SECTION Ⅶ- MAINTENANCE AND ALIGNMENTS

This transceiver has been carefully aligned and tested at the factory prior to shipment. The reliability of the solid devices used in TS-788DX should provide years of trouble-free services if the equipment is not abused and the proper routine maintenance is carried out. This section describes the adjusting sequence and procedures of TS-788DX. Please do not attempt to adjust the transceiver without using the proper measuring instruments listed in this manual.

RECEIVER ADJUSTMNT

1. Measuring Instruments:

a) DC Power Supply 11-16V
b) Signal Generator
c) Voltmeter

2. Sensitivity Adjustment:

(1) Mode·····AM, Freq.·····28.000 MHz Frequency Figure·····100 KHz

i. Connect the signal generator to the antenna receptacle and set the output of the SG to 90 dB. Adjust L5 for maximum reading on the voltmeter so that AGC will become best.

ii. Set the output of the SG to-10dB. Adjust L1, 2, 3 & 4 for maximum reading on the voltmeter.

iii. Set the output of the SG to-10dB. And adjust the RIT potentiometer for maximum reading on the voltmeter so that the transceiver tunes to 28,000 MHz correctly. And then adjust L1, 2, 3 & 4 again for maximum reading on the voltmeter.

iv. Set the output of the SG to 60dB. and place the VSWR switch on the rear panel in S/R position. Set the indicator of RX meter to 9 by adjusting VR28. This is for RX meter adjustment.

v. Set the output of the SG to -8dB and switch off the squelch potentiometer. Check and confirm on the voltmeter if the difference between "ON" and "OFF" of the squelch switch is over 15dB. This is ANL adjustment.

(2) Mode·····FM, Freq.,·····28,000 (or 27,065 MHz)
For adjustment FM, you should not rotate both RIT potentiometer and Channel Selector. Connect the SG to the antenna receptacle and set the output of the SG to 20dB. Adjust L6 for maximum reading on the voltmeter.

(3) Mode·····SSB and CW
No special adjustments are necessary for receiver sensitivity.

3. Adjustment of Frequency Range (26,000-29,999 MHz):

If. L1, 2, 3, 4 & 5 are adjusted properly as described above, the adjustment of frequency range is unnecessary. In case these adjustments are not well enough performed, rotate L1 clockwise so that the good S/N of high channel side (29,999 MHz) can be obtained. Good S/N of low channel side (26,000 MHz) can be obtained by rotating L1 counter-clockwise.

4. Adjustment of Scanning Stop Sensitivity:

i. Set the output of the SG to 20dB in 28,000 MHz.
ii. Adjust VR1 so that scanning stops with 25-35 dB.

iii. Rotate VR30 so that its resistance becomes maximum.
Move the frequency of the transceiver around 20-30 KHz from 28,000 MHz up or down by turning the frequency selector knob, and let the transceiver start scanning down or up. It will stop at the point of catching RX signal. Even if it stopped, for example, during up scanning, it will never start scanning again if you rotate the frequency selector knob upward again. This is because VR30 has been so adjusted. Now you keep rotating the frequency selector knob upward and simultaneously return to rotate VR30 to the point carefully where it just starts scanning.

TRANSMITTER ADJUSTMENT

1. Measuring Instruments:

a) Voltmeter
b) Signal Generator
c) Power Supply 11-16V DC
d) Watt Meter
e) Frequency Counter
f) Osciloscope
g) Two Tone Generator (Audio Generator)
h) FM Linear Detector
i) Tester

2. Adjustments of Output Power and Modulation Capacity:

(1) Mode·····AM, TX Freq.·····28,000 MHz

i. Connect the frequency counter and watt meter to the antenna receptacle of transceiver. Rotate the core of L8, 9, 10, 12 & 14 so that the watt meter will give the maximum indications. Before the above adjustments, check up the frequency counter and confirm on the frequency counter whether the transceiver is sending the correct frequency.

ii. Adjust VR7 until the watt meter reading indicates 20-30 W as the high power. Connect the output of the audio generator to the Mic. input and feed 1 KHz signal to the transceiver. Adjust VR11 & 13 to get the good modulation sensitivity and modulation wave on the osciloscope.

iii. If there is the difference of TX output power between high channel and low channel, adjust it as follows:

1. Set the frequency to 29.999 MHz and adjust L9, 10 & 12 and VR15 for the maximum reading on the watt meter.
2. Set the frequency to 26.000 MHz and adjust L8 for the maximum reading on the watt meter.

In this way you can keep the balance between the high channel and low channel within about ±2.5W. In case that the power of 26.000 MHz is higher than one of 29.999 MHz., adjust it by rotating L10 clockwise.

iv. ALC:
Adjust VR20 and make the good balance of frequency range (26.000-29.999 MHz) checking on the watt meter.

(2) Mode·····FM or CW

If AM power is adjusted properly, no adjustment is required as to FM or CW power. If the output is weak, adjust VR7 checking on the watt meter. When you move VR7, confirm again whether AM power is still correct.

ALC:

Adjust VR21 and make the good balance of frequency range (26.000-29.999 MHz) checking on the watt meter.

Adjust FM Modulation Capacity by VR25 checking on the FM linear detector and control the deviation around 2KHz in 26.000 MHz and around 0.5-2 KHz in 29.999 MHz. In this case Modulation Input power is 3mV.

(3) Mode·····USB or LSB

If AM or FM power is adjusted properly, no adjustment is required as to SSB power.

Adjustment of SSB Wave Figure:

Connect the output of the signal generator to mic. input. Adjust mic. sensitivity by VR12 and Carrier Balance of Balance Modulation Circuit by VR9 & 10. Connect the two tone generator to mic. input. Adjust the bias of SSB drive position by VR16 so that the distortion of SSB wave will be corrected.

Adjust the low power by VR8 checking on the watt meter.

(4) Adjustment of CW Keying Monitor

It is the adjustment of keying monitor volume when sending CW signal. Set VR5 at the center position where the voltmeter reading will indicate 1V.

(5) Standardized TX Output Power

	High Power	Low Power
AM	20—30 W	over 4—10 W
FM, CW	60—80 W	over 20—40 W
USB	50—70 W	10—30 W
LSB	50—70 W	10—30 W

* Electric current: within 12A. maximum

3. Meter Adjustment:

(1) RF Meter

Mode·····FM or CW

High power: Set the VSWR switch of rear panel to S/R position. Adjust VR19 to 20dB on the S/RF meter.

(2) SWR Meter

Mode·····FM or CW

Set the SWR meter of rear panel to the middle position, C (Calibration). Set the pointer of meter to the full scale by adjusting volume knob of transceiver. Next, change the VSWR switch to the bottom position, SWR. Adjust TC4 to the minimum scale. Keep the SWR meter within 1.5 : 1 in 50 Ohm Load.

4. Protection Circuit Adjustment:

Mode·····AM

Voltage of Power Supply·····11V

Antenna·····Open or Short circuit

This circuit operates mainly to protect the final transistor TR21 by ceasing the work of TR16 when SWR exceeds 3 : 1.

After switching on the power, adjust VR29 and observe the lighting of protection circuit lamp. Move VR29 clockwise seeing from the front panel side and set VR29 at the position where a red lamp just lights up.

ADJUSTMENT OF LOCAL OSCILLATOR AND SUB-PRINTED BOARD

1. Measuring Instruments:

a) Frequency Counter
b) Osciloscope
c) DC Power Supply 14V
d) Tester

2. Local Oscillator Adjustment:

(1) Main Printed Board

Crystal, X1 for LSB: Adjust the frequency of 10.7015 MHz. by TC1.
Crystal, X2 for USB: Adjust the frequency of 10.6985 MHz. by TC2.
Crystal, X3 for AM & FM: Adjust the frequency of 10.7000 MHz. by TC3.

The hint of the above measurement:

Couple a condenser of the smallest possible capacitance on the probe and apply to the emitter of TR9 and read the following frequencies on the frequency counter.

	AM, FM	CW	USB	LSB
RX	—	10.6985 (X2)	10.6985 (X2)	10.7015 (X1)
TX	10.7000 (X3)	10.7000 (X3)	10.6985 (X2)	10.7015 (X1)

(2) Sub-Printed Board

Crystal, X4 for PLL Base Oscillator Frequency:
Adjust the frequency of 10.240 MHz by TC9.

The hint of the measurement:
Apply the probe coupling the condenser of the smallest possible capacitance to Pin 2 of IC25 and read the frequency of 10.240 MHz on the frequency counter.

Crystal, X5 for PLL Local Oscillator (Adjustment of PLL 11.3 MHz)
Mode ..... AM or FM
Freq ..... 28.000 MHz

i. Set the Trimmer Capasitor, TC5, 6, 7 & 8 to the center position.
ii. Switch off RIT Volume and produce the frequency of 11.3 MHz by rotating L30.
The hint of this measurement:
Connect the frequency counter to the secondary position of L29 and read the frequency of 11.3 MHz.

3. PLL LOCK:

(1) PLL Lock is achieved after X5 (11.3 MHz), X4 (10.240 MHz) and VCO (X1, 2 & 3) were properly adjusted. Set the channel to 29.999 MHz and rotate L26 clockwise checking the frequency counter so that you will find the place that the frequency is locked. From that position rotate L26 about 60 degrees to the clockwise position so that you can read 19.3 MHz on the secondary position of L27. Change the channel to 26.000 MHz and confirm the frequency of 15.3 MHz. All channels are now being locked consequently.

(Note) When PLL Lock is performed, the voltage should be between 0.5V (26.000 MHz) and 4.7V (29.999 MHz) on Pin 3 of IC25.

Please be noted that the Local Oscillator is actually adjusted within ±500 — 1,500 Hz for both 15.3 MHz in low channel (26.000 MHz) and 19.3 MHz in high channel (29.999 MHz). That is why the influence of temperature or long-term use are previously considered. Such the adjustment is performed by TC5, 6, 7 & 8 as follows:

Mode	Trimmer Capacitor	26.000 MHz.		29.999 MHz.	
AM & FM	TC5	15.3 MHz	0	19.3 MHz.	0
CW	TC6	15.3007 MHz	+700 Hz.	19.3007 MHz	+700 Hz.
USB	TC7	15.3015 MHz	+1,500 Hz.	19.3015 MHz.	+1,500 Hz.
LSB	TC8	15.2985 MHz	−1,500 Hz.	19.2985 MHz.	−1,500 Hz.

(2) Channel Selector:

Adjust the voltage of low channel (26.000 MHz) and high channel (29.999 MHz) by moving the following potis.

* Frequency·····26.000 MHz (low channel)

Set the frequency figure to 100 KHz and adjust VR23 so that the tester indicates 1.5V. Next, set the frequency figure to 100 Hz and adjust VR24 to 1.8V on the tester.

* Frequency·····29.999 MHz (high channel)

Set the frequency figure to 100 Hz and adjust VR26 to 4V on the tester. Next, set the frequency figure to 100 KHz and adjust VR27 to 4.5V on the tester.

The hint of the above measurements:

Apply the tester to Pin 1 of IC1 for adjustment of VR24 & 26 and to Pin 7 of IC1 for adjustment of VR23 & 27.

4. RIT Adjustment:

i. First, switch off the RIT Volume and check the frequency on the frequency counter.

ii. Switch on the RIT Volume and observe if the same frequency as of the above i. is found in some place within the variable range of the RIT.

iii. Next, adjust VR4 so that the frequency as above stays on the center of the variable range of the RIT. The difference under 100–200 Hz will be acceptable.

5. The Correction of TX Frequency:

Mode·····AM or FM

Rit Volume·····OFF.

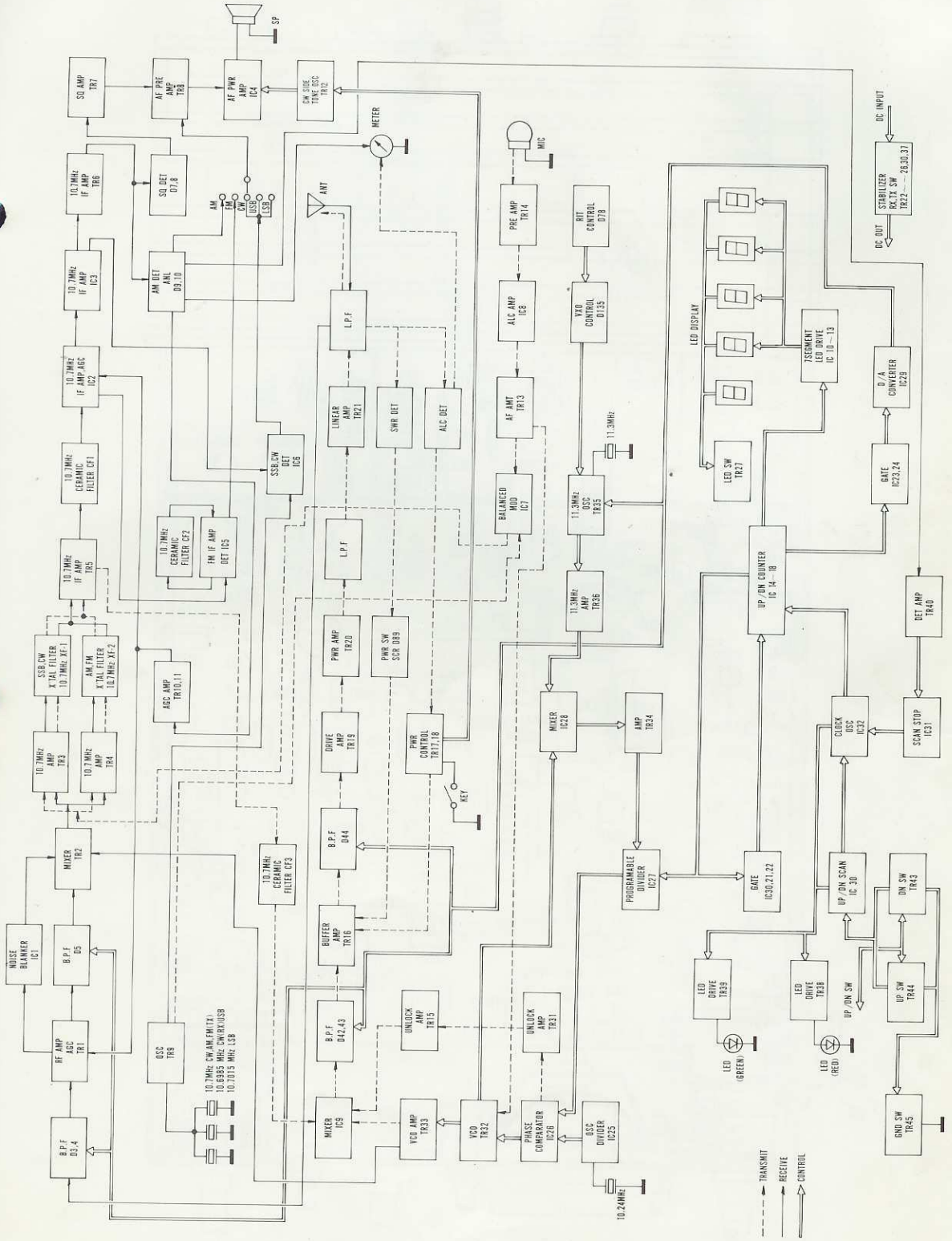
Apply the probe of the frequency counter to the secondary position of L27 and adjust VR14 so that TX and RX frequency stays same.

(Remark:)

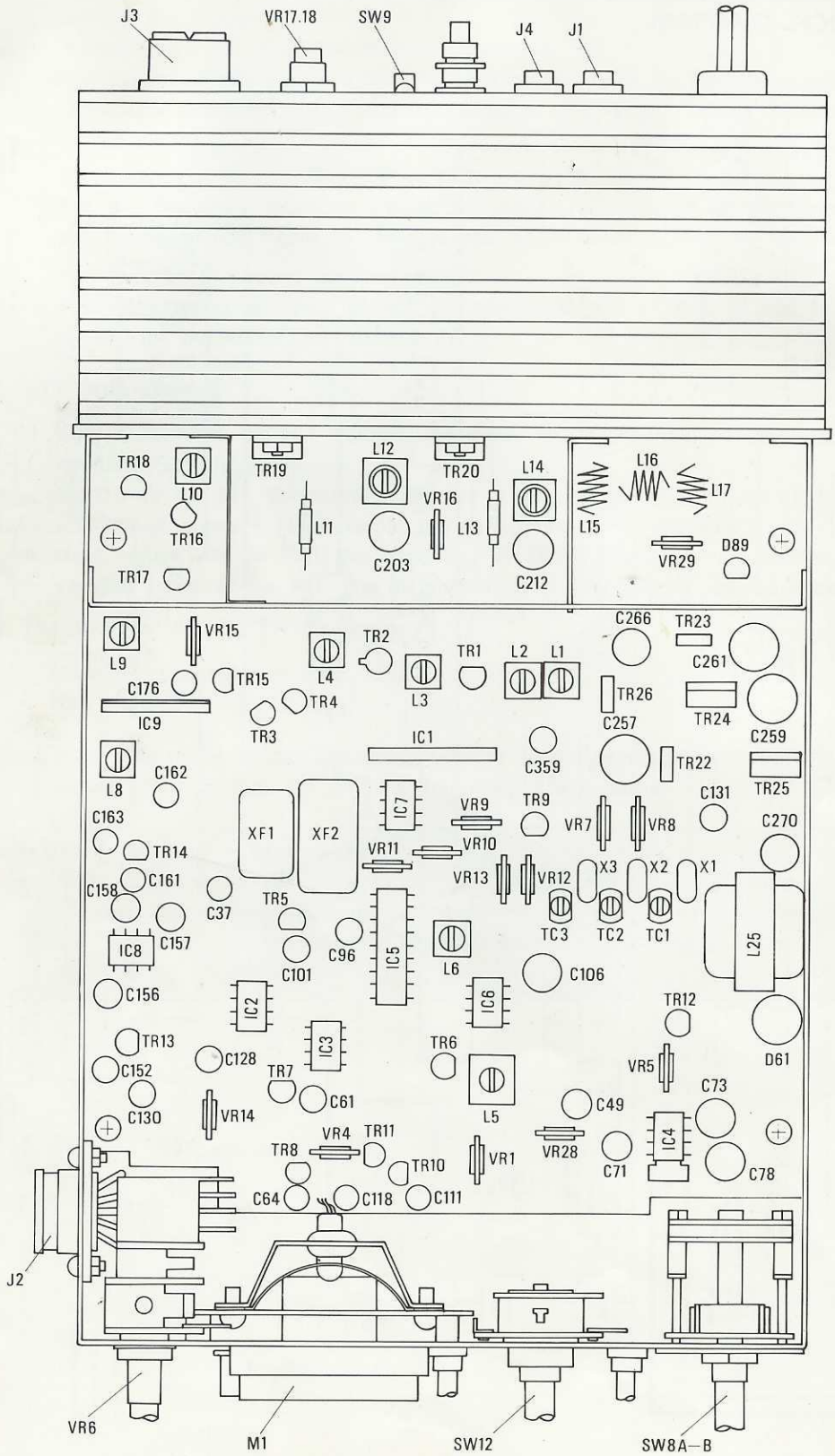
After finishing all adjustments, it is absolutely necessary to connect the speaker connectors to the proper poles, the red wire to the positive pole (+) and the black wire to the negative pole (−). Otherwise it may self-oscillate on FM mode.

SECTION Ⅷ-DIAGRAMS & LAYOUTS

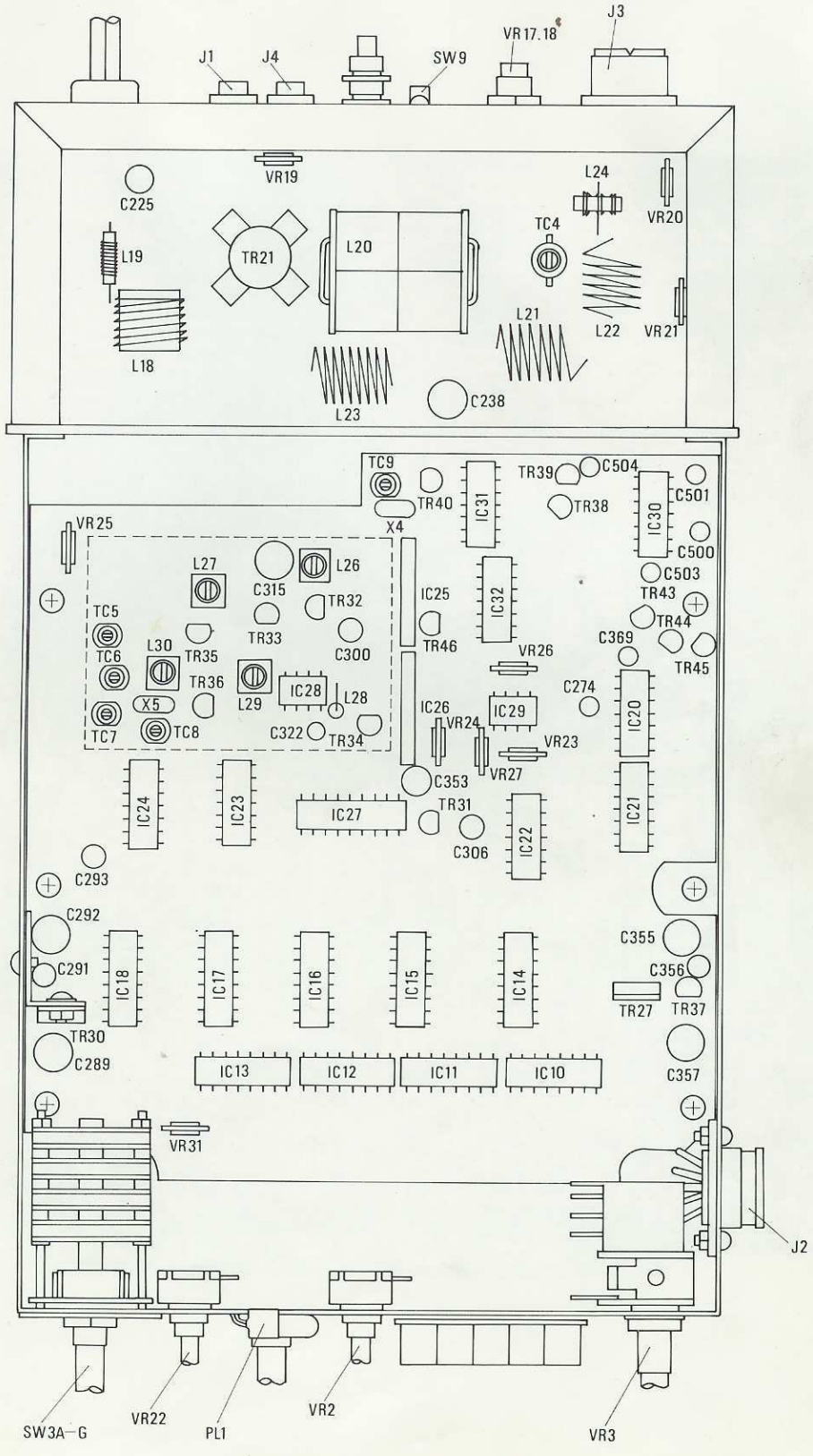
BLOCK DIAGRAM



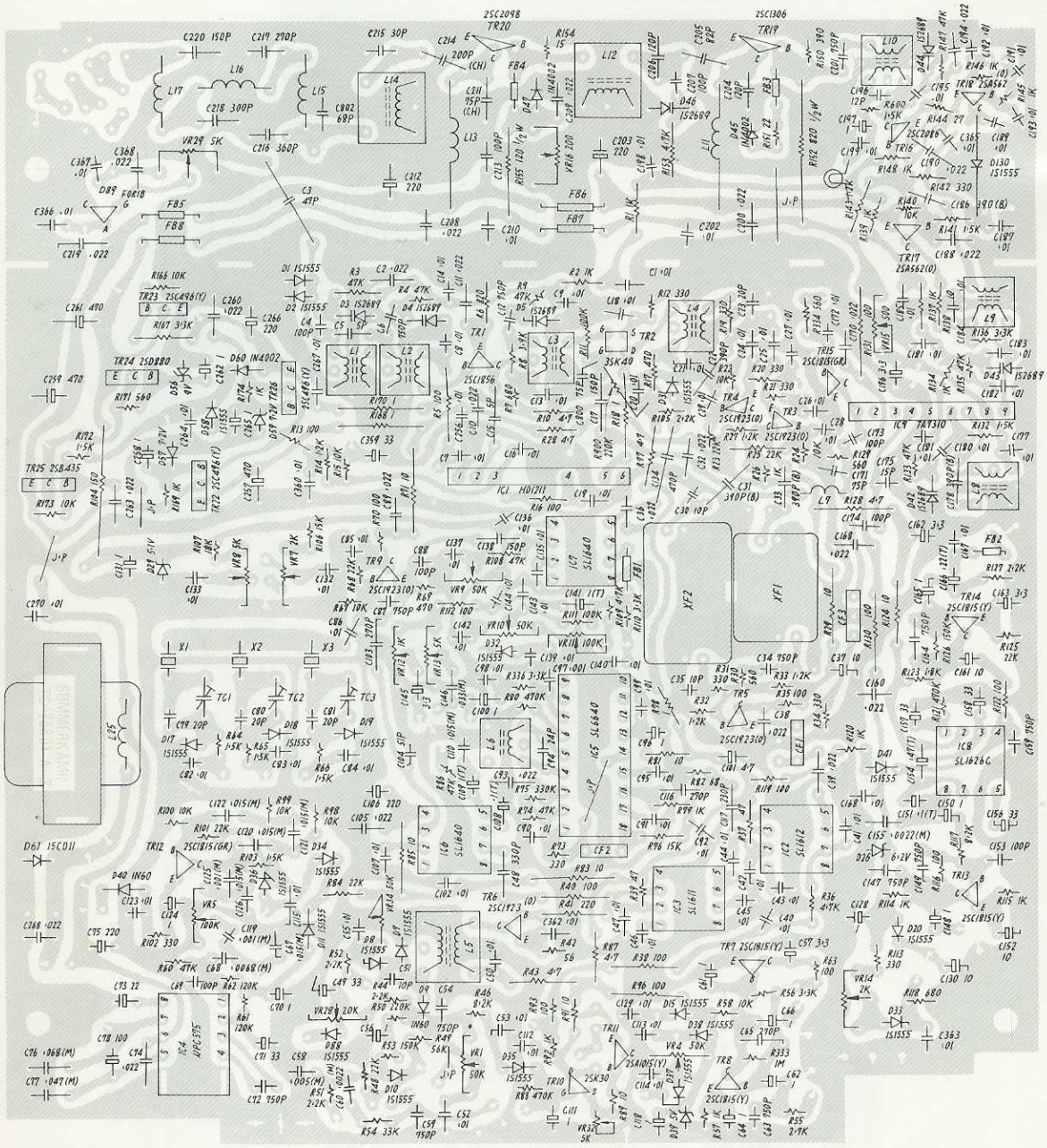
COMPLETE PARTS LAYOUT



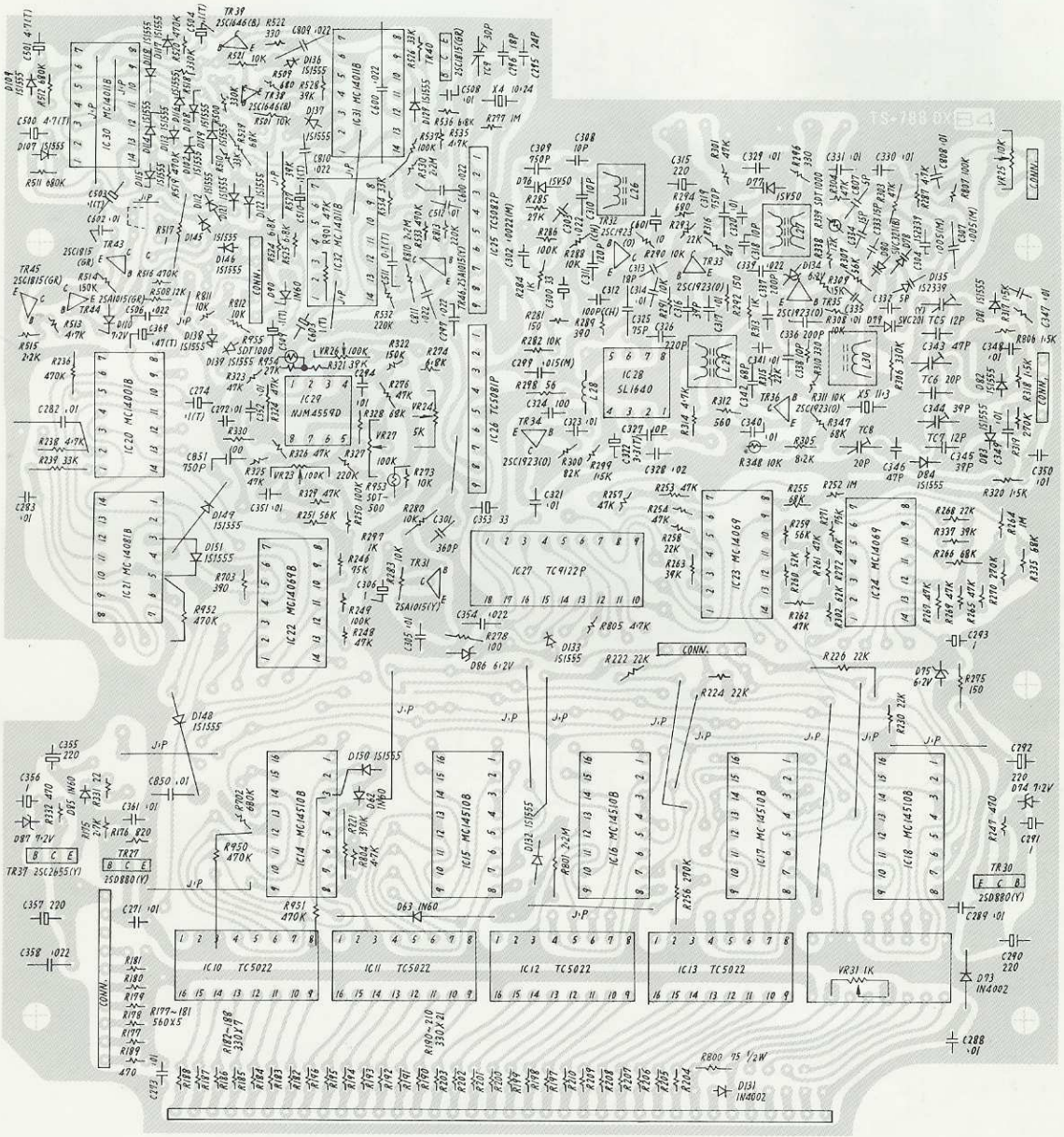
COMPLETE PARTS LAYOUT



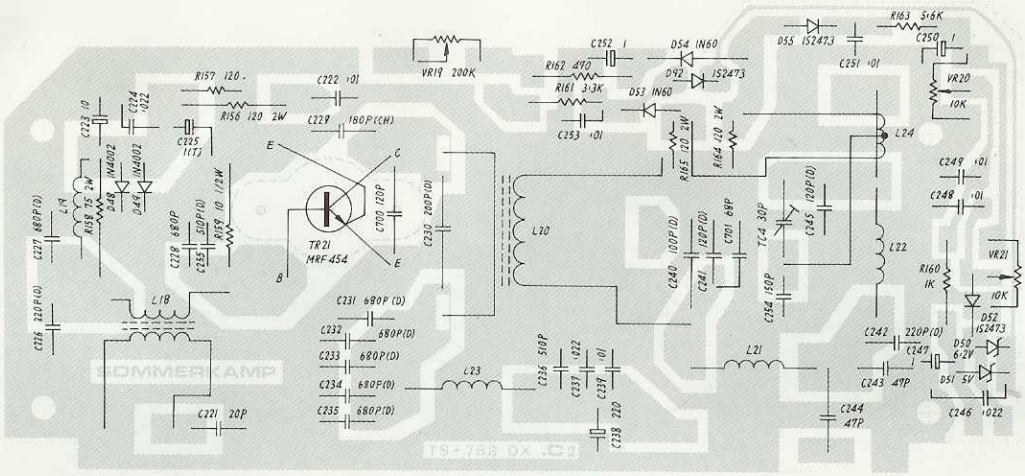
PRINTED CIRCUIT BOARD PARTS LAYOUT (MAIN)



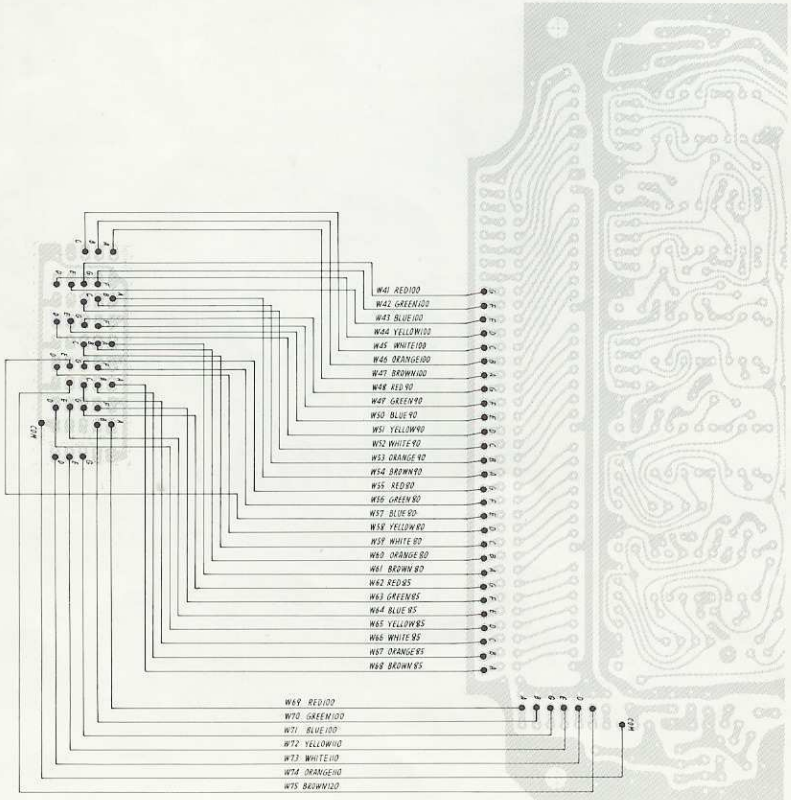
PRINTED CIRCUIT BOARD PARTS LAYOUT (SUB)

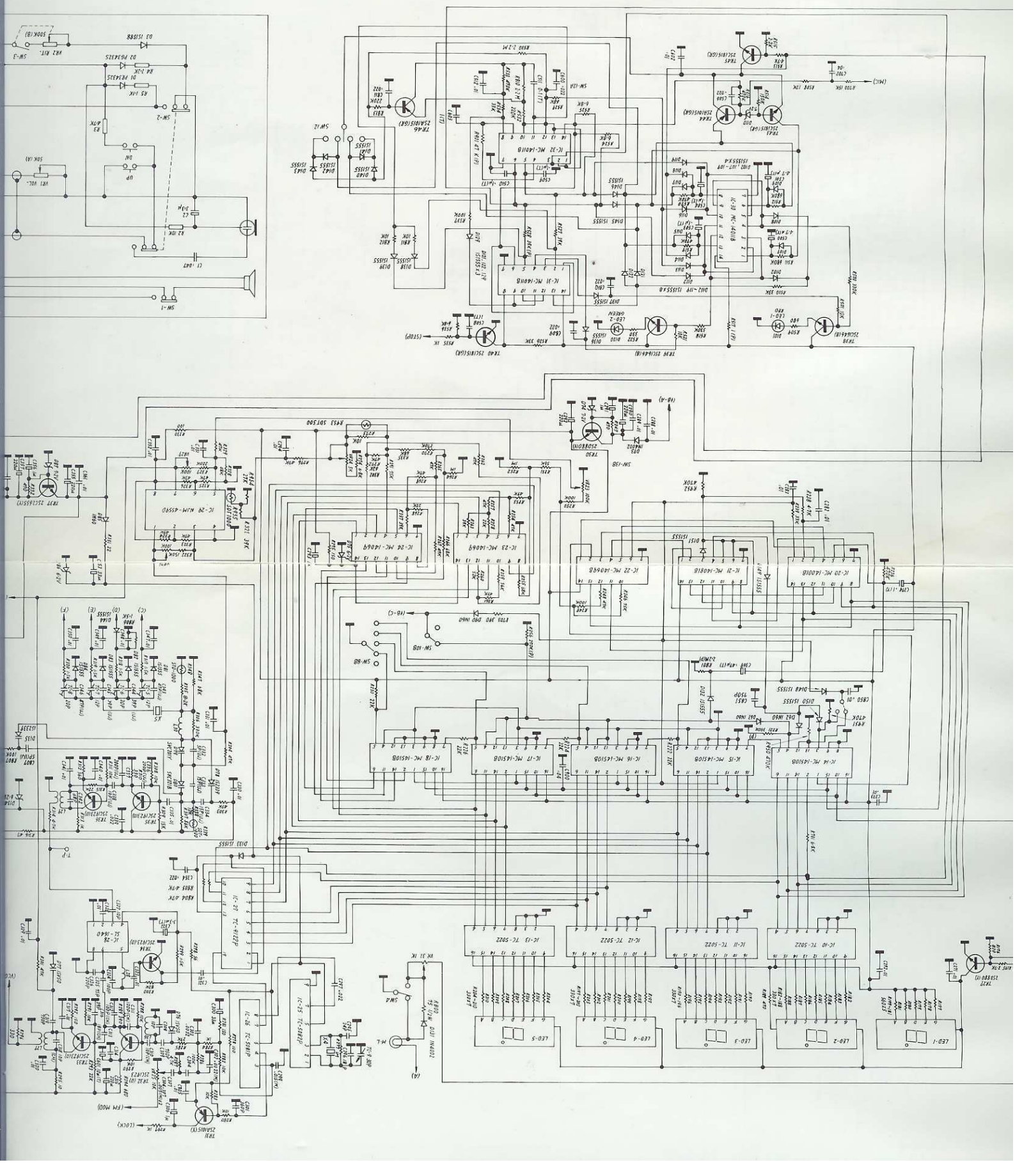


PRINTED CIRUIT BOARD PARTS LAYOUT

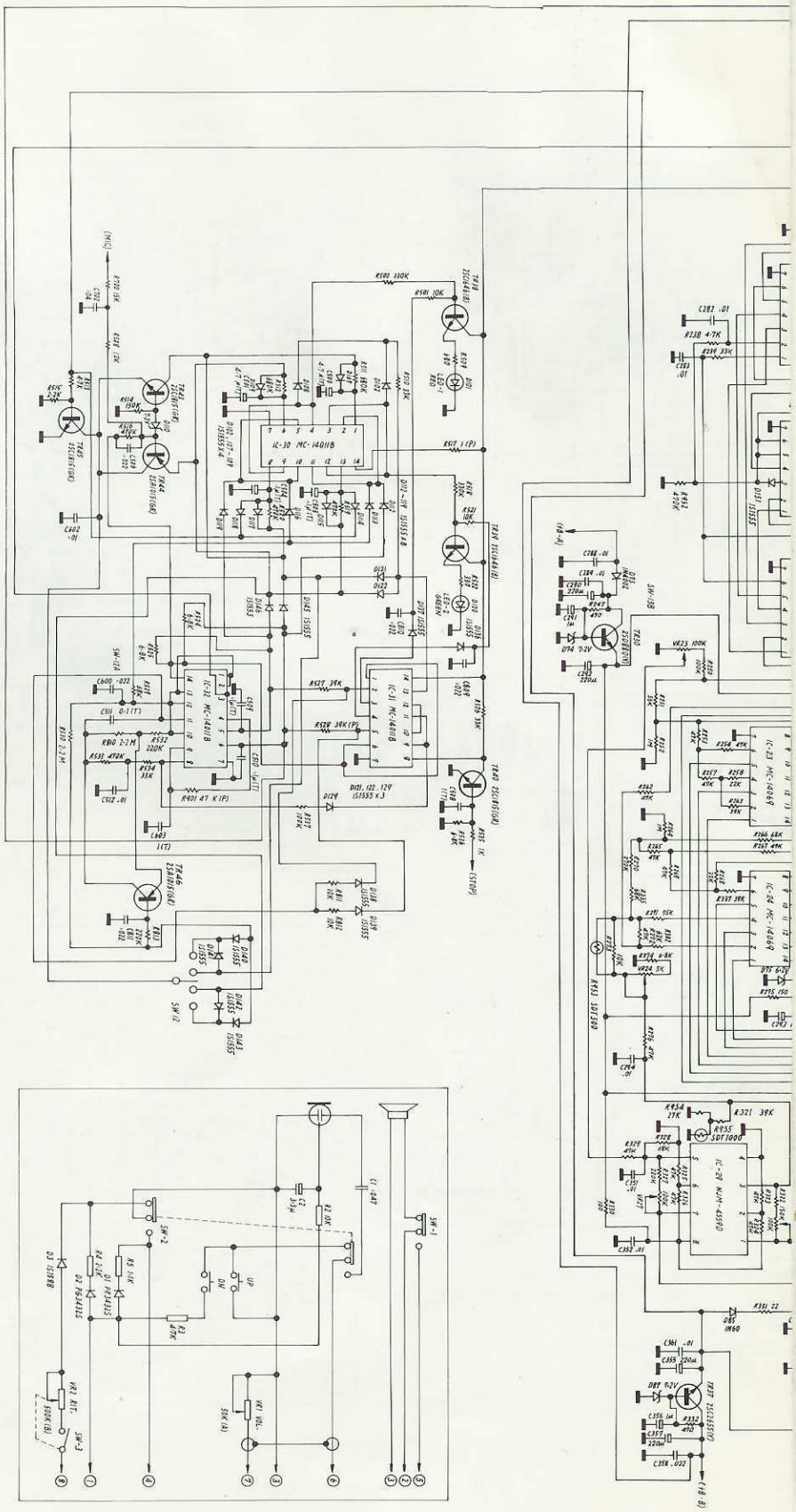


WIRING LAYOUT





CIRCUIT DIAGRAM



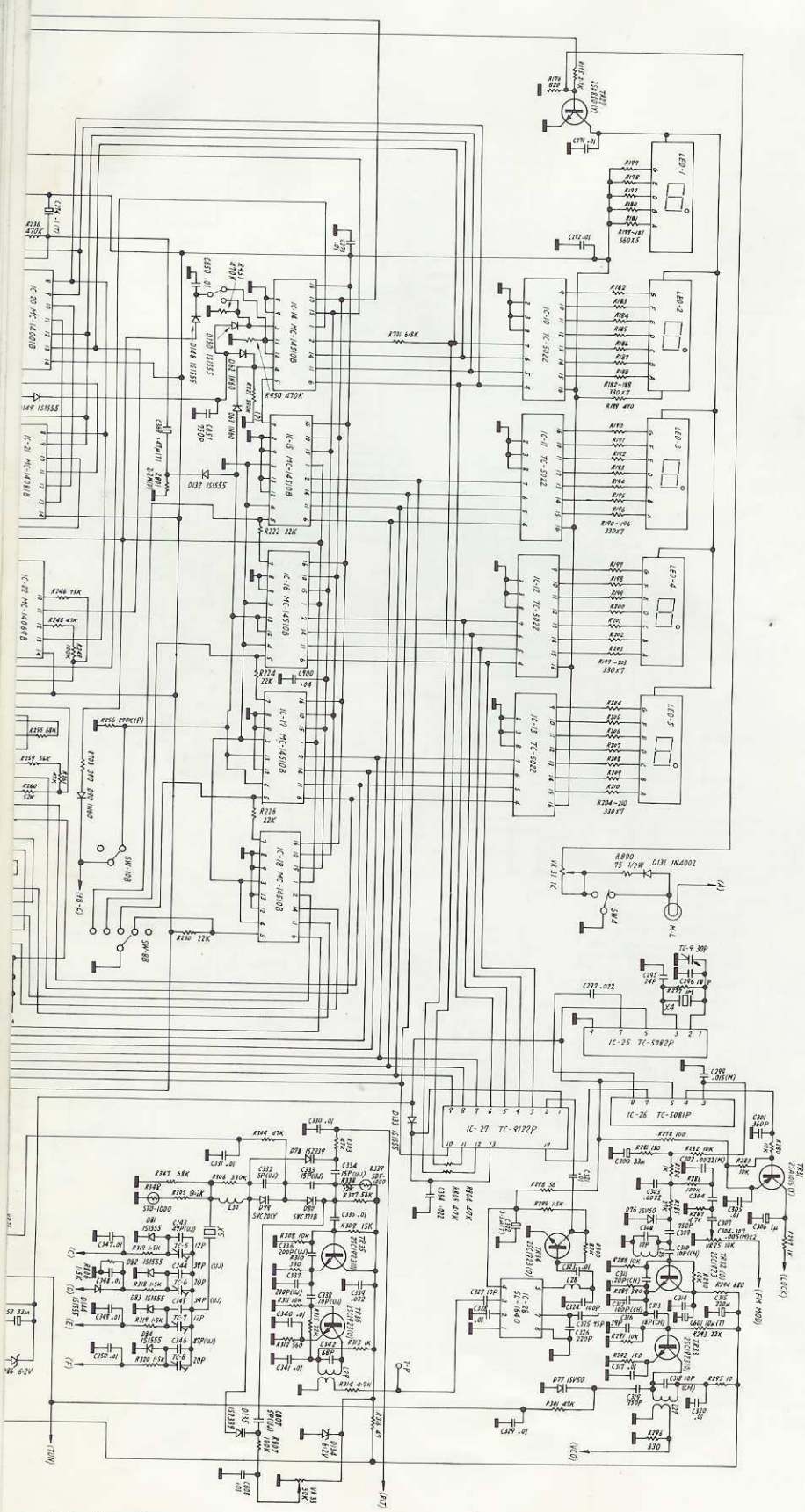


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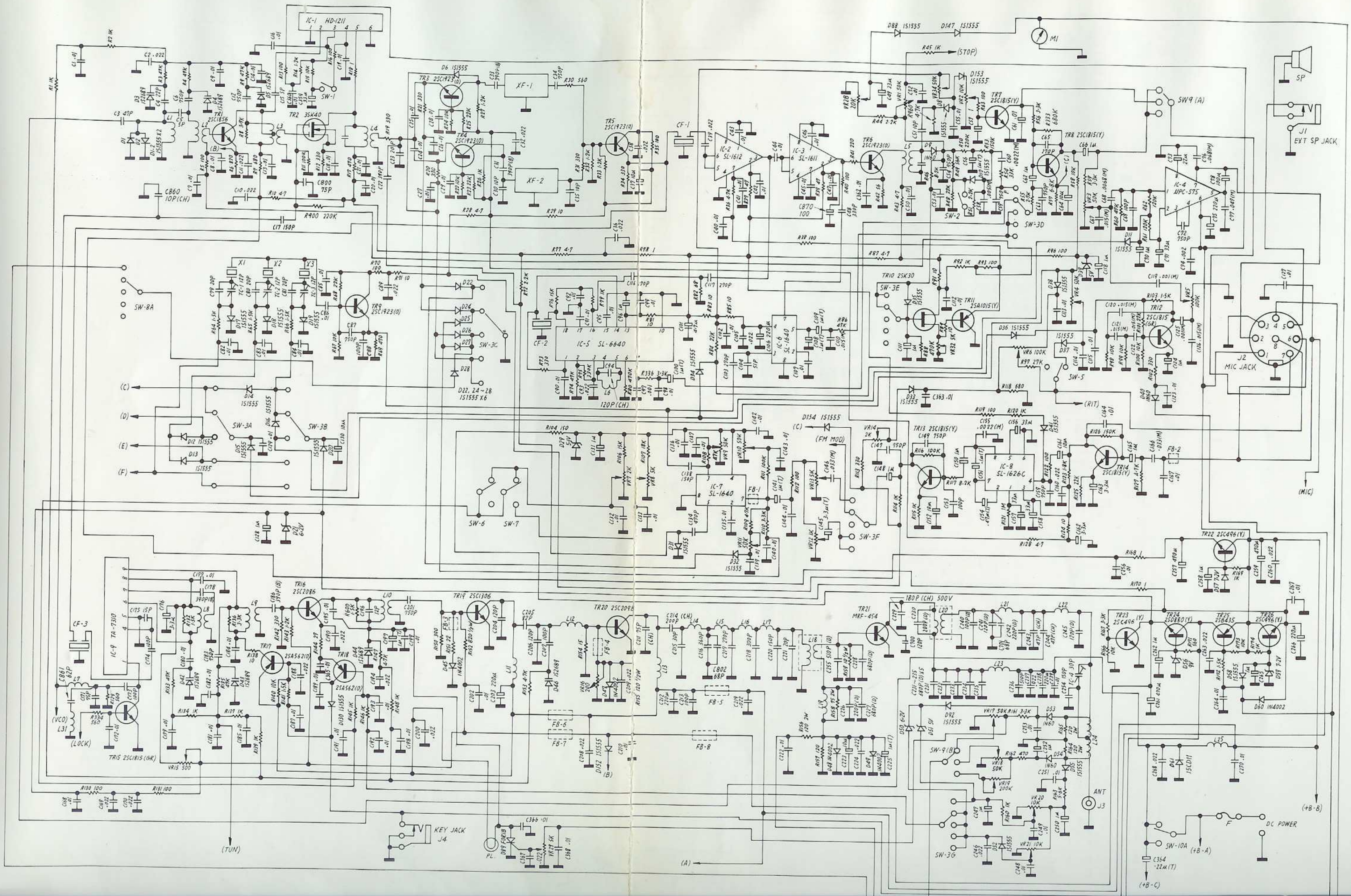
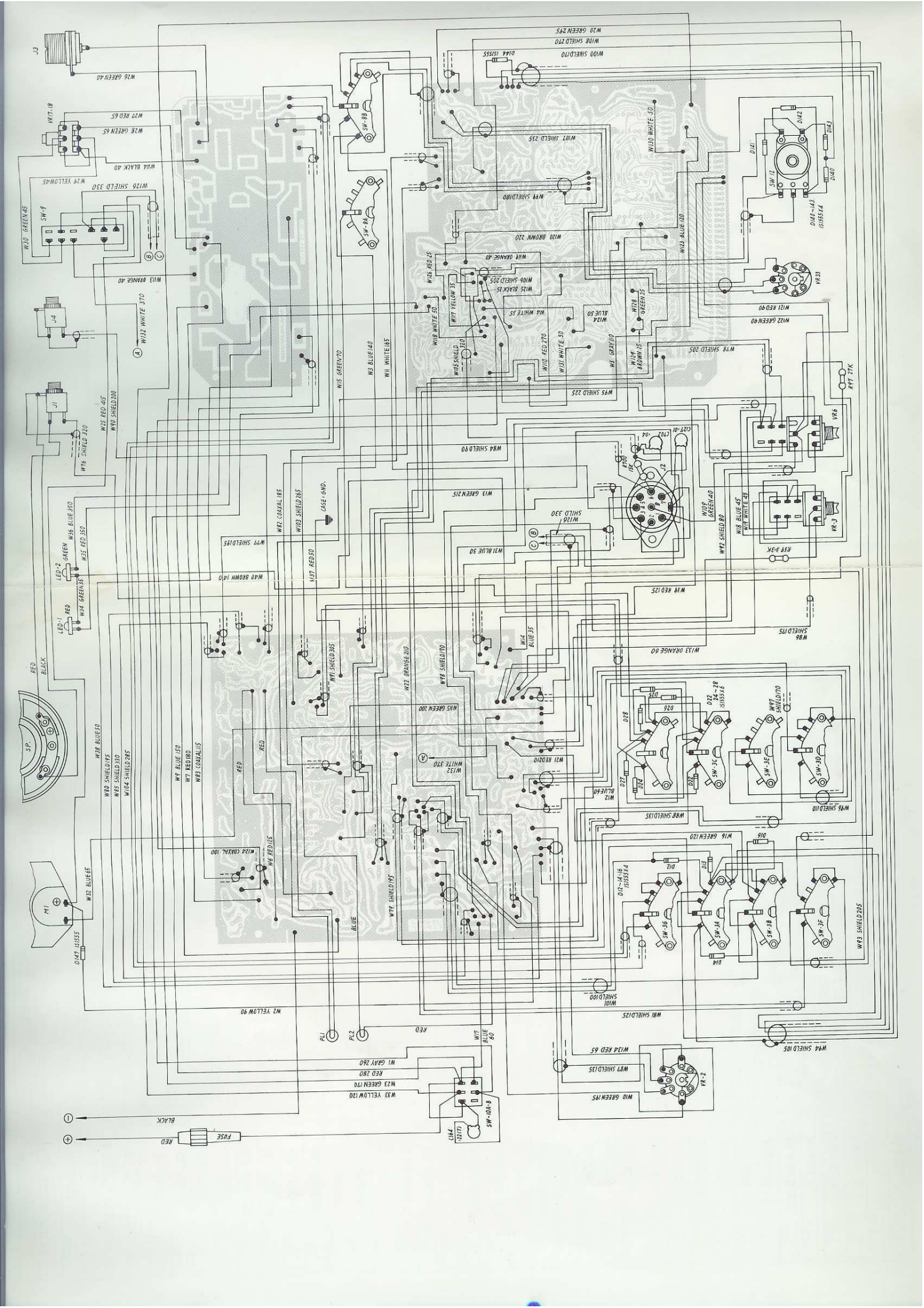
DIAGRAM



IC-1 HD-1211
IC-2 SL-1612
IC-3 SL-1611
IC-4 µPC-575
IC-5 SL-6640
IC-6 SL-1640
IC-7 SL-1640
IC-8 SL-1626C
IC-9 TA-7310
TR1 2SC1856
TR2 3SK40
TR3 2SC1923(O)
TR4 2SC1923(O)
TR5 2SC1923(O)
TR6 2SC1923(O)
TR7 2SC1815(Y)
TR8 2SC1815(Y)
TR9 2SC1923(O)
TR10 2SK30
TR11 2SA1015(Y)
TR12 2SC1815(GR)
TR13 2SC1815(Y)
TR14 2SC1815(Y)
TR15 2SC1815(GR)
TR16 2SC2086
TR17 2SA562(O)
TR18 2SA562(O)
TR19 2SC1306
TR20 2SC2098
TR21 MRF-454
TR22 2SC496(Y)
TR23 2SC496(Y)
TR24 2SD880(Y)
TR25 2SB435
TR26 2SC496(Y)
XF-1
XF-2
CF-1
CF-2
CF-3
X1
X2
X3
SW-1
SW-2
SW-3A
SW-3B
SW-3C
SW-3D
SW-3E
SW-3F
SW-3G
SW-5
SW-6
SW-7
SW-8A
SW9 (A)
SW-9(B)
SW-10A
J1 EXT SP JACK
J2 MIC JACK
J3 ANT
J4 KEY JACK
SP
M1
DC POWER
F
PL
(VCO)
(LOCK)
(TUN)
(RIT)
(STOP)
(MIC)
(FM MOD)
(+B-A)
(+B-B)
(+B-C)
(A)
(B)
(C)
(D)
(E)
(F)
VR1 50K
VR2 10K
VR3 50K
VR4 50K
VR5 100K
VR6 100K
VR7 2K
VR8 5K
VR9 50K
VR10 50K
VR11 50K
VR12 1K
VR13 5K
VR14 2K
VR15 500
VR16 200
VR17 50K
VR18 50K
VR19 200K
VR20 10K
VR21 10K
VR28 20K
VR29 5K
VR32 5K
VR34 50K


J3
W26 GREEN 40
VR17-18
W27 RED 65
W28 GREEN 65
W14 BLACK 40
W29 YELLOW 45
W136 SHIELD 330
SW-9
W30 GREEN 45
W13 ORANGE 40
J4
W132 WHITE 370
J1
W35 RED 45
W90 SHIELD 200
W76 SHIELD 320
W36 BLUE 350
W35 RED 350
LED-2 GREEN
W34 GREEN 35
LED-1 RED
W40 BROWN 140
W77 SHIELD 195
W38 BLUE 50
W10 SHIELD 75
W35 SHIELD 330
W104 SHIELD 285
W8 BLUE 150
W7 RED 180
W83 COAXIAL 115
W124 COAXIAL 100
W6 RED 125
W32 BLUE 65
M1
D147 1N5555
W2 YELLOW 90
W82 COAXIAL 185
W103 SHIELD 265
W37 RED 50
CASE GND.
W15 GREEN 70
W3 BLUE 140
W11 WHITE 185
W22 ORANGE 210
W79 SHIELD 170
W44 BLUE 35
W21 RED 210
W132 WHITE 370
W115 GREEN 200
W79 SHIELD 195
W137 BLUE 50
W1 GRAY 260
RED 280
W23 GREEN 170
W33 YELLOW 120
W17 BLUE 60
PL1
PL2
RED
BLUE
W20 GREEN 295
W108 SHIELD 270
W100 SHIELD 270
D144 1N5555
SW-8B
SW-8A
W107 SHIELD 235
W99 SHIELD 180
W120 BROWN 220
W26 RED 25
W125 BLACK 25
W106 SHIELD 205
W49 ORANGE 40
W18 WHITE 50
W18 YELLOW 35
W4 WHITE 55
W124 BLUE 50
W128 GREEN 35
W127 WHITE 50
W10 RED 270
W5 GRAY 110
W42 BROWN 140
W95 SHIELD 225
W130 WHITE 30
W133 BLUE 120
D141
D142
D143
SW-12
D140
D140~143 1N5555X4
VR33
W122 GREEN 90
W121 RED 90
W78 SHIELD 205
R47 27K
VR6
C27 .01
C202 .04
R200 15K
J2
W84 SHIELD 90
W109 GREEN 40
W72 SHIELD 80
W18 BLUE 45
W17 WHITE 25
VR-3
R59 3.3K
W34 RED 125
W86 SHIELD 175
W133 ORANGE 60
D25
D26
D28
D32 ~ 28 1N5555X6
SW-3C
SW-3E
SW-3D
W97 SHIELD 170
W96 SHIELD 110
D27
D24
D22
W12 BLUE 60
W88 SHIELD 135
W16 GREEN 120
D16
D12
D13
D17~14~16 1N5555X4
SW-3G
SW-3H
SW-3B
SW-3F
D14
W93 SHIELD 205
W101 SHIELD 100
W81 SHIELD 125
W94 SHIELD 105
W134 RED 65
W87 SHIELD 135
VR-2
W10 GREEN 195
SW-10A,B
CN4 (12)
FUSE
BLACK
RED

NOTE: (T) TRANS. (R) RCIV.

TESTER
DC:——20KΩ/V
AC:——30MHz Scope

TR.NO	TR	DC VOLT (Voltage in bracket Vp-p) BASE	EMITTER	COLLECTOR
1	2SC1856	2.5	1.8	5.4
3	2SC1923(O)	1.8	1	3.3
4	2SC1923(O)	1.9	0.8	4.5
5	2SC1923(O)	3.2	2.4	5.6
6	2SC1923(O)	1.5	0.8	6
7	2SC1815(Y)	——	——	7
8	2SC1815(Y)	0.7	0.4	2.3
9	2SC1923(O)	1.8	1.2 (0.3)	6.2
11	2SA1015(Y)	1.5	2.2	——
12	2SC1815(6R)	1.5	1	2.7
13	2SC1813(Y)	2.4	2.2	4.2
14	2SC1815(Y)	1.9	1.6	5.7
15	2SC1815(6R)	——	——	2.5
16	2SC2086	0.8	0.6	13.5
17	2SA562(O)	4.8	13.8	13.8
18	2SA562(O)	0.3	0.5	——
19	2SC1306	0.4	——	13.5
20	2SC2098	0.4	——	13.5
21	MRF454	0.5	——	13.8
22	2SC496(Y)	7.2	6.5	13.8
23	2SC496(Y)	0.4	——	8.5
24	2SD880(Y)	9	8.5	13
25	2SB435	12	13.8	13

TR.NO	TR	DC VOLT (Voltage in bracket Vp-p) BASE	EMITTER	COLLECTOR
26	2SC496(Y)	7.2	6.5	13.8
27	2SD880(Y)	0.8	——	0.2
30	2SD880(Y)	7.2	7	13
31	2SA1015(Y)	5.6	5.6	——
32	2SC1923(O)	2	1.4(0.3)	4.4
33	2SC1923(O)	1.7	1	6.5
34	2SC1923(O)	0.8	——	2.4
35	2SC1923(O)	1.8	1(0.6)	6.3
36	2SC1923(O)	1.5	0.9	4.8
37	2SC2060(Q)	7.2	6.6	13.8
38	2SC1646(B)	——	——	9
39	2SC1646(B)	——	——	7
40	2SC1815(6R)	——	——	6
43	2SC1815(6R)	0.2	0.2	6
44	2SA1015(6R)	1.5	6	0.2
45	2SC1815(6R)	0.8	——	0.2
46	2SA1015(6R)	3.3	3.2	1.3

TR.NO	FET	DC VOLT (Voltage in bracket Vp-p) GATE (1)	GATE (2)	DRAIN	SOURCE
2	3SK40	(1)	——	5.9	0.5
10	2SK30	——	——	6	1.5

	DC VOLT ON	OFF
VXO		
RIT		

IC.NO	IC	PIN NO / DC VOLT (Voltage in bracket Vp-p) 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
1	HD-1211	—	0.8	2.2	6	5.9	—																						
2	SL-1612	—	6	2.3	—	0.9	—	2	—																				
3	SL-1611	—	5.5	1.7	—	—	—	—	—																				
4	MPC-575	1.6	13.8	13		7.2	6.2	13.8	0.3	1.9																			
5	SL-6640	5	5.2	0.8	4	4	5.8	1.8	—	—	—	—	—	6	5	5	1.6	1.6	1.6										
6	SL-1640	—	2.8	2.7	5.9	5.2	—	2.8	—																				
7	SL-1640	—	3	3	6.2	5.6	—	2.8	—																				
8	SL-1626C	0.3	2.9	6	1.2	1	—	1.4	1.4																				
9	TA-7310	2.6	—	—	2.6	—	4.6	2.2	4.6	13.8																			
25	TC-5082P	—	2	2.4	—	5.5	—	1.8	—	—																			
26	TC-50891P	—	—	0.5 ~4.5	—	5.5	—	—	2.2																				
28	SL-1640	—	2.3	2.5	5	4.5	—	2.3	—																				
29	NJM-4559D	1.5	3	0.9	—	0.9	3	2.6	6.6																				

NOTE: (T) TRANS. (R) RCIV.

TESTER
DC:——20KΩ/V
AC:——30MHz Scope

TR.NO	TR	DC VOLT (Voltage in bracket Vp-p) BASE	EMITTER	COLLECTOR
1	2SC1856	2.5	1.8	5.4
3	2SC1923(O)	1.8	1	3.3
4	2SC1923(O)	1.9	0.8	4.5
5	2SC1923(O)	3.2	2.4	5.6
6	2SC1923(O)	1.5	0.8	6
7	2SC1815(Y)	——	——	7
8	2SC1815(Y)	0.7	0.4	2.3
9	2SC1923(O)	1.8	1.2 (0.3)	6.2
11	2SA1015(Y)	1.5	2.2	——
12	2SC1815(6R)	1.5	1	2.7
13	2SC1813(Y)	2.4	2.2	4.2
14	2SC1815(Y)	1.9	1.6	5.7
15	2SC1815(6R)	——	——	2.5
16	2SC2086	0.8	0.6	13.5
17	2SA562(O)	4.8	13.8	13.8
18	2SA562(O)	0.3	0.5	——
19	2SC1306	0.4	——	13.5
20	2SC2098	0.4	——	13.5
21	MRF454	0.5	——	13.8
22	2SC496(Y)	7.2	6.5	13.8
23	2SC496(Y)	0.4	——	8.5
24	2SD880(Y)	9	8.5	13
25	2SB435	12	13.8	13

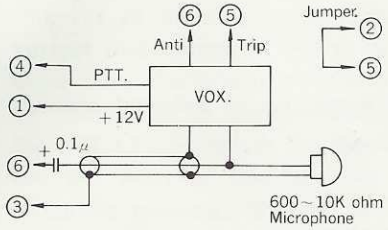
TR.NO	TR	DC VOLT (Voltage in bracket Vp-p) BASE	EMITTER	COLLECTOR
26	2SC496(Y)	7.2	6.5	13.8
27	2SD880(Y)	0.8	——	0.2
30	2SD880(Y)	7.2	7	13
31	2SA1015(Y)	5.6	5.6	——
32	2SC1923(O)	2	1.4(0.3)	4.4
33	2SC1923(O)	1.7	1	6.5
34	2SC1923(O)	0.8	——	2.4
35	2SC1923(O)	1.8	1(0.6)	6.3
36	2SC1923(O)	1.5	0.9	4.8
37	2SC2060(Q)	7.2	6.6	13.8
38	2SC1646(B)	——	——	9
39	2SC1646(B)	——	——	7
40	2SC1815(6R)	——	——	6
43	2SC1815(6R)	0.2	0.2	6
44	2SA1015(6R)	1.5	6	0.2
45	2SC1815(6R)	0.8	——	0.2
46	2SA1015(6R)	3.3	3.2	1.3

TR.NO	FET	DC VOLT (Voltage in bracket Vp-p) GATE (1)	GATE (2)	DRAIN	SOURCE
2	3SK40	(1)	——	5.9	0.5
10	2SK30	——	——	6	1.5

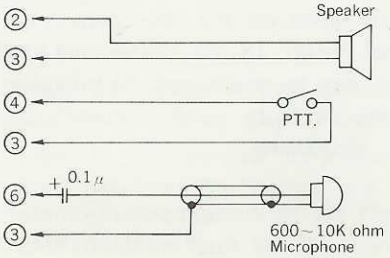
	DC VOLT ON	OFF
VXO		
RIT		

IC.NO	IC	PIN NO / DC VOLT (Voltage in bracket Vp-p) 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
1	HD-1211	—	0.8	2.2	6	5.9	—																						
2	SL-1612	—	6	2.3	—	0.9	—	2	—																				
3	SL-1611	—	5.5	1.7	—	—	—	—	—																				
4	MPC-575	1.6	13.8	13		7.2	6.2	13.8	0.3	1.9																			
5	SL-6640	5	5.2	0.8	4	4		5.8	1.8	—	—	—	—	—	6	5	5	1.6	1.6	1.6									
6	SL-1640	—	2.8	2.7	5.9	5.2	—		2.8	—																			
7	SL-1640	—	3	3	6.2	5.6	—		2.8	—																			
8	SL-1626C	0.3	2.9	6	1.2	1	—		1.4	1.4																			
9	TA-7310	2.6	—	—	2.6	—	4.6		2.2	4.6	13.8																		
25	TC-5082P	—	2	2.4	—	5.5	—		1.8	—	—																		
26	TC-50891P	—	—	0.5 ~4.5	—	5.5	—		—	2.2																			
28	SL-1640	—	2.3	2.5	5	4.5	—		2.3	—																			
29	NJM-4559D	1.5	3	0.9	—	0.9	3		2.6	6.6																			

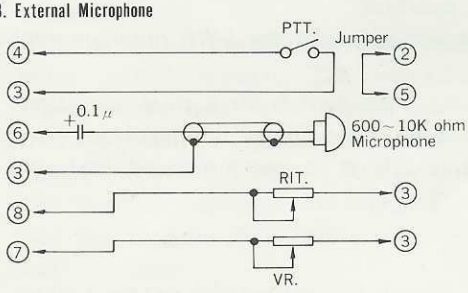
1- Microphone with VOX.



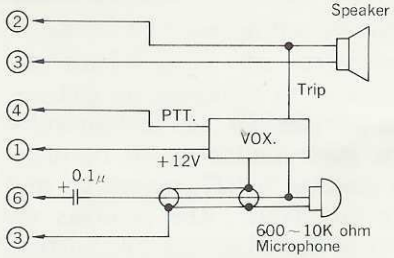
2. Headset or Telephoneset with PTT.



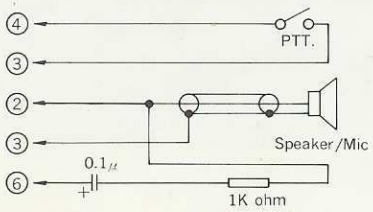
3. External Microphone



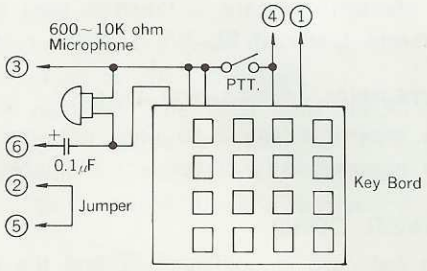
4. Headset or Telephoneset with VOX.



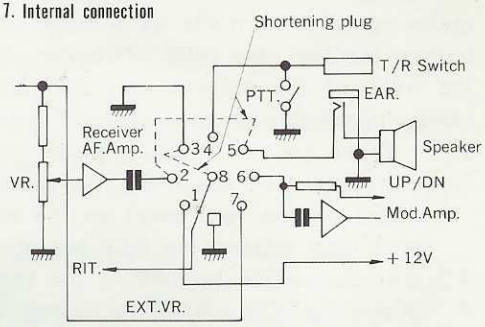
5. External Microphone Speaker with PTT.



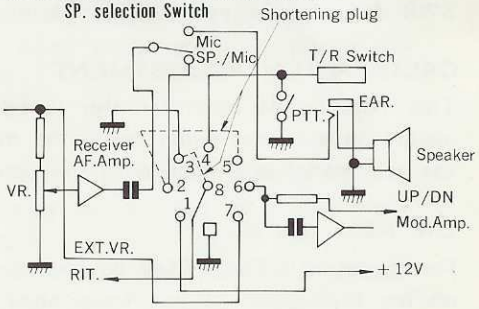
6. Telephone encorder Mic.



7. Internal connection



8. Internal connection with SP. selection switch



9. Connections number