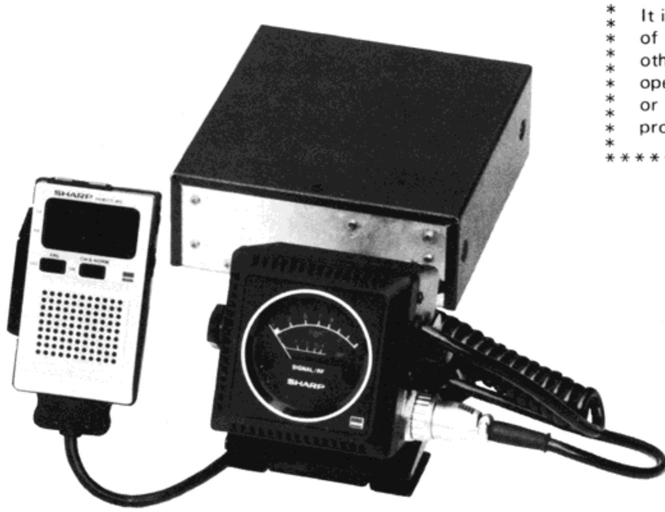
SHARP

OUTSTANDING RECEPTION THE WORLD OVER

SERVICE MANUAL

CB-4670



'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.

P.L.L. SYNTHESIZED 40 CHANNEL CITIZENS BAND TRANSCEIVER

MODEL CB-4670 CX-1 (Optional Extension Cord)

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SHARP ELECTRONICS CORPORATION

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

Parts Centers:

P.O. Box 664	Paramus,	New Jersey	07652	(201) 265-5600
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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 . . . . 50 ohms Un-balanced
Carrier deviation. . . . . . Not greater than ± 800Hz nominal on (exceeds F.C.C., 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.
Auxiliary circuits . . . . . Automatic noise limiter (ANL), Variable squelch

General

Power source . . . . DC 12.0V Nominal
negative or positive ground
Antenna . . . . 50 ohm external antenna for car or base operation

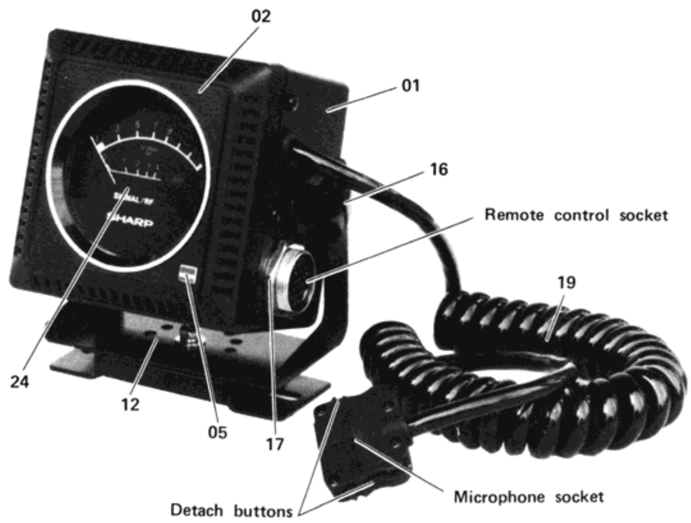
Speaker . . . . 3-1/8″
P.D.S. 8-ohm Imp.
Semiconductor 5-ICs
24-Transistors
31-Diodes
3-LED
2-Crystal
Dimensions . . . . Main unit
Width : 6-11/16″
Height: 2-1/2″
Depth : 7-1/4″
Speaker unit
Width : 3-15/16″
Height: 3-15/16″
Depth : 3-1/4″
Microphone unit
Width : 2-5/8″
Height: 4-1/2″
Depth : 7/8″
Weight. . . . . Main unit : 3.9 lbs.
Speaker unit : 1.5 lbs
Microphone unit : 0.3 lbs.

Pocket size Remote Control Microphone Unit
- Microphone : Dynamic microphone (500 ohm)
- Off-Volume control
- Squelch control
- Press-to-talk switch
- Channel selection switch : UP and DOWN type
- Emergency channel (CH-9) priority switch, with flashing the channel indicator.
- ANL (Automatic Noise Limiter) switch
- Large scale LED channel indicator : 1-ch. ~ 40-ch.
- RX indicator : LED (green)
- TX indicator : LED (red)

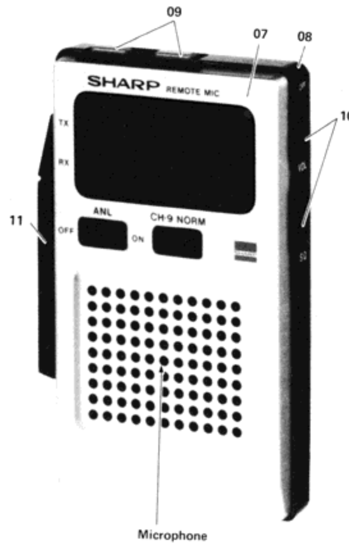
Specifications are subject to change without prior notice, within FCC rules and regulations.

PARTS LAYOUT

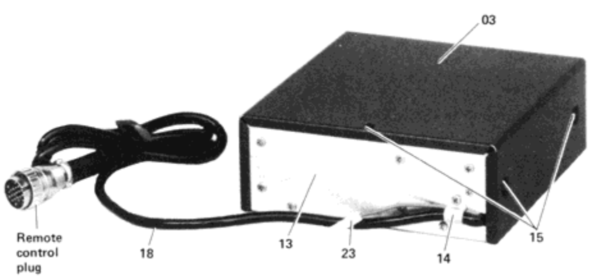
SPEAKER/SIGNAL-RF POWER METER UNIT



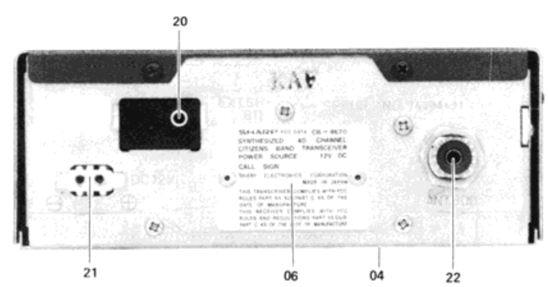
REMOTE MICROPHONE UNIT



MAIN UNIT (FRONT)



MAIN UNIT (REAR)



- 01 Cabinet, Speaker Side (GCABA1465AFSA)
- 02 Cabinet, Signal/RF Power Meter Side (GCABB1465AFSA)
- 03 Cabinet, Main Unit, Black (GCABA3464AFSA)
- 04 Cabinet, Main Unit, Silver (GCABB3464AFFW)
- 05 Emblem "SHARP" (HINDM1080AFSB)
- 06 Indication Plate, Spec. (HINDM1183AFZZ)
- 07 Cabinet, Front, Microphone Unit (HPNLH0008AAZZ)
- 08 Cabinet, Rear, Microphone Unit (HPNLH0010AAZZ)
- 09 Up and Down (Channel Selector Switch) Knob (JKNBZ0001AAZZ)
- 10 Off-On Switch/Volume Control Knob (JKNBZ0002AAZZ) Squelch Control Knob (JKNBZ0002AAZZ)
- 11 Press-to-Talk Switch Knob (JKNBZ0003AAZZ)
- 12 Mounting Bracket Assembly, Speaker Unit (LBRC-0053AFSA)
- 13 Chassis, Front, Main Unit (LCHSS0126AFFW)
- 14 Holder, Remote Control Cable and Memory Cord (LHLDW3057AFFW)
- 15 Screw, Cabinet, Main Unit (LX-BZ0237AFFB)
- 16 Moulding Screw, 5ϕ x 15 mm (LX-BZ0248AFZZ)
- 17 Nut, Remote Control Socket (24ϕ) (LX-NZ0123AFFN)
- 18 Remote Control Cable with Plug and Sockets Assembly (QCNW-0258AFZZ)
- 19 Microphone Cable with Sockets Assembly (QCNW-0255AFZZ)
- 20 Jack, External Speaker, J101 (QJAKA0052AFZZ)
- 21 Plug, Power Supply, PG601 (QSOCZ2454AFZZ)
- 22 Socket, Antenna (50 ohms), SO401 (QSOCZ2470AFZZ)
- 23 Memory Cord with Socket, SO701 (QCNW-0254AFZZ)
- 24 Meter, Signal/RF Power, ME801 (RMTRE0068AFZZ)

Figure 1 PARTS LAYOUT

GENERAL DESCRIPTION (Refer to Figure 3)

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 (R925), 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 2)

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 2.

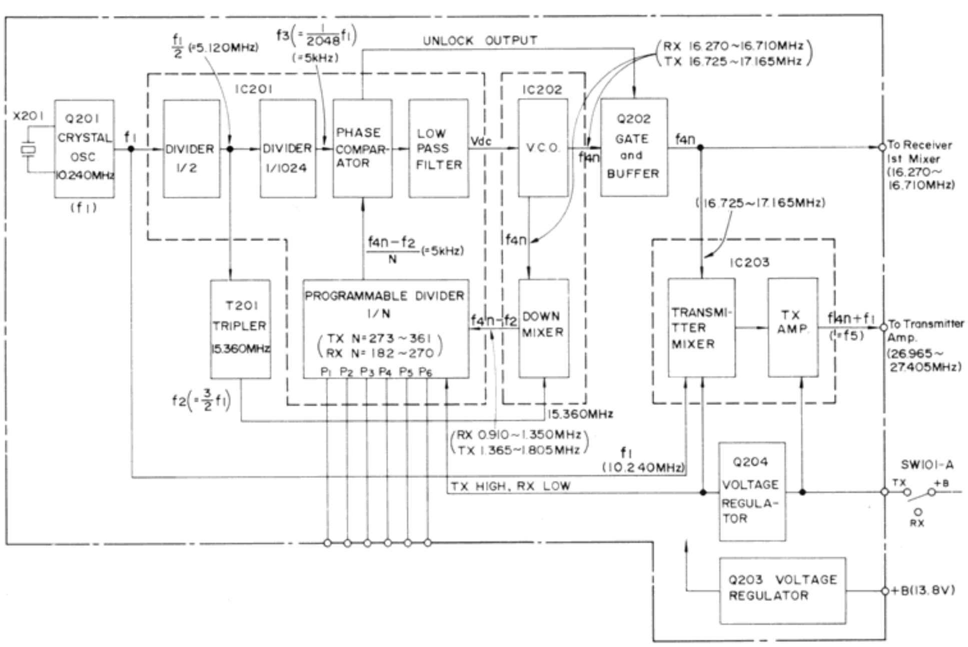


Figure 2 P.L.L. CIRCUIT FREQUENCY SYNTHESIZER

3) Frequency Determining (Refer to Figure 2 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}-f_2. This frequency signal f_{4n}-f_2 is applied to the programmable divider inside the IC201.

–5– The programmable divider (a portion of IC201) divides the frequency f_{4n}-f_2 by the frequency divider number N (Receiver 182 to 270, transmitter 273 to 361), which is programmable by the channel selector bit of IC901 connected to the terminal pins ⑪ to ⑯ of IC201. The assigned number is shown in Table 1. The output frequency (f_{4n}-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}-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}-f_2) /N goes higher then f_3 and moves upward when (f_{4n}-f_2) /N goes lower than f_3. When (f_{4n}-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 = 15.360MHz (=$3/2 \cdot f_1$)
f_3 = 5kHz (=$1/2048 \cdot f_1$)
N = 182 to 270 . . . . . Determined channel select bit of IC901 as shown in Table 1.

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

Namely "N= 182" is assigned for "channel 1". 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 = 15.360MHz
f_3 = 5kHz
N = 273 to 361 . . . . . Determined by channel select bit of IC901 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 x 0.005 + 15.360 (MHz)
= 16.725 (MHz)

Namely "N=273" is assigned for "channel 1".
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 = 10.240MHz
f_2 = 15.360MHz
f_3 = 5kHz
N = 273 to 361

For example, the frequency f_5 of "channel 1" is calculated as follows:

$$f_5 = 273 \times 0.005 + 15.360 + 10.240 \text{ (MHz)}$$
$$= 26.965 \text{ (MHz)}$$

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.

–10– The frequency divider number N of programmable divider is decided by the value set by either of the channel selector LSI (IC904). 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_5 (MHz)	f_1 (MHz)	f_2 (=3/2f_1) (MHz)	f_3 (=f_1/2048) (kHz)	RECEIVER						TRANSMITTER		
					N_R	f_4n (MHz)	f_4n-f_2 (kHz)	f_5-f_4n (=f_6) (MHz)	f_7 (MHz)	f_7-f_6 (=f_8) (kHz)	N_T	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	1190	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

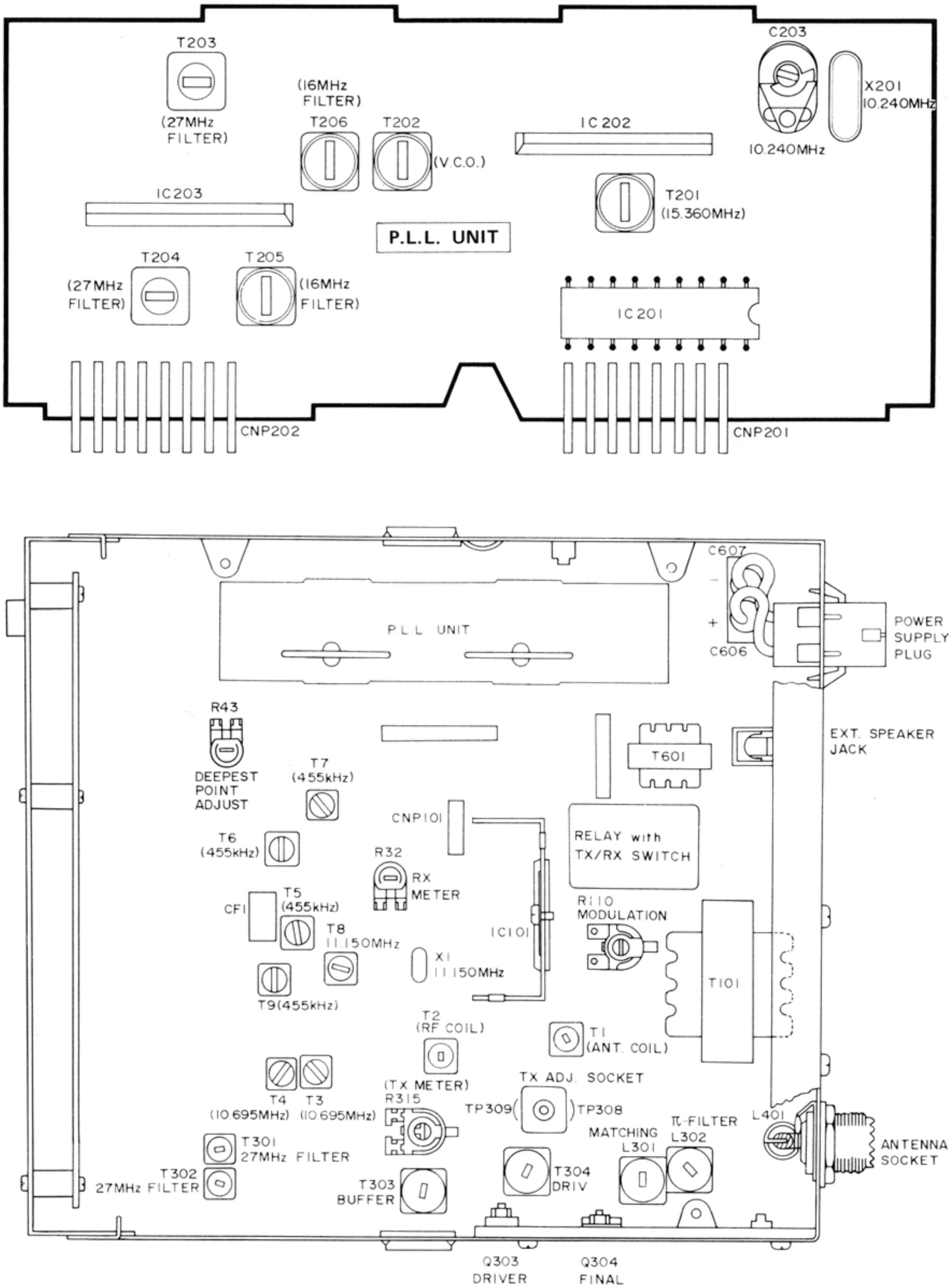


Figure 4 ALIGNMENT POINTS

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.

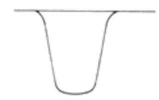
–3– Be sure to keep 50 ohms dummy load connectable with the antenna terminal all the way during the transmitter alignment.

–4– The main unit, speaker/S-RF meter unit and microphone unit must be, when operated together, considered an independent set.

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 to "1". 2) Adjust so that the D.C. V.T.V.M. reads exactly 2.0V. 3) Set the channel to "1" and/or "40" and make sure the D.C. V.T.V.M. reads within 2.0V to 4.3V.
	4 (16MHz Filter)	Connect an RF voltmeter to the test point [TP204]. (the secondary of the transformer T205).	T205 T206	1) Set the channel to "40". 2) Adjust so that the RF voltmeter reads the maximum. (about 400 mV ± 200 mV)
	5 (16 MHz Frequency)	Connect a frequency counter, through 5PF capacitor, to the test point [TP204] (the secondary of the transformer T205).	——	1) Set the channel to "1". 2) Make sure the frequency counter is reading 16.270 MHz (RX) and 16.725 MHz (TX). 3) Set the channel "40". 4) Make sure the frequency counter is reading 16.710 MHz (RX) and 17.165 MHz (TX).
TX	6 (27 MHz Filter)	Connect a RF voltmeter to the test point [TP205] (the secondary of the transformer T204).	T203 T204	1) Set the channel to "20". 2) Adjust so that the RF voltmeter reads the maximum. (about 2.5 V to 3.5 V)
TX	7 (27 MHz Frequency)	Connect a frequency counter, through 5PF capacitor, to the test point [TP205] (the secondary of the transformer T204).	——	1) Set the channel to "20". 2) Make sure the frequency counter is reading within 27.205 MHz ± 300 Hz.
	8 (27MHz Frequency Readjust)	Same as step 7.	C203	1) Set the channel to "20". 2) Readjust so that the frequency counter reads 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	Adjust so that the frequency counter reads within 11.150 MHz ± 100 Hz. (The oscillation voltage then is about 90mV)
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 antenna socket.	T3 T4 T5 T6 T7 T9	Adjust so that the AC V.T.V.M. reads the maximum.  IF waveform can be said to be best adjusted when it becomes maximum in size and its band width is the widest with the central frequency similar to that of the ceramic filter.
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 antenna socket. 3) Set the signal generator to 27.175 MHz (18 channel), modulation 1000 Hz, 30%.	T2 T1	1) Set the channel to "18". 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 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.	R43 (30K ohms –B)	1) Adjust the channel indication of the unit to "18" and set the volume control to "MAX" position. 2) Set the output level of a signal generator to "60 dB" (1000 Hz, 30%). At the time make sure the low-frequency wattmeter reads approx. 4W (maximum). 3) Next, adjust the volume control so that the low-frequency wattmeter indicates 500 mW. 4) Rotate the squelch control knob of the unit fully clockwise. 5) Adjust the semi-fixed resistor R43 so that the low-frequency output becomes 0.05W.

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 5.

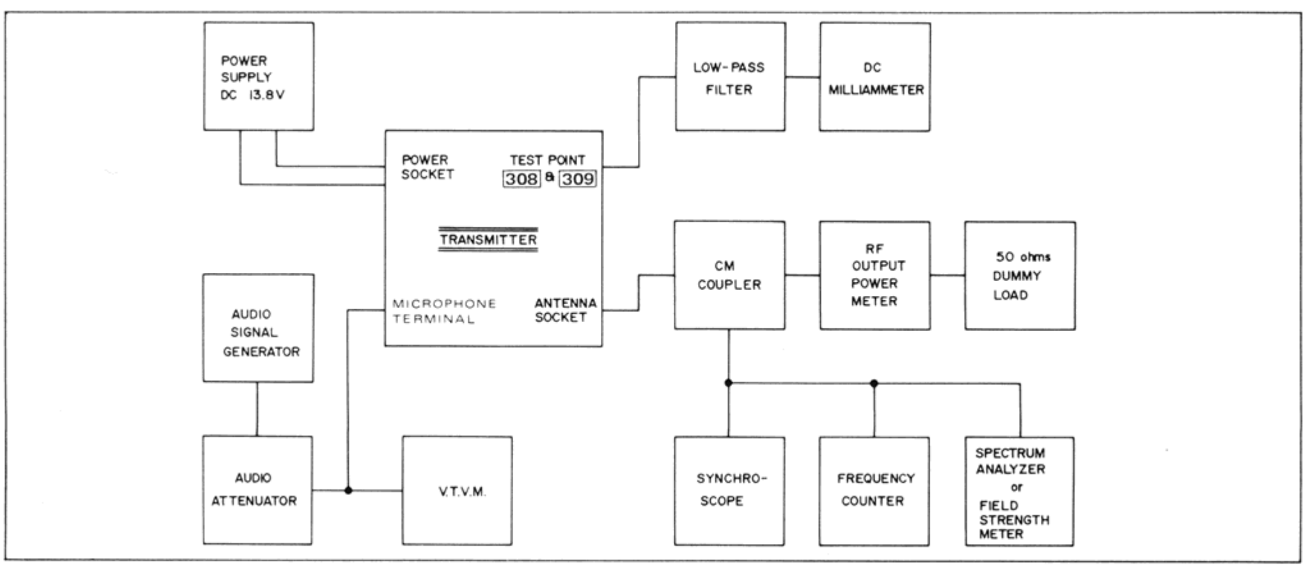


Figure 5

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 to "40". 2) Adjust so that the maximum waveform (amplitude) appears on the synchroscope. 3) Set the channel to "1" and/or "40" to make sure the waveform doesn't decrease in size. 4) Loosen the core of T301 by 2 turns from a peak point where the output is maximum.
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 6, to the test points [TP308] and [TP309].	T303	1) Set the channel to "40". 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 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 (Modulation)	1) Connect the RF output power meter, 50 ohms dummy load and synchroscope, through CM coupler, to the antenna socket. 2) Connect a audio signal generator, attenuater and AC V.T.V.M. to the microphone terminal. 3) Keep the output of audio signal generator to 1000 Hz, 700mV.	R110 (1K ohms –B)	1) Set the channel to "20". 2) Turn R110 counterclockwise until the modulation limiter circuit stops its function. 3) Make sure there appears 700mV input signal at the microphone terminal from an audio signal generator. 4) Depress the press-to-talk switch on the microphone. 5) Adjust R110 so that the modulation factor of RF output waveform appeared on the synchroscope becomes 95 to 99% (See Figure 7). 6) Set the attenuator to "–41dB" (6 mV). 7) Make sure the modulation factor of RF output waveform on a synchroscope is more than 50%.

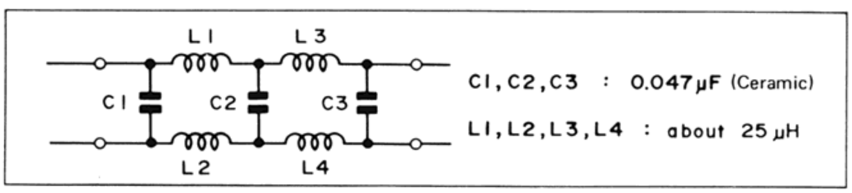
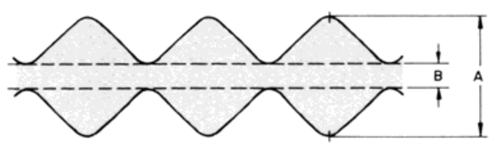


Figure 6 RF REJECTION FILTER (LOW-PASS FILTER)

SIGNAL/RF POWER METER ADJUSTMENT

STEP	CONNECTION OF MEASURING INSTRUMENT	ADJUST-MENT	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 to "18". 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 to "20" 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.)
3 (Meter)	Same as step 1 (when replacing the speaker box or meter with a new one).	R807	In the same manner as in step 1, adjust the semi-fixed resistor R807 and concurrently make sure that the requirement in step 2 is also satisfactory.



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

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

Figure 7

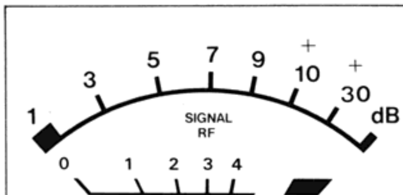


Figure 8 SIGNAL/RF POWER METER (ME801)

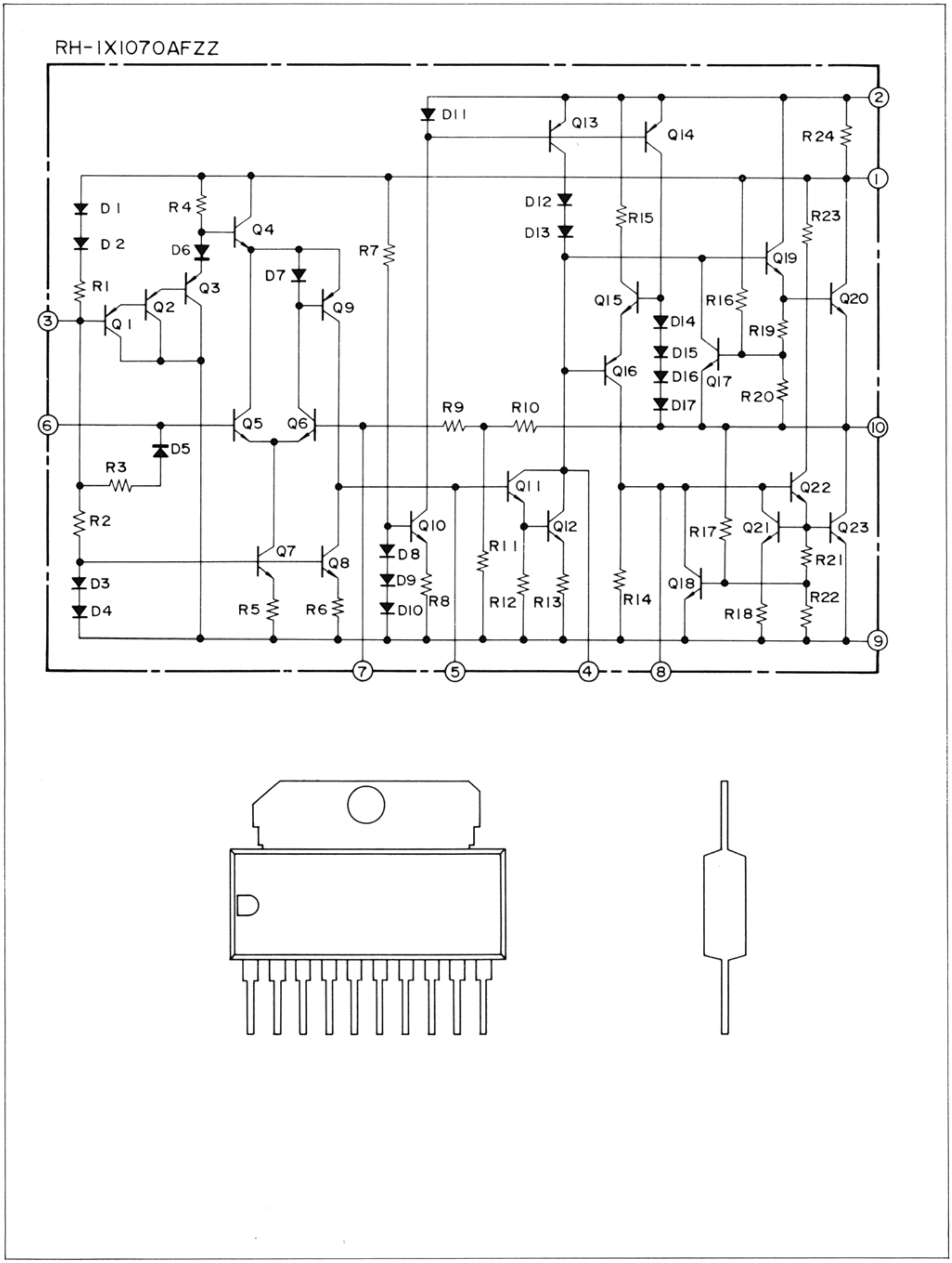


Figure 9 EQUIVALENT CIRCUIT OF IC101

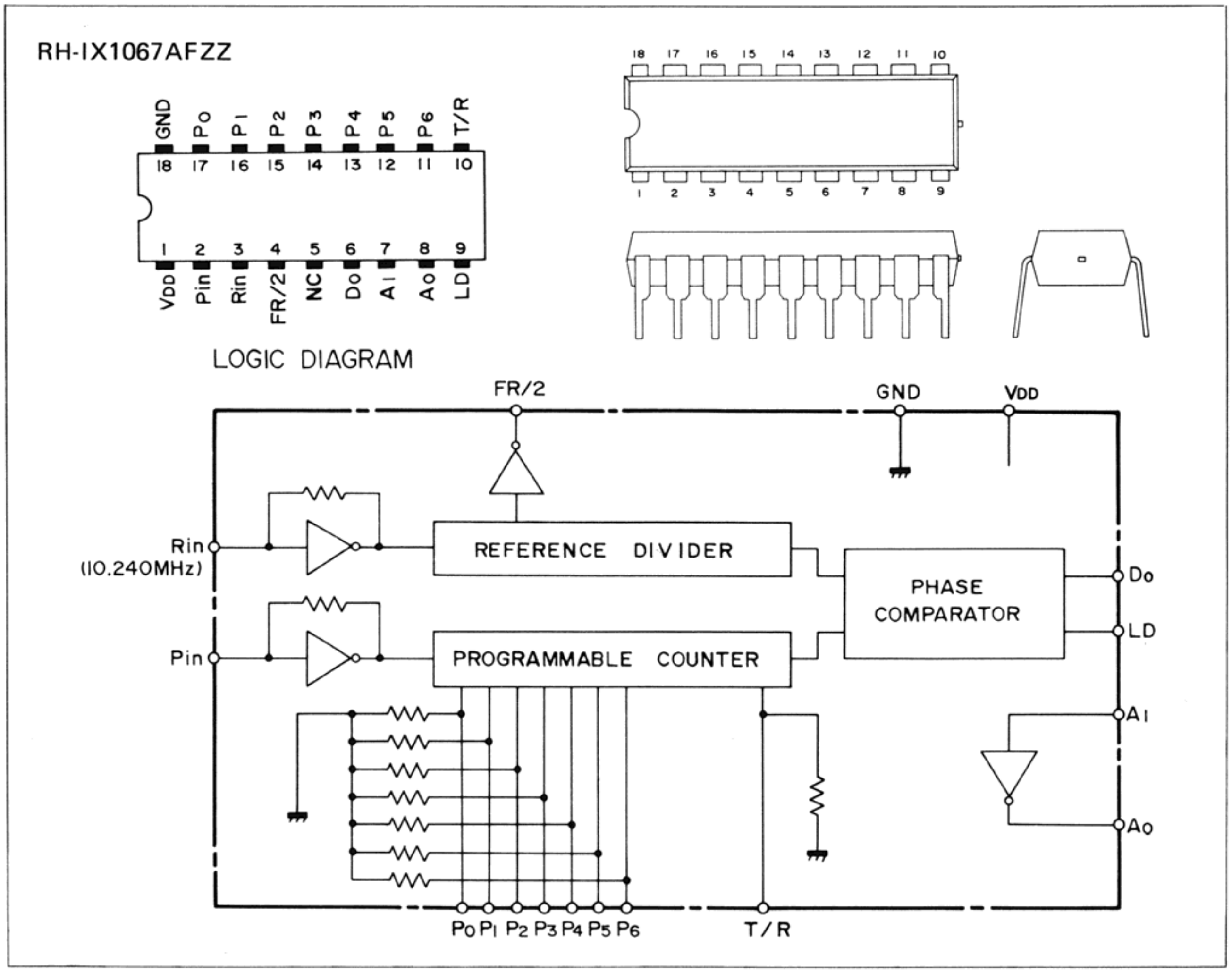


Figure 10 EQUIVALENT CIRCUIT OF IC201

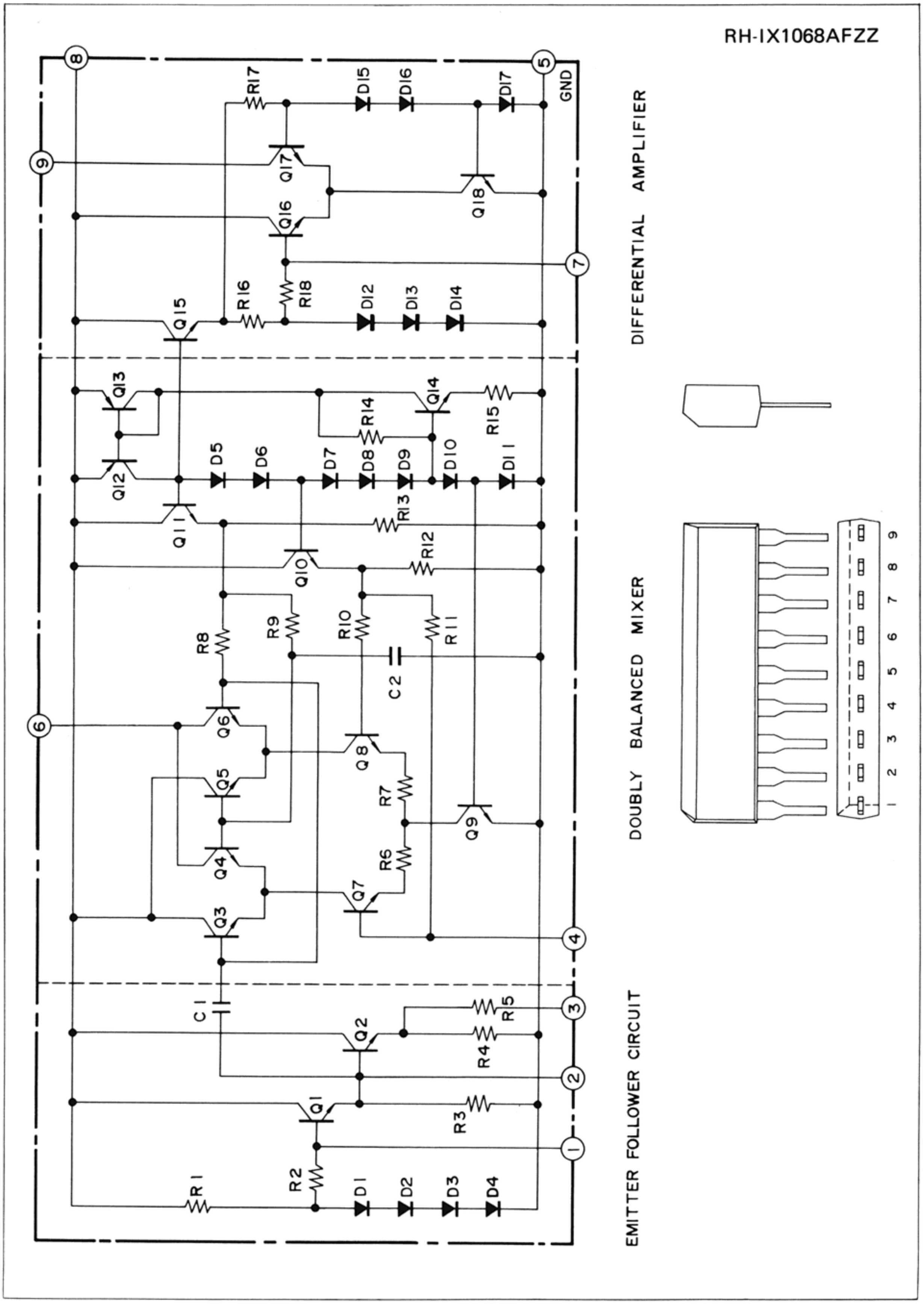
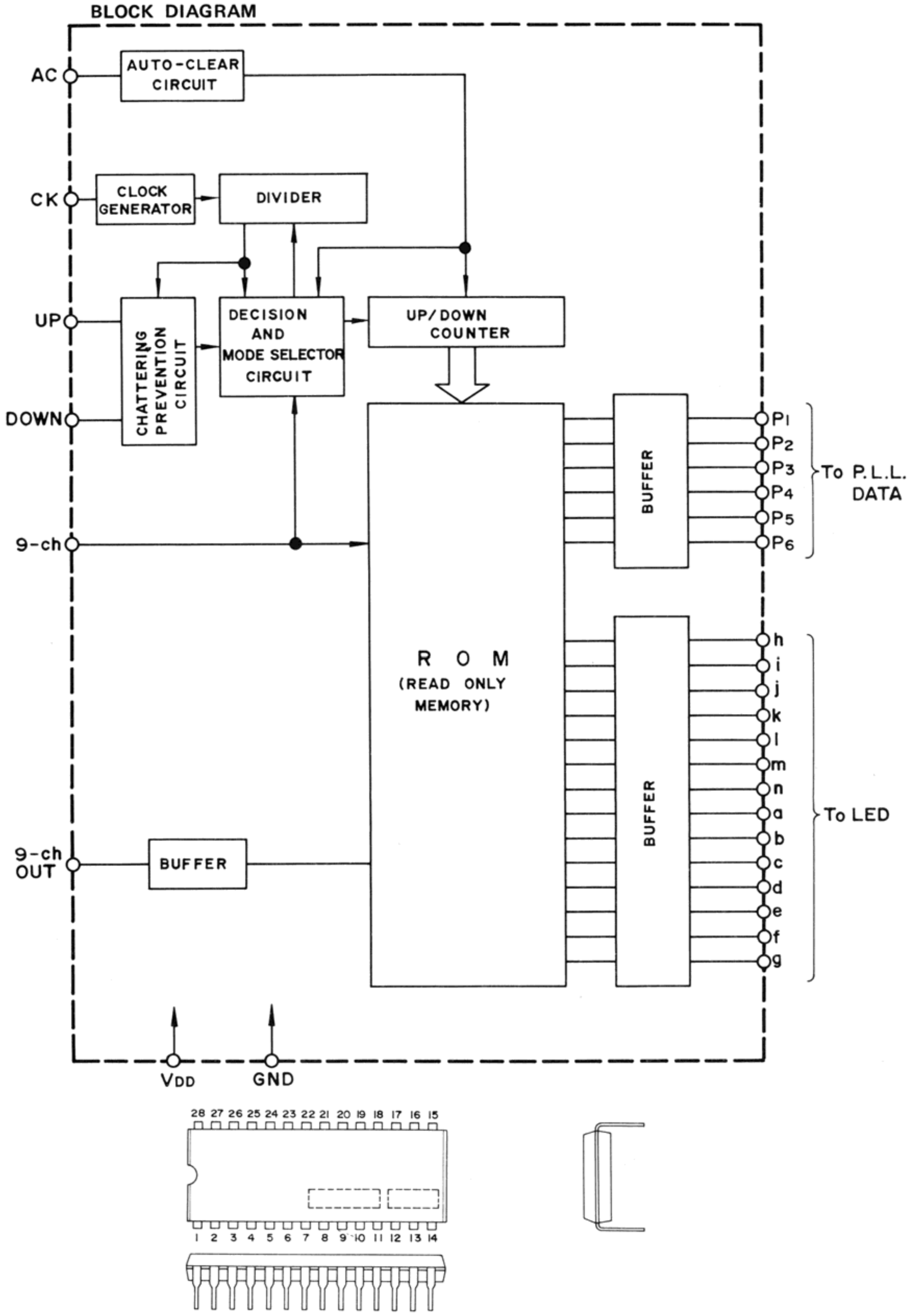


Figure 11 EQUIVALENT CIRCUIT OF IC202 and IC203



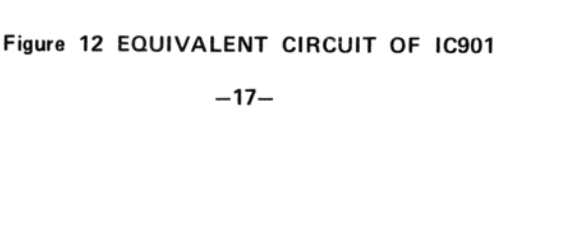
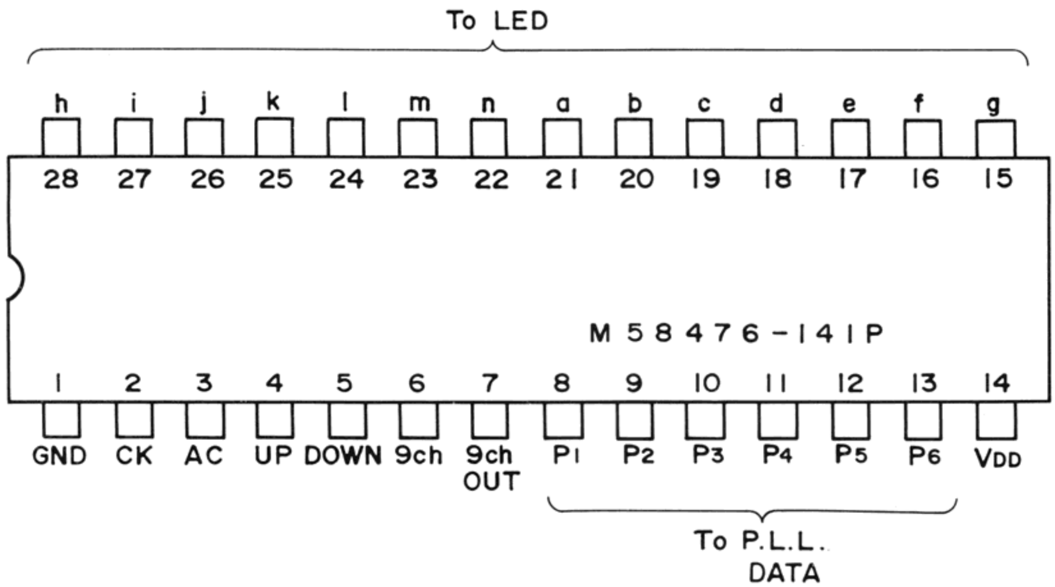


Figure 12 EQUIVALENT CIRCUIT OF IC901



C-MOS IC USED IN THE CHANNEL SELECTOR

1. OUTLINE

This C-MOS IC is the IC which is coupled directly with the C-MOS IC employed for the P.L.L. system digital frequency synthesizer and one chip of it includes a 6-bit up-down counter and ROM etc. At the output stage are produced 6-bit data output which allows a direct connection of this IC with the C-MOS IC for the P.L.L. system synthesizer, and 2-digit segment output which can drive directly the LED into action.

2. FUNCTIONS

(1) Auto-Clear Circuit

A connection of capacitor to the terminal AC permits the unit to automatically indicate 9-channel when the power switch is turned on, and if the terminal AC is forced to get low level, the present channel whichever it may be is changed to 9-channel.

(2) Clock generator

With resistor and capacitor being connected to the terminal CK, the clock generator is to provide oscillation of 256Hz (in which, R=510K ohm, C=0.01μF) but the clock generation is left in a stop except when it becomes needed for the succeeding circuits.

(3) Forward Advance of the Channels

At the terminal "Up" for the channel selector's input is included the pull-up resistor which maintains high level when it is kept open. When the terminal "Up" is made to get low level from high level (or, the open condition) the present channel moves forward by 1 channel --- if the terminal "Up" is maintained at low level for more than a particular interval (1 second) the channel indication advances forward at the rate of 4 channels per second.

(4) Backward Advance of the Channels

At the terminal "Down" for the channel selector's input is included the pull-up resistor which maintains high level when it is kept open. When the terminal "Down" is made to get low level from high level (or, the open condition), the present channel moves backward by 1 channel --- if the terminal "Down" is maintained at the low level for more than a particular interval (1 second) the channel indication advances backward at the rate of 4 channels per second. Note that when the terminals "Up" and "Down" are made to get low level at a time, the function peculiar to the former (Up) is given priority.

(5) Chattering Preventive Circuit

At the input terminals "Up" and "Down" is incorporated a circuit that is to prevent a chattering within 16 ms.

(6) Function of Priority-Given Channel (9-ch.)

When the terminal 9-ch. is made to get low level, the 9-channel is given priority to be selected rather than the other channels and when it is, then, made to go high level or open, the preset channel resumes. Besides, as long as the terminal 9-ch. is maintained at low level, it is inhibited for the channels to advance either forward or backward.

(7) P.L.L. Data Output

The output terminals P_1 to P_6 may be connectable with the data input terminals of the P.L.L. system's C-MOS IC, and what the output data will be is determined by the ROM.

(8) Channel Display Output

The outputs from the terminals ⓐ to ⓝ enable directly the LED to be driven.

Note:
The channel selector "Up and Down" do not operate when the channel 9 switch is locked into channel 9 position, or if you are operating in the transmit (TX) mode.

TRUTH TABLE FOR A RELATIONSHIP BETWEEN THE CHANNEL NUMBERS AND P.L.L. DATA OUTPUTS AND CHANNEL DISPLAY OUTPUTS

CHANNEL	P.L.L. DATA OUTPUT						CHANNEL DISPLAY OUTPUT														9-CH. OUT ⑦
	P1(⑧)	P2(⑨)	P3(⑩)	P4(⑪)	P5(⑫)	P6(⑬)	㉘	㉗	㉖	㉕	㉔	㉓	㉒	㉑	⑳	⑲	⑱	⑰	⑯	⑮	
	s	t	u	v	w	x	h	i	j	k	l	m	n	a	b	c	d	e	f	g	
1	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	1	1	1	1	0
2	1	0	0	0	0	0	1	1	1	1	1	1	1	0	0	1	0	0	1	0	0
3	0	1	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	1	1	0	0
4	0	0	1	0	0	0	1	1	1	1	1	1	1	1	0	0	1	1	0	0	0
5	1	0	1	0	0	0	1	1	1	1	1	1	1	0	1	0	0	1	0	0	0
6	0	1	1	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
7	1	1	1	0	0	0	1	1	1	1	1	1	1	0	0	0	1	1	1	1	0
8	1	0	0	1	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
9	0	1	0	1	0	0	1	1	1	1	1	1	1	0	0	0	1	1	0	0	1
10	1	1	0	1	0	0	1	0	0	1	1	1	1	0	0	0	0	0	0	1	0
11	0	0	1	1	0	0	1	0	0	1	1	1	1	1	0	0	1	1	1	1	0
12	0	1	1	1	0	0	1	0	0	1	1	1	1	0	0	1	0	0	1	0	0
13	1	1	1	1	0	0	1	0	0	1	1	1	1	0	0	0	0	1	1	0	0
14	0	0	0	0	1	0	1	0	0	1	1	1	1	1	0	0	1	1	0	0	0
15	1	0	0	0	1	0	1	0	0	1	1	1	1	0	1	0	0	1	0	0	0
16	1	1	0	0	1	0	1	0	0	1	1	1	1	1	1	0	0	0	0	0	0
17	0	0	1	0	1	0	1	0	0	1	1	1	1	0	0	0	1	1	1	1	0
18	1	0	1	0	1	0	1	0	0	1	1	1	1	0	0	0	0	0	0	0	0
19	0	1	1	0	1	0	1	0	0	1	1	1	1	0	0	0	1	1	0	0	0
20	0	0	0	1	1	0	0	0	1	0	0	1	0	0	0	0	0	0	0	1	0
21	1	0	0	1	1	0	0	0	1	0	0	1	0	1	0	0	1	1	1	1	0
22	0	1	0	1	1	0	0	0	1	0	0	1	0	0	0	1	0	0	1	0	0
23	1	0	1	1	1	0	0	0	1	0	0	1	0	0	0	0	0	1	1	0	0
24	1	1	0	1	1	0	0	0	1	0	0	1	0	1	0	0	1	1	0	0	0
25	0	0	1	1	1	0	0	0	1	0	0	1	0	0	1	0	0	1	0	0	0
26	0	1	1	1	1	0	0	0	1	0	0	1	0	1	1	0	0	0	0	0	0
27	1	1	1	1	1	0	0	0	1	0	0	1	0	0	0	0	1	1	1	1	0
28	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0
29	1	0	0	0	0	1	0	0	1	0	0	1	0	0	0	0	1	1	0	0	0
30	0	1	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0
31	1	1	0	0	0	1	0	0	0	0	1	1	0	1	0	0	1	1	1	1	0
32	0	0	1	0	0	1	0	0	0	0	1	1	0	0	0	1	0	0	1	0	0
33	1	0	1	0	0	1	0	0	0	0	1	1	0	0	0	0	0	1	1	0	0
34	0	1	1	0	0	1	0	0	0	0	1	1	0	1	0	0	1	1	0	0	0
35	1	1	1	0	0	1	0	0	0	0	1	1	0	0	1	0	0	1	0	0	0
36	0	0	0	1	0	1	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0
37	1	0	0	1	0	1	0	0	0	0	1	1	0	0	0	0	1	1	1	1	0
38	0	1	0	1	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
39	1	1	0	1	0	1	0	0	0	0	1	1	0	0	0	0	1	1	0	0	0
40	0	0	1	1	0	1	1	0	0	1	1	0	0	0	0	0	0	0	0	1	0

"1" : "H" level "0" : "L" level

Table 2

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.)

CONNECTORS JUNCTION DIAGRAM

(1) Junction of all the connections is as illustrated below. Check that there is no mis-wiring nor wire disconnection.

(2) For identification of the pin numbers of the connectors, see the Wiring Side of P.W. Board shown in both Figures 17 and 18.

(3) The main unit, speaker/S-RF power meter unit and microphone unit must be, when operated together, considered an independent set.

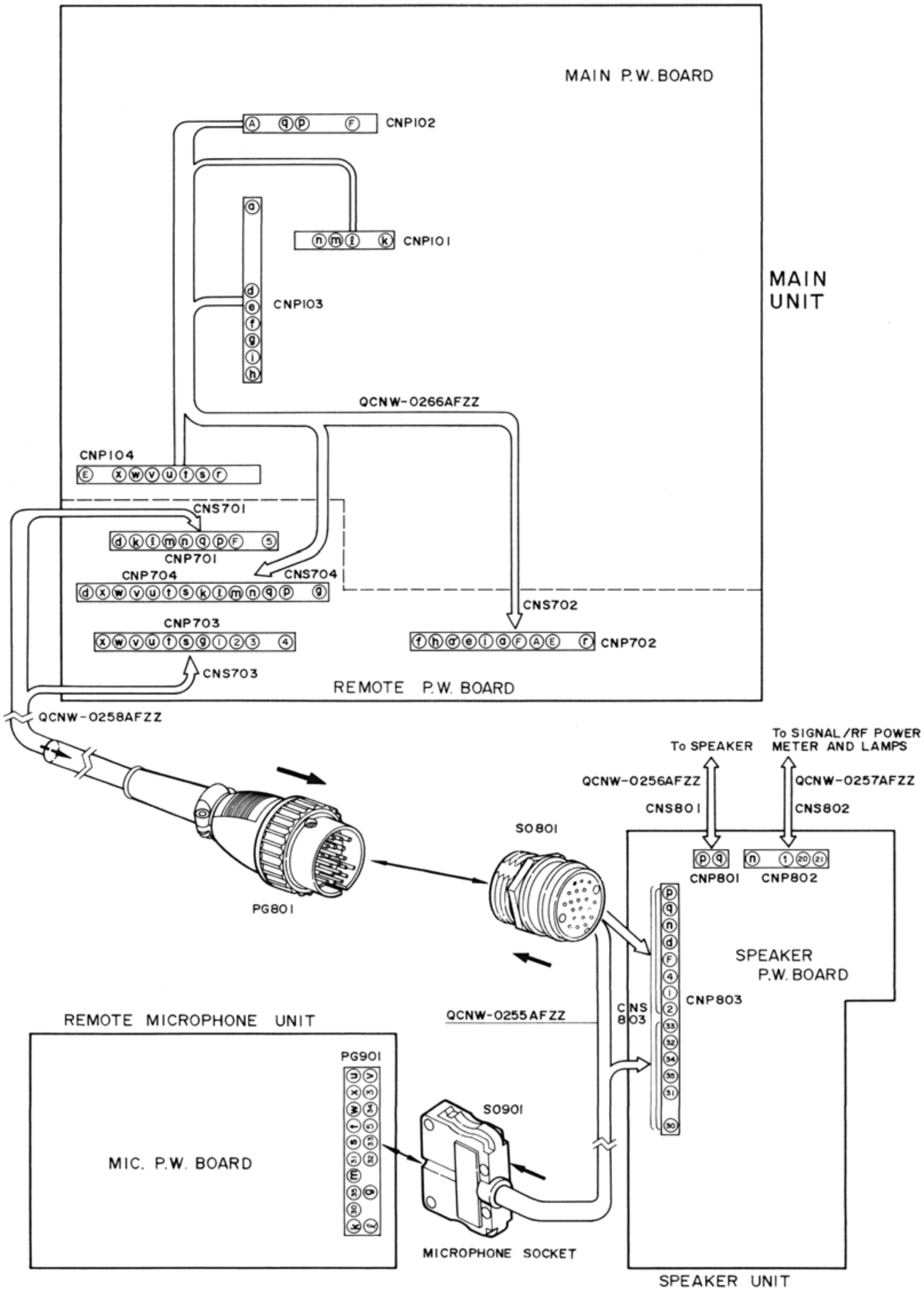
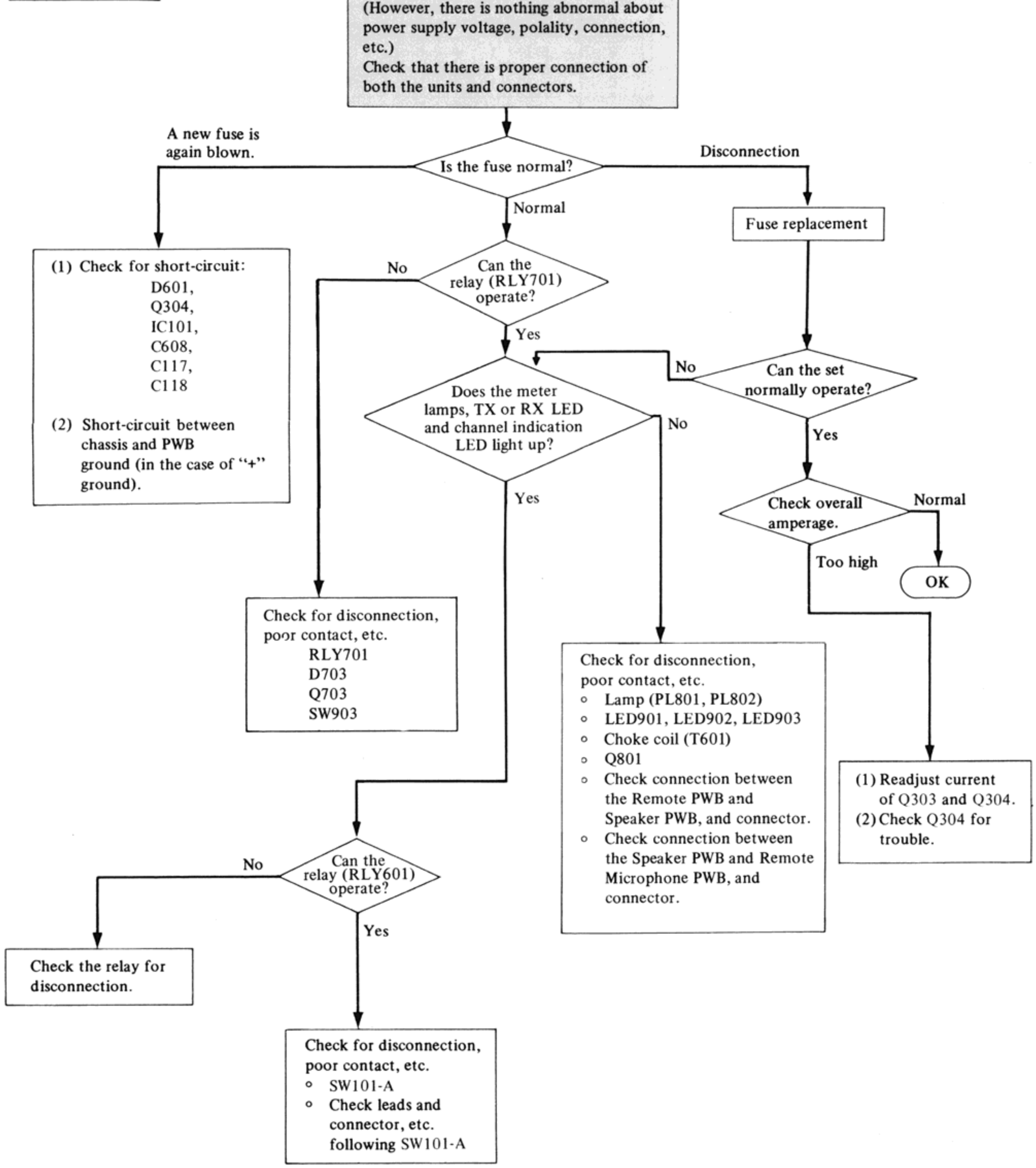


Figure 13

TROUBLE SHOOTING GUIDE

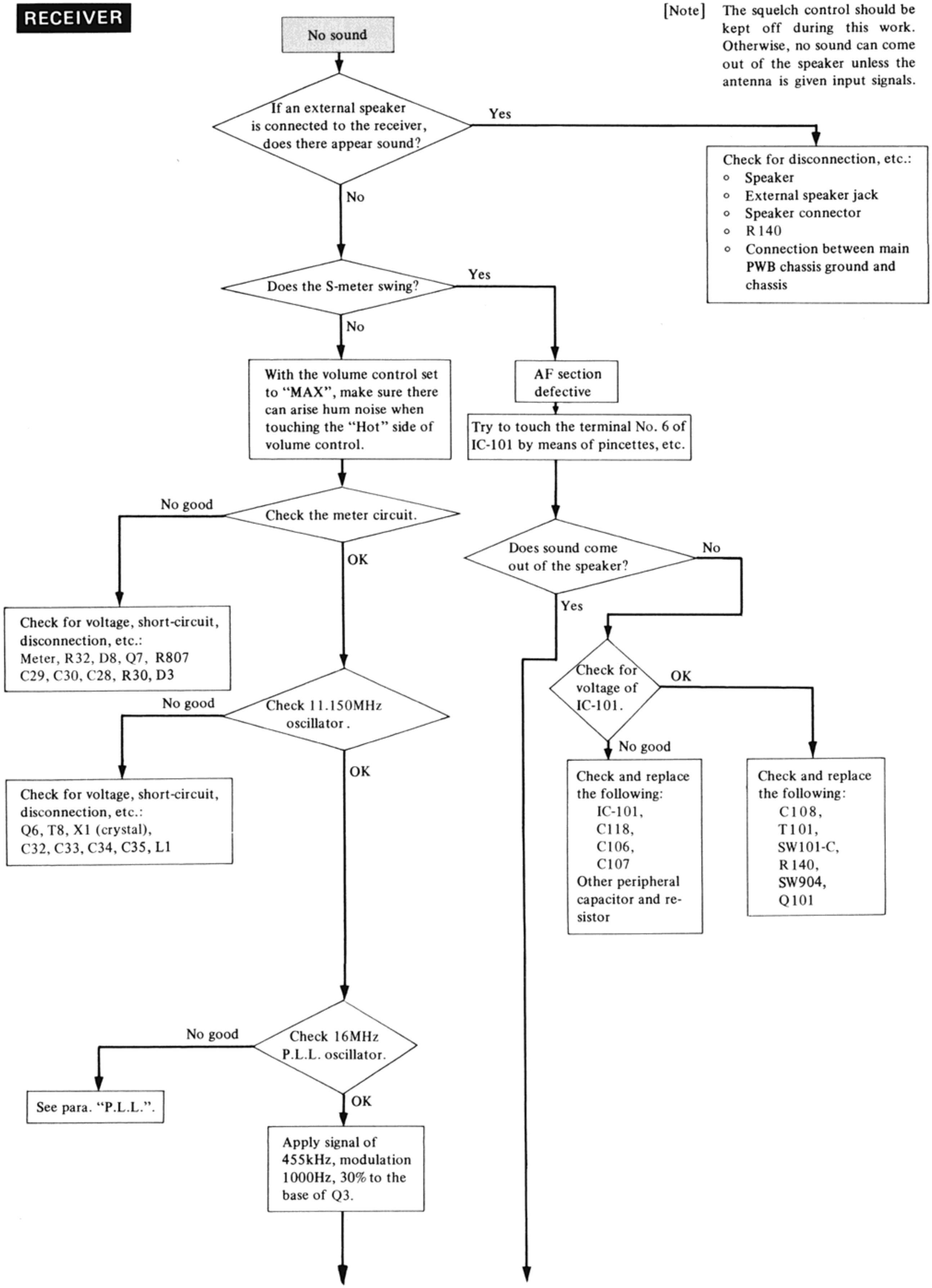
When you try to investigate the unit referring to the TROUBLE SHOOTING GUIDE, be sure, in advance, to check that there is no mis-wiring nor wire disconnection in reference with the CONNECTORS JUNCTION DIAGRAM of page 21.

ALL MODES

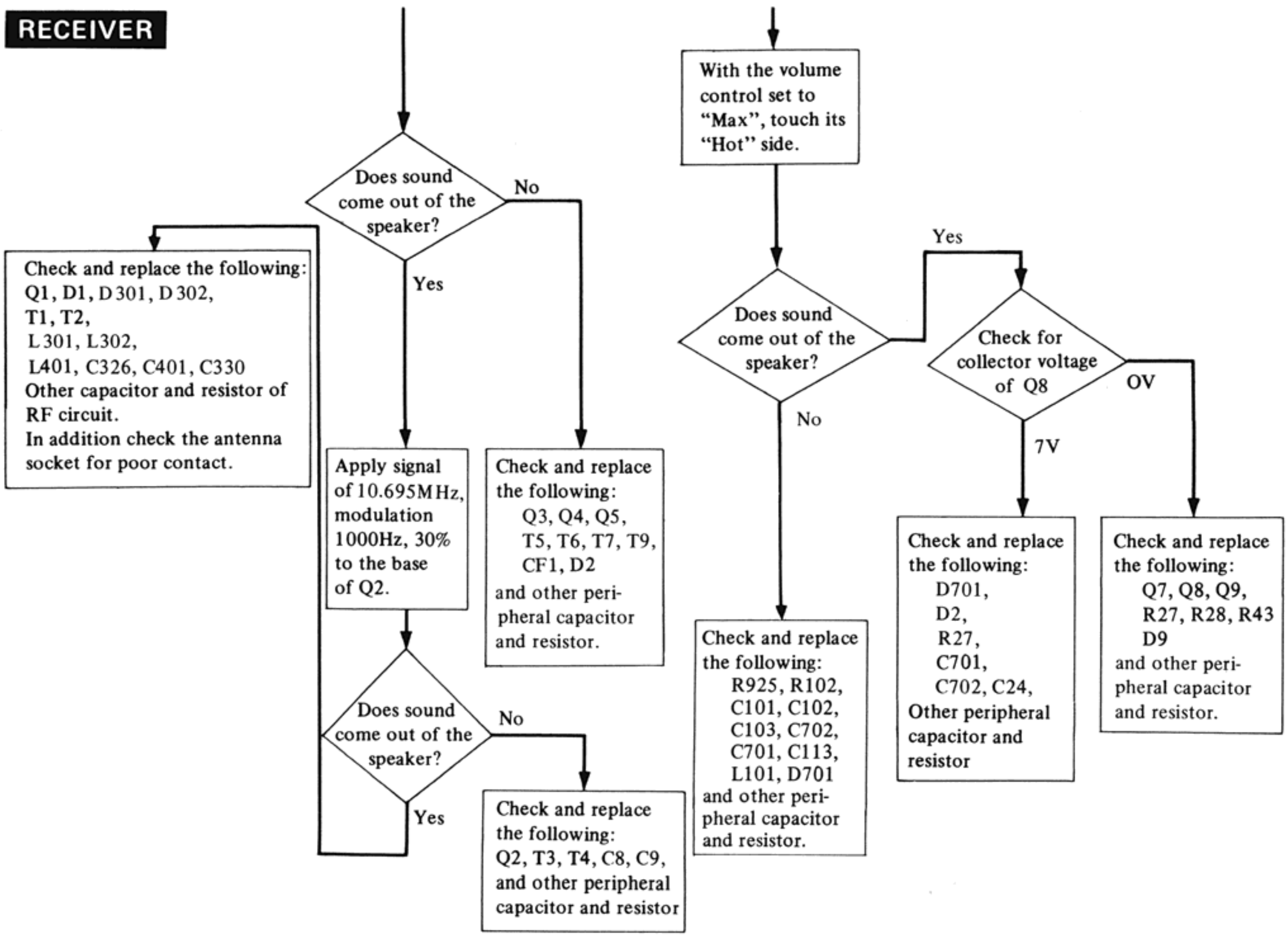


RECEIVER

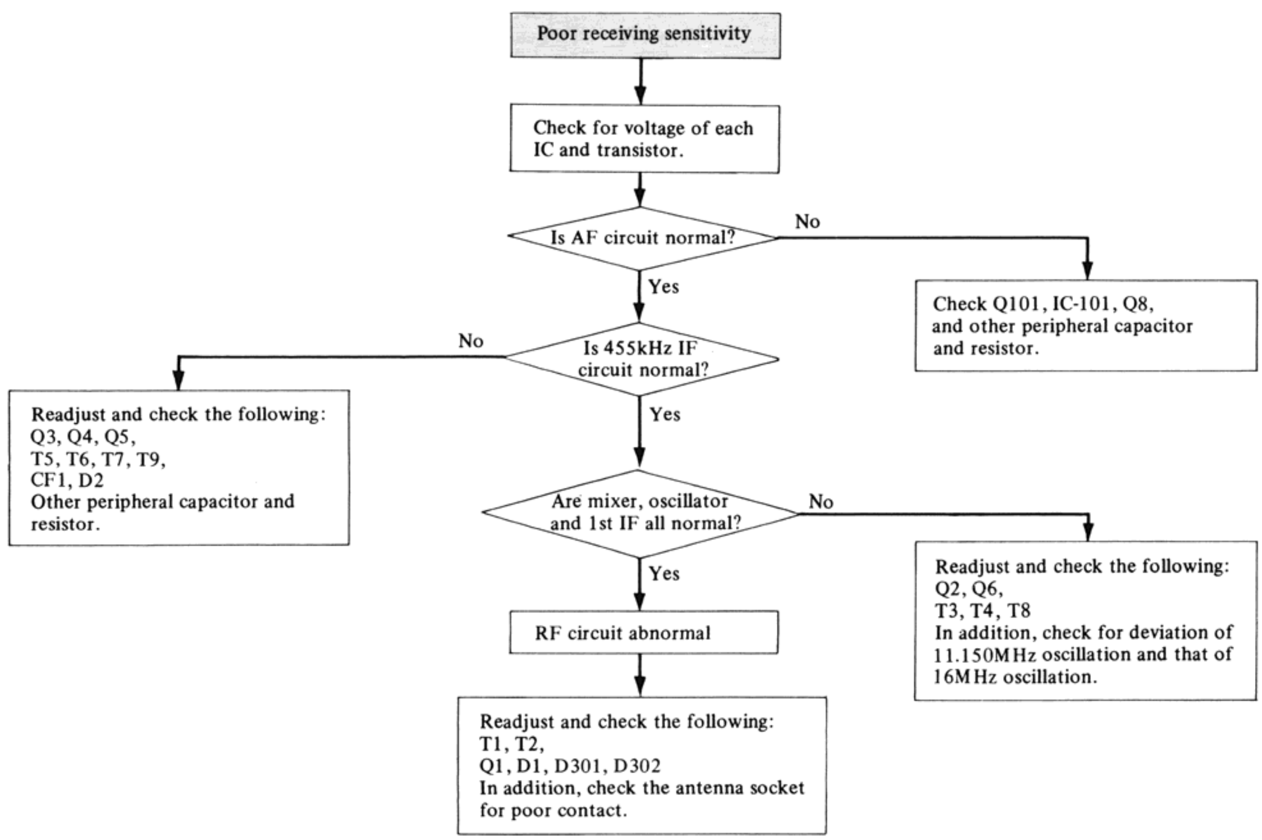
[Note] The squelch control should be kept off during this work. Otherwise, no sound can come out of the speaker unless the antenna is given input signals.



RECEIVER

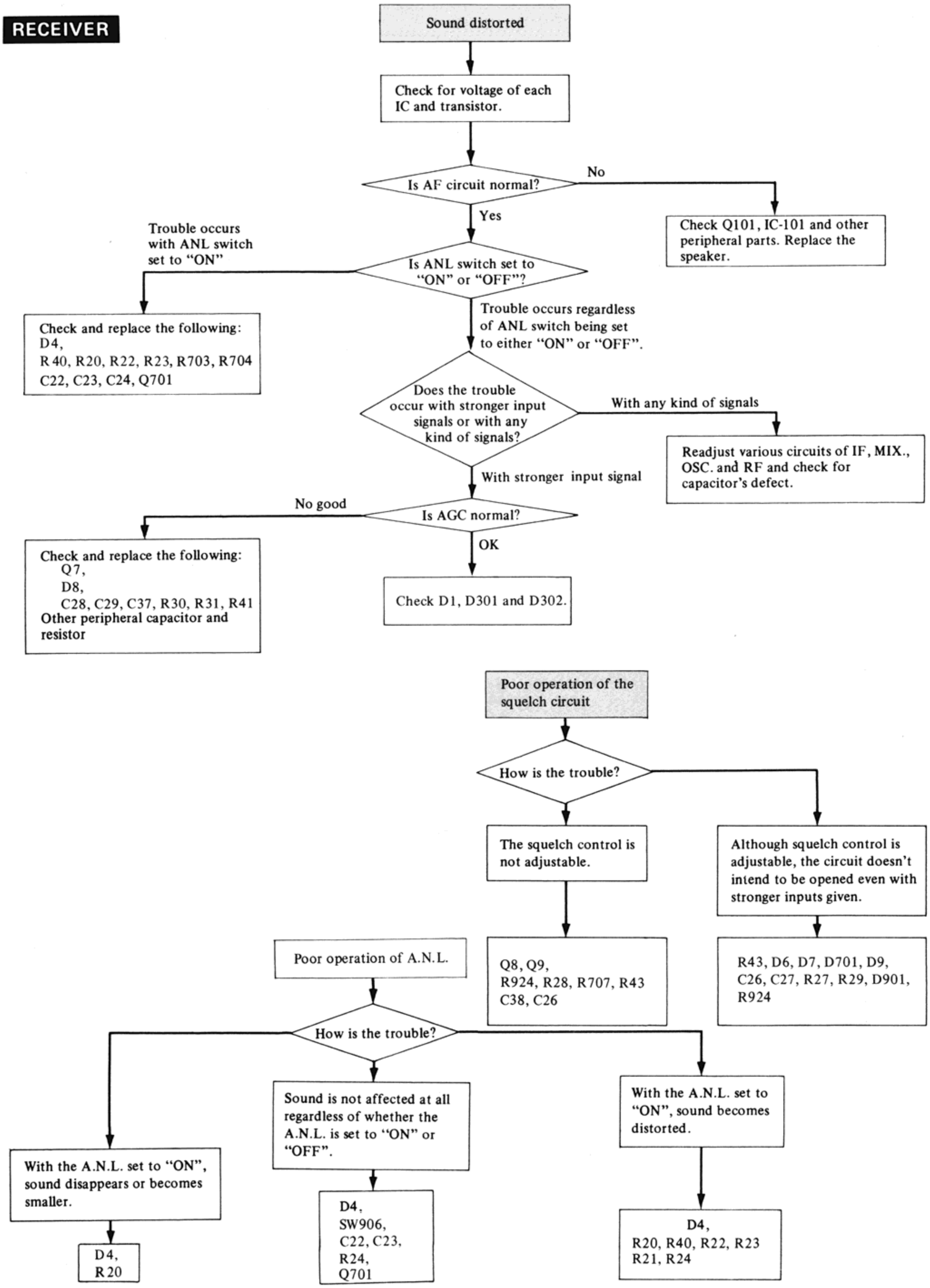


With the volume control set to "Max", touch its "Hot" side.
Does sound come out of the speaker?
No
Yes
Check and replace the following:
Q1, D1, D301, D302,
T1, T2,
L301, L302,
L401, C326, C401, C330
Other capacitor and resistor of RF circuit.
In addition check the antenna socket for poor contact.
Apply 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, D2
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
Does sound come out of the speaker?
Yes
No
Check for collector voltage of Q8
7V
OV
Check and replace the following:
R925, R102,
C101, C102,
C103, C702,
C701, C113,
L101, D701
and other peripheral capacitor and resistor.
Check and replace the following:
D701,
D2,
R27,
C701,
C702, C24,
Other peripheral capacitor and resistor
Check and replace the following:
Q7, Q8, Q9,
R27, R28, R43
D9
and other peripheral capacitor and resistor.

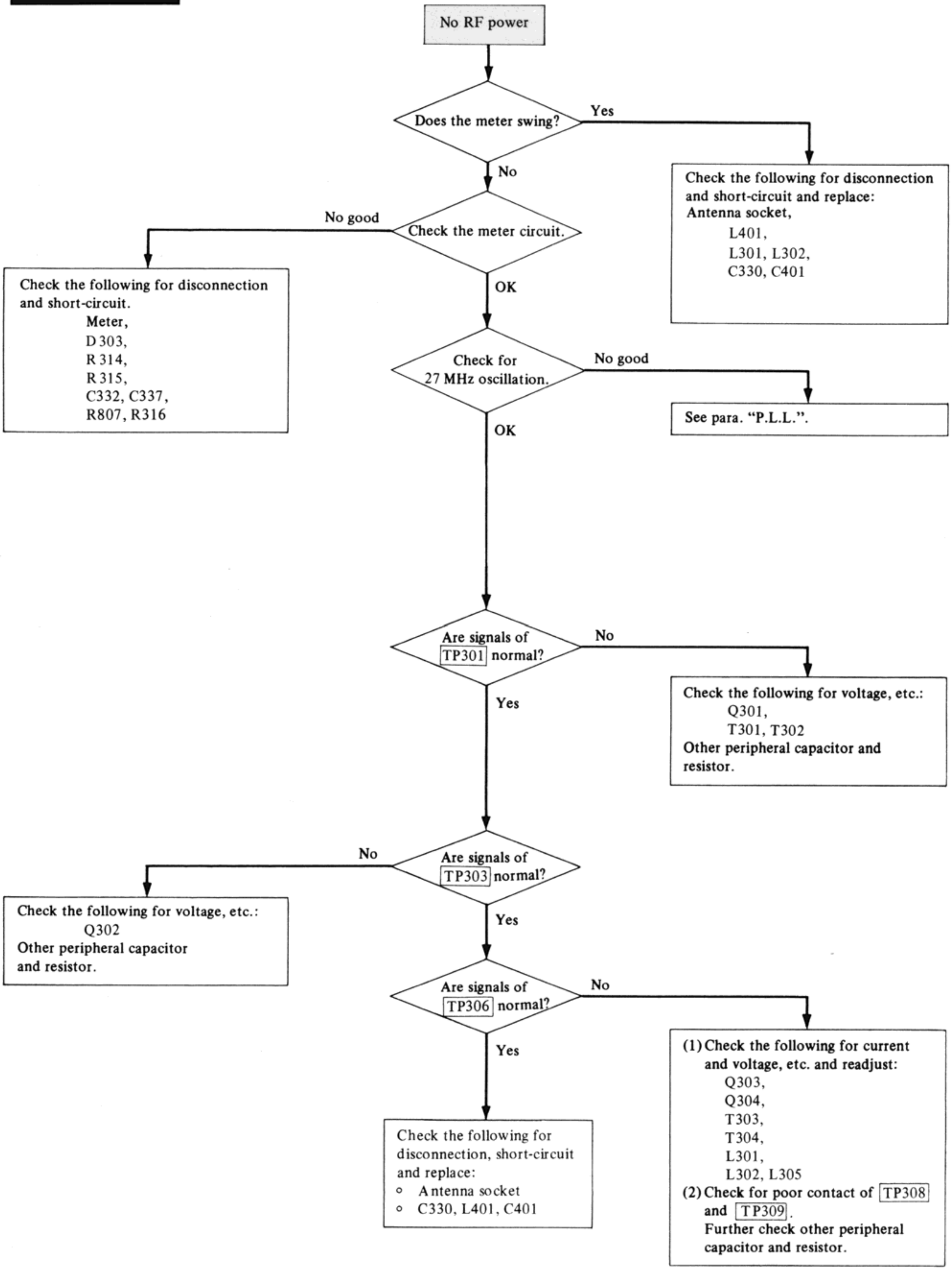


Poor receiving sensitivity
Check for voltage of each IC and transistor.
Is AF circuit normal?
No
Yes
Check Q101, IC-101, Q8, and other peripheral capacitor and resistor.
Is 455kHz IF circuit normal?
No
Yes
Readjust and check the following:
Q3, Q4, Q5,
T5, T6, T7, T9,
CF1, D2
Other peripheral capacitor 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, R 40, R20, R22, R23, R703, R704 C22, C23, C24, Q701
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.
Poor operation of the squelch circuit
How is the trouble?
The squelch control is not adjustable.
Q8, Q9, R924, R28, R707, R43 C38, C26
Although squelch control is adjustable, the circuit doesn't intend to be opened even with stronger inputs given.
R43, D6, D7, D701, D9, C26, C27, R27, R29, D901, R924
Poor operation of A.N.L.
How is the trouble?
With the A.N.L. set to "ON", sound disappears or becomes smaller.
D4, R 20
Sound is not affected at all regardless of whether the A.N.L. is set to "ON" or "OFF".
D4, SW906, C22, C23, R24, Q701
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)

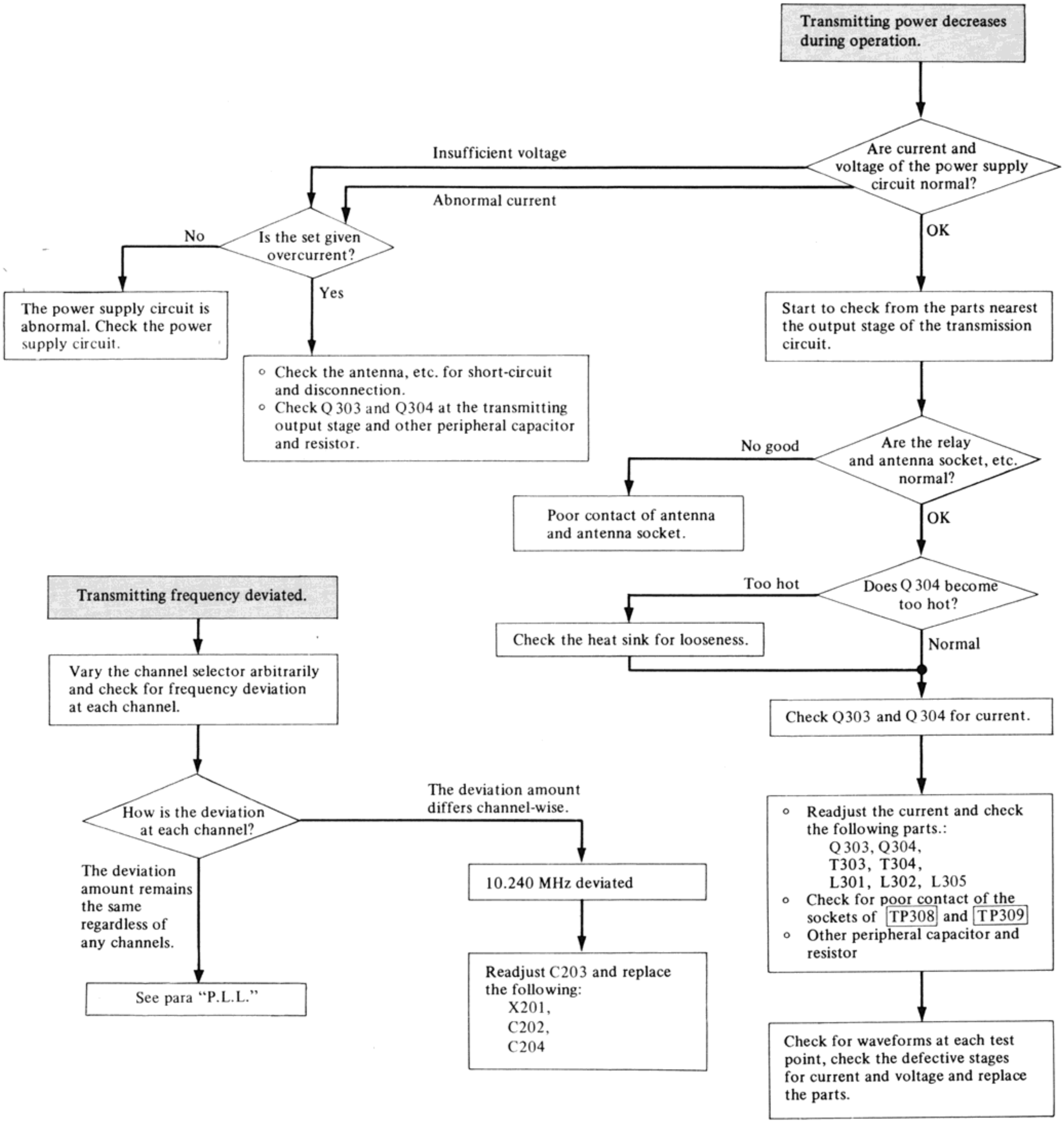
Does sound come out of the speaker during reception?

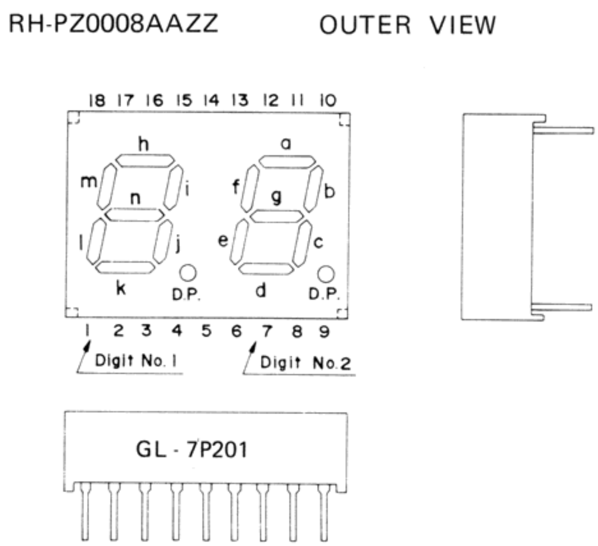
- No: See para. "AF Defective at Receiver".
- Yes: Disconnect the microphone and insert a testing microphone plug thereto, instead to make a test. Or use another microphone for the purpose.

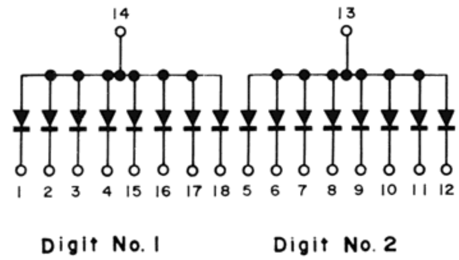
Is the modulation all right?

- 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
  - SW101-D
  - R102, L305
  - Modulation coil of T101.
  - SW904

TRANSMITTER







Terminals Connection Diagram

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

Figure 14 CHANNEL INDICATOR (LED901)

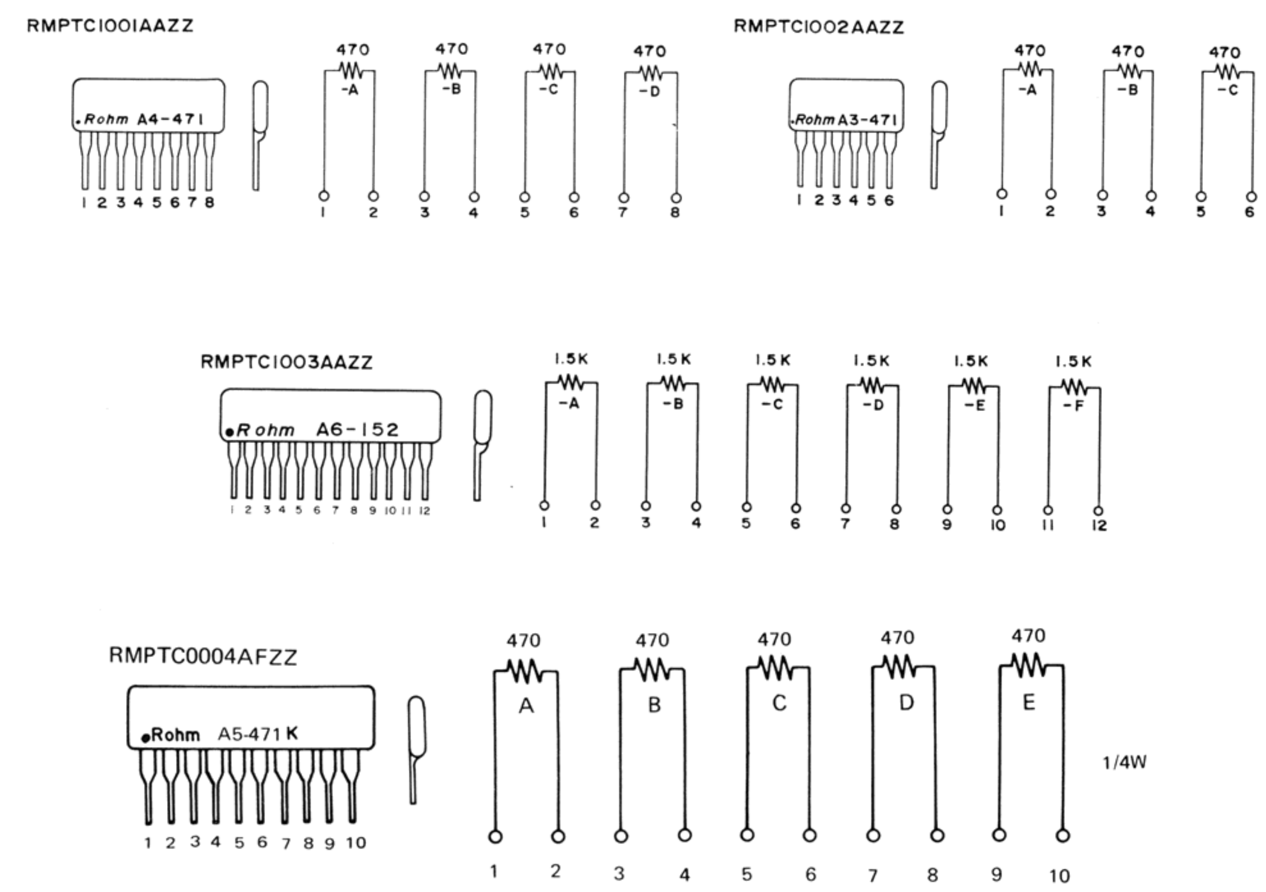


Figure 15 RESISTOR ARRAY

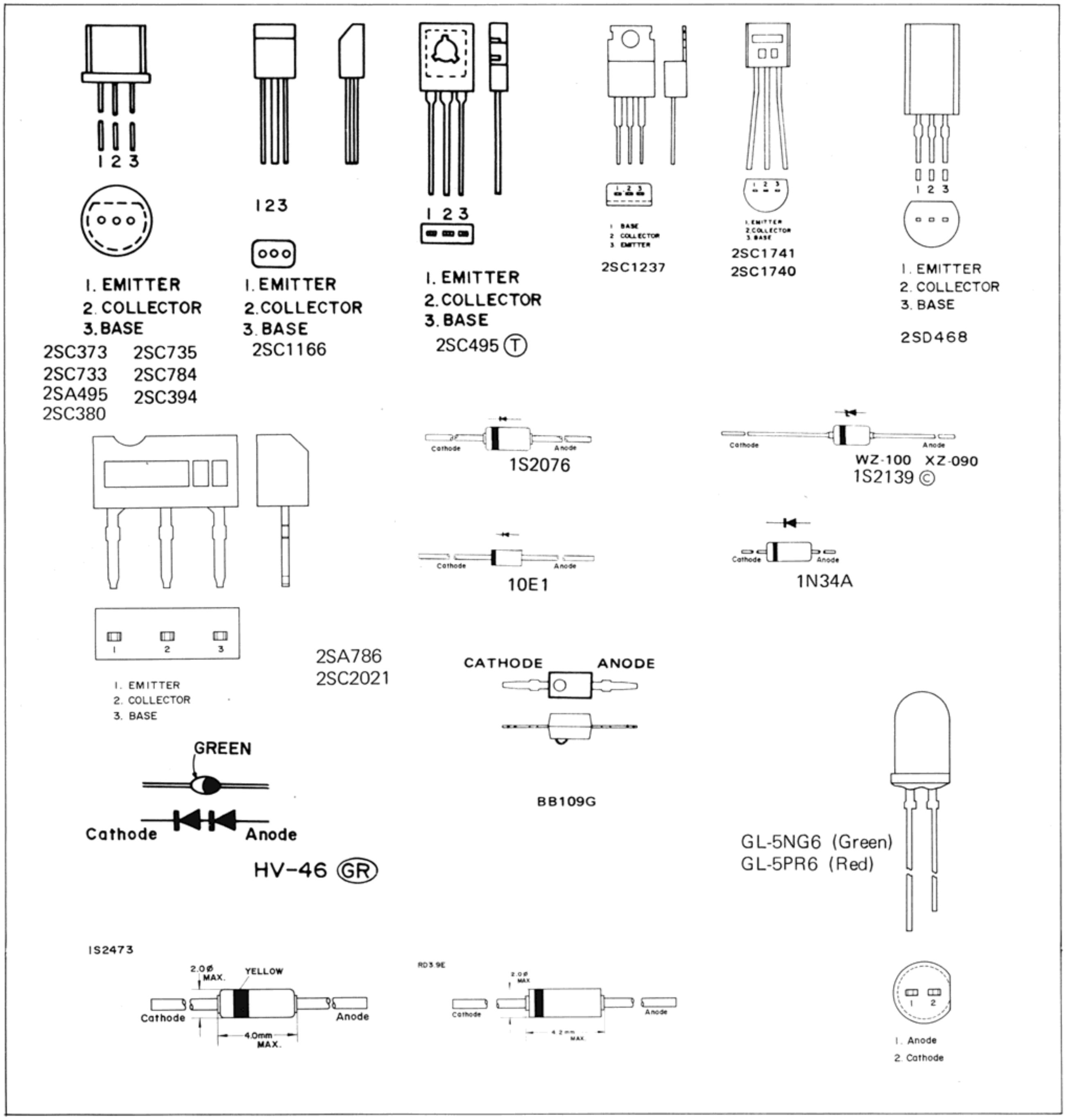


Figure 16 SEMICONDUCTORS BASING

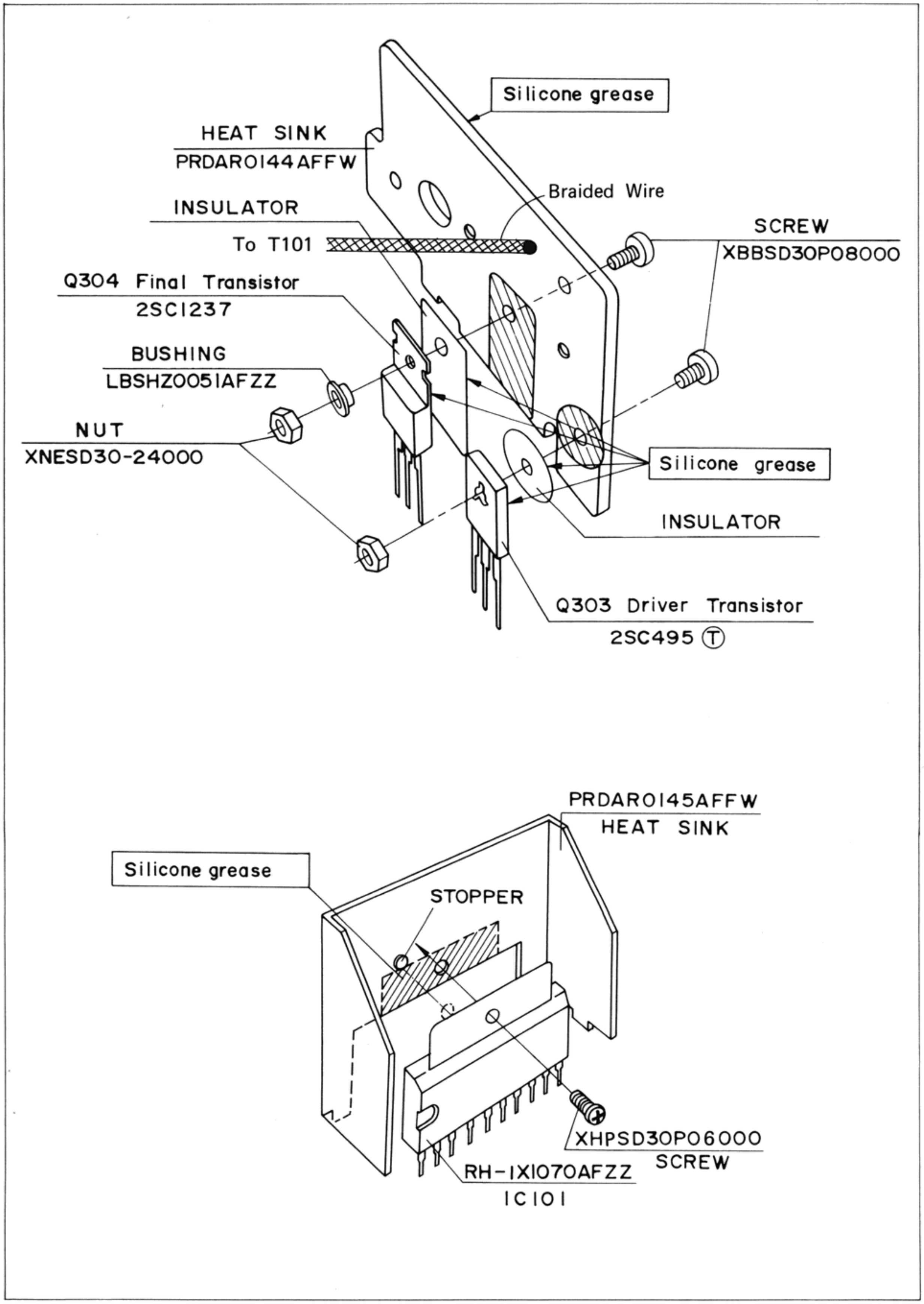


Figure 20 HOW TO SET THE TRANSISTORS AND IC

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

REF. NO.	PART NO.	DESCRIPTION
		INTEGRATED CIRCUITS
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)
IC901	RH-IX0017AAZZ	C-MOS IC, Channel Selector (M58476-141P)
		TRANSISTORS
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))
Q9	VS2SC1740Q/-1	Squelch Switching (2SC1740Ⓠ)
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)
Q701	VS2SA786///-1	ANL (Automatic Noise Limiter) Switching (2SA786)

REF. NO.	PART NO.	DESCRIPTION
Q702	VS2SC1741//-1	Voltage Regulator (2SC1741)
Q703	VS2SC1741//-1	Power Switching (2SC1741)
Q801	VS2SD468-C/-1	Channel Indication Driver (2SD468Ⓒ)
Q802	VS2SC2021//-1	9-channel Flashing (2SC2021)
Q803	VS2SC2021//-1	9-channel Flashing (2SC2021)
		DIODES
D1	VHD1S2076//-1	Static Protector (1S2076)
D2	VHD1N34A///-1	AM Detector (1N34A)
D3	VHD1N34A///-1	Signal Meter (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	VHD1S2076//-1	Squelch (1S2076)
D7	VHD1S2076//-1	Squelch (1S2076)
D8	VHD1S2473//-1	A.V.C. (1S2473)
D9	VHVHV46-G//-1	Varistor, Squelch Stabilizer (HV-46(GR))
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Ⓒ)
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)
D601	VHD10E1////-1	Circuit Protector (10E1)
D602	VHD10E1////-1	Protector (10E1)
D701	VHD1S2473//-1	Squelch Switching (1S2473)
D702	VHEXZ-090//-1	Zener Diode, Voltage Regulator, 9V ± 0.25V (XZ-090)
D703	VHD10E1////-1	Protector (10E1)
D704	VHD10E1////-1	Memory (10E1)
D705	VHD10E1////-1	Memory (10E1)
D706	VHD10E1////-1	Memory (10E1)
D708	VHD10E1////-1	Memory (10E1)
D709	VHD1S2473//-1	Memory (1S2473)
D710	VHD1S2473//-1	Memory (1S2473)
D711	VHD1N34A///-1	Memory (1N34A)
D901	VHERD3.9E-B//	Zener Diode, Voltage Regulator, 3.7V ~4.1V (RD3.9EⒷ)
LED901	RH-PZ0008AAZZ	LED (Light Emitting Diode), Channel Indicator (GL-7P201)
LED902	VHPGL5NG6//-1	LED (Light Emitting Diode), RX Indicator, Green, (GL-5NG6)

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION
LED903	VHPGL5PR6//-1	LED (Light Emitting Diode), TX Indicator, Red, (GL-5PR6)

COILS

L1	RCILC0023AFZZ	OSC. Choke
L101	RCILC0023AFZZ	AF Choke
L301	RCILR0135AFZZ	Transmitter, Matching (Loading)
L302	RCILR0055AFZZ	Transmitter, π-Filter
L305	RCILC0011AFZZ	RF Choke (TX)
L401	RCILR0329AFZZ	Antenna Choke

TRANSFORMERS

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

X1	RCRSB0055AFZZ	11.150MHz
X201	RCRSB0051AFZZ	10.240MHz

CERAMIC FILTER

CF1	RFILA0056AFZZ	455kHz

ELECTROLYTIC CAPACITORS

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%
C39	VCAAKU0XA474M	.47MFD, 6.3V, ±20%, Aluminum
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
C702	VCEAAU1HW105A	1MFD, 50V, +75 –10%
C703	VCEAAU1AW108Y	1000MFD, 10V, +50 –10%
C704	VCEAAU1AW476Y	47MFD, 10V, +50 –10%
C705	VCEAAU1CW476Y	47MFD, 16V, +50 –10%
C706	VCEAAU1AW477Y	470MFD, 10V, +50 –10%
C801	VCAAKU0XA474M	.47MFD, 6.3V, ±20%, Aluminum
C802	VCEAAU1EW335Y	3.3MFD, 25V, +50 –10%
C803	VCEAAU1EW335Y	3.3MFD, 25V, +50 –10%
C804	VCEAAU1AW107Y	100MFD, 10V, +50 –10%
C901	VCSATU1EF105M	1MFD, 25V, ±20%, Tantalu
C903	VCEAAU1AW476Y	47MFD, 10V, +50 –10%

CAPACITORS

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

C1	VCKZPU1HF103Z	.01MFD
C2	VCKYPU1SD103Z	.01MFD (Z5T), 30V, +80 –20%, Ceramic
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	VCCSPU1HL680J	68PF, 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	VCCSPU1HL221J	220PF, 50V, ±5%, Ceramic
C33	VCCSPU1HL330J	33PF, 50V, ±5%, Ceramic
C34	VCCSPU1HL221J	220PF, 50V, ±5%, Ceramic

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION
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
C120	RC-KZ1010AFZZ	1000PF, 50V, +80 −20%, Ceramic (Wage Type)
C122	VCCSPU1HL680J	68PF, 50V, ±5%, Ceramic
C123	VCCSPU1HL680J	68PF, 50V, ±5%, Ceramic
C124	VCKYPU1SD103Z	.01MFD (Z5T), 30V, +80 −20%, Ceramic
C125	VCKZPU1HF103Z	.01MFD
C201	VCKYPU1SD103Z	.01MFD (Z5T), 30V, +80 −20%, Ceramic
C202	VCCCPU1HH330J	33PF (CH), 50V, ±5%, Ceramic
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	VCCCPU1HH100F	10PF (CH), 50V, ±1PF, Ceramic
C311	VCKZPU1HF103Z	.01MFD
C312	VCCSPU1HL221J	220PF, 50V, ±5%, Ceramic
C313	VCCSPU1HL471J	470PF, 50V, ±5%, Ceramic
C314	VCKYPU1SD103Z	.01MFD (Z5T), 30V, +80 −20%, 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	VCCSPU1HL391J	390PF, 50V, ±5%, Ceramic
C326	VCCSPU1HL150J	15PF, 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
C337	VCCSPU1HL221J	220PF, 50V, ±5%, Ceramic
C338	VCCSPU1HL101J	100PF, 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
C606, C607	RC-KZ1009AFZZ	Feed Through Capacitors with Bracket
C608	VCKZPU1HF103Z	.01MFD
C701	VCQYKU1HM333M	.033MFD, 50V, ±20%, Mylar
C710	RC-KZ1010AFZZ	1000PF, 50V, +80 −20%, Ceramic (Wage Type)
C711	RC-KZ1010AFZZ	1000PF, 50V, +80 −20%, Ceramic (Wage Type)
C712	RC-KZ1010AFZZ	1000PF, 50V, +80 −20%, Ceramic (Wage Type)
C715	RC-KZ1010AFZZ	1000PF, 50V, +80 −20%, Ceramic (Wage Type)
C717	RC-KZ1010AFZZ	1000PF, 50V, +80 −20%, Ceramic (Wage Type)
C718	RC-KZ1010AFZZ	1000PF, 50V, +80 −20%, Ceramic (Wage Type)
C719	RC-KZ1010AFZZ	1000PF, 50V, +80 −20%, Ceramic (Wage Type)
C721	RC-KZ1010AFZZ	1000PF, 50V, +80 −20%, Ceramic (Wage Type)

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION
C722	RC-KZ1010AFZZ	1000PF, 50V, +80 −20%, Ceramic (Wage Type)
C723	RC-KZ1010AFZZ	
C724	RC-KZ1010AFZZ	
C725	RC-KZ1010AFZZ	
C726	RC-KZ1010AFZZ	
C727	RC-KZ1010AFZZ	
C728	RC-KZ1010AFZZ	
C729	RC-KZ1010AFZZ	
C730	RC-KZ1010AFZZ	
C731	RC-KZ1010AFZZ	
C902	VCTYPU1EX103M	.01MFD, 25V, ±20%, Ceramic

RESISTORS ARRAY

REF. NO.	PART NO.	DESCRIPTION
RM901-A ∼ C	RMPTC1002AAZZ	470 ohm x 3, 1/8W
RM902-A ∼ D	RMPTC1001AAZZ	470 ohm x 4, 1/8W
RM903-A ∼ E	RMPTC0004AFZZ	470 ohm x 5, 1/4W
RM904-A ∼ F	RMPTC1003AAZZ	1.5K ohm x 6, 1/8W

RESISTORS

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

REF. NO.	PART NO.	DESCRIPTION
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-SU2EY683J	68K 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
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
R42	VRD-ST2EE563J	56K ohm
R43	RVR-M0146AFZZ	30K (B) ohm, Deepest Point Adjust
R44	VRD-SU2EY683J	68K ohm
R45	VRD-SU2EY682J	6.8K 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
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
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
R316	VRD-ST2EY222J	2.2K ohm
R516	VRD-ST2HA101K	100 ohm, ½W, ±10%, Carbon
R517	VRD-ST2HA681K	680 ohm, 1/2W, ±10%, Carbon
R518	VRS-PT3DB221K	220 ohm, 2W, ±10%, Oxide Film
R701	VRD-ST2EE103J	10K ohm
R702	VRD-ST2EE102J	1K ohm
R703	VRD-ST2EE103J	10K ohm

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION
R704	VRD-ST2EE104J	100K ohm
R706	VRD-ST2EE104J	100K ohm
R707	VRD-ST2EE104J	100K ohm
R710	VRD-ST2EE101J	100 ohm
R711	VRD-ST2EE471J	470 ohm
R712	VRD-ST2EE472J	4.7K ohm
R713	VRD-ST2EE331J	330 ohm
R801	VRS-PT3DB470K	47 ohm, 2W, ±10%, Oxide Film
R802	VRD-ST2EY102J	1K ohm
R803	VRD-ST2EY104J	100K ohm
R804	VRD-ST2EY102J	1K ohm
R805	VRD-ST2EY331J	330 ohm
R806	VRD-ST2EY104J	100K ohm
R807	RVR-M0094AGZZ	5K (B) ohm, Meter Sub. Adjust
R808	VRD-ST2EY220J	22 ohm
R809	VRS-PT3AB220K	22 ohm, 1W, ±10%, Oxide Film
R901	VRD-SC2EF471J	470 ohm
R902	VRD-SU2EF471J	470 ohm
R921	VRD-SU2EF474J	470K ohm
R923	VRD-SC2EF561J	560 ohm
R924	RVR-C0001AAZZ	5K (C) ohm, Squelch Control
R925/ SW903	RVR-B0006AAZZ	5K (B) ohm, Volume Control with OFF-ON Switch
R926	VRD-SC2EF181J	180 ohm
R927	VRD-SU2EF471J	470 ohm

MISCELLANEOUS

REF. NO.	PART NO.	DESCRIPTION
01	GCABA1465AFSA	Cabinet, Speaker Side
02	GCABB1465AFSA	Cabinet, Signal/RF Power Meter Side
03	GCABA3464AFSA	Cabinet, Main Unit (See Figure 1)
04	GCABB3464AFFW	Cabinet, Main Unit (See Figure 1)
05	HINDM1080AFSB	Emblem "SHARP", Signal/RF Power Meter Cabinet
06	HINDM1183AFZZ	Indication Plate, Spec.
07	HPNLH0008AAZZ	Cabinet, Front, Microphone Unit
08	HPNLH0010AAZZ	Cabinet, Rear, Microphone Unit
09	JKNBZ0001AAZZ	Knob, Up and Down (Channel Selection Switch)
10	JKNBZ0002AAZZ	Knob, Off-On Switch/Volume Control, Squelch Control
11	JKNBZ0003AAZZ	Knob, Press-to-Talk Switch
	LANGF0407AFFW	Metal Plate, Output/Modulation Transformer, Small (Flat)
	LANGQ0545AFFW	Fixing Metal, Remote P.C. Board
	LANGR0418AFFW	Fixing Metal, Output/Modulation Transformer, Large
	LANGT0650AFFW	Bracket, Signal/RF Power Meter
	LANGT0651AFFW	Mounting Bracket, Main Unit
12	LBRC-0053AFSA	Mounting Bracket Assembly, Speaker Unit
	LBSHZ0051AFZZ	Bushing, Transistor Q304
	LCHSM0264AFFW	Chassis, Main Unit
	LCHSM0279AFFW	Chassis, Speaker Unit
	LCHSM2082AAZZ	Bracket, P.L.L. Circuit P.C. Board
13	LCHSS0126AFFW	Chassis, Front, Main Unit
	LHLDW3009AFFW	Holder, Microphone Cable
14	LHLDW3057AFFW	Holder, Remote Control Cable and Memory Cord
15	LX-BZ0237AFFB	Screw, Cabinet, Main Unit
16	LX-BZ0248AFZZ	Moulding Screw, 5ϕ x 15mm
	LX-LZ0001AGZZ	Rivet, Indication Plate of Spec.
	LX-LZ0051AF00	Push Rivet, Nylon, Speaker Unit
17	LX-NZ0123AFFN	Nut, Remote Control Socket (24ϕ)
	LX-TZ0001AFFE	Self-Tapping Screw (5ϕ), Mounting Bracket of Main Unit
	LX-WZ3017CEFN	Shakeproof Lockwasher External Type, Main P.C. Board
	LX-WZ3057AFFN	Washer, Remote Control Socket (24ϕ)
	LX-WZ9055AFZZ	Washer (ϕ6.5), Speaker Unit, Plastic
	PCOVS1002AAZZ	Cover, P.L.L. Circuit P.C. Board
	PCOVU3109AFZZ	Shade Plate, Meter Illumination Lamp
	PCOVU8108AFZZ	Cover, Meter Illumination Lamp, Rubber
	PFLT-0338AF00	Felt, Meter Cabinet
	PFILW0005AFZZ	Film, Channel Indicator LED901, Red
	PGUMM0123AF00	Cover, Signal/RF Power Meter, Rubber
	PGUMS0110AF00	Cushion, P.L.L. Unit, Rubber
	PGUMS1001AAZZ	Switch Cover, SW905 and SW906, Rubber
	PHAG-001MAFFC	Microphone Hanger, Small
	PHAG-002MAFFN	Microphone Hanger, Large
	PRDAR0144AFFW	Heat Sink, Transistors (Q303 and Q304)
	PRDAR0145AFFW	Heat Sink, Integrated Circuit IC101
	PSLDM3136AFFW	Shield Plate, Wage Type Ceramic Capacitors, Remote P.C. Board
	PSPO-0059AFZZ	Sponge, Speaker Unit P.C. Board
CNP101, CNP102, CNP103, CNP104, CNS702, CNS704	QCNW-0266AFZZ	Connecting Cord with Sockets (10-Pin, 14-Pin) and Plugs (7-Pin, 10-Pin x 2, 5-Pin) Assembly
CNP701	QCNCM0902AGZZ	Plug, 9-Pin
CNP702	QCNCM1001AGZZ	Plug, 10-Pin
CNP703	QCNCM1101AGZZ	Plug, 11-Pin
CNP704	QCNCM1401AGZZ	Plug, 14-Pin
CNP705	QCNTZ0071AFZZ	Plug, 1-Pin
CNP801	QCNCM095BAFZZ	Plug, 2-Pin, Speaker
CNP802	QCNCM0402SGZZ	Plug, 4-Pin, Signal/RF Power Meter
CNP803	QCNCM1401AGZZ	Plug, 14-Pin
CNS701, CNS703, PG801/ 18	QCNW-0258AFZZ	Remote Control Cable with Plug (PG801) and Sockets Assembly

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION
CNS801	QCNW-0256AFZZ	Connecting Cord with Socket, Speaker
CNS802	QCNW-0257AFZZ	Connecting Cord with Socket, Signal/RF Power Meter
CNS803, SO801, SO901/19	QCNW-0255AFZZ	Microphone Cable with Sockets and Bushing Assembly
	QFS-D201AAGNA	Fuse, 200mA
	QFS-A232AAFNA	Fuse, 2.3A
	QFSHJ9052AFZZ	Power Supply Cord with Fuse Holder and Socket
	QFSHJ9054AFZZ	Memory Cord (Power Supply) with Fuse Holder and Plug
J101/20	QJAKA0052AFZZ	Jack, External Speaker
	QPWBE0061AAZZ	Printed Circuit Board, Remote Microphone Circuit
	QPWBF0052AAZZ	Printed Circuit Board, P.L.L. Circuit
	QPWBF0612AFZZ	Printed Circuit Board, Main Circuit
	QPWBF0675AFZZ	Printed Circuit Board, Remote Unit
	QPWBF0676AFZZ	Printed Circuit Board, Speaker Unit
PG201	QPLGZ0850AFZZ	Plug, 8-Pin
PG202	QPLGZ0850AFZZ	Plug, 8-Pin
PG601/21	QSOCZ2454AFZZ	Plug, Power Supply
PG901	QCNTZ0001AAZZ	Plug, 20-Pin, Microphone Unit
	QSOCE0401AFZZ	Socket, Test Point TP308 and TP309
	QPLGE0403AGZZ	Plug, Test Point TP308 and TP309
SO401/22	QSOCZ2470AFZZ	Socket, Antenna (50 ohms)
SO701/23	QCNW-0254AFZZ	Memory Cord with Socket
SW101-A ~D/ RLY601	RRLYZ0007AFZZ	Relay with Receiver/Transmitter Switch
SW701, RLY701	RRLYZ0009AGZZ	Relay with Power Switch
SW901	QSW-P0002AAZZ	Switch, Up (Channel Selection)
SW902	QSW-P0002AAZZ	Switch, Down (Channel Selection)
SW903/ R925	RVR-B0006AAZZ	Switch, OFF-ON with Volume Control (5K-B ohm)
SW904	QSW-P0003AAZZ	Switch, Press-to-Talk (P.T.T.)
SW905	QSW-S0005AAZZ	Switch, Channel 9 Preset
SW906	QSW-S0005AAZZ	Switch, ANL (Automatic Noise Limiter)
PL801, PL802	RLMPM0019AGZZ	Lamp, Meter Illumination
	RMICD0001AAZZ	Dynamic Microphone, 500 ohms (at 1kHz)
	RMICB0050AFZZ	Remote Control Microphone Unit
ME801/24	RMTRE0068AFZZ	Meter, Signal/RF Power
	RTUNS0052AFZZ	P.L.L. Synthesizer Unit
	SPAKA0488AFZZ	Packing Add.
	SPAKC1060AFZZ	Packing Case
	SPAKX0162AFZZ	Packing Add., Cushion
	SSAKH0016AGZZ	Polyethylene Bag, Main Unit
	SSAKH0070AGZZ	Polyethylene Bag, Remote Control Microphone Unit
	SSAKH0113AGZZ	Polyethylene Bag, Speaker Unit
	TINSE0528AFZZ	Operation Manual
SP801	VSP0080P-288A	Speaker, 8 ohms, 8cm
	XCBSC30P10000	Screw, Mounting Bracket of Speaker Unit
	XCPSN30P12000	Tapping Screw ($3\phi \times 12$mm), Microphone Unit
	XWHGZ28-20100	Rubber Washer, Main P.C. Board

MODEL CX-1 (Optional Extension Cord)

	PART NO.	DESCRIPTION
	QCNW-0261AFZZ	Remote Control Cable, 9-feet
	QFSHJ9055AFZZ	DC Main Power Supply Cord with Fuse Holder and 2.3A Fuse and Socket, 14-feet
	QFSHJ9056AFZZ	Extra Power Cord (Memory Cord) with Fuse Holder and 200mA Fuse and Plug, 14-feet