Check
- [B] AGC Adjustment
- [C] DC Balance Adjustment
- [D] Gain Control Adjustment
- [E] Separation Adjustment
- [F] Front Logic Adjustment

SQ-W control settings:

MASTER VOLUME control	.....	Maximum
TAPE-SOURCE switch	.....	Source
H - L SENSITIVITY switch	.....	"L"
FUNCTION switch	.....	SQ FULL LOGIC
POWER	.....	ON

### A. PHASE CHECK

1. Apply the output of an audio signal generator [2KHz, 1 volt] to the Left channel SOURCE input jack. Connect a phase meter [or any other device capable of determining phase] between test points ③ and ⑮ on PC board EPO-146C. Check for a phase difference of  $90^{\circ} \pm 10^{\circ}$ .
2. In same manner, connect the audio signal to the Right channel SOURCE input jack. Connect phase meter between test points ④ and ⑤ on PC board EPO-146C. Check for a phase difference of  $90^{\circ} \pm 10^{\circ}$ .

NOTE: The output signal voltage at test points ③, ④, ⑤ and ⑮ should be approximately 0.3 to 0.5 volts.

### B. AGC ADJUSTMENT

1. Apply the output of the audio signal generator [2KHz, 1V] to the Left SOURCE INPUT JACK. Connect an oscilloscope and level meter between test point ⑦ on PC board EPO-147B and chassis ground. The reading should be 5.0 volts. If necessary, adjust RV1 for this figure.
2. Apply the audio signal to the Right SOURCE input jack and connect the level meter to test point ⑧ on EPO-147B. Adjust RV2, if necessary, for a 5.0 volt reading.  
Connect the level meter to test point ⑨ and adjust RV3, if necessary, for a 5.0 volt reading. Also check for an undistorted wave shape on the scope.
3. Repeat steps 1 and 2 so that the output at test points ⑦, ⑧ and ⑨ is 5.0 volts  $\pm 0.1$  volt.

### C. DC BALANCE ADJUSTMENT

1. Connect a high impedance DC voltmeter between test point ⑥ and ⑩ on PC board EPO-147B. Adjust RV4 for a zero reading. Then, connect the DC voltmeter between test point ⑥ and ⑪. Adjust RV5 for a zero reading.
2. Repeat the procedure in step 1 until the voltage between ⑥ and ⑩ and between ⑥ and ⑪ is  $0 \pm 0.1$  volt.

## D. GAIN CONTROL ADJUSTMENT

1. Use the test set-up shown in Figure 1.

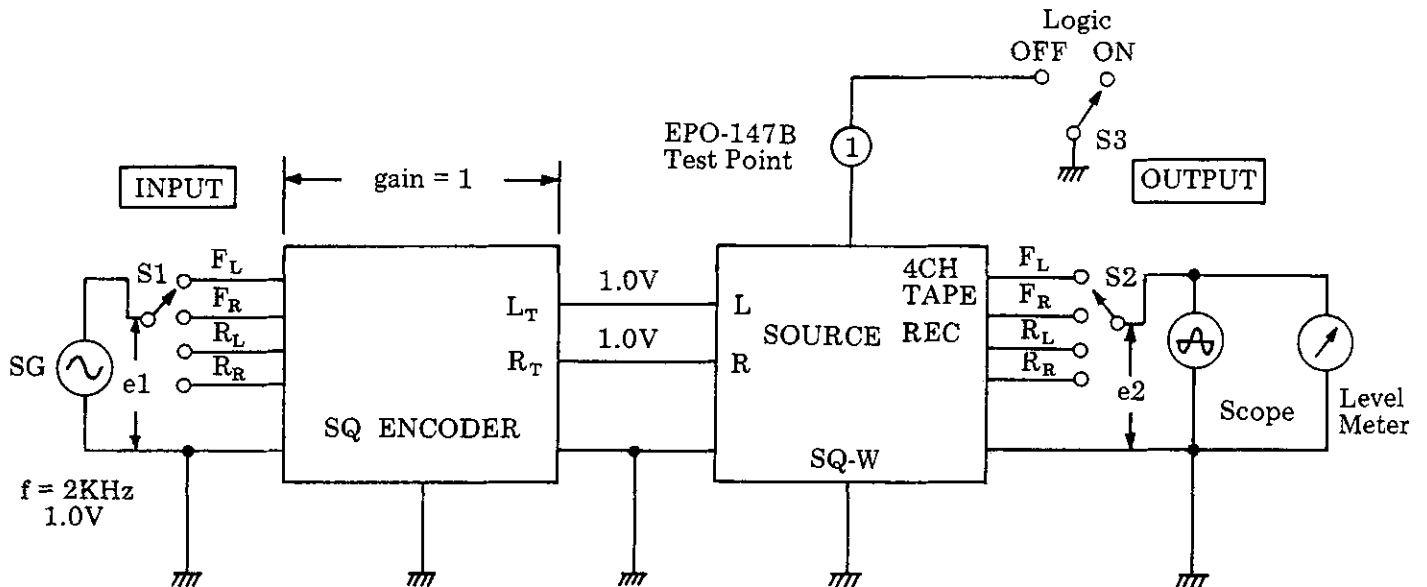


Figure 1. SQ-W Test Set-up

2. Place S1 and S2 switches in the FL positions. The output should be approximately 1 volt. Place the logic switch S3 in the OFF position [test point ① grounded]. The output level should decrease by 3dB. If not, adjust RV1 on PC board EPO-146C so that the output level change is 3 dB when S3 is switched on and off alternately.
3. In a similar manner, set S1 and S2 to the FR, RL and RR positions, and check for a 3 dB change when the logic switch S3 is switched on and off. Adjust RV2 [FR channel], RV3 [RL channel], and RV4 [RR channel] to obtain the 3 dB difference in level in each case.

## E. SEPARATION ADJUSTMENT

In the test set-up of figure 1, set the logic switch S3 in the ON position.

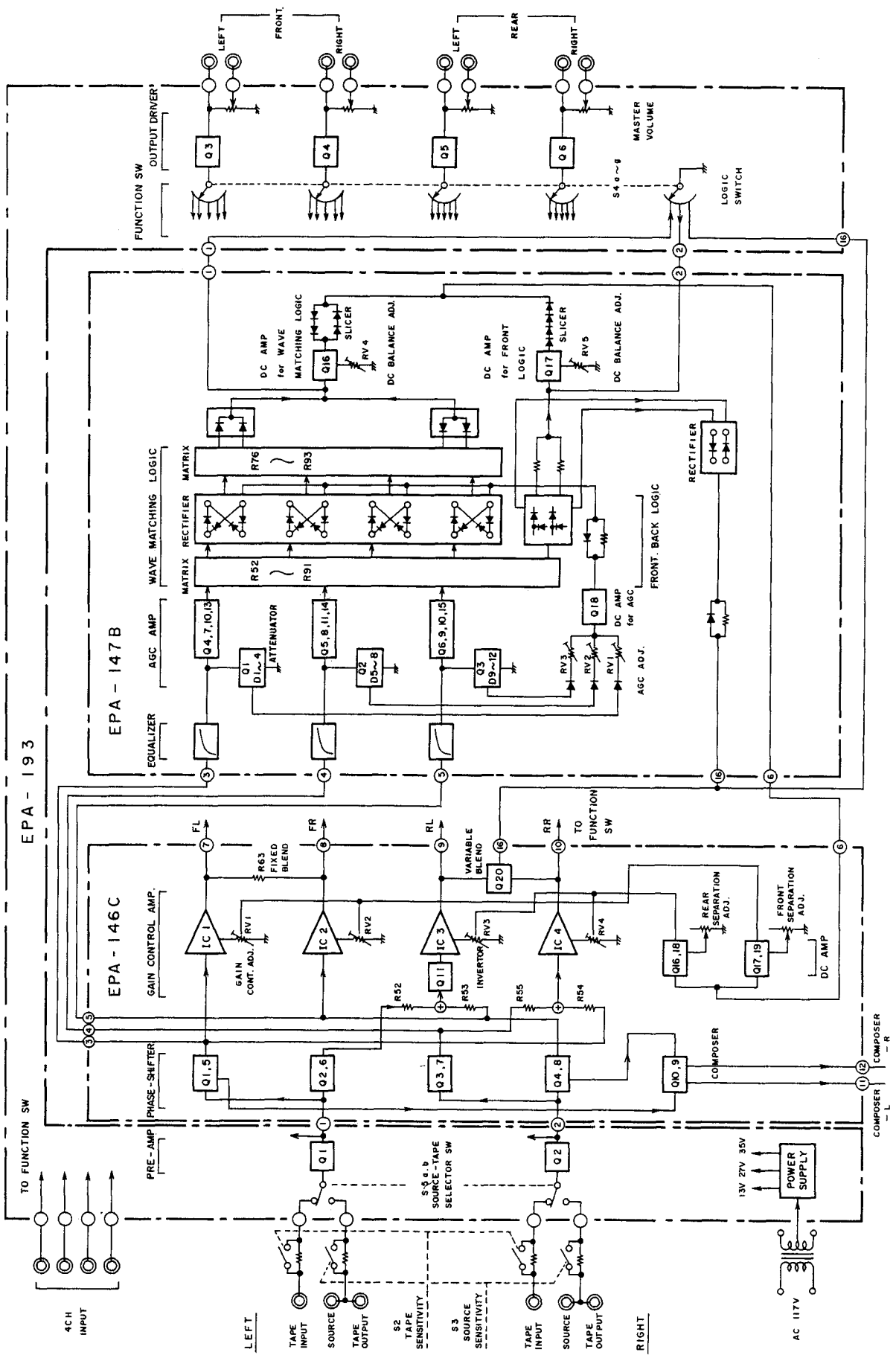
1. Place S1 and S2 switches in the FL positions and note the output level on the meter. Now check the output level when S1 is set to the RL and RR positions — there should be a reduction in level of  $18 \pm 2$  dB in each case. If not, leave S1 in either RL or RR position and adjust RV5 [on PC board EPO-146C] so that a decrease of  $18 \pm 2$  dB is obtained when an RL or RR signal is applied [relative to an FL signal].
2. Place S1 and S2 switches in the FR positions and note the output level. Now check the output level when S1 is set to the RL and RR positions — there should be a reduction in level of  $18 \pm 2$  dB in each case. If this test does not meet the minimum figure required [ $-16$  dB], re-adjust RV5 to ensure a reduction of at least 16 dB when S1 is set to RL or RR. Ideally, you should try to obtain an 18 dB [or greater] level change in the tests performed in both step 1 and 2.

- 3, Place S1 and S2 switches in the RL positions and note the output level. Now check the output level when S1 is set to the FL and FR positions — there should be a reduction in level of  $18 \pm 2$  dB in each case. If not, leave S1 in either FL or FR position and adjust RV6 to meet this figure.
4. Place S1 and S2 switches in the RR positions and note the output level. Now check the output level when S1 is set to the FL and FR positions — there should be a reduction in level of  $18 \pm 2$  dB in each case. If not, re-adjust RV-6 to ensure that this test produces at least 16 dB level change. Ideally, you should try to obtain an 18 dB [or greater] level change in the tests performed in both steps 3 and 4.

#### F. FULL LOGIC ADJUSTMENT

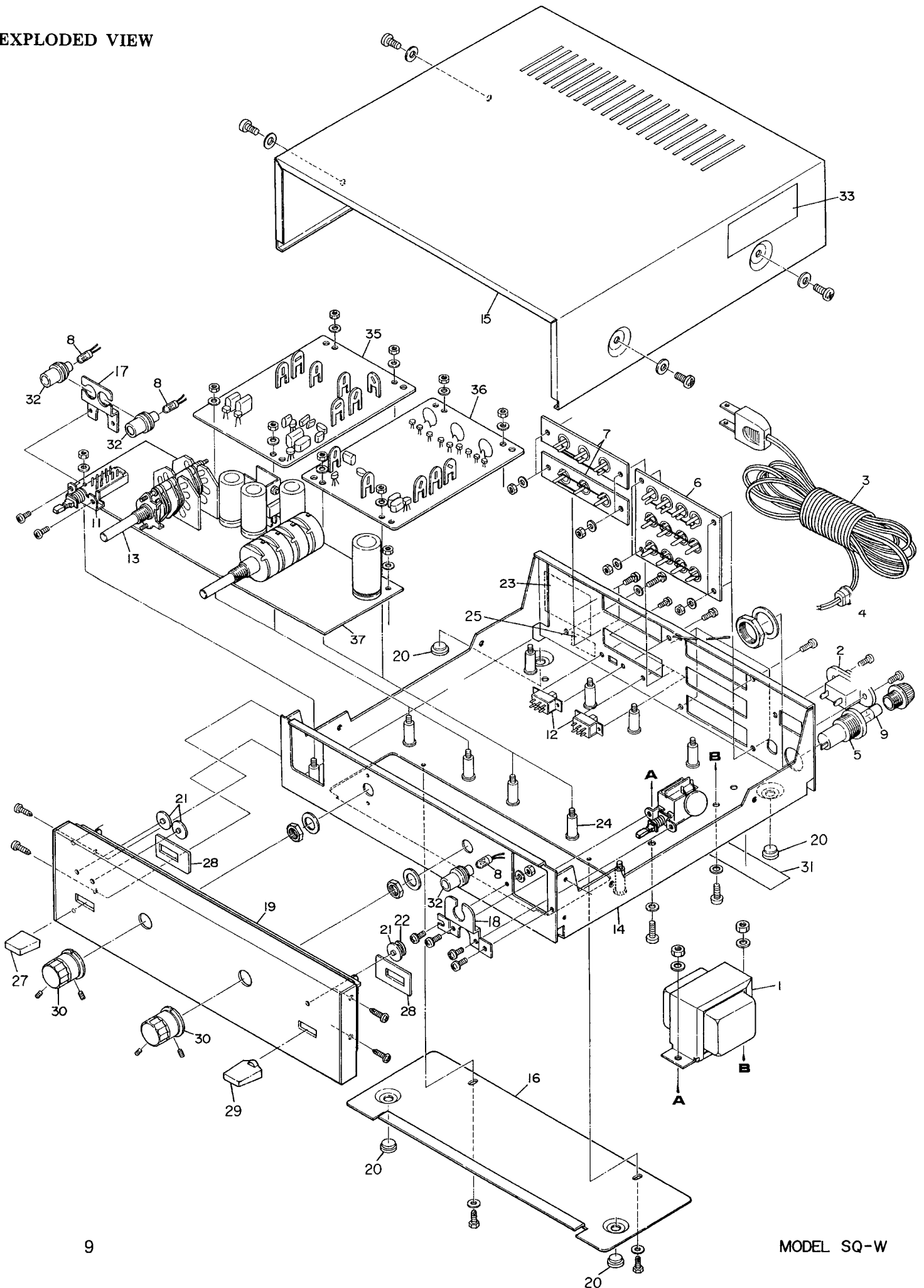
1. Place S1 switch in the RR position and S2 in the RL position. Set RV7 to the position in which the separation between RL and RR is just about to decrease.

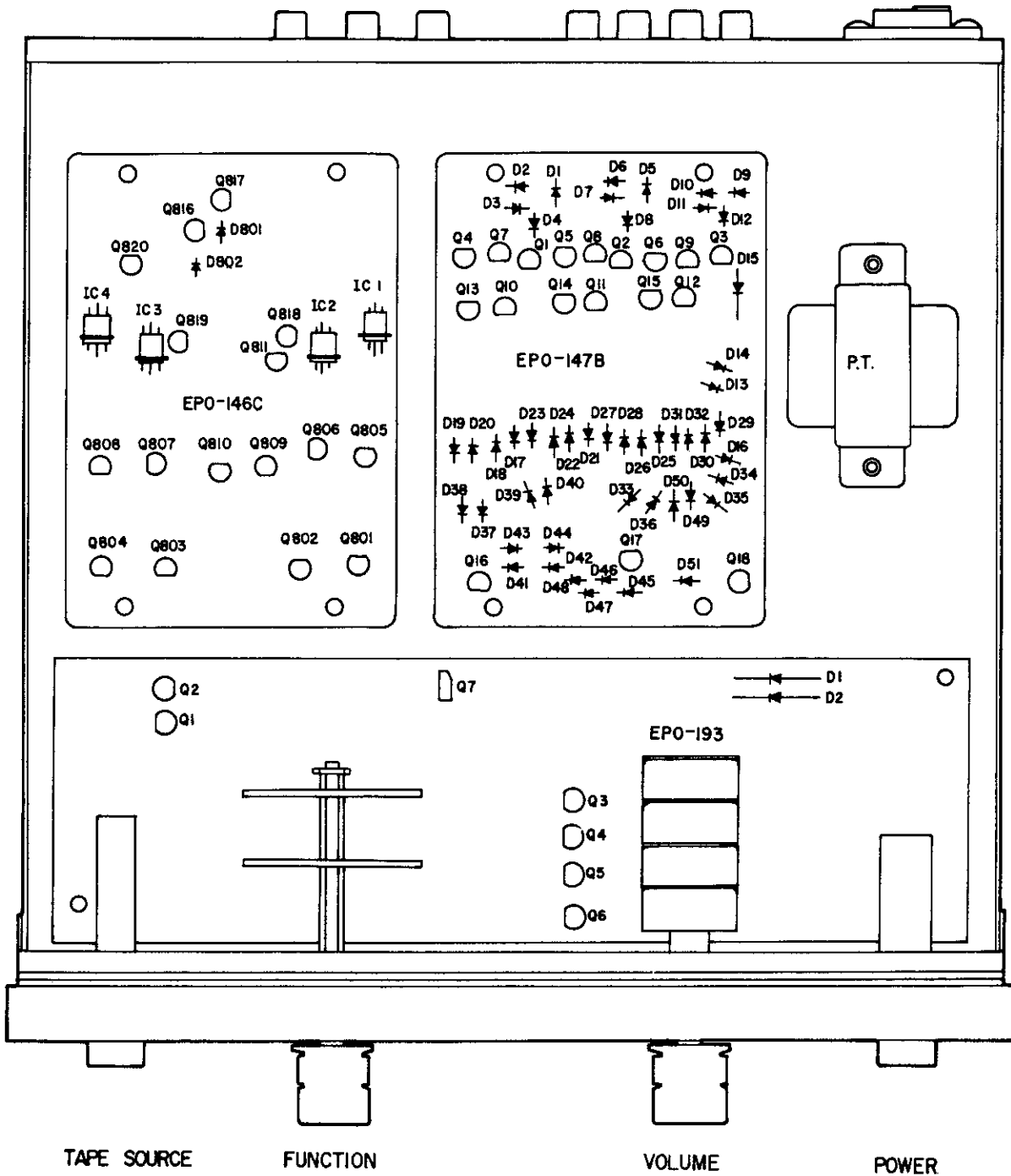
# BLOCK DIAGRAM



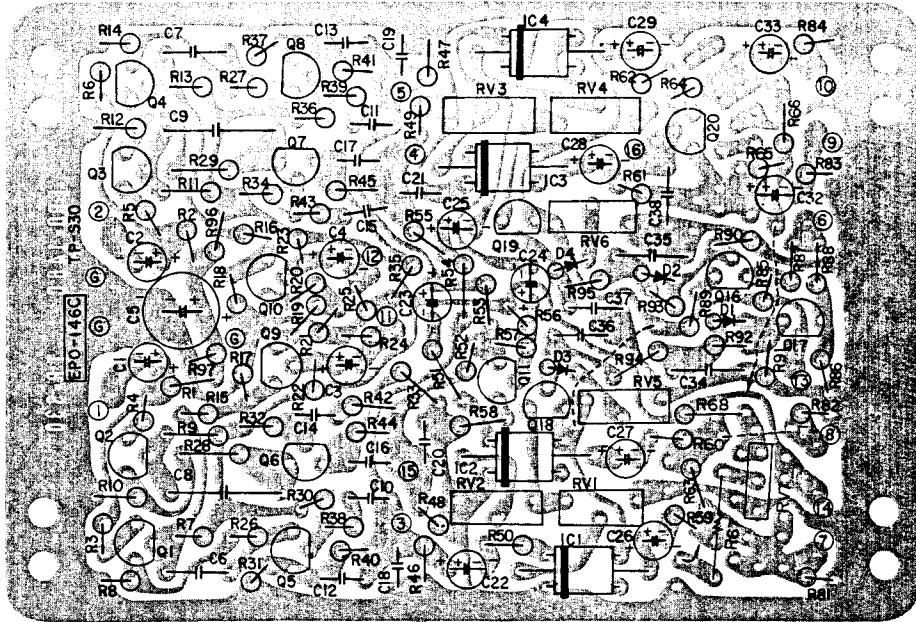


EXPLODED VIEW

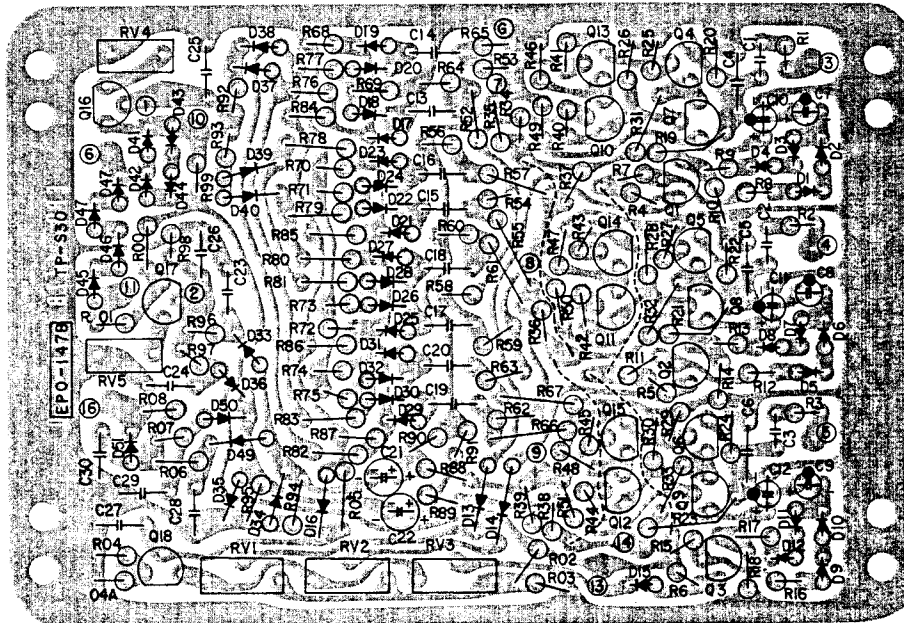




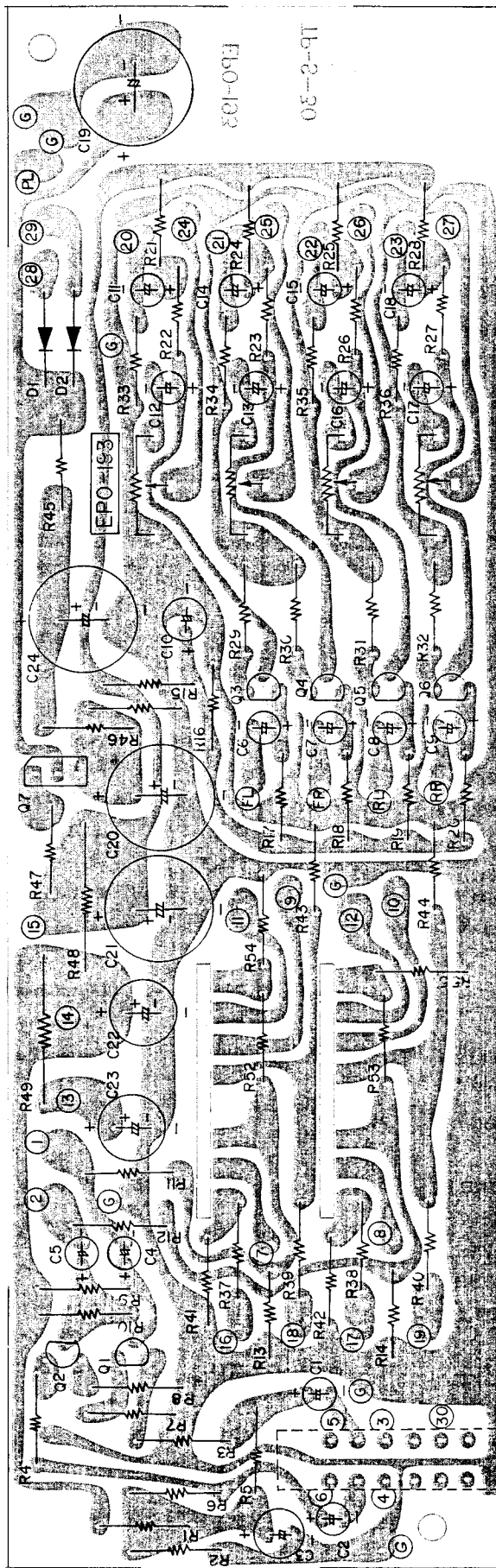
ELECTRICAL PARTS LOCATION (P.C. Board)



SQ-W (1) UNIT PC BOARD ASSEMBLY, EPO-146C



SQ-W (2) UNIT PC BOARD ASSEMBLY, EPO-147B



EPO-193  
03-2-9T

PC BOARD COMPLETE (PUSH SWITCH), EPO-193

## PARTS LIST

Symbol No.	Description	Stock No.
P.T. (1)	Power Transformer	1815-15
S1 (11)	Push Switch	2045-14
J1 (2)	AC Outlet (Brown)	1731-19
(3)	AC Power Cord	1256-38
(4)	Cord Bushing	4356-20
PL1,2,3 (8)	Pilot Lamp (CB) 6V34mA	3944-20
J1,4,5 (6)	Pin Jack 4P x 3	2239-19
J2,3 (7)	Pin Jack 3P	2240-19
F1H (5)	Fuse Holder	1417-19
F1 (9)	Fuse 1/2 Amp.	4355-20
S4a-g (13)	E-Rotary Switch	2048-14
(10)	P.C. Board EPO-192	1736-16
S2,3 (12)	Slide Switch	1877-14
	Cable (pin to pin)	1244-38
R101~104	Carbon Resistor 1/4W 68K $\Omega$	
R105~108	Carbon Resistor 1/4W 18K $\Omega$	
C101	Ceramic Capacitor 4700pF	1091-51
R109~112	Carbon Resistor 1/4W 2.2K $\Omega$	
R113	Carbon Resistor 1/4W 10 $\Omega$	
(35)	P.C. Board Complete (PUSH-SW) EPA-0193A	1292-31
	P.C. Board EPO-0193	1737-16
S5a,b	Push Switch	1821-14
RF1a~d	Volume Control 4-Gang	1761-11
Q1,2	Transistor 2SC-900(F)	2132-17
Q3~6	Transistor 2SC-828T	2355-17
Q7	Transistor 2SC-1096(L)	2160-17
D1,2	Diode F14A	2084-17
R1	Carbon Resistor 1/4W 47K $\Omega$	
R2	Carbon Resistor 1/4W 10K $\Omega$	
R3,4	Carbon Resistor 1/4W 2.2K $\Omega$	
R5,6	Carbon Resistor 1/4W 330K $\Omega$	
R7,8	Carbon Resistor 1/4W 680 $\Omega$	
R9,10	Carbon Resistor 1/4W 4.7K $\Omega$	
R11,12	Carbon Resistor 1/4W 39K $\Omega$	
R13,14	Carbon Resistor 1/4W 18K $\Omega$	
R15	Carbon Resistor 1/4W 33K $\Omega$	
R16	Carbon Resistor 1/4W 5.6K $\Omega$	
R17~20	Carbon Resistor 1/4W 330K $\Omega$	
R21~28	Carbon Resistor 1/4W 5.6K $\Omega$	

Symbol No.	Description	Stock No.
R29,30	Carbon Resistor 1/4W 470 $\Omega$	
R31,32	Carbon Resistor 1/4W 330 $\Omega$	
R33~36	Carbon Resistor 1/4W 220K $\Omega$	
R37,38	Carbon Resistor 1/4W 47K $\Omega$	
R41,42	Carbon Resistor 1/4W 27K $\Omega$	
R45	Carbon Resistor 1/4W 1K $\Omega$	
R46	Carbon Resistor 1/4W 1.2K $\Omega$	
R47	Solid Resistor 1/2W 10 $\Omega$	
R48	Incombustible Resistor 82 $\Omega$	2762-13
R49	Incombustible Resistor 180 $\Omega$	2763-13
R50,51	Carbon Resistor 1/4W 47K $\Omega$	
R39,40	Carbon Resistor 1/4W 56K $\Omega$	
R43,44	Carbon Resistor 1/4W 18K $\Omega$	
C1,2	Elyt. Capacitor 1 $\mu$ F 50V	1015-52
C3	Elyt. Capacitor 47 $\mu$ F 10V	1062-52
C4,5,6~9	Elyt. Capacitor 1 $\mu$ F 50V	1015-52
C10	Elyt. Capacitor 47 $\mu$ F 10V	1065-52
C11~18	Elyt. Capacitor 4.7 $\mu$ F 25V	1031-52
C19	Elyt. Capacitor 470 $\mu$ F 50V	
C20,21	Elyt. Capacitor 220 $\mu$ F 50V	1097-52
C22	Elyt. Capacitor 100 $\mu$ F 35V	1082-52
C23	Elyt. Capacitor 100 $\mu$ F 16V	1080-52
C24	Elyt. Capacitor 220 $\mu$ F 50V	1097-52
R52,53	Carbon Resistor 1/4W 68K $\Omega$	
R54,55	Carbon Resistor 1/4W 56K $\Omega$	
	Tie Point	
	Heat Sink	7605-10
(35)	P.C. Board Complete (SQ-W-1) EPA-0146CA	
	P.C. Board EPO-0146C	1738-16
IC1~4	I.C. MFC6043	1022-25
Q1~10	Transistor 2SC-945(Q)	2121-17
Q11	Transistor 2SC-900(E)	2195-17
Q16	Transistor 2SA-564(S)	2221-17
Q17	Transistor 2SC-828(S)	1751-17
Q18,19	FET 2SK-30(GR)	2265-17
D1~4	Diode 1S-1555	1937-17
Q20	FET 2SK-30(D)	2265-17
C1,2	Elyt. Capacitor 1 $\mu$ F 50V	1015-52

Symbol No.	Description	Stock No.
C3,4	Elyt. Capacitor 4.7 $\mu$ F 35V	1142-52
C5	Elyt. Capacitor 47 $\mu$ F 25V	1064-52
C6,7	Mylar Capacitor .047 $\mu$ F 50V	1065-53
C8,9	Mylar Capacitor .15 $\mu$ F 50V	1073-53
C10,11	Mylar Capacitor .0068 $\mu$ F 50V	1041-53
C12,13	Mylar Capacitor .0015 $\mu$ F 50V	1027-53
C14,15	Mylar Capacitor .022 $\mu$ F 50V	1055-53
C16,17	Mylar Capacitor .0056 $\mu$ F 50V	1039-53
C18,19	Mylar Capacitor .0012 $\mu$ F 50V	1026-53
C20,21	Mylar Capacitor .0056 $\mu$ F 50V	1039-53
C22~29,32,33	Elyt. Capacitor 1 $\mu$ F 50V	1015-52
C34,35	Ceramic Capacitor .5 $\mu$ F 12V	1117-51
C36,37	Ceramic Capacitor .047 $\mu$ F 25V	1107-51
C38	Mylar Capacitor .022 $\mu$ F 50V	1055-53
R1,2	Carbon Resistor 1/4W 150K $\Omega$	
R3~6	Carbon Resistor 1/4W 1.2K $\Omega$	
R7~14	Carbon Resistor 1/4W 4.7K $\Omega$	
R15,16	Carbon Resistor 1/4W 47K $\Omega$	
R17,18	Carbon Resistor 1/4W 22K $\Omega$	
R19,20	Carbon Resistor 1/4W 2.7K $\Omega$	
R21	Carbon Resistor 1/4W 3.3K $\Omega$	
R22,23	Carbon Resistor 1/4W 4.7K $\Omega$	
R24,25	Carbon Resistor 1/4W 6.8K $\Omega$	
R26,27	Carbon Resistor 1/4W 22K $\Omega$	
R28,29	Carbon Resistor 1/4W 27K $\Omega$	
R30,37	Carbon Resistor 1/4W 2.2K $\Omega$	
R38,39	Carbon Resistor 1/4W 2.7K $\Omega$	
R40,41	Carbon Resistor 1/4W 22K $\Omega$	
R42,43	Carbon Resistor 1/4W 3K $\Omega$	
R44,45	Carbon Resistor 1/4W 24K $\Omega$	
R46,47	Carbon Resistor 1/4W 18K $\Omega$	
R48,49	Carbon Resistor 1/4W 15K $\Omega$	
R50,51	Carbon Resistor 1/4W 33K $\Omega$	
R52,53	Carbon Resistor 1/4W 56K $\Omega$	
R54,55	Carbon Resistor 1/4W 47K $\Omega$	
R56	Carbon Resistor 1/4W 2.7K $\Omega$	
R57	Carbon Resistor 1/4W 100K $\Omega$	
R58	Carbon Resistor 1/4W 3.3K $\Omega$	
R59,60~62	Carbon Resistor 1/4W 15K $\Omega$	
R63	Carbon Resistor 1/4W 120K $\Omega$	

Symbol No.	Description	Stock No.
R64	Carbon Resistor 1/4W 5.6K $\Omega$	
R65,66	Carbon Resistor 1/4W 15K $\Omega$	
R67	Carbon Resistor 1/4W 100K $\Omega$	
R68	Carbon Resistor 1/4W 150K $\Omega$	
R81~84	Carbon Resistor 1/4W 220K $\Omega$	
R85~86	Carbon Resistor 1/4W 150K $\Omega$	
R87,88	Carbon Resistor 1/4W 68K $\Omega$	
R89~91	Carbon Resistor 1/4W 3.9K $\Omega$	
R92,93	Carbon Resistor 1/4W 120K $\Omega$	
R94,95	Carbon Resistor 1/4W 27K $\Omega$	
R96	Carbon Resistor 1/4W 22K $\Omega$	
R97	Carbon Resistor 1/4W 15K $\Omega$	
RV1~4	Potentiometer 5K $\Omega$ B 3-leg	2682-13
RV5,6	Potentiometer 20K $\Omega$ B 3-leg	2553-13
RV7	Potentiometer 50K $\Omega$ B 3-leg Tie Point	2555-13
(36)	P.C. Board Complete (SQ-W-2) EPA-0147BA	
	P.C. Board EPO-0147B	1697-16
Q1~3	Transistor 2SC-828(S)	1751-17
Q4~9	Transistor 2SA-564(S)	2221-17
Q10~15	Transistor 2SC-900(E)	2195-17
Q16,17	FET 2SK-30(O)	2010-17
Q18	FET 2SK-30(GR)	2265-17
D1~51	Diode 1S-1555	1937-17
C1~3	Mylar Capacitor .0022 $\mu$ F 50V	1031-53
C4~6	Ceramic Capacitor 470pF 50V	1070-51
C7~9,10~12	Tantal Capacitor 1 $\mu$ F 35V	1594-58
C13~20	Mylar Capacitor .01 $\mu$ F 50V	1046-53
C21,22	Elyt. Capacitor .1 $\mu$ F 25V	1000-52
C23,24	Ceramic Capacitor .068 $\mu$ F 12V	1162-51
C25	Mylar Capacitor .018 $\mu$ F 50V	1082-53
C26	Mylar Capacitor .022 $\mu$ F 50V	
C27	Mylar Capacitor .0082 $\mu$ F 50V	1044-53
C28,29	Mylar Capacitor .0022 $\mu$ F 50V	1031-53
R1~3	Carbon Resistor 1/4W 47K $\Omega$	
R4~6	Carbon Resistor 1/4W 220K $\Omega$	
R7~18	Carbon Resistor 1/4W 887 $\Omega$	

Symbol No.	Description	Stock No.
R19~24	Carbon Resistor 1/4W 270K $\Omega$	
R25~30	Carbon Resistor 1/4W 6.8K $\Omega$	
R31~33	Carbon Resistor 1/4W 27K $\Omega$	
R34~39	Carbon Resistor 1/4W 1.8K $\Omega$	
R40~45	Carbon Resistor 1/4W 100K $\Omega$	
R46~48	Carbon Resistor 1/4W 120 $\Omega$	
R49~51	Carbon Resistor 1/4W 180K $\Omega$	
R52~63	Carbon Resistor 1/4W 15K $\Omega$	
R64~67	Carbon Resistor 1/4W 39K $\Omega$	
R68~75	Carbon Resistor 1/4W 33K $\Omega$	
R76~83	Carbon Resistor 1/4W 220K $\Omega$	
R84~87	Carbon Resistor 1/4W 620K $\Omega$	
R88~91	Carbon Resistor 1/4W 56K $\Omega$	
R92,93	Carbon Resistor 1/4W 120K $\Omega$	
R94,95	Carbon Resistor 1/4W 220K $\Omega$	
R96,97	Carbon Resistor 1/4W 150K $\Omega$	
R98	Carbon Resistor 1/4W 68K $\Omega$	
R99,100	Carbon Resistor 1/4W 33K $\Omega$	
R101	Carbon Resistor 1/4W 18K $\Omega$	
R102	Carbon Resistor 1/4W 15K $\Omega$	
R103	Carbon Resistor 1/4W 120K $\Omega$	
R104	Carbon Resistor 1/4W 8.2K $\Omega$	
R105	Solid Resistor 1/2W 2.2M $\Omega$	
RV1~3	Potentiometer 30KB $\Omega$ 3-leg	
RV4,5	Potentiometer 10KB $\Omega$ 2-leg	2596-13
R04a	Carbon Resistor 1/4W 27K $\Omega$	
R06,07	Carbon Resistor 1/4W 220K $\Omega$	
R08	Carbon Resistor 1/4W 330K $\Omega$	
C30	Mylar Capacitor .0056 $\mu$ F 50V Tie Point	1039-53
MECHANICAL PARTS		
	Chassis	1763-80
	Cage	1764-80
	Bottom Plate	1765-80
	Lamp Holder (A) (Tape Source)	9084-10
	Lamp Holder (B) (Power)	9085-10
	Foot	4074-20
	Frame for Push Button	9048-10
	Push Button (Power)	1973-18

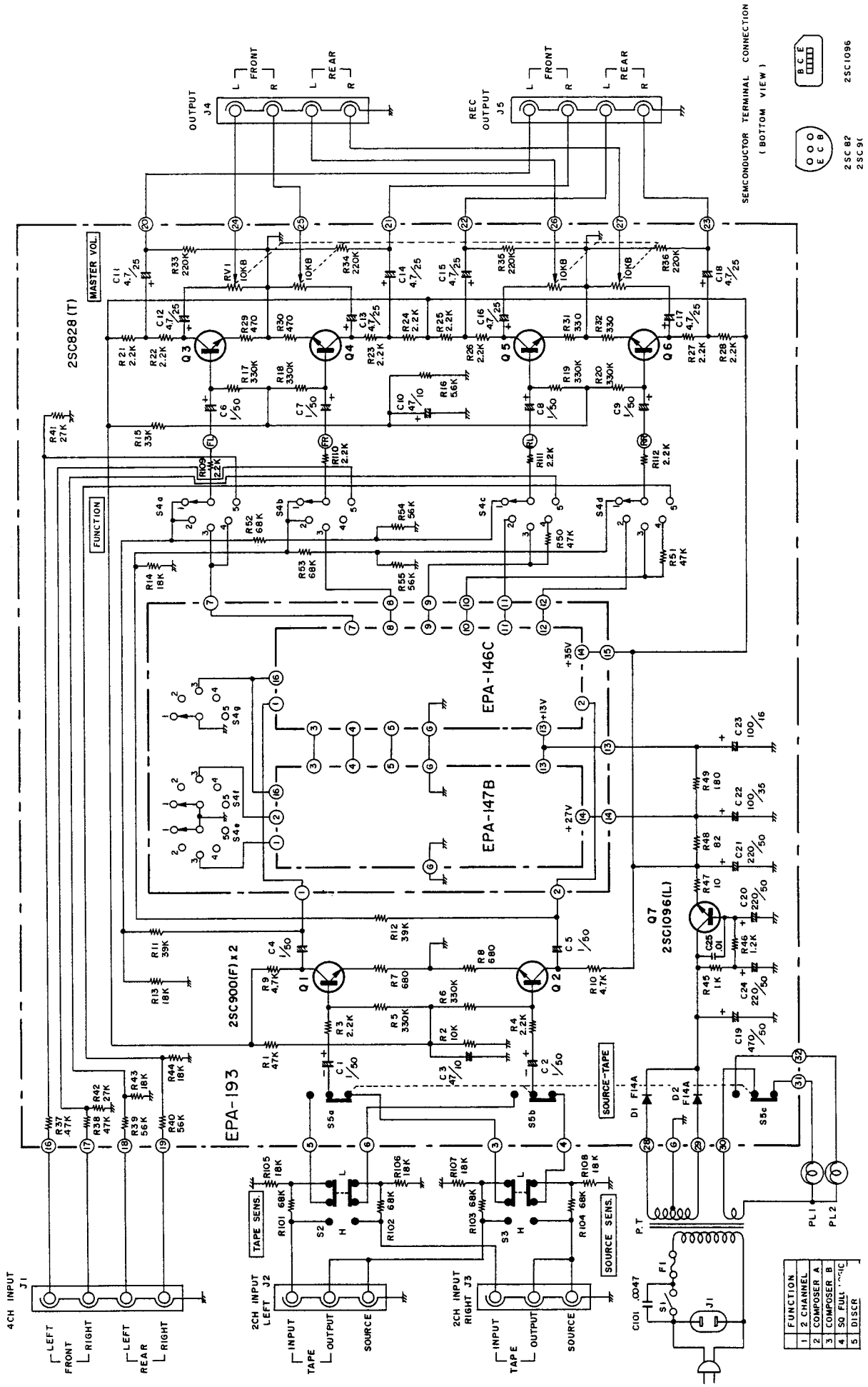
Symbol No.	Description	Stock No.
	Push Button (Tape Source)	1870-18
	Knob (Volume/Function)	1975-18
	Lamp Holder (Rubber)	5092-20
	Indicator Jewel (Plastic)	5196-20
	Indicator (Blue)	5193-20
	Stud for P.C.B. Mount	9086-10
	Serial Number Label	9087-10
	Cord Clamper	7706-10
	Escutcheon Assy	1766-80
	Instruction Manual	1863-30

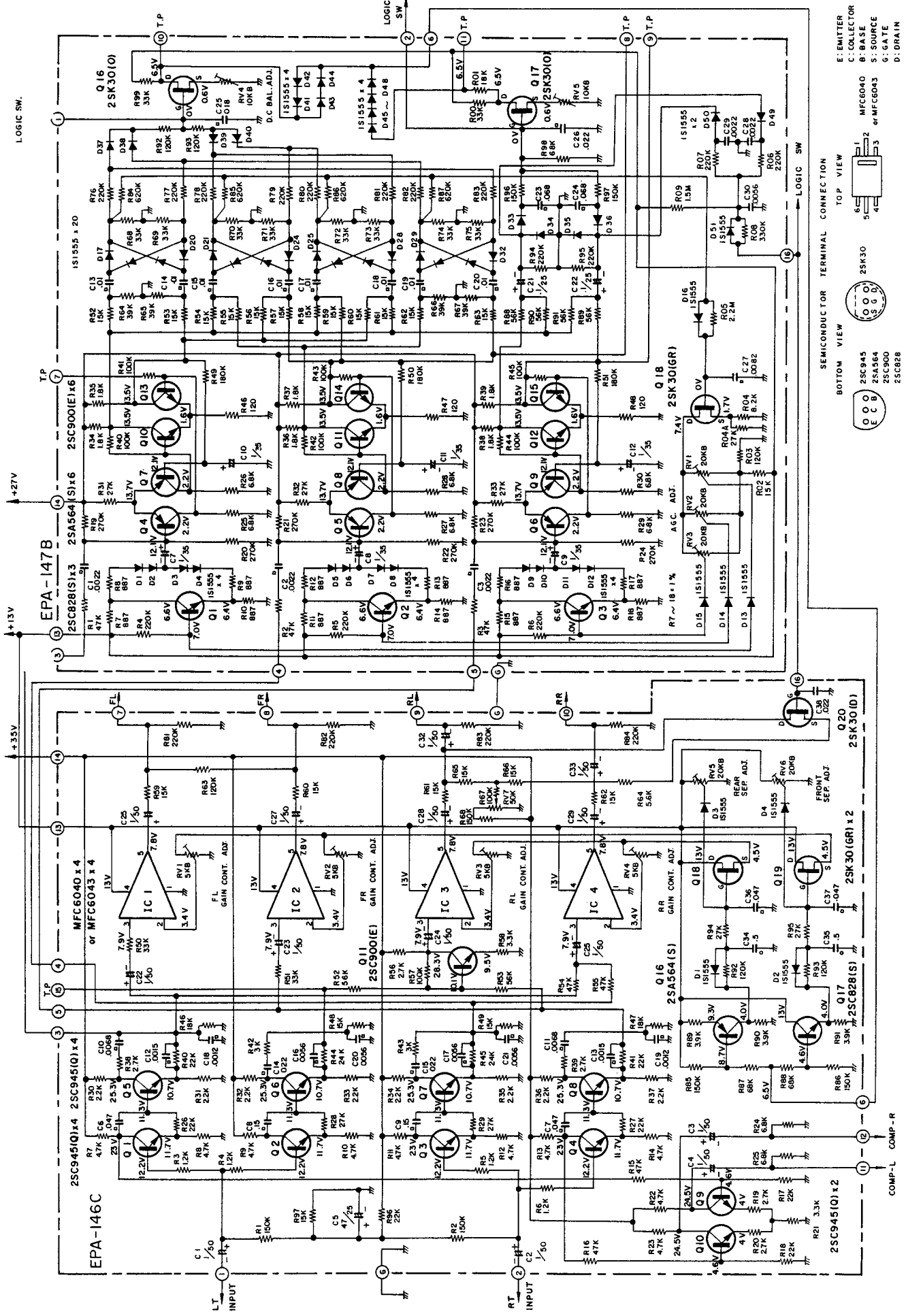
**Lafayette** RADIO  
ELECTRONICS  
CORPORATION

111 Jericho Turnpike, Syosset, L.I., New York 11791



# SCHEMATIC DIAGRAM OF MODEL SQ-W





**Lafayette**  
 RADIO  
 ELECTRONICS  
 CORPORATION

111 Jericho Turnpike, Syosset, L.I., New York 11791

Printed in Japan