SHARP SERVICE MANUAL

OUTSTANDING RECEPTION THE WORLD OVER

CB-4370

SYNTHESIZED 40 CHANNEL CITIZENS BAND TRANSCEIVER

MODEL CB-4370

"WARNING"
It is unlawful for the user to make any replacement or substitution of parts, adjustments or to service the transmitter by any one other than a person holding a commercial 1st or 2nd class radio operator's license. Any change in the circuitry that would change or violate the technical regulations or type acceptance is prohibited.

SPECIFICATIONS

Transmitter section

RF power output	4W (maximum)
Frequency range	27MHz Citizens Band
Channels	40 chs. P.L.L. (Phase Locked Loop) circuit Synthesizer
Type of crystal	HC-18U Tolerance 10.240MHz .... ± 0.003%
Transmitter modulation	100% (maximum)
Modulation limiter	Yields high average modulation at average voice levels
Antenna matching	Nominal 50 ohms
Carrier deviation	Not greater than ± 800Hz nominal on (exceeds F.C.C., D.O.C., etc. requirements)
Harmonic suppression	Exceeds 60dB

Receiver section

Audio power output	3.5 Watts maximum power output
Sensitivity	0.5μV/m for 10dB S + N/N ratio at 30% at 1000Hz modulation
Channels	40 chs. P.L.L. (Phase Locked Loop) circuit Synthesizer
Type of crystal	HC-18U 11.150MHz .... ± 0.003%
Selectivity	6dB down at ± 3kHz; 60dB down at ± 10kHz.
Intermediate frequency	1st-IF: 10.695MHz, 2nd-IF: 455kHz
Circuit type	Dual conversion superheterodyne: Phase Locked Loop (P.L.L.) frequency synthesizer provides 40 transmit and receive channels. Delta tuning of ±1.0kHz on each channels plus ceramic filter.
Auxiliary circuits	Automatic noise limiter (ANL), Variable squelch, Public Address System (P.A.)

General

Power source	DC 12.0V Nominal negative or positive ground
Antenna	50 ohm external antenna for car or base operation
Speaker	3-1/8" P.D.S. 8-ohm Imp.
Microphone	Press-to-talk dynamic microphone (500 ohm)
Accessories	Microphone hanger Mobile mounting bracket Mounting screws Microphone with plug and cord. Power supply cord with fuse holder and socket. Spare fuse (2.3A)
Dimensions	2-17/32" (H) × 6-11/16" (W) × 7-9/16" (D)
Weight	3.8 lbs. without microphone
Cabinet	Metal body with plastic front

SHARP ELECTRONICS CORPORATION

Executive Office:

10 Keystone Place,	Paramus,	New Jersey	07652	(201) 265-5600

Regional Offices & Distribution Centers:

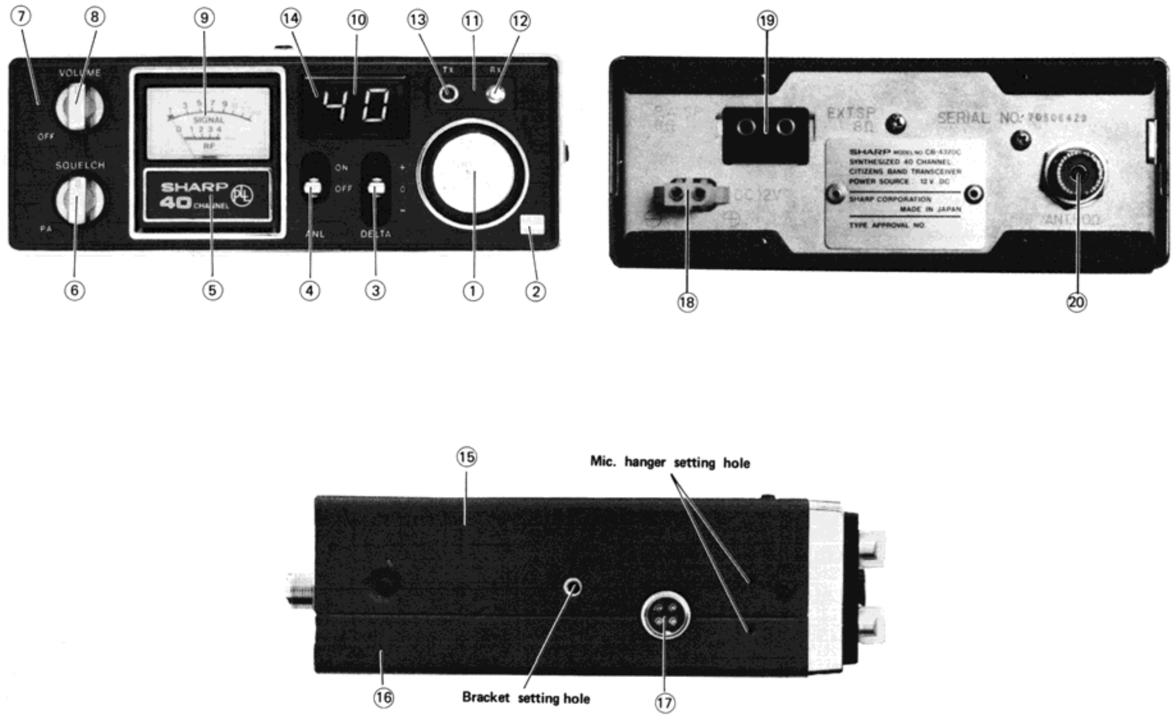
10 Keystone Place	Paramus,	New Jersey	07652	(201) 265-5600
21580 Wilmington Ave.,	Long Beach,	Calif.	90810	(213) 830-4470

U.S. Subsidiary of Sharp Corporation, Osaka, Japan

Parts Centers:

P.O. Box 664	Paramus,	New Jersey	07652	(201) 265-5600
P.O. Box 20394	Long Beach,	Calif.	90801	(213) 830-4470

PARTS LAYOUT



① Channel Selector Knob (JKNBN0299AFSA)
② Emblem "SHARP" (HINDM1080AFSB)
③ Delta Tuning Switch Knob (JKNBM0219AFSA)
④ A.N.L. Switch Knob (JKNBM0219AFSA)
⑤ Decoration Plate, 40 CHANNEL (HBDGS3050AFSA)
⑥ Squelch Control with P.A. Switch (JKNBN0300AFSA)
⑦ Front Panel (HPNLC1225AFSA)
⑧ Volume Control with Power Switch (JKNBN0300AFSA)
⑨ Signal/RF Power Meter (RMTRE0063AFZZ)
⑩ Window, Channel Indicator (GMADT0051AFSA)
⑪ Decoration Plate, TX/RX (HDECB0065AFSA)
⑫ Indication Plate, Green, RX (HINDP0116AFSA)
⑬ Indication Plate, Red, TX (HINDP0116AFSB)
⑭ Film, Channel Indicator, Red (PFILW0004AFZZ)
⑮ Cabinet, Top (GCABA3447AFSA)
⑯ Cabinet, Bottom (GCABB3447AFSA)
⑰ Microphone Socket, SO101 (QSOCZ2468AFZZ)
⑱ Power Supply Plug (QSOCZ2454AFZZ)
⑲ Jacks, External Speaker and P.A. Speaker (QJAKB0050AFZZ)
⑳ External Antenna Socket, SO401 (QSOCZ2470AFZZ)

Figure 1 PARTS LAYOUT

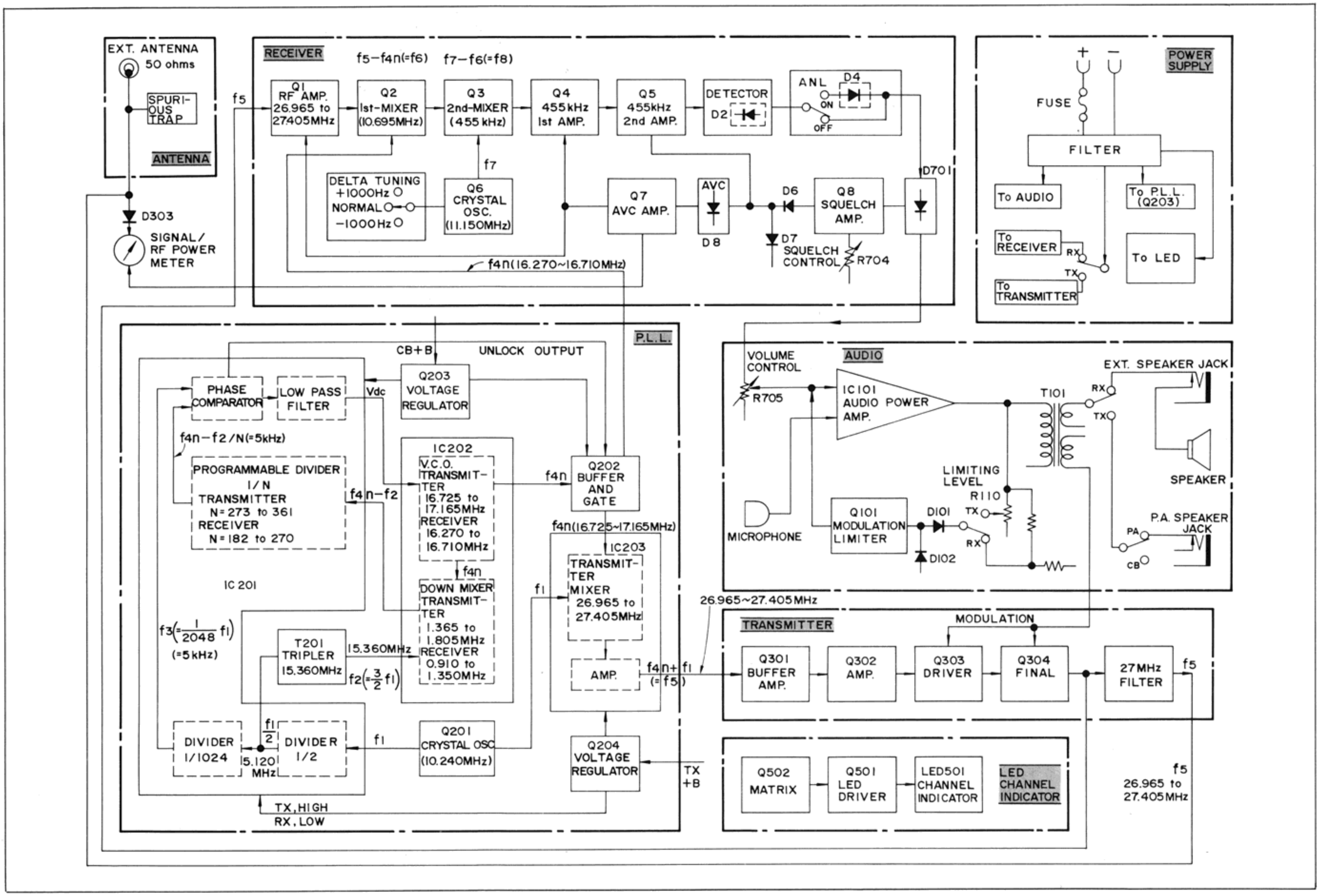


Figure 2 BLOCK DIAGRAM

GENERAL DESCRIPTION (Refer to Figure 2)

RECEIVER SECTION

An input signal sent from the antenna is applied to the 1st-mixer (transistor Q2) via the RF amplifier (transistor Q1). Meanwhile, an oscillator signal delivered from the P.L.L. synthesizer is applied to the base of the transistor Q2 (1st-mixer) via the buffer circuit (transistor Q202). In this stage the above-mentioned input signal is converted to 1st-IF signal of 10.695 MHz.
This 1st-IF (10.695MHz) signal is supplied to the base of the transistor Q3 (2nd-mixer) through the transformers T3 and T4. Also to this transistor Q3 is supplied an oscillator signal (11.150MHz) from the transistor Q6, in which the signal is converted to 2nd-IF signal of 455kHz. The 2nd-IF (455kHz) signal is amplified by the 2nd-IF amplifier (transistors Q4 and Q5) and detected by the diode D2.
The output signal thus detected is applied to the terminal ⑥ of the integrated circuit IC-101 through the volume control (R705), amplified by the driver circuit and audio power amplifier circuit inside the IC-101 and finally applied to the speaker via the transformer T101.

TRANSMITTER SECTION

An audio signal sent from the microphone is applied to the terminal ⑥ of the integrated circuit IC101 so that it be audio-amplified and then applied to the final-stage transistor Q304 and drive-stage transistor Q303 via the transformer T101. Meanwhile, a carrier signal synthesized by the P.L.L. synthesizer circuit is amplified-by the 27MHz amplifier (transistors Q301 and Q302) and applied to the final-stage transistor Q304 through the drive-stage transistor Q303, in which it is modulated together with the aforesaid audio signal and finally transmitted through the antenna.

DESCRIPTION OF PHASE-LOCKED-LOOP (P.L.L.) CIRCUIT (Refer to Figure 3)

1) **What is P.L.L. ?**

P.L.L. is abbreviation of Phase-Locked-Loop which synchronizes with frequency and phase of the stable standard input (crystal oscillation) given from the outside, namely working not only as automatic frequency control but also as automatic phase control.
The P.L.L. is now used to realize a synthesizer. Consisting of one crystal, the synthesizer serves as an oscillator to oscillate step by step (5kHz) in the receiver section range of 16.270MHz to 16.710MHz and the transmitter section range of 16.725 MHz to 17.165MHz.
Therefore, this synthesizer can be said to be on the same level in the connection with the accuracy and stability of oscillation as the crystal oscillator.

2) **Frequency Synthesizer**

The frequencies for both transmitter and receiver are synthesized by one crystal controlled oscillator and the Phase-Locked-Loop (or P.L.L.) consisting of eight basic building blocks: the divider (1/2) IC201, the divider (1/1024) IC201, the phase detector (phase comparator) IC201, the low-pass filter IC201, the voltage controlled oscillator (or V.C.O.) IC202, the down mixer IC202, the programmable divider IC201 and the tripler T201 as shown in Figure 3.

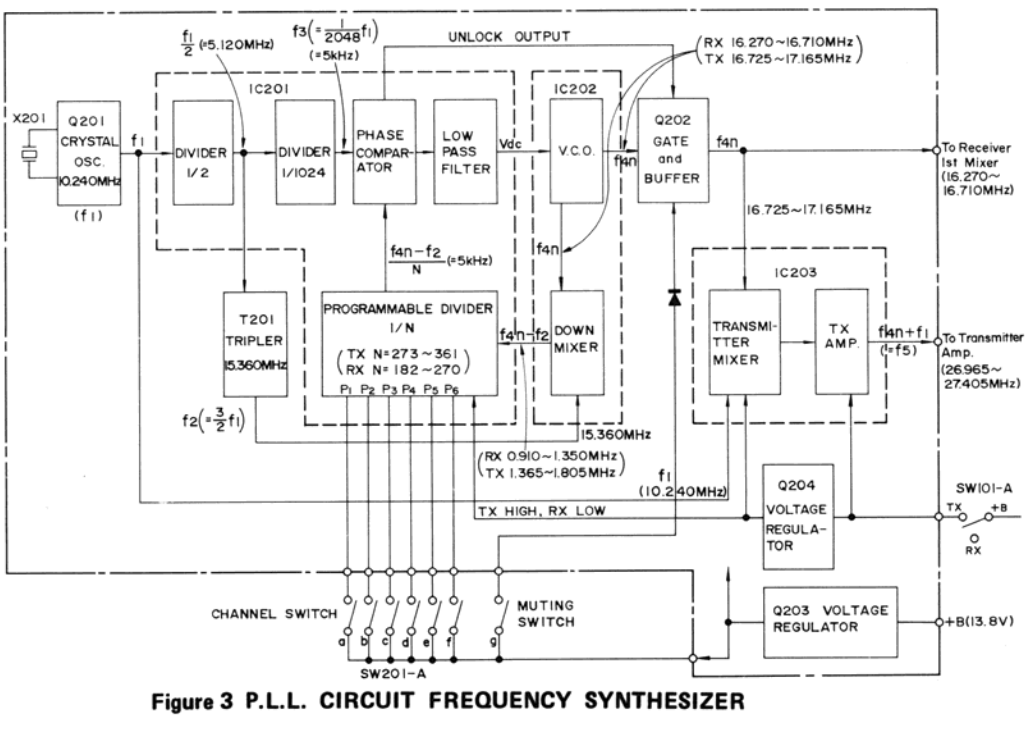


Figure 3 P.L.L. CIRCUIT FREQUENCY SYNTHESIZER

3) Frequency Determining (Refer to Figure 3 and Table 1)

–1– The crystal oscillator consisting of a crystal X201 (10.240MHz) and transistor Q201 generates a basic frequency f_1 (=10.240MHz).

–2– The basic frequency f_1 is applied to the fixed divided (1/2) network in the IC201 to be divided down to 5.120MHz signal (equivalent to 1/2 of the basic frequency f_1). The 5.120MHz signal is further divided down to a 5kHz ($f_3 = 1/2048 \cdot f_1$) signal by the fixed divided (1/1024) network and this frequency signal f_3 (5kHz) is applied to the input of phase comparator.
In addition to the above, the frequency signal f_1 (10.240MHz) is also applied to the transmitter mixer inside the IC203 and the frequency signal $f_1/2$ (5.120MHz) is converted to a signal f_2 (15.360MHz) ($f_2 = 3/2 \cdot f_1$) by the tripler network (transformer T201) and this frequency signal f_2 is applied to the down mixer inside the IC202.

–3– Frequency signal f_{4n} is the one that is generated by the voltage controlled oscillator (V.C.O.) inside the IC202 and this signal level is determined by DC voltage (Vdc) coming from the IC201. This frequency signal f_{4n} is applied to the down mixer.
The following will describe how the signal f_{4n} generated by the V.C.O. serves to maek the P.L.L. (phase locked loop) circuit be locked.

–4– The V.C.O. frequency signal f_{4n} is mixed down with the above-mentioned signal f_2 (15.360MHz) by the down mixer inside the IC202, as a result of which there appears a mixed-down signal $f_{4n}\text{-}f_2$. This frequency signal $f_{4n}\text{-}f_2$ is applied to the programmable divider inside the IC201.

–5– The programmable divider (a portion of IC201) divides the frequency $f_{4n}\text{-}f_2$ by the frequency divider number N (Receiver 182 to 270, transmitter 273 to 361), which is programmable by the switch position of the channel selector connected to the terminal pins ⑪ to ⑯ of IC201. The assigned number is shown in Table 1. The output frequency $(f_{4n}\text{-}f_2)/N$ (near 5kHz) of the programmable divider is applied to another input of the phase comparator.

–6– The phase comparator (IC201) compares the frequency f_3 (=5kHz) and the other frequency $(f_{4n}\text{-}f_2)/N$ from the programmable divider and generates a DC voltage Vdc (voltage control signal) proportional to the phase differences of both frequencies. The signal Vdc moves downward when $(f_{4n}\text{-}f_2)/N$ goes higher then f_3 and moves upward when $(f_{4n}\text{-}f_2)/N$ goes lower than f_3. When $(f_{4n}\text{-}f_2)/N$ equals to f_3, the Vdc does not move.
The voltage signal Vdc from the output of phase comparator goes back to the V.C.O. (voltage controlled oscillator) IC202 via the low-pass filter. Then the closed feedback loop is established.

–7– In this method, a closed-loop frequency-feedback system, which is so called P.L.L., is formed and the frequency f_{4n} of V.C.O. IC202 is locked.

–8– When the P.L.L. is in lock, the two input signal frequencies to the phase comparator input are equal. Therefore the frequency f_{4n} is determined as follows:

The Receiver Frequency

$f_{4n} = N \times f_3 + f_2$
where $f_2 = 15.360\text{MHz}\ (=3/2 \cdot f_1)$
$f_3 = 5\text{kHz}\ (=1/2048 \cdot f_1)$
$N = 182$ to 270 ..... Determined channel selector as shown in Table 1.

For example, the frequency f_{4n} of "channel 1" is calculated as follows:
$f_{4n} = 182 \times 0.005 + 15.360$ (MHz)
$= 16.270$ (MHz)

Namely "N= 182" is assigned for "channel 1" by channel selector. This frequency f_{4n} is applied to the first mixer Q2 of receiver and the mixer IC203 of transmitter through the buffer amplifier Q202 and the filter coils T205 and T206.

The Transmitter Frequency

(1) $f_{4n} = N \times f_3 + f_2$
where $f_2 = 15.360\text{MHz}$
$f_3 = 5\text{kHz}$
$N = 273$ to 361 ..... Determined by channel selector as shown Table 1.

(During the transmission, switching signal becomes high level (DC) so that the frequency divider number N is changed from one to another and then the number will be applied to the programmable divider.)
For example, the frequency f_{4n} of " channel 1" is calculated as follows:
$f_{4n} = 273 \times 0.005 + 15.360$ (MHz)
$= 16.725$ (MHz)

Namely "N=273" is assigned for "channel 1" by channel selector.
This frequency f_{4n} is applied to the first mixer Q2 of receiver and the mixer IC203 of transmitter through the buffer amplifier Q202 and the filter coils T205 and T206.

(2) The transmitter frequency f_5 is determined by mixing the frequency f_{4n} and the frequency f_1 (= 10.240MHz).
$f_5 = f_{4n} + f_1$
$= N \times f_3 + f_2 + f_1$
where $f_1 = 10.240\text{MHz}$
$f_2 = 15.360\text{MHz}$
$f_3 = 5\text{kHz}$
$N = 273$ to 361

For example, the frequency f_S of "channel 1" is calculated as follows:

$$f_S = 273 \times 0.005 + 15.360 + 10.240 \text{ (MHz)}$$
$$= 26.965 \text{ (MHz)}$$

Table 1 shows the synthesized frequencies for each channel.

–9– The gate and buffer circuit made of transistor Q202 works to prevent emission of unnecessary waves when the P.L.L. circuit is unlocked or when one channel is changed over to another.

–10– The frequency divider number N of programmable divider is decided by the value set by either of the channel selector switches SW201-A (a ~ f). In any of the channels, it is designed that the frequency divider number N_T at the transmission is larger than that N_R at the reception by a difference of 91.

$$N_R = N_T - 91$$

FREQUENCY OF SYNTHESIS CHART

CHANNEL	f_S (MHz)	f_1 (MHz)	f_2 (=3/2f_1) (MHz)	f_3 (=f_1/2048) (kHz)	RECEIVER						TRANSMITTER		
					N	f_4n (MHz)	f_4n-f_2 (kHz)	f_S-f_4n (=f_6) (MHz)	f_7 (MHz)	f_7-f_6 (=f_8) (kHz)	N	f_4n (MHz)	f_4n-f_2 (kHz)
1	26.965	10.240	15.360	5	182	16.270	910	10.695	11.150	455	273	16.725	1365
2	26.975	10.240	15.360	5	184	16.280	920	10.695	11.150	455	275	16.735	1375
3	26.985	10.240	15.360	5	186	16.290	930	10.695	11.150	455	277	16.745	1385
4	27.005	10.240	15.360	5	190	16.310	950	10.695	11.150	455	281	16.765	1405
5	27.015	10.240	15.360	5	192	16.320	960	10.695	11.150	455	283	16.775	1415
6	27.025	10.240	15.360	5	194	16.330	970	10.695	11.150	455	285	16.785	1425
7	27.035	10.240	15.360	5	196	16.340	980	10.695	11.150	455	287	16.795	1435
8	27.055	10.240	15.360	5	200	16.360	1000	10.695	11.150	455	291	16.815	1455
9	27.065	10.240	15.360	5	202	16.370	1010	10.695	11.150	455	293	16.825	1465
10	27.075	10.240	15.360	5	204	16.380	1020	10.695	11.150	455	295	16.835	1475
11	27.085	10.240	15.360	5	206	16.390	1030	10.695	11.150	455	297	16.845	1485
12	27.105	10.240	15.360	5	210	16.410	1050	10.695	11.150	455	301	16.865	1505
13	27.115	10.240	15.360	5	212	16.420	1060	10.695	11.150	455	303	16.875	1515
14	27.125	10.240	15.360	5	214	16.430	1070	10.695	11.150	455	305	16.885	1525
15	27.135	10.240	15.360	5	216	16.440	1080	10.695	11.150	455	307	16.895	1535
16	27.155	10.240	15.360	5	220	16.460	1100	10.695	11.150	455	311	16.915	1555
17	27.165	10.240	15.360	5	222	16.470	1110	10.695	11.150	455	313	16.925	1565
18	27.175	10.240	15.360	5	224	16.480	1120	10.695	11.150	455	315	16.935	1575
19	27.185	10.240	15.360	5	226	16.490	1130	10.695	11.150	455	317	16.945	1585
20	27.205	10.240	15.360	5	230	16.510	1150	10.695	11.150	455	321	16.965	1605
21	27.215	10.240	15.360	5	232	16.520	1160	10.695	11.150	455	323	16.975	1615
22	27.225	10.240	15.360	5	234	16.530	1170	10.695	11.150	455	325	16.985	1625
23	27.255	10.240	15.360	5	240	16.560	1200	10.695	11.150	455	331	17.015	1655
24	27.235	10.240	15.360	5	236	16.540	1180	10.695	11.150	455	327	16.995	1635
25	27.245	10.240	15.360	5	238	16.550	1690	10.695	11.150	455	329	17.005	1645
26	27.265	10.240	15.360	5	242	16.570	1210	10.695	11.150	455	333	17.025	1665
27	27.275	10.240	15.360	5	244	16.580	1220	10.695	11.150	455	335	17.035	1675
28	27.285	10.240	15.360	5	246	16.590	1230	10.695	11.150	455	337	17.045	1685
29	27.295	10.240	15.360	5	248	16.600	1240	10.695	11.150	455	339	17.055	1695
30	27.305	10.240	15.360	5	250	16.610	1250	10.695	11.150	455	341	17.065	1705
31	27.315	10.240	15.360	5	252	16.620	1260	10.695	11.150	455	343	17.075	1715
32	27.325	10.240	15.360	5	254	16.630	1270	10.695	11.150	455	345	17.085	1725
33	27.335	10.240	15.360	5	256	16.640	1280	10.695	11.150	455	347	17.095	1735
34	27.345	10.240	15.360	5	258	16.650	1290	10.695	11.150	455	349	17.105	1745
35	27.355	10.240	15.360	5	260	16.660	1300	10.695	11.150	455	351	17.115	1755
36	27.365	10.240	15.360	5	262	16.670	1310	10.695	11.150	455	353	17.125	1765
37	27.375	10.240	15.360	5	264	16.680	1320	10.695	11.150	455	355	17.135	1775
38	27.385	10.240	15.360	5	266	16.690	1330	10.695	11.150	455	357	17.145	1785
39	27.395	10.240	15.360	5	268	16.700	1340	10.695	11.150	455	359	17.155	1795
40	27.405	10.240	15.360	5	270	16.710	1350	10.695	11.150	455	361	17.165	1805

CRYSTAL

X1 crystal 11.150MHz = f_7

X201 crystal 10.240MHz = f_1

Table 1 FREQUENCY OF SYNTHESIS CHART

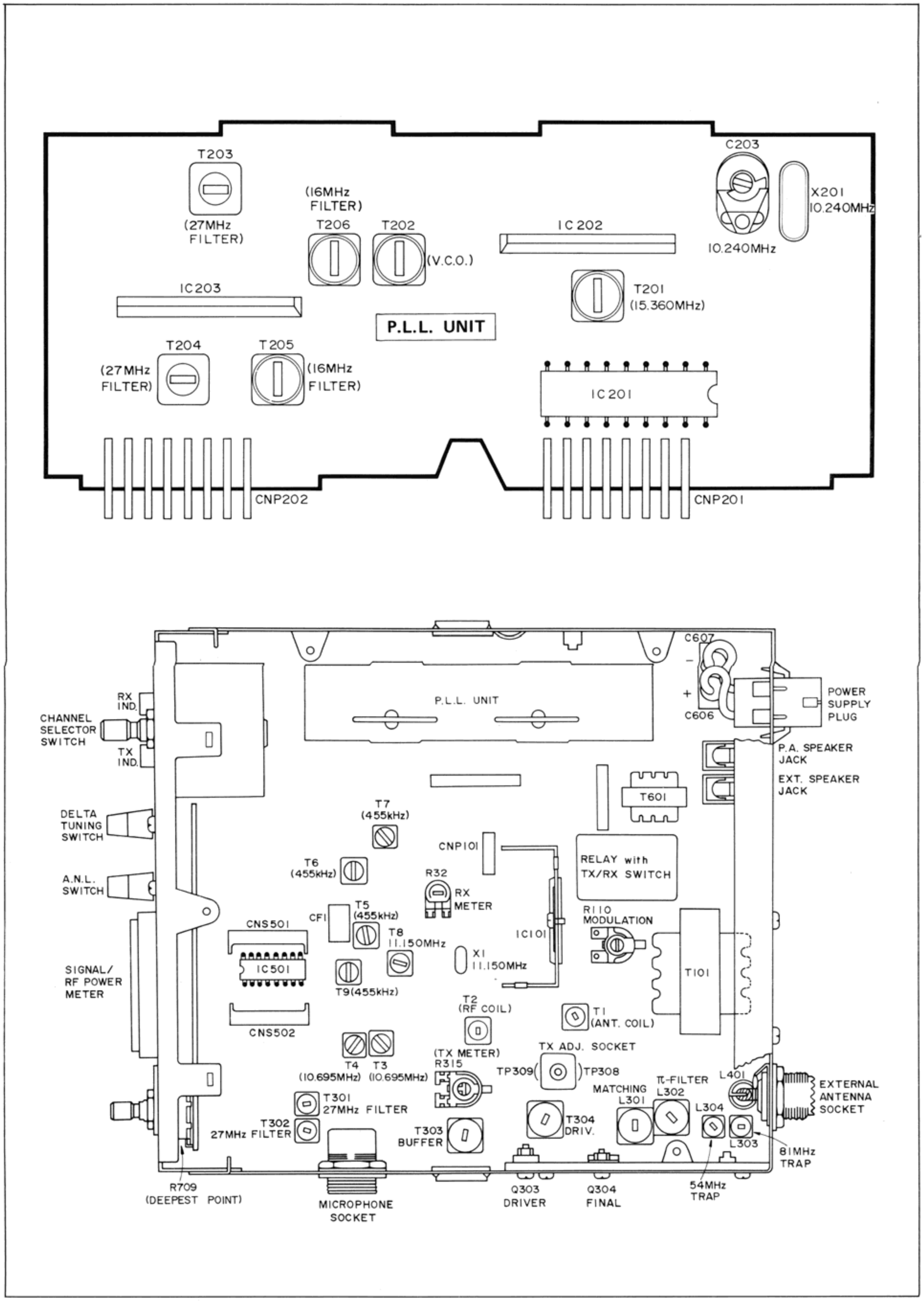


Figure 4 ALIGNMENT POINTS

ALIGNMENT

EQUIPMENT REQUIRED

Frequency Counter:	0 to 40MHz (High Sensitivity)
Synchroscope:	0 to 50MHz
Signal Generator:	10MHz to 30MHz with 1000Hz AM mod.
Audio Signal Generator:	1000Hz (sine wave)
Audio Attenuator:	0 to 100dB
RF Output Power Meter:	0 to 5W at 27MHz
RF Voltmeter:	0 to 3V, 0 to 50MHz
AC V.T.V.M.:	0 to 10V
DC V.T.V.M.:	0 to 10V
DC Milliammeter:	0 to 500mA with Low-pass Filter
Dummy Load 8 ohms and 50 ohms:	Non-inductive
Spectrum Analyzer or Field Strength Meter	
CM Coupler	
DC Power Supply:	13.8V, 2A

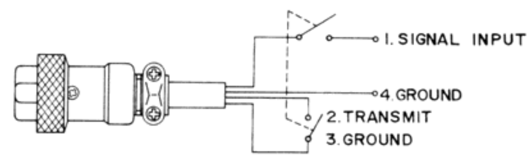
[NOTE]

–1– Keep supply voltage to 13.8V always during the alignment.

–2– The tools to be used for the alignment should be non-metallic ones.

–3– Be sure to keep 50 ohms dummy load connectable with the antenna terminal all the way during the transmitter alignment.

–4– As to the alignment of the modulation circuit, be sure to use the microphone plug shown in Figure 5 to be connected to it.



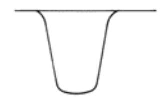
The terminal numbers (1 to 4) are found on the surface of microphone plug.

Figure 5 CONNECTION OF MICROPHONE PLUG

PHASE LOCKED LOOP (P.L.L.) CIRCUIT ALIGNMENT

STEP		CONNECTION OF MEASURING INSTRUMENT	ADJUSTMENT	PROCEDURE
1 (10.240 MHz)		Connect a frequency counter, through 5PF capacitor, to the test point TP201 (Emitter of transistor Q201).	C203	Adjust so that the frequency counter reads within 10.240 MHz ± 300 Hz.
2 (15.360 MHz)		1) Connect an RF voltmeter to the test point TP202 (the terminal No.4 of IC202). 2) Connect a frequency counter, through 5PF capacitor, to the test point TP202 .	T201	1) Adjust so that the RF voltmeter reads the maximum. 2) Make sure the frequency counter is reading within 15.360 MHz ± 450 Hz.
3 (V.C.O.)		Connect a D.C. V.T.V.M. to the test point TP203 .	T202	1) Set the channel selector to "1" channel. 2) Adjust so that the D.C. V.T.V.M. reads exactly 2.0V. 3) Set in turn the channel selector to "1" channel and/or "40" channel and make sure the D.C. V.T.V.M. reads within 2.0V to 4.3V.
RX	4 (16MHz Filter)	Connect an RF voltmeter to the test point TP204 . (the secondary of the transformer T205).	T205 T206	1) Set the channel selector to "40" channel. 2) Adjust so that the RF voltmeter reads the maximum. (about 400mV ± 200mV)
RX	5 (16MHz Frequency)	Connect a frequency counter, through 5PF capacitor, to the test point TP204 (the secondary of the transformer T205).	——	1) Set the channel selector to "1" channel. 2) Make sure the frequency counter is reading 16.270 MHz. 3) Set the channel selector to "40" channel. 4) Make sure the frequency counter is reading 16.710 MHz.
TX	6 (27MHz Filter)	Connect a RF voltmeter to the test point TP205 (the secondary of the transformer T204).	T203 T204	1) Set the channel selector to "20" channel. 2) Adjust so that the RF voltmeter reads the maximum. (about 2.5V to 3.5V)
TX	7 (27MHz Frequency)	Connect a frequency counter, through 5PF capacitor, to the test point TP205 (the secondary of the transformer T204).	——	1) Set the channel selector to "20" channel. 2) Make sure the frequency counter is reading within 27.205 MHz ± 300 Hz.

RECEIVER ALIGNMENT

STEP	CONNECTION OF MEASURING INSTRUMENT	ADJUST-MENT	PROCEDURE
1 (11.150 MHz)	Connect a frequency counter, through 5PF capacitor, to the test point [TP1] . (Base of transistor Q3)	T8	1) Set the delta tuning switch to "0" position. 2) Adjust so that the frequency counter reads within 11.150 MHz ± 100 Hz. (The oscillation voltage then is about 60 mV to 80 mV)
2 (1st-IF and 2nd-IF)	1) Connect an AC V.T.V.M. to both sides of the speaker voice coil lug. 2) Connect a signal generator, through 0.01 MFD capacitor, to the test point [TP2] (the secondary of the transformer T2). 3) Set the signal generator to 10.695 MHz, modulation 1000 Hz, 30%. NOTE: Be sure to connect the ground wire of signal generator to the ground of the external antenna socket.	T3 T4 T5 T6 T7 T9	Adjust so that the AC V.T.V.M. reads the maximum. 
3 (RF)	1) Connect the AC V.T.V.M. to both sides of the speaker voice coil lug. 2) Connect the signal generator to the external antenna socket. 3) Set the signal generator to 27.175 MHz (18 channel), modulation 1000 Hz, 30%.	T2 T1	1) Set the channel selector to "18" channel. 2) Adjust the AC V.T.V.M. until it reads the maximum.
4 (Deepest Point of Squelch)	1) Connect a signal generator to the external antenna socket, keeping the frequency of signal generator to 27.175 MHz ("18 channel") and modulation 1000Hz, 30%. 2) Connect a low-frequency wattmeter to the external speaker jack.	R709 (5Kohms –B)	1) Set the channel selector of the unit to "18 channel" and the volume control to "maximum". 2) Adjust the output level of signal generator to "40dB". At the time make sure the output signal is maximum (about 4W). 3) Rotate the squelch control knob of the unit fully clockwise. 4) Adjust the semi-fixed resistor R709 so that the low-frequency output becomes 0.5W.

TRANSMITTER AND MODULATOR ALIGNMENT

–1– When the set is made ready for the transmitting operation, be sure to always connect the RF output power meter and 50 ohms dummy load to the external antenna socket––this should never be forgotten even if it is not noted down specifically. If otherwise, the final transistor Q304 may be damaged.

–2– When making the connection of measuring instruments, see Figure 6.

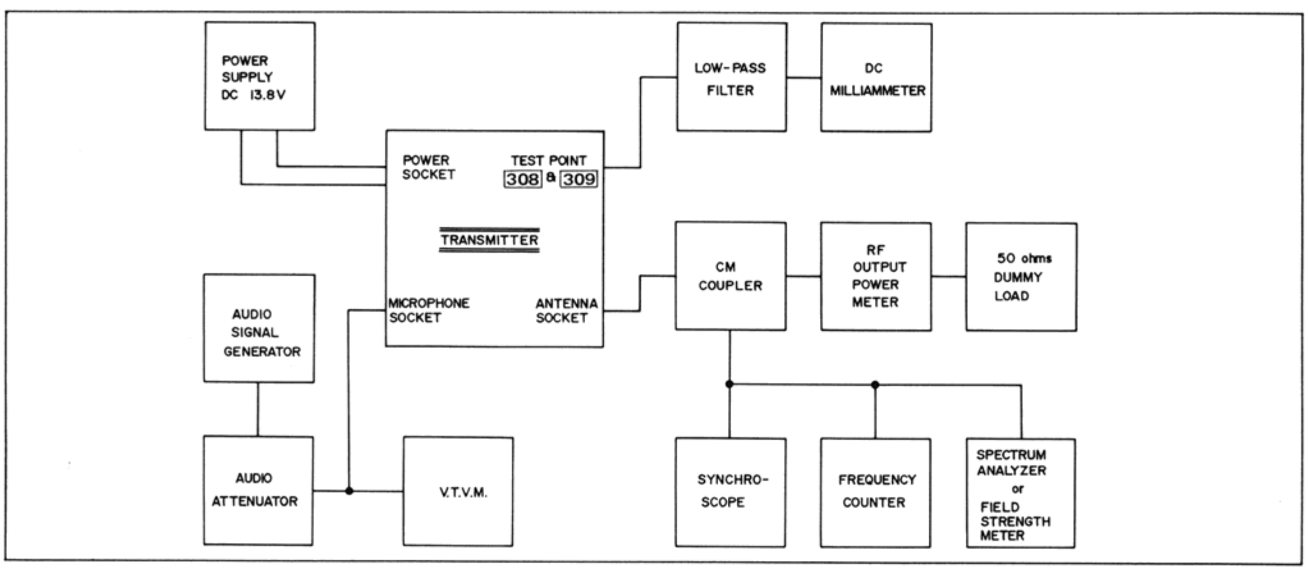


Figure 6

STEP	CONNECTION OF MEASURING INSTRUMENT	ADJUST-MENT	PROCEDURE
1 (27 MHz Filter)	Connect the synchroscope to the test point [TP301] (Base of transistor Q302).	T301 T302	1) Set the channel selector to "20" channel. 2) Adjust so that the maximum waveform (amplitude) appears on the synchroscope. 3) Set in turn the channel selector to "1" channel and/or "40" channel to make sure the waveform doesn't decrease in size.
2 (Buffer)	1) Remove the plug which have been inserted in the test points [TP308] and [TP309] of the set. 2) Connect in turn DC milliammeter, through the RF rejection filter shown in Figure 7, to the test points [TP308] and [TP309].	T303	1) Set the channel selector to "20" channel. 2) Adjust so that the DC milliammeter connected to the test point [TP309]. reads the maximum. (Driver current)
3 (Driver)	Same as above.	T304	Adjust so that the DC milliammeter connected to the test point [TP309] indicates the dip point. The amperage then is about 45 to 80mA.
4 (Final)	Same as step 2, and connect the RF output power meter and 50 ohms dummy load to the external antenna socket.	L301	Adjust so that the DC milliammeter connected to the test point [TP308] reads 450mA ± 50mA (Final current).
5 (π-Filter)	Same as above.	L302	Adjust so that the RF output power meter reads the maximum. The reading then should not exceed 4W. (FCC Rules and Regulations Part 95, Section 95. 43.)
6	Repeat the steps 2 to 5 until the best results will be obtained.		
7 (Second harmonic)	Connect the RF output power meter, 50 ohms dummy load and spectrum analyzer (or field strength meter), through CM coupler, to the external antenna socket.	L304	1) Set the channel selector to "20" channel. 2) Adjust so that 54 MHz output component (second harmonic) becomes the minimum on the spectrum analyzer (or field strength meter).
8 (Third harmonic)	Same as above.	L303	1) Set the channel selector to "20" channel. 2) Adjust so that 81 MHz output component (third harmonic) becomes the minimum on the spectrum analyzer (or field strength meter).
9 (Modulation)	1) Connect the RF output power meter, 50 ohms dummy load and synchroscope, through CM coupler, to the external antenna socket. 2) Connect a audio signal generator, attenuater and AC V.T.V.M. to the microphone socket (using the microphone plug shown in Figure 5). 3) Keep the output of audio signal generator to 1000 Hz, 700mV.	R110 (1K ohms –B)	1) Turn R110 counterclockwise until the modulation limiter circuit stops its function. 2) Make sure there appears 700mV input signal at the microphone terminal from an audio signal generator. 3) Adjust R110 so that the modulation factor of RF output waveform appeared on the synchroscope becomes 95 to 99% (See Figure 8). 4) Set the attenuator to "–41dB" (6 mV). 5) Make sure the modulation factor of RF output waveform on a synchroscope is more than 50%.

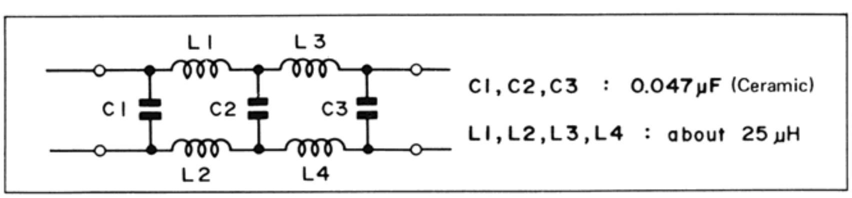
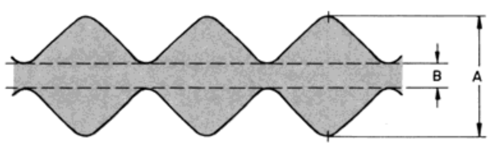


Figure 7 RF REJECTION FILTER (LOW-PASS FILTER)

SIGNAL/RF POWER METER ADJUSTMENT

STEP	CONNECTION OF MEASURING INSTRUMENT	ADJUSTMENT	PROCEDURE
1 (RX)	Connect the signal generator to the antenna socket and set the frequency to 27.175 MHz ("18" channel) and the modulation to 1000Hz, 30%. Keep the output of signal generator to 40dB.	R32	1) Set the channel selector to "18" channel. 2) Adjust so that the signal/RF power meter indicates "9" on the "SIGNAL" scale.
2 (TX)	Connect the RF output power meter and 50 ohms dummy load to the antenna socket.	R315	1) Set the channel selector to "20" channel and make the set be ready for the transmitting operation (non-modulation however). 2) First make sure of what value the pointer of signal/RF power meter indicates on the "POWER" scale and then adjust R315 so that such a value becomes nearly the same as that of the RF output power meter connected to the antenna socket. (The RF power output then is about 3.5W.)



$$\text{Modulation factor} = \frac{A-B}{A+B} \times 100\ (\%)$$

In the case a modulation factor is 95%:
If A = 4 is supposed,
B = 0.1 is resulted.

Figure 8

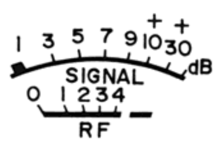


Figure 9 SIGNAL/RF POWER METER (ME701)

CHANNEL SELECTOR SWITCH

A) Connection table of channel selector switch (SW201-A) for each channel.

CHANNEL \ TERMINAL NO. OF THE SW201-A (1st)	(Po)	1 (P1)	2 (P2)	3 (P3)	4 (P4)	5 (P5)	6 (P6)	8
TERMINAL NO. OF IC201	—	16	15	14	13	12	11	—
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							◎	●
29		○					◎	
30			◎				◎	●
31		○	◎				◎	
32				○			◎	●
33		○		○			◎	
34			◎	○			◎	●
35		○	◎	○			◎	
36					◎		◎	●
37		○			◎		◎	
38			◎		◎		◎	●
39		○	◎		◎		◎	
40				○	◎		◎	●

NOTES:

1. Terminals marked ○ are connected with the terminal (C1).
2. Terminals marked ◎ are connected with the terminal (C2).
3. The mark ● given on the terminal No. 8 of SW201-A shows that this terminal comes in contact with the COMMON terminal if the set gets in a channel-to-channel situation.

QSW-R0143AFZZ

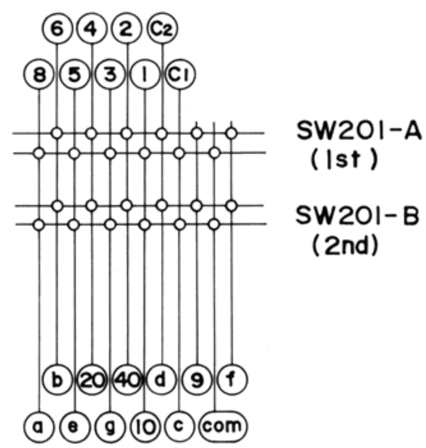
B) Connection table of channel selector switch (SW201-B) for each channel.

NOTE:

Terminals marked ○ are connected with the terminal (COM).

CHANNEL \ TERMINAL NO. OF THE SW201-B (2nd)	a	b	c	d	e	f	g	9	10	20	40
1		○	○								
2	○	○		○	○		○				
3	○	○	○	○			○				
4		○	○			○	○				
5	○		○	○		○	○				
6			○	○	○	○	○				
7	○	○	○								
8	○	○	○	○	○	○	○				
9	○	○	○			○	○	○			
10	○	○	○	○	○	○			○		
11		○	○						○		
12	○	○		○	○		○		○		
13	○	○	○	○			○		○		
14		○	○			○	○		○		
15	○		○	○		○	○		○		
16			○	○	○	○	○		○		
17	○	○	○						○		
18	○	○	○	○	○	○	○		○		
19	○	○	○			○	○		○		
20	○	○	○	○	○	○				○	
21		○	○							○	
22	○	○		○	○		○			○	
23	○	○	○	○			○			○	
24		○	○			○	○			○	

VIEW FROM TERMINAL INSERTION SIDE



MOUNTING FASE

– to be continued –

CHANNEL \ TERMINAL NO. OF THE SW201-B (2nd)	a	b	c	d	e	f	g	9	10	20	40
25	O		O	O		O	O			O	
26			O	O	O	O	O			O	
27	O	O	O							O	
28	O	O	O	O	O	O	O			O	
29	O	O	O			O	O			O	
30	O	O	O	O	O	O			O	O	
31		O	O						O	O	
32	O	O		O	O		O		O	O	
33	O	O	O	O			O		O	O	
34		O	O			O	O		O	O	
35	O		O	O		O	O		O	O	
36			O	O	O	O	O		O	O	
37	O	O	O						O	O	
38	O	O	O	O	O	O	O		O	O	
39	O	O	O			O	O		O	O	
40	O	O	O	O	O	O			O		O

Table 2 CHANNEL SELECTOR SWITCH

CAUTIONS ON HANDLING MOS IC

MOS IC is to control the electric conductivity between the source and drain by using the voltage at the gate electrode through insulating oxide film (SiO_2). If overvoltage is applied to the gate electrode, the insulator at the gate electrode undergoes dielectric breakdown. Once such dielectric breakdown occurs, the junction between the gate and other terminals is shortcircuited and MOS IC is so damaged that its quality will not be recovered again.

And, MOS IC is highly sensitive to static charge because its gate oxide film is as thin as 1000Å to 1500Å Input protective circuit is provided to protect MOS IC but this circuit can not always play its role according to the conditions of using MOS IC.

Therefore, pay due attention to the following when handling it.

1. **Cautions on Transportation and Preservation**

As for MOS IC, either the input or output terminal has remarkably high impedance in comparison with ordinary semiconductor IC. Therefore, MOS IC is liable to be affected by the induction of neary-by high-tension power source or A.C. power source and it may be given a larger voltage unexpectedly due to body discharged possibly causing dielectric breakdown of the gate. To eliminate this, during transportation and preservation of MOS IC all the terminals shoule be kept at the same potential in the following methods (to shortcircuit all the terminals).

① Wind thin wire around MOS IC.
② Fit metallic ring on it.
③ Pack it with aluminum foil.
④ Hold it by electric conductive jig.
⑤ Put it in a special case for LSI.

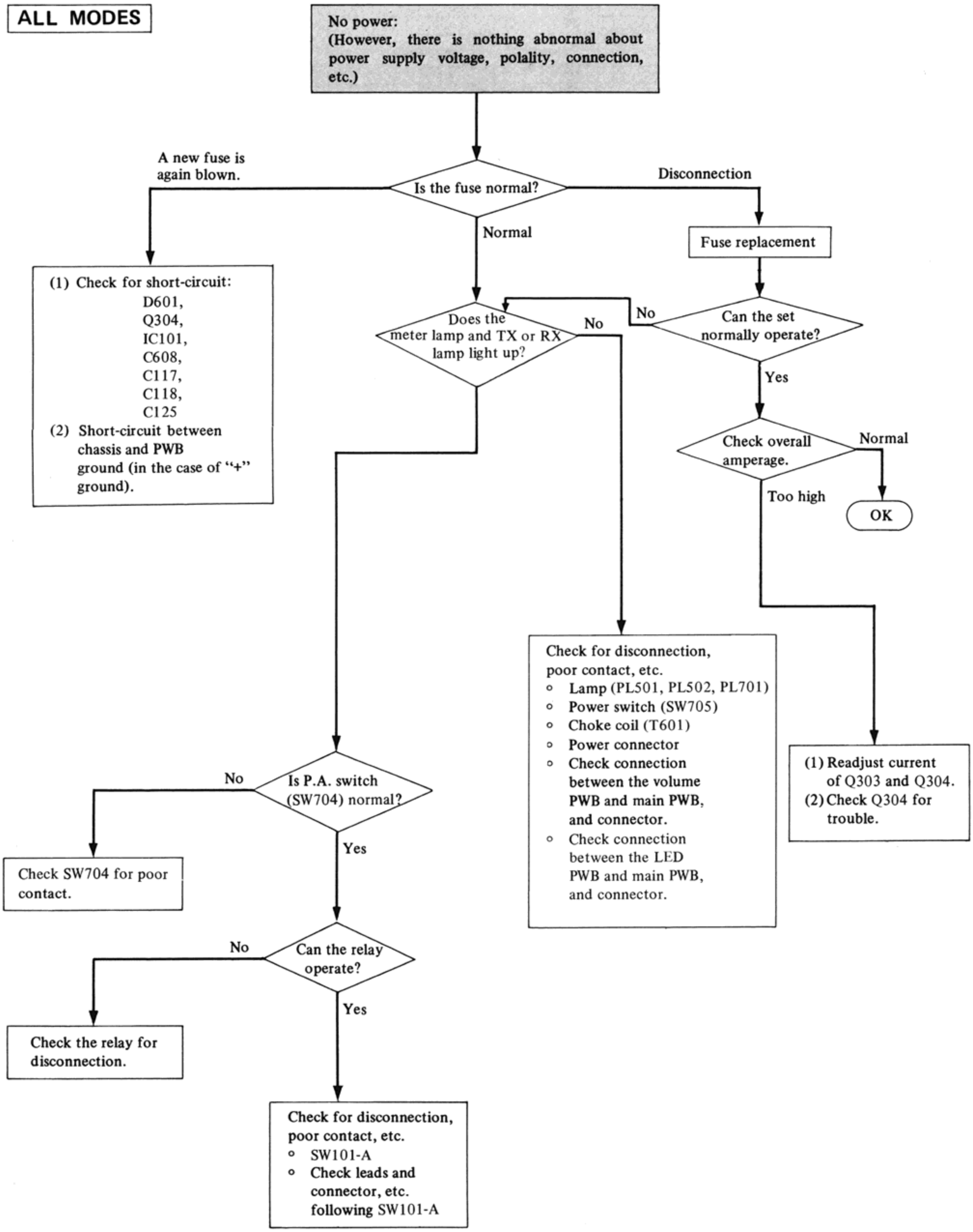
Note: Never put MOS IC in a mal-conductive container such as made of polystyrene.

2. **Cautions on Servicing**

① A soldering tool to be used should be the less-leak one (more than 100K ohm of leak resistance – there may be a soldering tool of more than 1 Meg. ohm to be used for semiconductor). Otherwise, ground the soldering tool when using it.
② Ground the earth terminal of a measuring instrument.
③ Ground a bench.
④ Before insertion or removal of LSI to or from P.W.B., be sure to turn off the power switch.
⑤ When inserting LSI to P.W.B., ground the earth terminal of P.W.B.
⑥ Never touch the terminals of LSI by hand.
⑦ Be sure to ground the earth terminal of D.C. power source.
⑧ To prevent LSI from being broken due to human body discharge, it is necessary to ground the human body. But this requires the greatest care as otherwise the body encounters large current (absolutely avoid touching A.C. power source).
⑨ As MOS IC is actuated with a small current, be sure to remove soldering flux and perform moisture-proof treatment after repairing. (Apply moisture-proof agent for electronic calculator.)

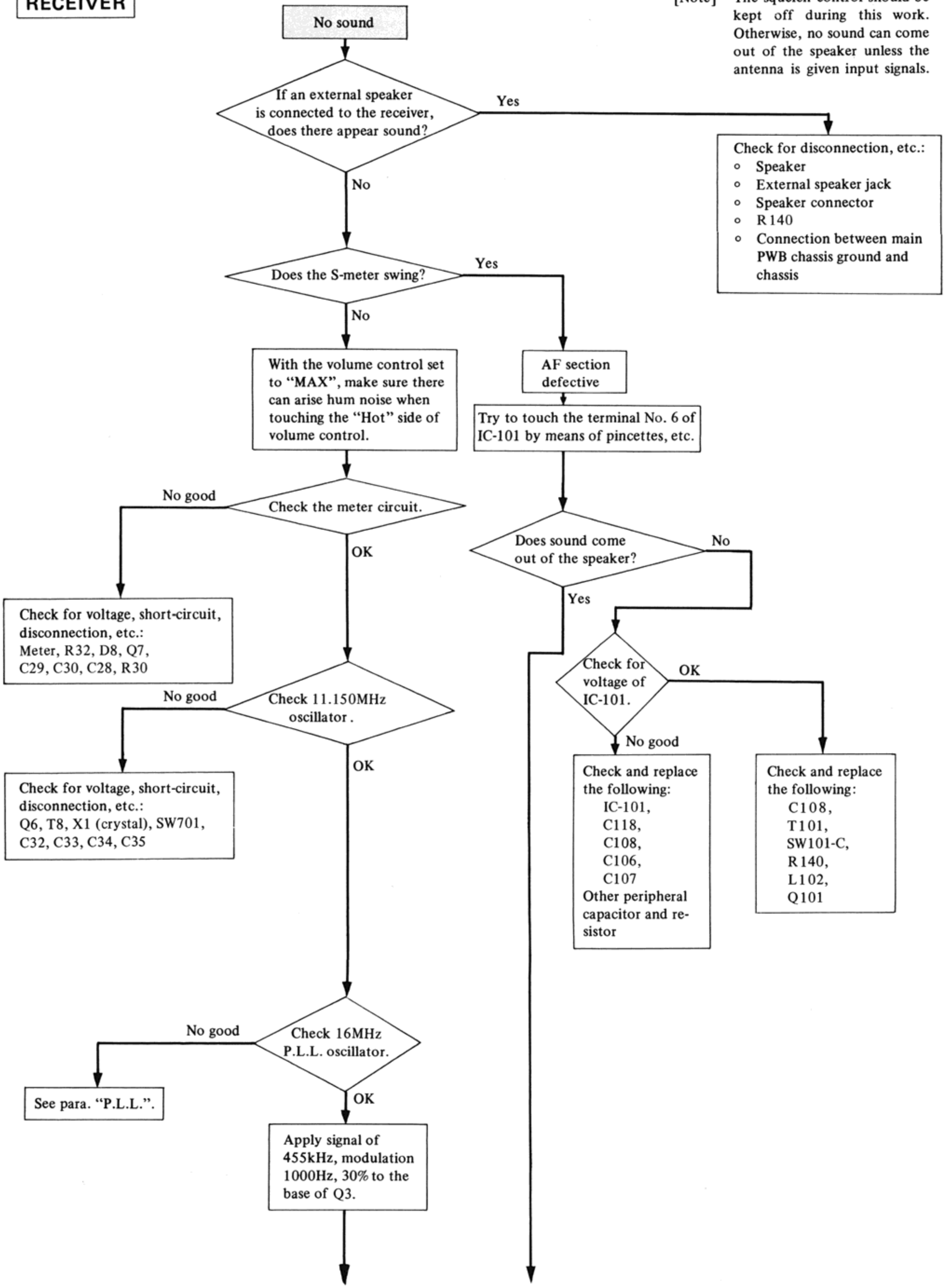
TROUBLE SHOOTING GUIDE

ALL MODES

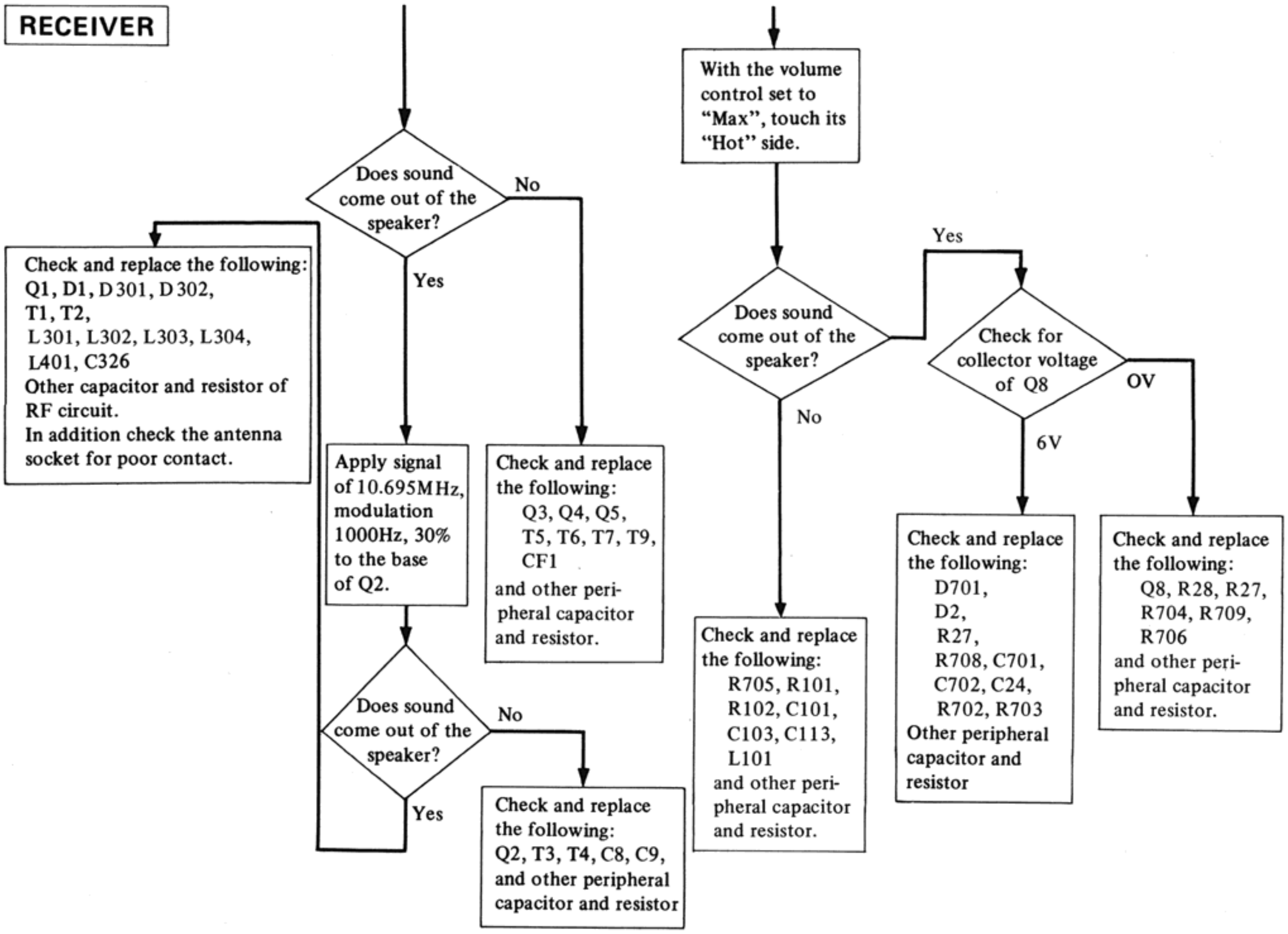


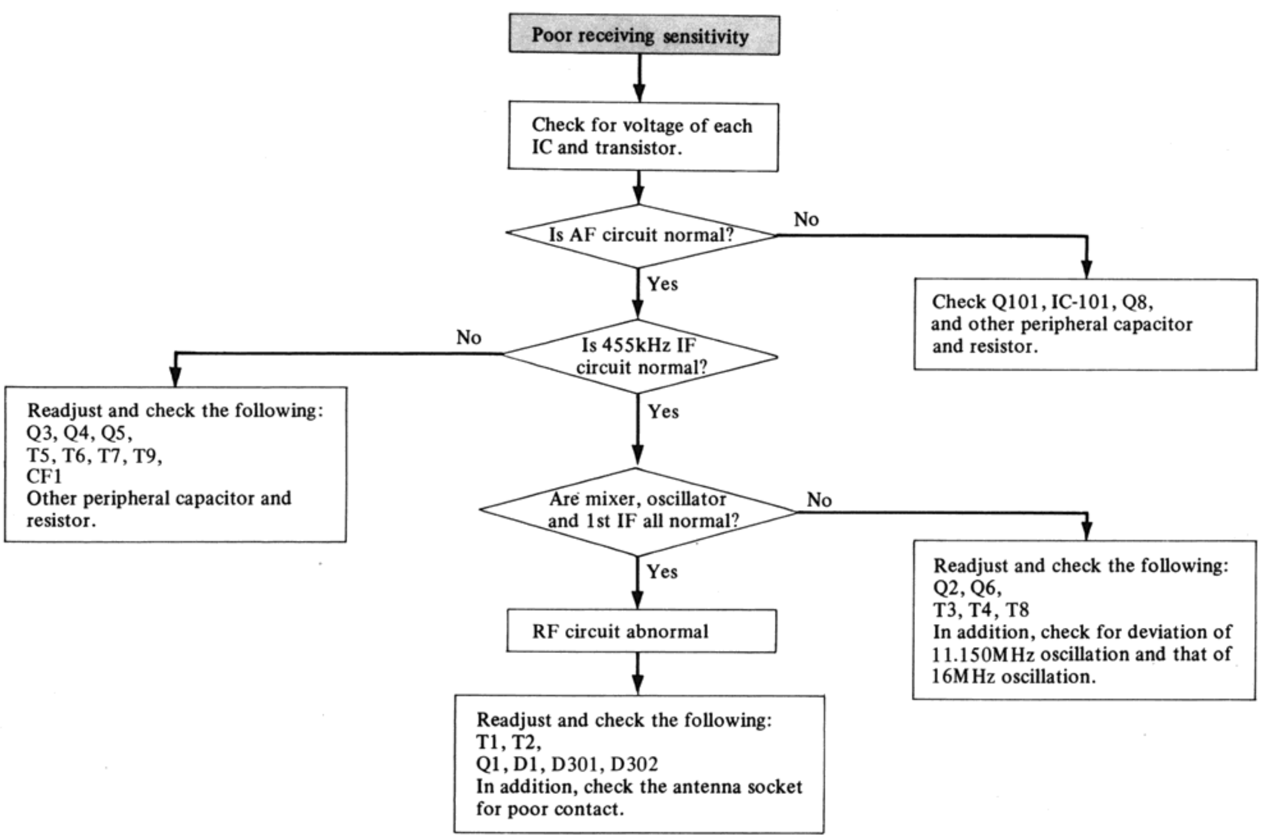
RECEIVER

[Note] The squelch control should be kept off during this work. Otherwise, no sound can come out of the speaker unless the antenna is given input signals.

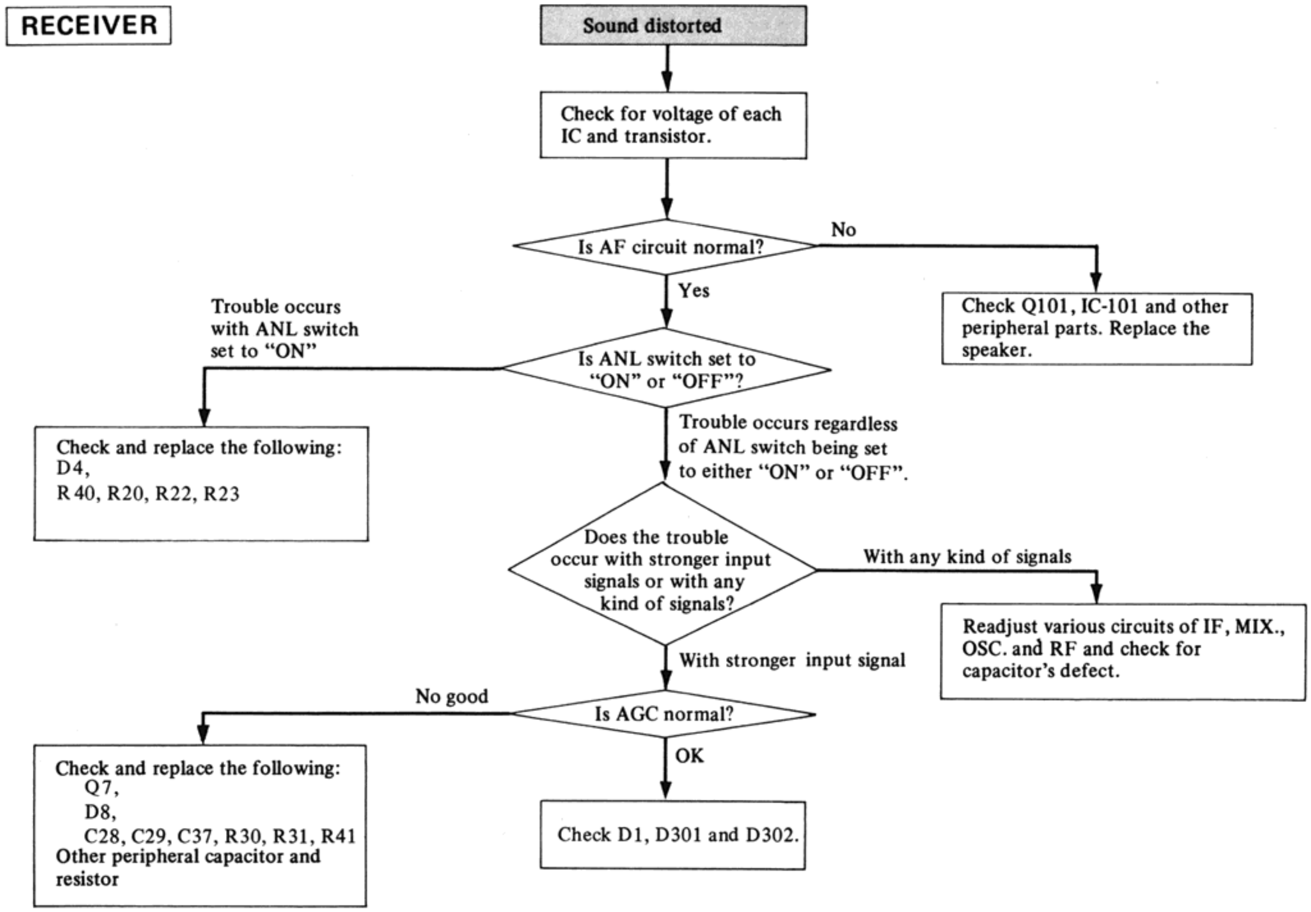


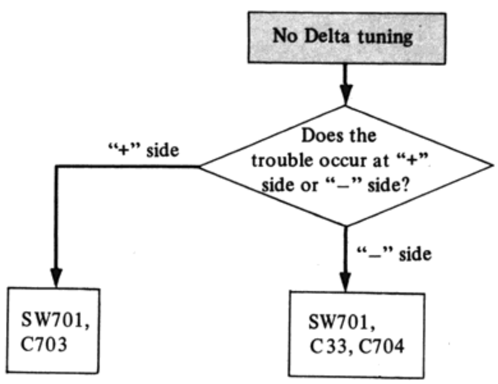
RECEIVER

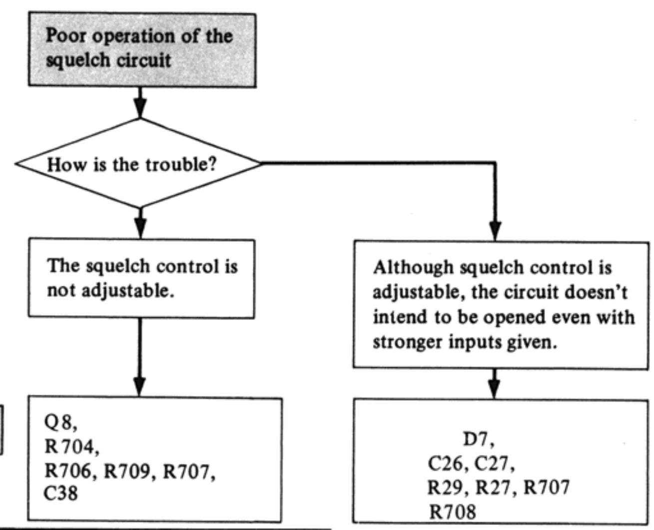

Does sound come out of the speaker?
No
Yes
Check and replace the following: Q1, D1, D301, D302, T1, T2, L301, L302, L303, L304, L401, C326 Other capacitor and resistor of RF circuit. In addition check the antenna socket for poor contact.
Apply signal of 10.695MHz, modulation 1000Hz, 30% to the base of Q2.
Check and replace the following: Q3, Q4, Q5, T5, T6, T7, T9, CF1 and other peripheral capacitor and resistor.
Does sound come out of the speaker?
No
Yes
Check and replace the following: Q2, T3, T4, C8, C9, and other peripheral capacitor and resistor
With the volume control set to "Max", touch its "Hot" side.
Does sound come out of the speaker?
Yes
No
Check for collector voltage of Q8
OV
6V
Check and replace the following: R705, R101, R102, C101, C103, C113, L101 and other peripheral capacitor and resistor.
Check and replace the following: D701, D2, R27, R708, C701, C702, C24, R702, R703 Other peripheral capacitor and resistor
Check and replace the following: Q8, R28, R27, R704, R709, R706 and other peripheral capacitor and resistor.

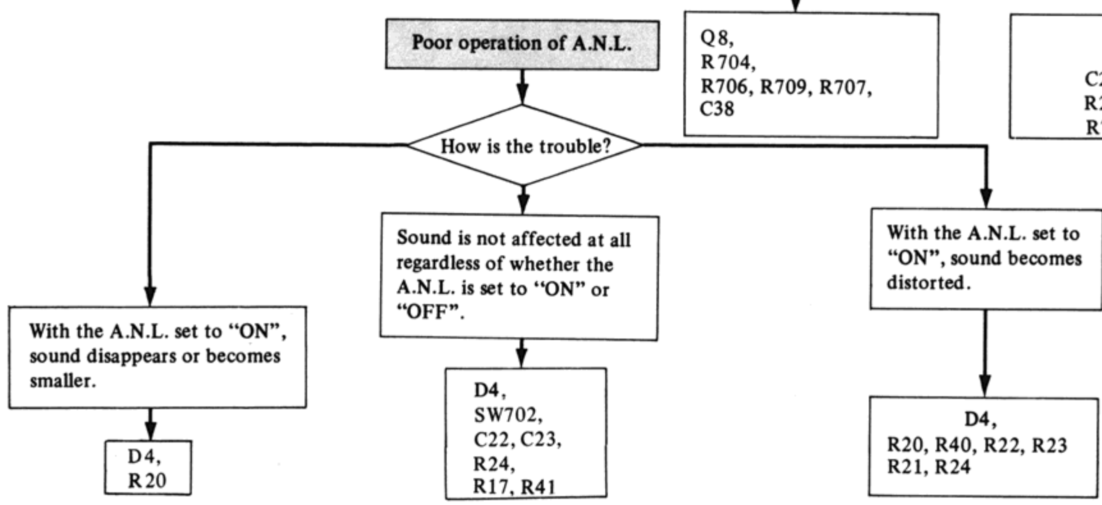

Poor receiving sensitivity
Check for voltage of each IC and transistor.
Is AF circuit normal?
No
Yes
Check Q101, IC-101, Q8, and other peripheral capacitor and resistor.
Is 455kHz IF circuit normal?
No
Yes
Readjust and check the following: Q3, Q4, Q5, T5, T6, T7, T9, CF1 Other peripheral capacitor and resistor.
Are mixer, oscillator and 1st IF all normal?
No
Yes
Readjust and check the following: Q2, Q6, T3, T4, T8 In addition, check for deviation of 11.150MHz oscillation and that of 16MHz oscillation.
RF circuit abnormal
Readjust and check the following: T1, T2, Q1, D1, D301, D302 In addition, check the antenna socket for poor contact.

RECEIVER

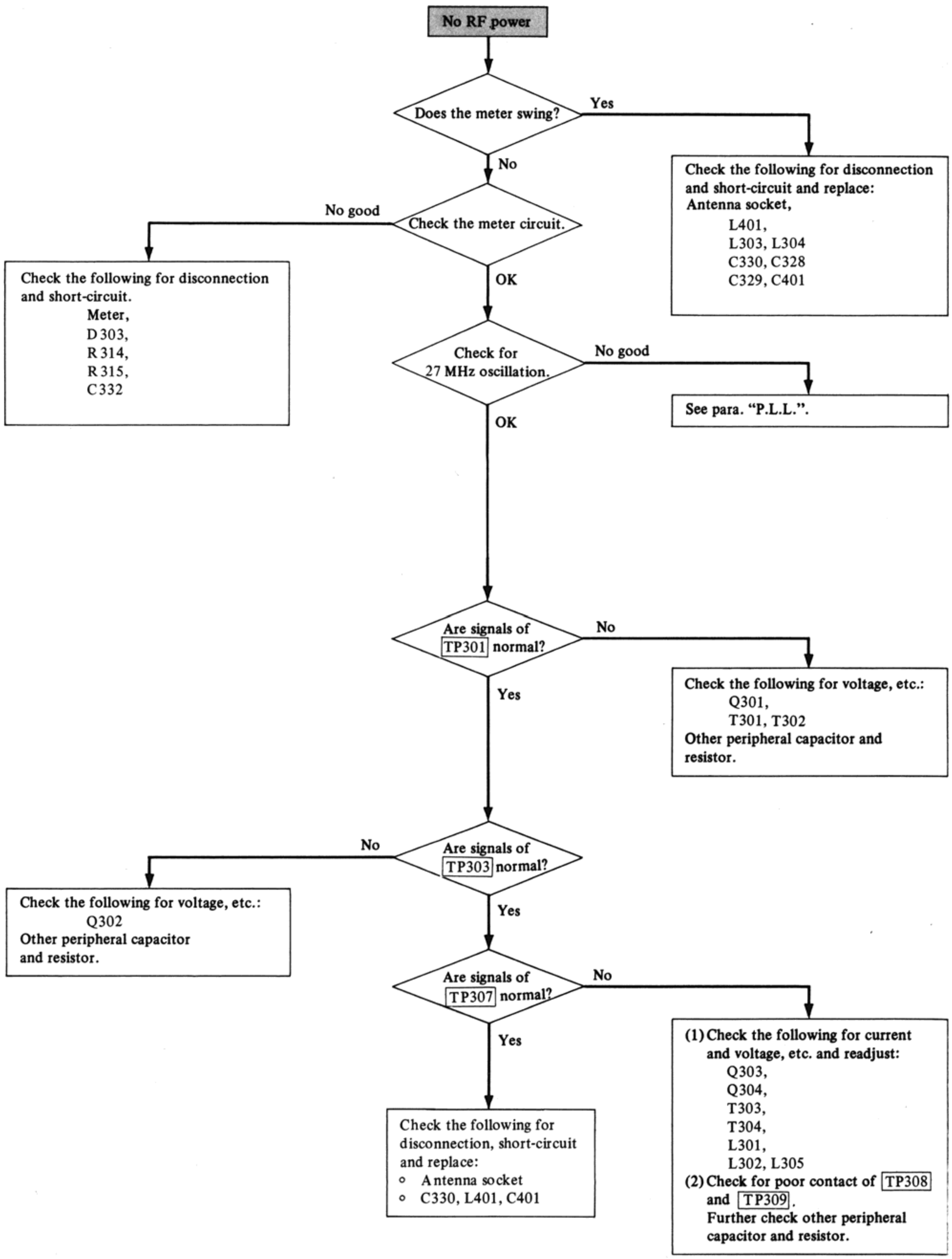

Sound distorted
Check for voltage of each IC and transistor.
Is AF circuit normal?
No
Check Q101, IC-101 and other peripheral parts. Replace the speaker.
Yes
Is ANL switch set to "ON" or "OFF"?
Trouble occurs with ANL switch set to "ON"
Check and replace the following: D4, R40, R20, R22, R23
Trouble occurs regardless of ANL switch being set to either "ON" or "OFF".
Does the trouble occur with stronger input signals or with any kind of signals?
With any kind of signals
Readjust various circuits of IF, MIX., OSC. and RF and check for capacitor's defect.
With stronger input signal
Is AGC normal?
No good
Check and replace the following: Q7, D8, C28, C29, C37, R30, R31, R41 Other peripheral capacitor and resistor
OK
Check D1, D301 and D302.


No Delta tuning
Does the trouble occur at "+" side or "–" side?
"+" side
SW701, C703
"–" side
SW701, C33, C704


Poor operation of the squelch circuit
How is the trouble?
The squelch control is not adjustable.
Q8, R704, R706, R709, R707, C38
Although squelch control is adjustable, the circuit doesn't intend to be opened even with stronger inputs given.
D7, C26, C27, R29, R27, R707 R708


Poor operation of A.N.L.
How is the trouble?
With the A.N.L. set to "ON", sound disappears or becomes smaller.
D4, R20
Sound is not affected at all regardless of whether the A.N.L. is set to "ON" or "OFF".
D4, SW702, C22, C23, R24, R17, R41
With the A.N.L. set to "ON", sound becomes distorted.
D4, R20, R40, R22, R23 R21, R24

TRANSMITTER



TRANSMITTER

Modulation waveform distorted

Does the distortion occur with stronger input signals or with any kind of input signals?

With stronger input signals

(1)Readjust R110.
(2) Check for ALC operation:
Q101,
D101,
D102,
R106,
R107,
C109,
C116,
C114,
C103, C124,
SW101-D

with any kind of input signals

(1) Check IC-101 for voltage, etc.
(2) Replace the microphone.
(3) Readjust transmitting circuit.
(4) Check the chassis ground capacitor for poor soldering.

No modulation (RF power all right)

Does sound come out of the speaker during reception?

No

See para. "AF Defective at Receiver".

Yes

Disconnect the microphone and insert a testing microphone plug thereto, instead to make a test. Or use another microphone for the purpose.

Is the modulation all right?

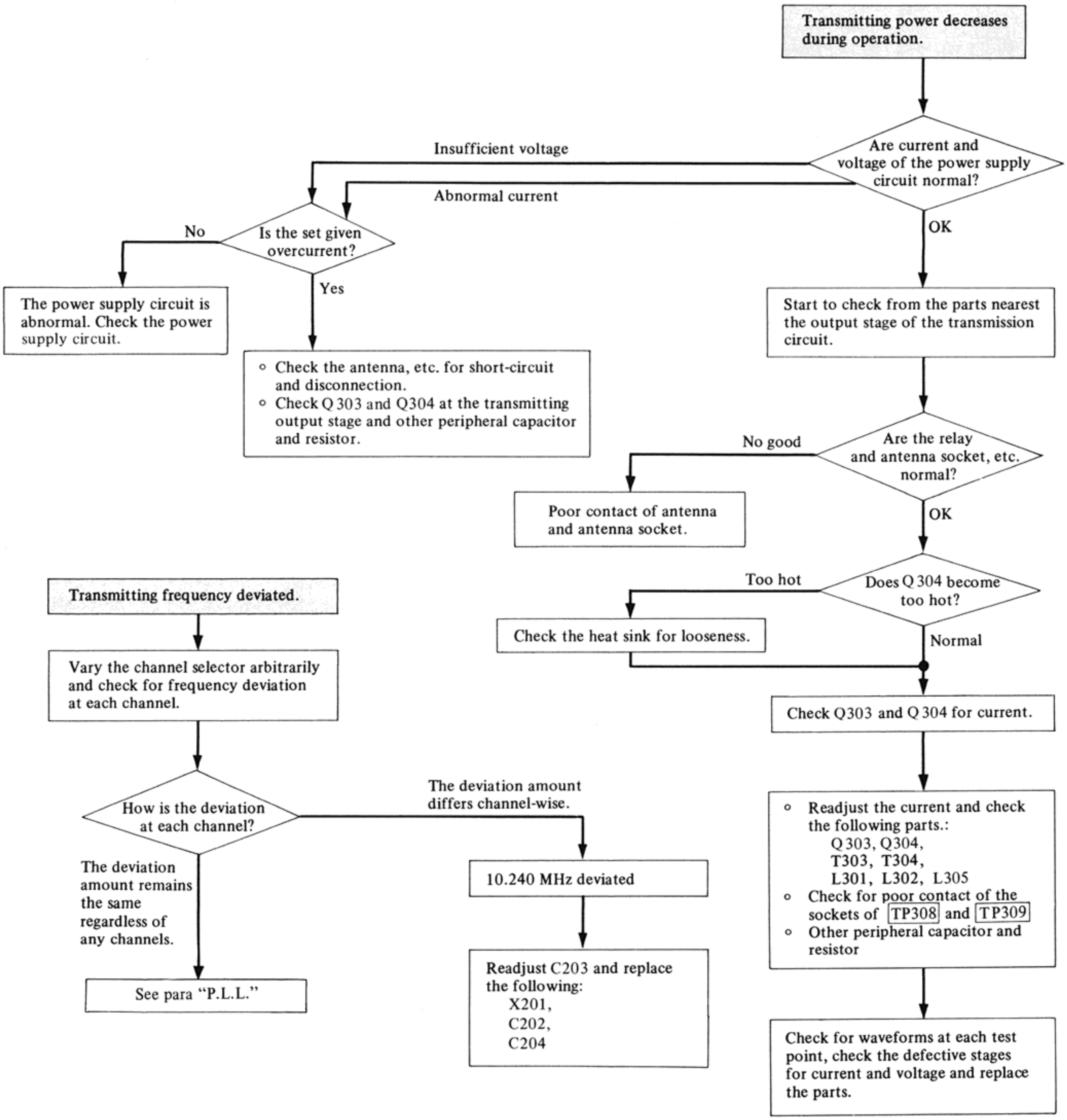
Yes

If the microphone is defective, replace it. (Check the microphone cord for disconnection, etc.)

No

Check the following for disconnection, short-circuit, poor contact, etc.
- Microphone socket
- SW101-D
- R102, L305
- Connector bet. the microphone socket and PWB
- Modulation coil of T101.

TRANSMITTER



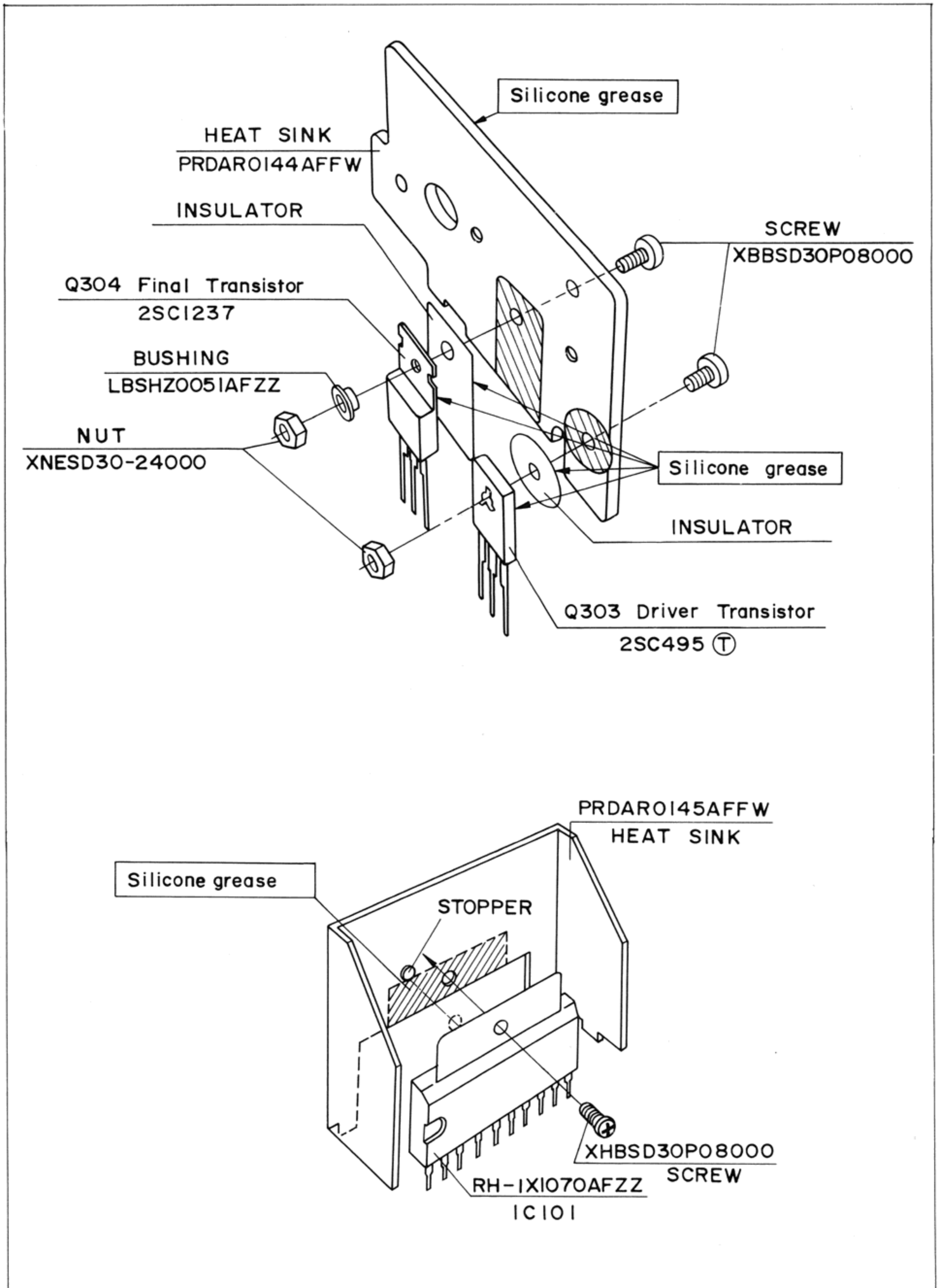
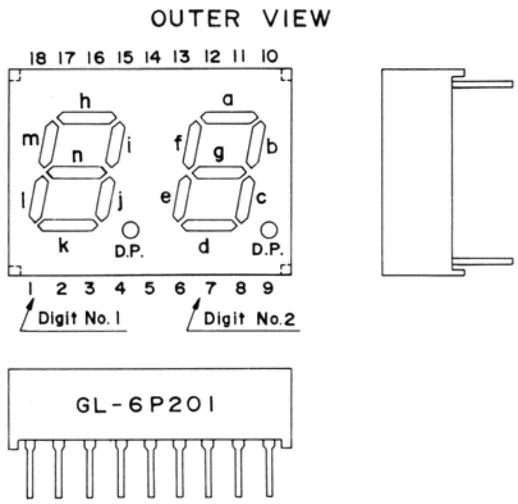
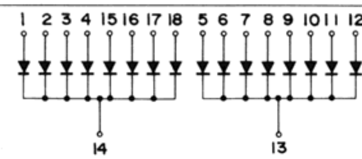


Figure 12 HOW TO SET THE TRANSISTORS AND IC





Terminals Connection Diagram

PIN	FUNCTION	PIN	FUNCTION
1	Anode l	18	Anode m
2	Anode k	17	Anode n
3	Anode j	16	Anode h
4	Anode D.P. (No. 1)	15	Anode i
5	Anode e	14	Digit No. 1 (cathode)
6	Anode d	13	Digit No. 2 (cathode)
7	Anode g	12	Anode f
8	Anode c	11	Anode a
9	Anode D.P. (No. 2)	10	Anode b

Figure13 CHANNEL INDICATOR (LED501)

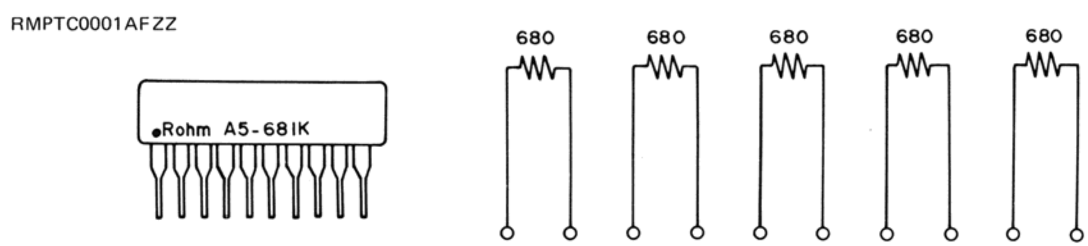


Figure 14 RESISTOR ARRAY

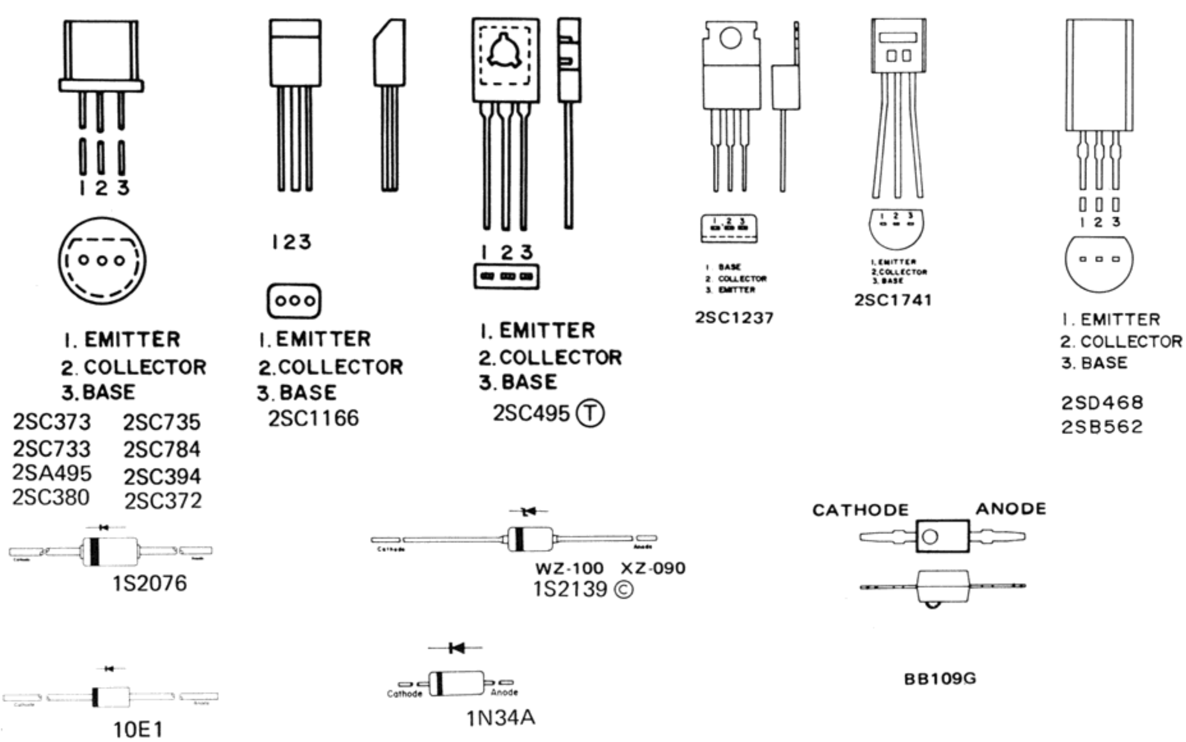


Figure 15 SEMICONDUCTORS BASING

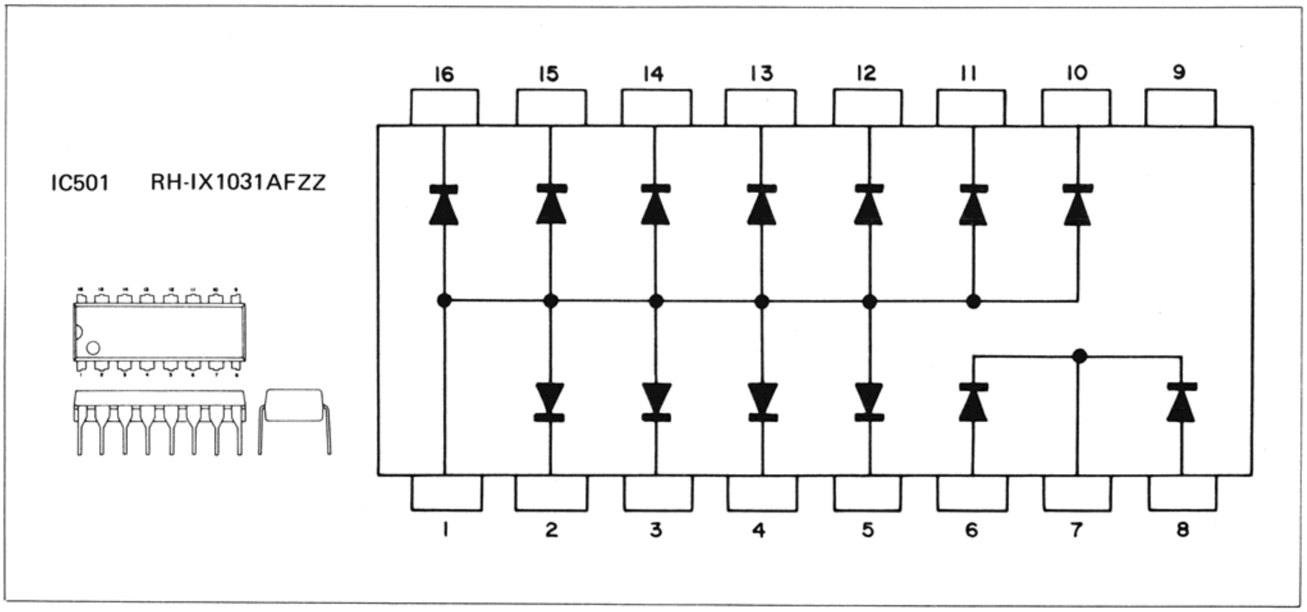


Figure 16 DIODE ARRAY (IC501)

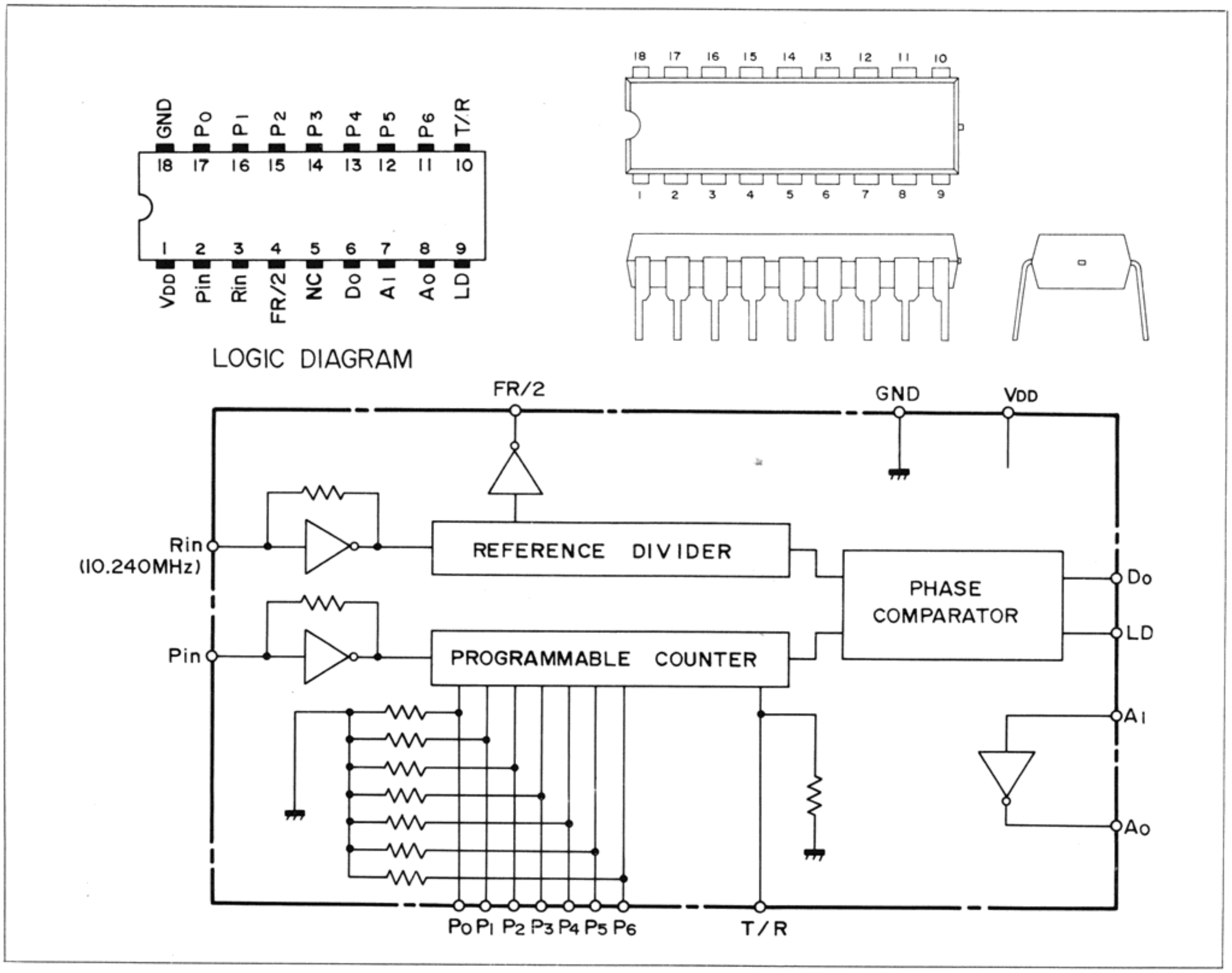


Figure 17 EQUIVALENT CIRCUIT OF IC201

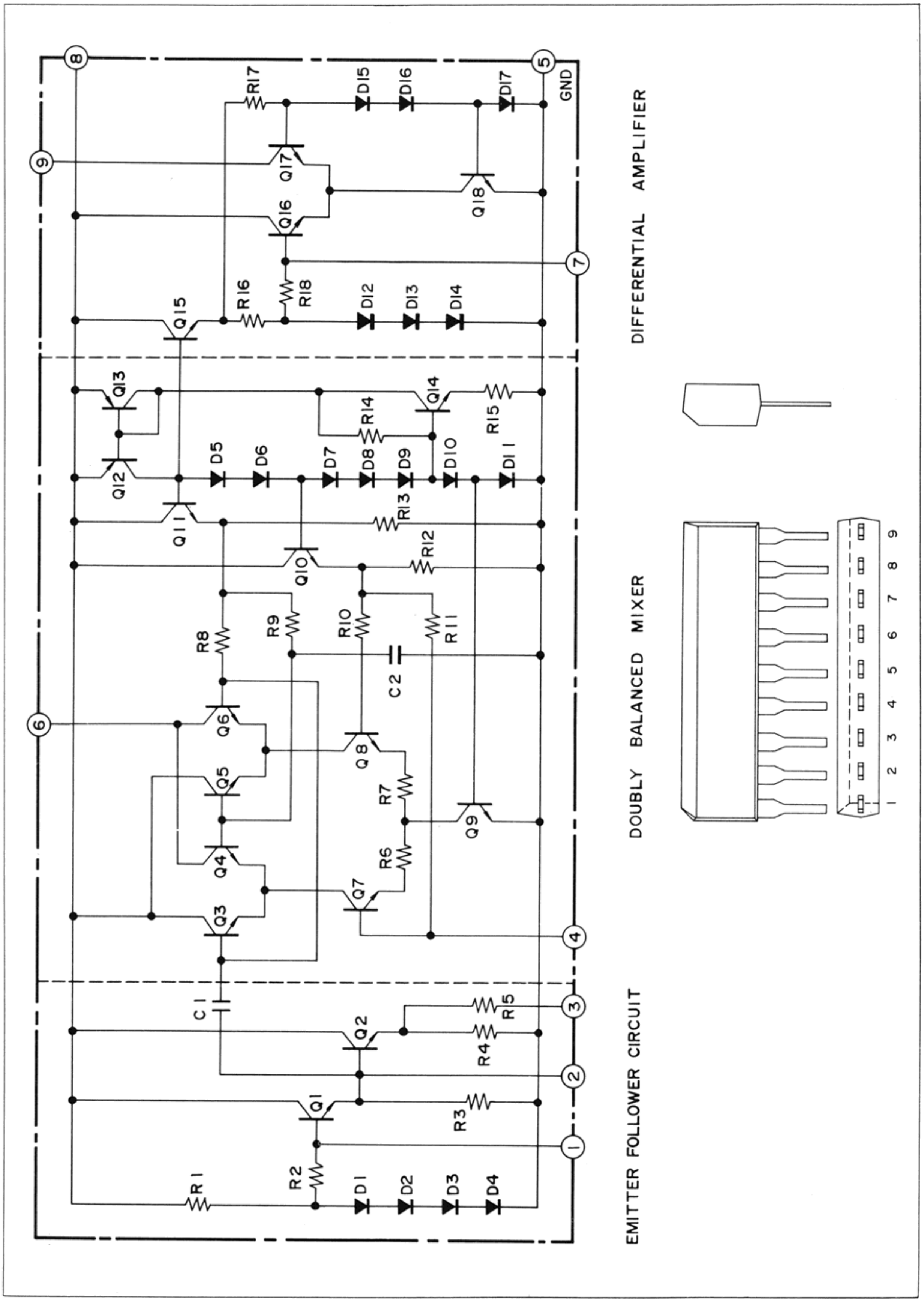


Figure 18 EQUIVALENT CIRCUIT OF IC202 and IC203

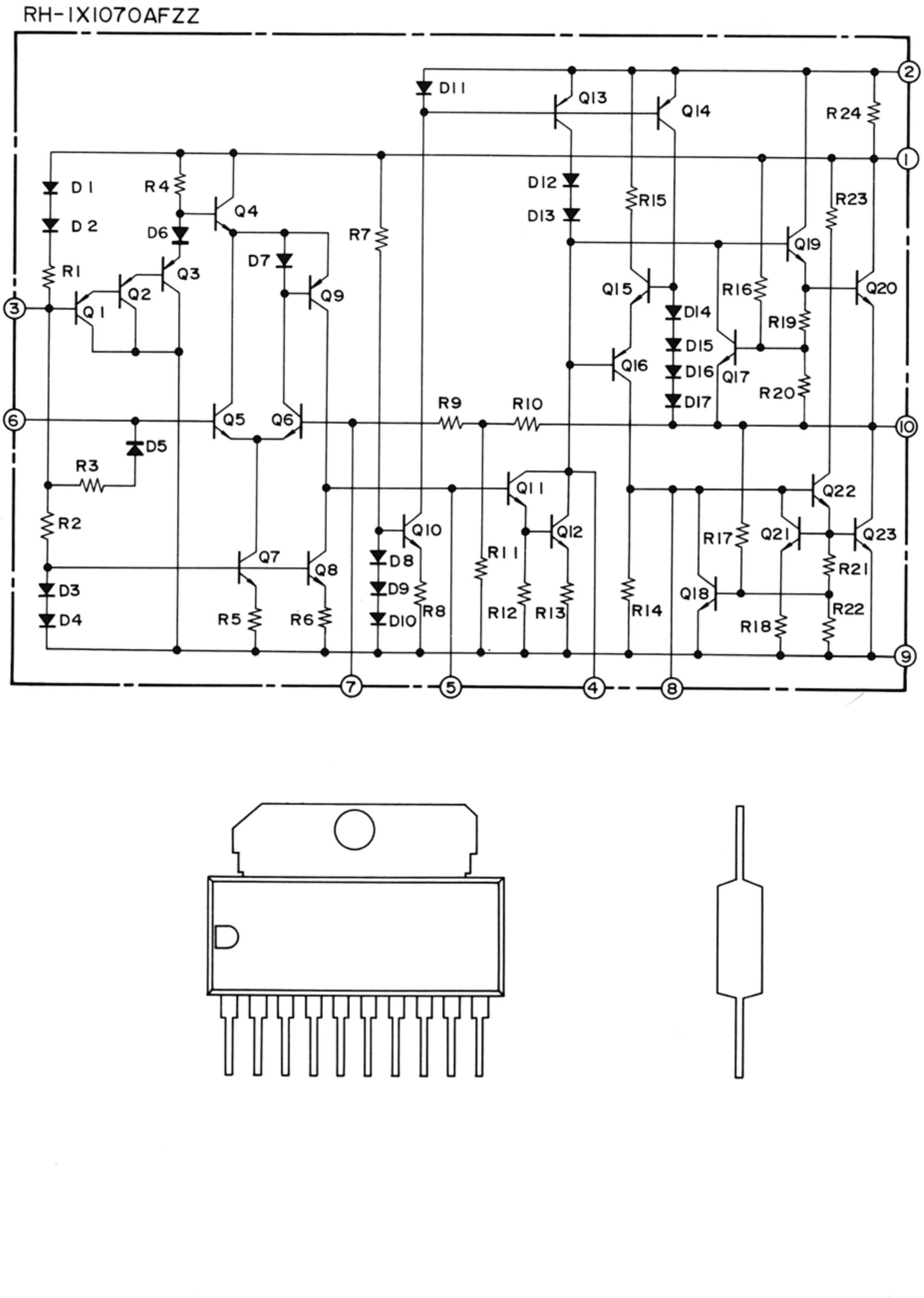


Figure 19 EQUIVALENT CIRCUIT OF IC101

REPLACEMENT PARTS LIST

"HOW TO ORDER REPLACEMENT PARTS"

To have your order filled promptly and correctly, please furnish the following informations.

1. MODEL NUMBER 2. REF. NO.
3. PART NO. 4. DESCRIPTION

Order to : Parts Center

P.O. Box 664 Paramus, New Jersey 07652 (201) 265-5600
P.O. Box 20394 Long Beach, Calif. 90801 (213) 830-4470

INTEGRATED CIRCUITS

REF. NO.	PART NO.	DESCRIPTION	PRICE
IC101	RH-IX1070AFZZ	Audio Power Amplifier (TA7205AP)	
IC201	RH-IX1067AFZZ	P.L.L. Synthesizer, Divider, Phase Comparator, Low-Pass Filter and Programmable Divider (TC9102P)	
IC202	RH-IX1068AFZZ	P.L.L. Synthesizer, V.C.O. (Voltage Controlled Oscillator) and Down Mixer (TA7310P)	
IC203	RH-IX1068AFZZ	Transmitter, 27MHz Mixer and Amplifier (TA7310P)	
IC501	RH-IX1031AFZZ	Diode Array, LED Indicator	

TRANSISTORS

REF. NO.	PART NO.	DESCRIPTION	PRICE
Q1	VS2SC784-R/1F	RF Amplifier (2SC784Ⓡ)	
Q2	VS2SC394-Y/-1	1st-Mixer (10.695MHz) (2SC394Ⓨ)	
Q3	VS2SC380-O/-1	2nd-Mixer (455kHz) (2SC380Ⓞ)	
Q4	VS2SC380-Y/-1	IF (455kHz) Amplifier (2SC380Ⓨ)	
Q5	VS2SC380-Y/-1	IF (455kHz) Amplifier (2SC380Ⓨ)	
Q6	VS2SC380-O/-1	Crystal (11.150MHz) Oscillator (2SC380Ⓞ)	
Q7	VS2SC373-G/-1	AVC Amplifier (2SC373)	
Q8	VS2SC733-BL-1	Squelch Voltage Amplifier (2SC733 (BL))	
Q101	VS2SA495-Y/-1	Modulation Limiter (2SA495Ⓨ)	
Q201	VS2SC373-G/-1	P.L.L. Synthesizer, Crystal (10.240MHz) Oscillator (2SC373)	
Q202	VS2SC373-G/-1	P.L.L. Synthesizer, Buffer and Gate (2SC373)	
Q203	VS2SD468-C/-1	P.L.L. Synthesizer, Voltage Regulator (2SD468Ⓒ)	
Q204	VS2SC1741//-1	P.L.L. Synthesizer, Voltage Regulator, TX (2SC1741)	
Q301	VS2SC735-Y/-1	Transmitter, Buffer Amplifier (2SC735Ⓨ)	
Q302	VS2SC1166-Y-1	Transmitter, 27MHz Amplifier (2SC1166Ⓨ)	
Q303	VS2SC495-T/-1	Transmitter, Driver (2SC495Ⓣ)	
Q304	VS2SC1237-/1F	Transmitter, Final (2SC1237)	
Q501	VS2SB562-C/-1	Channel Indicator, Driver (2SB562Ⓒ)	
Q502	VS2SA495-Y/-1	Channel Indicator, Matrix (2SA495Ⓨ)	
Q503	VS2SC372-Y/-1	9-channel Flashing Oscillator (2SC372Ⓨ)	
Q504	VS2SC372-Y/-1	9-channel Flashing Oscillator (2SC372Ⓨ)	

DIODES

REF. NO.	PART NO.	DESCRIPTION	PRICE
D1	VHD1S2076//-1	Static Protector (1S2076)	
D2	VHD1N34A///-1	Detector (1N34A)	
D4	VHD1S2076//-1	A.N.L. (Automatic Noise Limiter) (1S2076)	
D5	VHEWZ-100//1F	Zener Diode, Voltage Regulator (10V±0.5V) (WZ-100)	
D6	VHD1N34A///-1	Squelch (1N34A)	
D7	VHD1N34A///-1	Squelch (1N34A)	
D8	VHD1N34A///-1	A.V.C. (1N34A)	
D101	VHD1S2076//-1	Modulation Limiter (1S2076)	
D102	VHD1S2076//-1	Modulation Limiter (1S2076)	
D201	VHCBB109G//-1	Varicap, V.C.O. (BB109G)	
D202	VHC1S2139-C-1	Varicap, TX Shifter (1S2139Ⓒ)	
D203	VHD1S2076//-1	Switching (1S2076)	
D204	VHEXZ-090//-1	Zener Diode, Voltage Regulator, 9V±0.25V (XZ-090)	
D205	VHEXZ-090//-1	Zener Diode, Voltage Regulator, 9V±0.25V (XZ-090)	
D301	VHD1S2076//-1	Static Protector (1S2076)	
D302	VHD1S2076//-1	Static Protector (1S2076)	
D303	VHD1S2076//-1	Meter, RF Power (1S2076)	
D501	VHD10E1////-1	Detector, LED Indicator (10E1)	
D502	VHD1S2076//-1	LED Indicator (1S2076)	
D503	VHD1S2076//-1	LED Indicator (1S2076)	
D504	VHD1S2076//-1	LED Indicator (1S2076)	
D505	VHD1S2076//-1	LED Indicator (1S2076)	
D601	VHD10E1////-1	Circuit Protector (10E1)	
D602	VHD10E1////-1	Protector (10E1)	
D701	VHD1S2076//-1	Squelch (1S2076)	
LED501	VHPGL-6P201-1	LED (Light Emitting Diode), Channel Indicator (GL-6P201)	

COILS

REF. NO.	PART NO.	DESCRIPTION	PRICE
L101	RCILC0023AFZZ	AF Choke	
L102	RCILC0059AFZZ	RF Choke	
L103	RCILC0059AFZZ	RF Choke	
L301	RCILR0135AFZZ	Transmitter, Matching (Loading)	
L302	RCILR0055AFZZ	Transmitter, π-Filter	
L303	RCILC0055AFZZ	Trap, 81MHz	
L304	RCILC0055AFZZ	Trap, 54MHz	
L305	RCILC0011AFZZ	RF Choke (TX)	
L401	RCILR0310AFZZ	Antenna Choke	

PARTS LIST

TRANSFORMERS

REF. NO.	PART NO.	DESCRIPTION	PRICE
T1	RCILA0412AFZZ	Antenna	
T2	RCILR0304AFZZ	RF	
T3	RCILI0157AFZZ	1st-IF (10.695MHz)	
T4	RCILI0157AFZZ	1st-IF (10.695MHz)	
T5	RCILI0228AFZZ	2nd-IF (455kHz)	
T6	RCILI0229AFZZ	2nd-IF (455kHz)	
T7	RCILI0169AFZZ	2nd-IF (455kHz)	
T8	RCILB0421AFZZ	2nd Local Oscillator (11.150MHz)	
T9	RCILI0228AFZZ	2nd-IF (455kHz)	
T101	RTRNM0050AFZZ	Output and Modulation	
T201	RCILR3242AAZZ	Tripler (15.360MHz)	
T202	RCILB3241AAZZ	V.C.O. (Voltage Controlled Oscillator)	
T203	RCILB0383AFZZ	27MHz Filter	
T204	RCILB0383AFZZ	27MHz Filter	
T205	RCILR3243AAZZ	16MHz Filter	
T206	RCILR3243AAZZ	16MHz Filter	
T301	RCILB0383AFZZ	Transmitter, 27MHz Filter	
T302	RCILB0383AFZZ	Transmitter, 27MHz Filter	
T303	RCILB0221AFZZ	Transmitter, Buffer	
T304	RCILR0037AFZZ	Transmitter, Driver	
T601	RTRNC0003AFZZ	Power Choke	

CRYSTALS

REF. NO.	PART NO.	DESCRIPTION	PRICE
X1	RCRSB0055AFZZ	11.150MHz	
X201	RCRSB0051AFZZ	10.240MHz	

CERAMIC FILTER

REF. NO.	PART NO.	DESCRIPTION	PRICE
CF1	RFILA0056AFZZ	455kHz	

ELECTROLYTIC CAPACITORS

REF. NO.	PART NO.	DESCRIPTION	PRICE
C22	VCEAAU1EW335A	3.3MFD, 25V, +75 −10%	
C23	VCEAAU1EW335A	3.3MFD, 25V, +75 −10%	
C26	VCAAKU0XA474M	.47MFD, 6.3V, ±20%, Aluminum	
C30	VCEAAU1CW106Y	10MFD, 16V, +50 −10%	
C31	VCEAAU1AW227Y	220MFD, 10V, +50 −10%	
C37	VCEAAU1CW336Y	33MFD, 16V, +50 −10%	
C107	VCEAAU1CW106Y	10MFD, 16V, +50 −10%	
C108	VCEAAU1AW227Y	220MFD, 10V, +50 −10%	
C109	VCEAAU1CW106Y	10MFD, 16V, +50 −10%	
C112	VCEAAU1EW335A	3.3MFD, 25V, +75 −10%	
C113	VCEAAU1CW336Y	33MFD, 16V, +50 −10%	
C116	VCEAAU0JW476Y	47MFD, 6.3V, +50 −10%	
C117	VCEAAU1CW108Y	1000MFD, 16V, +50 −10%	
C119	VCEAAU1CW106Y	10MFD, 16V, +50 −10%	
C211	VCSATU1VF224M	.22MFD, 35V, ±20%, Tantalu	
C225	VCSATU1EF105M	1MFD, 25V, ±20%, Tantalu	
C228	VCEAAU1AW107Y	100MFD, 10V, +50 −10%	
C232	VCEAAU1AW476Y	47MFD, 10V, +50 −10%	
C237	VCEAAU1HW105A	1MFD, 50V, +75 −10%	
C244	VCEAAU1AW107Y	100MFD, 10V, +50 −10%	
C332	VCAAKU1CA104M	.1MFD, 16V, ±20%, Aluminum	
C501	VCEAAU1EW335A	3.3MFD, 25V, +75 −10%	
C502	VCEAAU1EW335A	3.3MFD, 25V, +75 −10%	
C503	VCAAKU0XA474M	.47MFD, 6.3V, ±20%, Aluminum	

CAPACITORS

(Unless otherwise specified capacitors are 50V, +80 −20%, Ceramic Type.)

REF. NO.	PART NO.	DESCRIPTION	PRICE
C1	VCKZPU1HF103Z	.01MFD	
C2	VCKZPU1HF103Z	.01MFD	
C3	VCKZPU1HF103Z	.01MFD	
C4	VCCSPU1HL271J	270PF, 50V, ±5%, Ceramic	
C5	VCCSPU1HL220J	22PF, 50V, ±5%, Ceramic	
C6	VCKYPU1HB103M	.01MFD, 50V, ±20%, Ceramic	
C7	VCKZPU1HF103Z	.01MFD	
C8	VCCSPU1HL2R0C	2PF, 50V, ±0.25PF, Ceramic	
C9	VCCSPU1HL330J	33PF, 50V, ±5%, Ceramic	
C10	VCCSPU1HL330J	33PF, 50V, ±5%, Ceramic	
C11	VCKYPU1HB103M	.01MFD, 50V, ±20%, Ceramic	
C12	VCKZPU1HF103Z	.01MFD	
C13	VCCSPU1HL5R0C	5PF, 50V, ±0.25PF, Ceramic	
C14	VCKZPU1HF103Z	.01MFD	
C15	VCCSPU1HLR50C	0.5PF, 50V, ±0.25PF, Ceramic	
C16	VCQYKU1HM333M	.033MFD, 50V, ±20%, Mylar	
C17	VCKZPU1HF103Z	.01MFD	
C18	VCKZPU1HF103Z	.01MFD	
C19	VCQYKU1HM333M	.033MFD, 50V, ±20%, Mylar	
C20	VCQYKU1HM333M	.033MFD, 50V, ±20%, Mylar	
C21	VCKYPU1HB472M	.0047MFD, 50V, ±20%, Ceramic	
C24	VCQYKU1HM103M	.01MFD, 50V, ±20%, Mylar	
C25	VCKZPU1HF223Z	.022MFD	
C27	VCCSPU1HL330J	33PF, 50V, ±5%, Ceramic	
C28	VCCSPU1HL680J	68PF, 50V, ±5%, Ceramic	
C29	VCQYKU1HM333M	.033MFD, 50V, ±20%, Mylar	
C32	VCCSPU1HL271J	270PF, 50V, ±5%, Ceramic	
C33	VCCSPU1HL121J	120PF, 50V, ±5%, Ceramic	
C34	VCCSPU1HL221J	220PF, 50V, ±5%, Ceramic	
C35	VCKZPU1HF103Z	.01MFD	
C36	VCKZPU1HF103Z	.01MFD	
C38	VCKZPU1HF103Z	.01MFD	
C40	VCKZPU1HF103Z	.01MFD	
C101	VCKYPU1HB472M	.0047MFD, 50V, ±20%, Ceramic	
C102	VCKYPU1HB472M	.0047MFD, 50V, ±20%, Ceramic	
C103	VCQYKU1HM223M	.022MFD, 50V, ±20%, Mylar	
C104	VCKYPU1HB222M	.0022MFD, 50V, ±20%, Ceramic	
C105	VCCSPU1HL271J	270PF, 50V, ±5%, Ceramic	
C106	VCQYKU1HM683M	.068MFD, 50V, ±20%, Mylar	
C110	VCCSPU1HL470J	47PF, 50V, ±5%, Ceramic	
C111	VCQYKU1HM104M	.1MFD, 50V, ±20%, Mylar	
C114	VCKYPU1SD103Z	.01MFD (Z5T), 30V, +80 −20%, Ceramic	
C118	VCQYKU1HM333M	.033MFD, 50V, ±20%, Mylar	
C123	VCCSPU1HL680J	68PF, 50V, ±5%, Ceramic	
C124	VCCSPU1HL680J	68PF, 50V, ±5%, Ceramic	
C125	VCKYPU1SD103Z	.01MFD (Z5T), 30V, +80 −20%, Ceramic	
C201	VCKYPU1SD103Z	.01MFD (Z5T), 30V, +80 −20%, Ceramic	
C202	VCCCPU1HH330J	33PF (CH), 50V, ±5%, Ceramic	

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	PRICE
C203	RTO-H1009AFZZ	Trimmer Capacitor, 10.240MHz Oscillator	
C204	VCCSPU1HL391J	390PF, 50V, ±5%, Ceramic	
C205	VCCSPU1HL151J	150PF, 50V, ±5%, Ceramic	
C206	VCCSPU1HL330J	33PF, 50V, ±5%, Ceramic	
C207	VCQYKU1HM223M	.022MFD, 50V, ±20%, Mylar	
C208	VCCCPU1HH150J	15PF (CH), 50V, ±5%, Ceramic	
C209	VCCCPU1HH5R0C	5PF (CH), 50V, ±0.25PF, Ceramic	
C210	VCCSPU1HL3R0C	3PF, 50V, ±0.25PF, Ceramic	
C212	VCCCPU1HH470J	47PF (CH), 50V, ±5%, Ceramic	
C213	VCCUPU1HJ100J	10PF (UJ), 50V, ±5%, Ceramic	
C214	VCCSPU1HL101J	100PF, 50V, ±5%, Ceramic	
C215	VCCSPU1HL101J	100PF, 50V, ±5%, Ceramic	
C216	VCCUPU1HJ180J	18PF (UJ), 50V, ±5%, Ceramic	
C217	VCQYKU1HM223M	.022MFD, 50V, ±20%, Mylar	
C218	VCKYPU1HB102M	.001MFD, 50V, ±20%, Ceramic	
C219	VCCSPU1HL101J	100PF, 50V, ±5%, Ceramic	
C220	VCCSPU1HL101J	100PF, 50V, ±5%, Ceramic	
C221	VCCSPU1HL101J	100PF, 50V, ±5%, Ceramic	
C222	VCKYPU1HB102M	.001MFD, 50V, ±20%, Ceramic	
C223	VCQYKU1HM223M	.022MFD, 50V, ±20%, Mylar	
C224	VCCSPU1HL101J	100PF, 50V, ±5%, Ceramic	
C226	VCCCPU1HH330J	33PF (CH), 50V, ±5%, Ceramic	
C227	VCKZPU1HF103Z	.01MFD	
C229	VCKZPU1HF103Z	.01MFD	
C230	VCCCPU1HH100F	10PF (CH), 50V, ±1PF, Ceramic	
C231	VCKZPU1HF103Z	.01MFD	
C233	VCCRPU1HH390J	39PF (RH), 50V, ±5%, Ceramic	
C234	VCKZPU1HF103Z	.01MFD	
C235	VCCRPU1HH330J	33PF (RH), 50V, ±5%, Ceramic	
C236	VCKZPU1HF103Z	.01MFD	
C238	VCKYPU1HB102M	.001MFD, 50V, ±20%, Ceramic	
C239	VCCSPU1HL820J	82PF, 50V, ±5%, Ceramic	
C240	VCCSPU1HL101J	100PF, 50V, ±5%, Ceramic	
C241	VCCSPU1HL101J	100PF, 50V, ±5%, Ceramic	
C243	VCCSPU1HL151J	150PF, 50V, ±5%, Ceramic	
C245	VCQYKU1HM103M	.01MFD, 50V, ±20%, Mylar	
C301	VCCSPU1HL330J	33PF, 50V, ±5%, Ceramic	
C302	VCCSPU1HL390J	39PF, 50V, ±5%, Ceramic	
C303	VCCSPU1HL390J	39PF, 50V, ±5%, Ceramic	
C304	VCCSPU1HL3R0C	3PF, 50V, ±0.25PF, Ceramic	
C305	VCKZPU1HF103Z	.01MFD	
C306	VCKZPU1HF103Z	.01MFD	
C307	VCCSPU1HL151J	150PF, 50V, ±5%, Ceramic	
C308	VCCSPU1HL4R0C	4PF, 50V, ±0.25PF, Ceramic	
C309	VCKZPU1HF103Z	.01MFD	
C310	VCCSPU1HL100D	10PF, 50V, ±0.5PF, Ceramic	
C311	VCKZPU1HF103Z	.01MFD	
C312	VCCSPU1HL221J	220PF, 50V, ±5%, Ceramic	
C313	VCCSPU1HL471J	470PF, 50V, ±5%, Ceramic	
C314	VCKYPU1SD103Z	.01MFD (Z5T), 30V, +80 −20%, Ceramic	
C315	VCCSPU1HL511J	510PF, 50V, ±5%, Ceramic	
C316	VCCSPU1HL180J	18PF, 50V, ±5%, Ceramic	
C317	VCKYPU1SD103Z	.01MFD (Z5T), 30V, +80 −20%, Ceramic	
C318	VCKYPU1SD103Z	.01MFD (Z5T), 30V, +80 −20%, Ceramic	
C319	VCKYPU1SD103Z	.01MFD (Z5T), 30V, +80 −20%, Ceramic	
C320	VCCSPU1HL511J	510PF, 50V, ±5%, Ceramic	
C321	VCCSPU1HL331J	330PF, 50V, ±5%, Ceramic	
C322	VCKYPU1SD103Z	.01MFD (Z5T), 30V, +80 −20%, Ceramic	
C323	VCCSPU1HL471J	470PF, 50V, ±5%, Ceramic	
C324	VCCSPU1HL271J	270PF, 50V, ±5%, Ceramic	
C325	VCCSPU1HL820J	82PF, 50V, ±5%, Ceramic	
C326	VCCSPU1HL220J	22PF, 50V, ±5%, Ceramic	
C327	VCKZPU1HF103Z	.01MFD	
C328	VCCSPU1HL220J	22PF, 50V, ±5%, Ceramic	
C329	VCCSPU1HL560J	56PF, 50V, ±5%, Ceramic	
C330	VCKYPU1SD103Z	.01MFD (Z5T), 30V, +80 −20%, Ceramic	
C331	VCKZPU1HF103Z	.01MFD	
C333	VCCSPU1HL511J	510PF, 50V, ±5%, Ceramic	
C334	VCKZPU1HF103Z	.01MFD	
C335	VCCSPU1HL511J	510PF, 50V, ±5%, Ceramic	
C336	VCCSPU1HL330J	33PF, 50V, ±5%, Ceramic	
C401	VCCSPU1HL151J	150PF, 50V, ±5%, Ceramic	
C402	VCKYPU1SD103Z	.01MFD (Z5T), 30V, +80 −20%, Ceramic	
C601	VCKZPU1HF103Z	.01MFD	
C604	VCKZPU1HF333P	.033MFD, 50V, +100 −0%, Ceramic	
C605	VCKZPU1HF333P	.033MFD, 50V, +100 −0%, Ceramic	
C608	VCKZPU1HF103Z	.01MFD	
C701	VCQYKU1HM333M	.033MFD, 50V, ±20%, Mylar	
C702	VCQYKU1HM223M	.022MFD, 50V, ±20%, Mylar	
C703	VCCSPU1HL220J	22PF, 50V, ±5%, Ceramic	
C704	VCCSPU1HL560J	56PF, 50V, ±5%, Ceramic	
C705	VCQYKU1HM332M	.0033MFD, 50V, ±20%, Mylar	

RESISTORS

(Unless otherwise specified resistors are 1/4W, ±5%, Carbon Type).

REF. NO.	PART NO.	DESCRIPTION	PRICE
R1	VRD-ST2EE472J	4.7K ohm	
R2	VRD-ST2EE152J	1.5K ohm	
R3	VRD-ST2EE102J	1K ohm	
R4	VRD-ST2EE222J	2.2K ohm	
R5	VRD-ST2EE473J	47K ohm	
R6	VRD-ST2EE562J	5.6K ohm	
R7	VRD-ST2EE471J	470 ohm	
R8	VRD-ST2EE472J	4.7K ohm	
R9	VRD-ST2EE333J	33K ohm	
R10	VRD-ST2EE681J	680 ohm	
R12	VRD-SU2EY223J	22K ohm	
R13	VRD-ST2EE472J	4.7K ohm	
R14	VRD-ST2EE102J	1K ohm	
R15	VRD-ST2EE273J	27K ohm	
R16	VRD-SU2EY562J	5.6K ohm	
R17	VRD-SU2EY102J	1K ohm	
R18	VRD-SU2EY102J	1K ohm	
R20	VRD-SU2EY224J	220K ohm	
R21	VRD-SU2EY333J	33K ohm	
R22	VRD-SU2EY223J	22K ohm	
R23	VRD-ST2EE333J	33K ohm	
R24	VRD-ST2EE153J	15K ohm	
R27	VRD-SU2EY104J	100K ohm	
R28	VRD-SU2EY224J	220K ohm	
R29	VRD-SU2EY104J	100K ohm	
R30	VRD-SU2BY333J	33K ohm, 1/8W, ±5%, Carbon	
R31	VRD-SU2EY154J	150K ohm	
R32	RVR-M0146AFZZ	30K (B) ohm, Signal Meter Adjust	
R34	VRD-ST2EE222J	2.2K ohm	
R35	VRD-SU2EY222J	2.2K ohm	
R36	VRD-ST2EE223J	22K ohm	

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	PRICE
R37	VRD-ST2EE472J	4.7K ohm	
R38	VRD-ST2EE151J	150 ohm	
R39	VRD-ST2EE101J	100 ohm	
R40	VRD-SU2EY823J	82K ohm	
R41	VRD-ST2EE471J	470 ohm	
R101	VRD-ST2EE153J	15K ohm	
R102	VRD-ST2EE222J	2.2K ohm	
R103	VRD-ST2EE470J	47 ohm	
R106	VRD-ST2EE222J	2.2K ohm	
R107	VRD-ST2EE222J	2.2K ohm	
R108	VRD-ST2EE223J	22K ohm	
R109	VRD-ST2EE153J	15K ohm	
R110	RVR-M0123AFZZ	1K (B) ohm, Modulation Level Adjust	
R111	VRD-ST2EE472J	4.7K ohm	
R112	VRD-SU2EY563J	56K ohm	
R140	VRD-ST2HA1R0K	1 ohm, 1/2W, ±10%, Carbon	
R201	VRD-SS2EY563J	56K ohm	
R202	VRD-SS2EY473J	47K ohm	
R203	VRD-SS2EY152J	1.5K ohm	
R205	VRD-SS2EY222J	2.2K ohm	
R206	VRD-SS2EY103J	10K ohm	
R207	VRD-SS2EY562J	5.6K ohm	
R208	VRD-SS2EY103J	10K ohm	
R209	VRD-SS2EY224J	220K ohm	
R210	VRD-SS2EY103J	10K ohm	
R211	VRD-SS2EY102J	1K ohm	
R212	VRD-SS2EY103J	10K ohm	
R214	VRD-SS2EY561J	560 ohm	
R215	VRD-SS2EY222J	2.2K ohm	
R216	VRD-SS2EY331J	330 ohm	
R217	VRD-SS2EY683J	68K ohm	
R218	VRD-ST2EY221J	220 ohm	
R219	VRD-SS2EY560J	56 ohm	
R220	VRD-SS2EY471J	470 ohm	
R221	VRD-SS2EY183J	18K ohm	
R222	VRD-SS2EY333J	33K ohm	
R223	VRD-SS2EY102J	1K ohm	
R224	VRD-SS2EY680J	68 ohm	
R225	VRD-SS2EY561J	560 ohm	
R226	VRD-SS2EY471J	470 ohm	
R227	VRD-SS2EY560J	56 ohm	
R228	VRD-SS2EY222J	2.2K ohm	
R229	VRD-SS2EY222J	2.2K ohm	
R301	VRD-ST2EE123J	12K ohm	
R302	VRD-ST2EE222J	2.2K ohm	
R303	VRD-ST2EE221J	220 ohm	
R304	VRD-ST2EE223J	22K ohm	
R305	VRD-ST2EE470J	47 ohm	
R306	VRD-ST2EE332J	3.3K ohm	
R307	VRD-ST2EE101J	100 ohm	
R308	VRD-ST2EE101J	100 ohm	
R309	VRD-ST2EE680J	68 ohm	
R310	VRD-ST2HA220J	22 ohm, 1/2W, ±5%, Carbon	
R312	VRD-ST2HA471J	470 ohm, 1/2W, ±5%, Carbon	
R313	VRD-ST2EE332J	3.3K ohm	
R314	VRD-ST2EE332J	3.3K ohm	
R315	RVR-M0129AFZZ	30K (B) ohm, RF Power Meter Adjust	
R501	RMPTC0001AFZZ	Resistor Array, 680 ohm x 5	
R502	RMPTC0001AFZZ	Resistor Array, 680 ohm x 5	
R503	VRD-ST2EE681J	680 ohm	
R504	VRD-ST2EE681J	680 ohm	
R505	VRD-SU2BY681J	680 ohm, 1/8W, ±5%, Carbon	
R506	VRD-ST2EE681J	680 ohm	
R507	VRS-PT3DB560K	56 ohm, 2W, ±10%, Oxide Film	
R508	VRS-PT3DB330K	33 ohm, 2W, ±10%, Oxide Film	
R509	VRD-ST2EE103J	10K ohm	
R510	VRD-ST2EE102J	1K ohm	
R511	VRD-ST2EE154J	150K ohm	
R513	VRD-ST2EE152J	1.5K ohm	
R514	VRD-ST2EE154J	150K ohm	
R515	VRD-ST2EE331J	330 ohm	
R516	VRD-ST2EE390J	39 ohm	
R517	VRD-SU2EY390J	39 ohm	
R701	VRD-ST2HA470K	47 ohm, 1/2W, ±10%, Carbon	
R702	VRD-ST2EY682J	6.8K ohm	
R703	VRD-ST2EY332J	3.3K ohm	
R704/ SW703, SW704	RVR-B0131AFZZ	Squelch Volume (10K-B ohms) with P.A. (Public Address) Switch	
R705/ SW705	RVR-D0107AFZZ	50K (D) ohms, Off/Volume Control	
R706	VRD-ST2EY122J	1.2K ohm	
R707	VRD-ST2EY104J	100K ohm	
R708	VRD-ST2EY104J	100K ohm	
R709	RVR-M0148AFZZ	5K (B) ohm, Deepest Point Adjust	

MISCELLANEOUS

REF. NO.	PART NO.	DESCRIPTION	PRICE
	GCABA3447AFSA	Cabinet, Top	
	GCABB3447AFSA	Cabinet, Bottom (Speaker Side)	
	GMADT0051AFSA	Window, Channel Indicator	
	HBDGS3050AFSA	Decoration Plate, 40 CHANNEL	
	HDECB0065AFSA	Decoration Plate, TX/RX	
	HINDM1080AFSB	Emblem "SHARP"	
	HINDP0116AFSA	Indication Plate, Green, RX	
	HINDP0116AFSB	Indication Plate, Red, TX	
	HPNLC1225AFSA	Front Panel	
	JKNBM0219AFSA	Knob, ANL Switch, Delta Tuning Switch	
	JKNBN0299AFSA	Knob, Channel Selector	
	JKNBN0300AFSA	Knob, Off/Volume Control, Squelch Control/P.A. Switch	
	LANGF0407AFFW	Bracket, Output/Modulation Transformer, Small	
	LANGR0418AFFW	Bracket, Output/Modulation Transformer, Large	
	LBRC-0051AFSA	Mobile Mounting Bracket	
	LBSHZ0051AFZZ	Bushing, Transistor Q304	
	LCHSS0120AFFW	Chassis, Front	
	LCHSM2082AAZZ	Bracket, P.L.L. Circuit P.W. Board	
	LX-BZ0237AFFB	Screw, Cabinet	
	LX-BZ0053AFFD	Bolt (5ϕ x 10mm)	
	LX-NZ0121AFFD	Flange Nut, Speaker	
	LX-WZ3017CEFN	Shakeproof Lockwasher External Type, P.W. Board	
	PCOVS0059AAZZ	Cover, P.L.L. Circuit P.W. Board	
	PCOVM8054AF00	Cover, ANL and Delta Tuning Switches, Rubber	
	PCAPH0001AGZZ	Cap, ANL Switch	
	PFILW0004AFZZ	Film, Channel Indicator (LED), Red	
	PFLT-0320AF00	Felt, Front Chassis	

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	PRICE
	PGUMM0041AG09	Holder, Meter, Rubber	
	PGUMM0116AF09	Holder, Lamp (TX and RX), Rubber	
	PGUMS0110AF00	Cushion, P.L.L. Unit, Rubber	
	PHAG-001MAFFC	Hanger, Microphone	
	PRDAR0144AFFW	Heat Sink, Transistors (Q303 and Q304)	
	PRDAR0145AFFW	Heat Sink, Integrated Circuit IC101	
	PSPAG0057AF00	Rubber Washer, Mounting Bracket	
CNP101	QCNCM0402SGZZ	Plug, 4 Pin, Microphone	
CNP701	QCNCM111KAFZZ	Plug, 10 Pin (U-bend)	
CNP702	QCNCM155GAFZZ	Plug, 7 Pin (U-bend)	
CNS101	QCNW-0229AFZZ	Connecting Cord with Socket (4 Pin), Microphone	
CNS501	QCNCW134JAFZZ	Socket, 9 Pin, LED	
CNS502	QCNCW134JAFZZ	Socket, 9 Pin, LED	
CNS701, CNS702	QCNW-0222AFZZ	Connecting Cord with Socket (10 Pin and 7 Pin) and Plug (10 Pin and 7 Pin) Assembly	
CNW501	QCNW-0224AFZZ	Connecting Cord, 8 Pin	
CNW502	QCNW-0225AFZZ	Connecting Cord, 7 Pin	
CNW503	QCNW-0226AFZZ	Connecting Cord, 3 Pin	
CNW504	QCNW-0227AFZZ	Connecting Cord, 2 Pin	
CNW505	QCNW-0228AFZZ	Connecting Cord, 4 Pin	
	QCNW-0238AFZZ	Connecting Cord with Socket, Speaker	
	QFS-A232AAFNA	Fuse, 2.3 Ampere	
	QFSHJ9052AFZZ	Power Supply Cord with Fuse Holder and Socket	
J601-A, B	QJAKB0050AFZZ	Jacks, External Speaker (J601-A) and P.A. Speaker (J601-B)	
	QPWBF0052AAZZ	Printed Wiring Board, P.L.L. Circuit	
	QPWBF0612AFZZ	Printed Wiring Board, Main Circuit	
	QPWBF0613AFZZ	Printed Wiring Board, Volume Circuit	
	QPWBF0614AFZZ	Flexible Printed Circuits, Channel Indicator	
PG201	QPLGZ0850AFZZ	Plug, 8 Pin	
PG202	QPLGZ0850AFZZ	Plug, 8 Pin	
	QSOCE0401AFZZ	Socket, Test Point TP308 and TP309	
	QPLGE0403AGZZ	Plug, Test Point TP308 and TP309	
PG601	QSOCZ2454AFZZ	Plug, Power Supply	
SO101	QSOCZ2468AFZZ	Socket, Microphone	
SO401	QSOCZ2470AFZZ	Socket, External Antenna (50 ohms)	
SW101-A ~ D/ RY601	RRLYZ0007AFZZ	Relay with Receiver/Transmitter Switch	
SW201-A, B	QSW-R0143AFZZ	Switch, Channel Selector	
SW701	QSW-B0003AFZZ	Switch, Delta Tuning	
SW702	QSW-B0028AGZZ	Switch, ANL (Automatic Noise Limiter)	
SW703, SW704/ R704	RVR-B0131AFZZ	Switch, P.A. (Public Address) with Squelch Volume (10K-B ohms)	
SW705/ R705	RVR-D0107AFZZ	50K (D) ohms, Off/Volume Control	
C606, C607	RC-KZ1009AFZZ	Feed Through Capacitors with Bracket	
	RCORF0051AFZZ	Ferrite Core	
PL501	RLMPM0069AFZZ	Lamp, RX (Receiver) Indication (14V, 50mA)	
PL502	RLMPM0069AFZZ	Lamp, TX (Transmitter) Indication (14V, 50mA)	
PL701	RLMPM0019AGZZ	Lamp, Meter Illumination	
	RMICD0211AFZZ	Microphone Assembly (with Press-to-talk Switch)	
ME701	RMTRE0063AFZZ	Meter, Signal/RF Power	
	RTUNS0050AFZZ	P.L.L. Unit	
	SPAKC1005AFZZ	Packing Case	
	SSAKZ0053AFZZ	Polyethylene Bag, Set	
SP601	VSP0080P-288A	Speaker, 8 ohms, 8cm	
	XBBSC30W08000	Screw, 3ϕ x 8mm, Microphone Hanger	
	XNESD50-40000	Nut (5ϕ)	
	XWHSD50-05000	Washer (5ϕ)	
	XWSSD50-13000	Spring Washer (5ϕ)	

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