SHARP

OUTSTANDING RECEPTION THE WORLD OVER

SERVICE MANUAL

CB-2260

This model CB-2260 is almost the same as the model CB-2460 except for the channel display circuit and some external parts. As to the descriptions about "Trouble Shooting Guide", "Cautions on Handling MOS IC" and "Equivalent Circuit of IC", refer to the Service Manual for the model CB-2460.

40 Channel C.B. Transceiver

MODEL CB-2260

"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 . . . . ± 0.004% Others. . . . . ± 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	0.7μV/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 Tolerance 11.730MHz . . . . ± 0.003%
Selectivity	6dB down at ±3kHz; 50dB down at ± 10kHz.
Intermediate frequency	1st-IF: 11.275MHz, 2nd-IF: 455kHz
Circuit type	Dual conversion superheterodyne: P.L.L. circuit 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	2-1/4"(H) x 5-3/4"(W) x 7-7/8"(D)
Weight	4 lbs. with microphone
Cabinet	Metal body with plastic front

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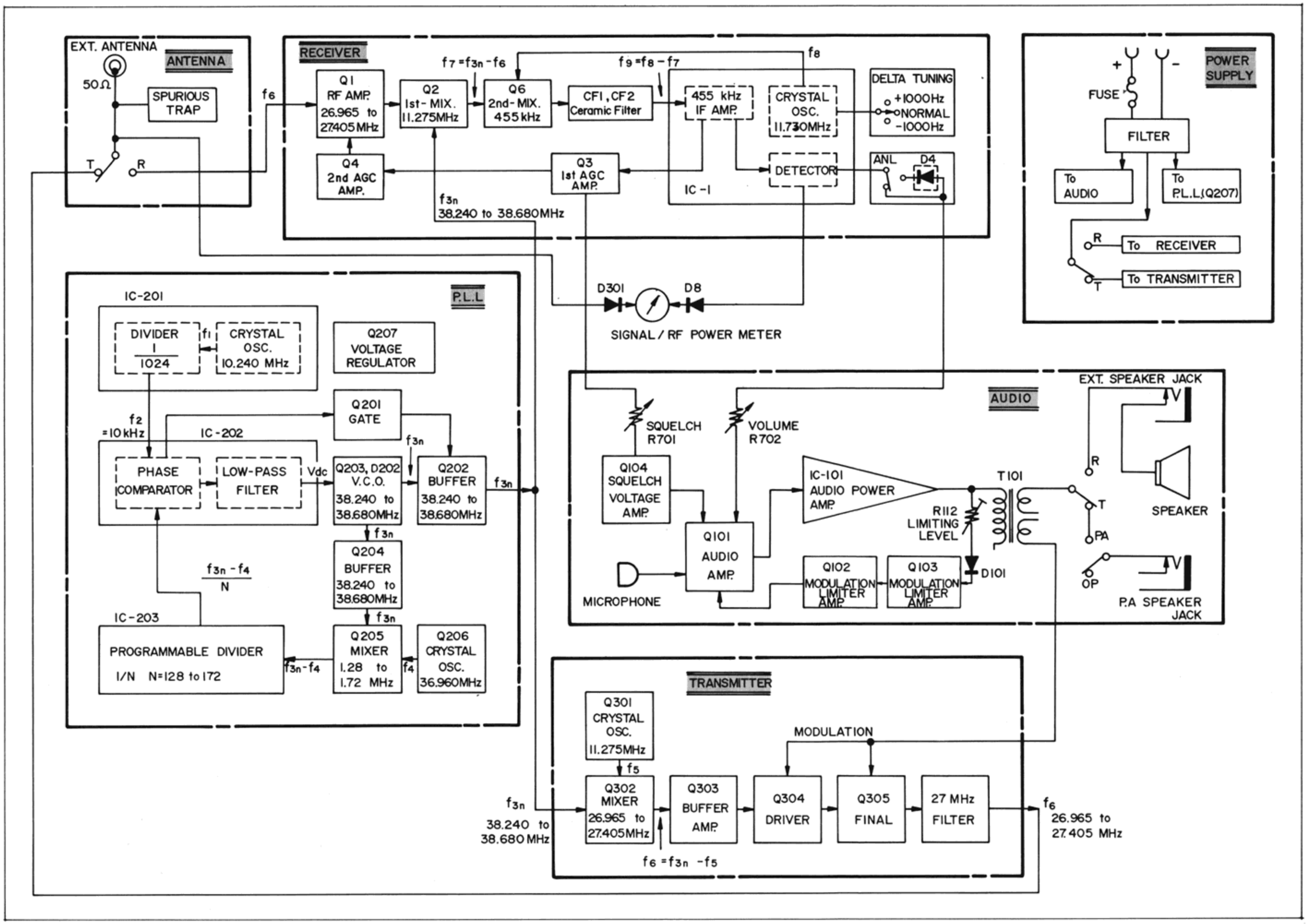


Figure 1 BLOCK DIAGRAM

GENERAL DESCRIPTION (Refer to Figure 1)

RECEIVER SECTION

An input signal sent from the antenna is applied to the 1st-mixer of transistor Q2 via the RF amplifier of transistor Q1, and an oscillator signal sent from transistor Q202 is also applied to the 1st-mixer of transistor Q2. In this stage the above-mentioned input signal is converted to 1st-IF signal of 11.275 MHz.
The 1st-IF signal (11.275 MHz) is applied to the 2nd-mixer of transistor Q6 via the transformers T3 and T4 to be converted to 2nd-IF signal of 455 kHz. The 2nd-IF signal is applied to the pin⑦of IC-1 via the transformer T5 and ceramic filters CF1 and CF2. (The 2nd-IF signal is amplified between the pin⑦and pin⑧of IC-1 and it is also detected between the pin ⑫and pin ⑪).
The detected output signal developed at the pin ⑪ of IC-1 is further applied to IC-101 consisting of drive circuit and power amplifier via audio amplifier of transistor Q101.

TRANSMITTER SECTION

The audio signal from the microphone is applied through the audio amplifier Q101 and the output of IC-101 to the final stage Q305 and the drive stage Q304.

The carrier signal synthesized in the P.L.L. circuit, the oscillator Q301 and mixer Q302 is supplied to the final amplifier Q305 where it is modulated with the audio signal and applied to the antenna for transmission.

A DESCRIPTION OF PHASE-LOCKED-LOOP (P.L.L.) CIRCUIT (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 two crystals, the synthesizer serves as an oscillator to oscillate step by step (10 kHz) in the range of 38.240 MHz ~ 38.680 MHz.
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.

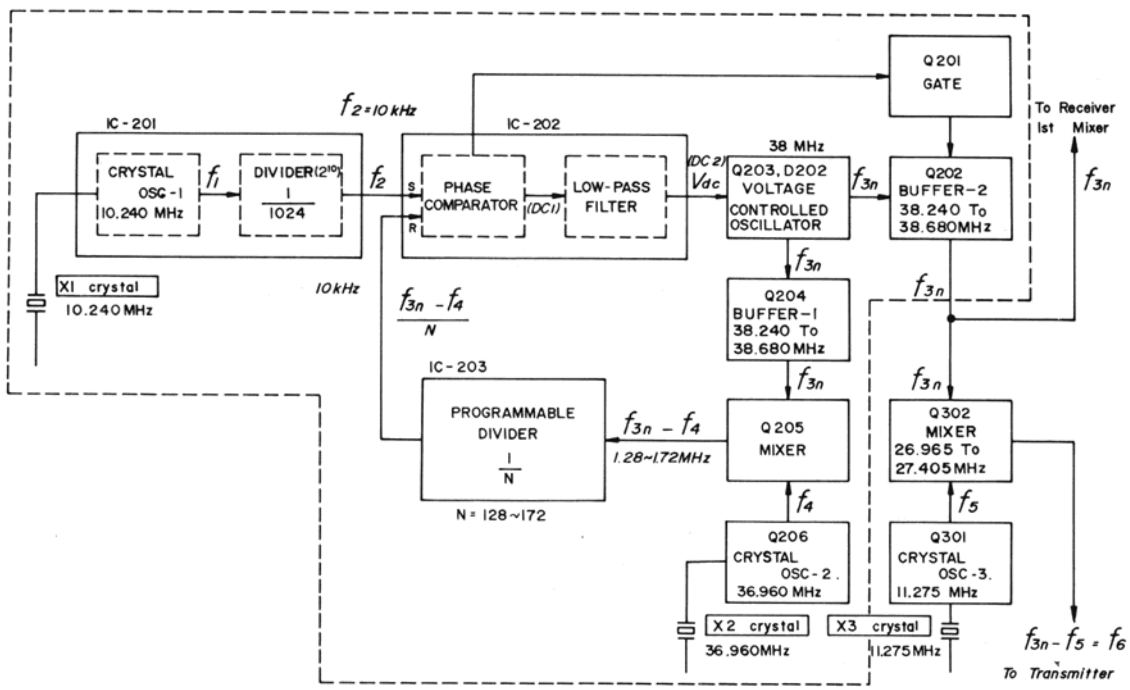


Figure 2 P.L.L. CIRCUIT FREQUENCY SYNTHESIZER

2) Frequency Synthesizer

The frequencies for both transmitter and receiver are synthesized by three crystal controlled oscillators and the Phase-Locked-Loop (or P.L.L.) consisting of six basic building blocks: the phase detector (phase comparator) IC-202, the low-pass filter

IC-202, the voltage controlled oscillator (or V.C.O.) Q203, the buffer amplifier Q204, the mixer Q205 and the programmable divider IC-203 as shown in Figure 2.

3) **Frequency Determining** (Refer to Figure 2)

– 1 – A crystal oscillator consisting of a crystal X 1 (10.240MHz) and IC-201 generates a basic frequency f_1 (=10.240MHz) and it is divided down through a fixed divided network (a portion of IC-201) to 10kHz frequency (f_2). The frequency 10kHz is applied to the input of a phase comparator IC-202.

– 2 – A second oscillator Q203 is a voltage controlled oscillator (V.C.O.) and its frequency (f_3n) is determined with a DC voltage (Vdc) from IC-202. The output frequency (f_3n) is applied to a mixer (Q205) through a buffer amplifier (Q204).

– 3 – A third oscillator consisting of a crystal X 2 (36.960MHz) and a transistor Q206 generates a frequency f_4 (=36.960 MHz) and feed its frequency to the mixer Q205 also.

– 4 – Although the mixer Q205 produces two frequency signals $f_3n + f_4$ and $f_3n - f_4$, the frequency $f_3n - f_4$ only is applied to a programmable divider IC-203 through a low-pass filter consisting of a coil L201 and capacitors C214 and C216.

– 5 – The programmable divider IC-203 divides the frequency $f_3n - f_4$ by the frequency divider number N, which is programmable by the switch position of the channel selector connected to the terminal pins 1 to 6 and 8 of IC-203. The assigned number is shown in Table 1. The output frequency $(f_3n - f_4)/N$ is close to 10kHz and is fed back to the phase comparator of IC-202.

– 6 – The phase comparator of IC-202 compares the frequency f_2 (= 10kHz) and the other frequency $(f_3n - f_4)/N$ from the programmable divider and generates a D.C. voltage Vdc proportional to the phase differences of both frequencies. The voltage Vdc goes back to the V.C.O. Q203 through a low-pass filter.

– 7 – In this method, a closed-loop frequency-feedback system, which is so called P.L.L., is formed and the frequency f_3n of V.C.O. Q203 is locked.

– 8 – When the P.L.L. is in lock, two frequencies to phase comparator input are the same and therefore the frequency f_3n is determined as follows:

$f_3n = Nf_2 + f_4$

Where f_2 = 10kHz

f_4 = 36.960MHz

N = 128 to 172 . . . . . . Determined by channel selector as shown in Table 1.

For example, the frequency f_3n of channel 1 is calculated as follows:

f_3n = 128 x 0.01 + 36.960 (MHz)

= 38.240 (MHz)

Where "N = 128" is assigned for channel 1 by channel selector.

This frequency f_3n is applied to the first mixer of receiver and a mixer Q302 of transmitter through a buffer amplifier Q202 and a filter block T202.

– 9 – DC voltage condition may vary according to the frequencies as tabulated below.

Lock frequency condition: $f_2 = \frac{f_3n - f_4}{N}$

f_3n	$f_3n - f_4$	$\frac{f_3n-f_4}{N}$	$f_2 \cdot \frac{f_3n-f_4}{N}$	Voltage DC_1	Voltage DC_2	f_3n	Final frequency
Rise (↑)	Rise (↑)	Rise (↑)	$<$	Rise (↑)	Drop (↓)	Drop (↓)	Lock
Drop (↓)	Drop (↓)	Drop (↓)	$>$	Drop (↓)	Rise (↑)	Rise (↑)	Lock
Lock	Still	Still	=	Still	Still	Still	Lock

– 10 – The Transmitter Frequency

The transmitter frequency f_6 is determined by mixing f_3n and f_5 signal which is generated by a crystal oscillator consisting of Q301 and crystal X 3. (= 11.275 MHz) and

$f_6 = f_3n - f_5$

$= (Nf_2 + f_4) - f_5$

Where f_5 = 11.275MHz

Consequently, the transmitter frequency f_6 is all crystal controlled. Table 1 shows the synthesized frequencies for each channel.

–11– Gate (transistor Q201) shown in the block diagram works to detect a lock condition of the P.L.L. circuit and to take out an output only at the lock condition, controlling the buffer-2 (transistor Q202) amplifier --- it is thus prevented that an unstable signal is emitted when the P.L.L. circuit can not be locked for some reason.

FREQUENCY OF SYNTHESIS CHART

TUNING FREQUENCY (MHz)	CHANNEL	N	f_1 (MHz)	f_2 (kHz)	f_{3n} (MHz)	f_4 (MHz)	f_5 (MHz)	$f_{3n}-f_4$ (MHz)	$f_{3n}-f_5$ (MHz)
26.965	(1)	128	10.240	10	38.240	36.960	11.275	1.280	26.965
26.975	(2)	129	10.240	10	38.250	36.960	11.275	1.290	26.975
26.985	(3)	130	10.240	10	38.260	36.960	11.275	1.300	26.985
27.005	(4)	132	10.240	10	38.280	36.960	11.275	1.320	27.005
27.015	(5)	133	10.240	10	38.290	36.960	11.275	1.330	27.015
27.025	(6)	134	10.240	10	38.300	36.960	11.275	1.340	27.025
27.035	(7)	135	10.240	10	38.310	36.960	11.275	1.350	27.035
27.055	(8)	137	10.240	10	38.330	36.960	11.275	1.370	27.055
27.065	(9)	138	10.240	10	38.340	36.960	11.275	1.380	27.065
27.075	(10)	139	10.240	10	38.350	36.960	11.275	1.390	27.075
27.085	(11)	140	10.240	10	38.360	36.960	11.275	1.400	27.085
27.105	(12)	142	10.240	10	38.380	36.960	11.275	1.420	27.105
27.115	(13)	143	10.240	10	38.390	36.960	11.275	1.430	27.115
27.125	(14)	144	10.240	10	38.400	36.960	11.275	1.440	27.125
27.135	(15)	145	10.240	10	38.410	36.960	11.275	1.450	27.135
27.155	(16)	147	10.240	10	38.430	36.960	11.275	1.470	27.155
27.165	(17)	148	10.240	10	38.440	36.960	11.275	1.480	27.165
27.175	(18)	149	10.240	10	38.450	36.960	11.275	1.490	27.175
27.185	(19)	150	10.240	10	38.460	36.960	11.275	1.500	27.185
27.205	(20)	152	10.240	10	38.480	36.960	11.275	1.520	27.205
27.215	(21)	153	10.240	10	38.490	36.960	11.275	1.530	27.215
27.225	(22)	154	10.240	10	38.500	36.960	11.275	1.540	27.225
27.235	(24)	155	10.240	10	38.510	36.960	11.275	1.550	27.235
27.245	(25)	156	10.240	10	38.520	36.960	11.275	1.560	27.245
27.255	(23)	157	10.240	10	38.530	36.960	11.275	1.570	27.255
27.265	(26)	158	10.240	10	38.540	36.960	11.275	1.580	27.265
27.275	(27)	159	10.240	10	38.550	36.960	11.275	1.590	27.275
27.285	(28)	160	10.240	10	38.560	36.960	11.275	1.600	27.285
27.295	(29)	161	10.240	10	38.570	36.960	11.275	1.610	27.295
27.305	(30)	162	10.240	10	38.580	36.960	11.275	1.620	27.305
27.315	(31)	163	10.240	10	38.590	36.960	11.275	1.630	27.315
27.325	(32)	164	10.240	10	38.600	36.960	11.275	1.640	27.325
27.335	(33)	165	10.240	10	38.610	36.960	11.275	1.650	27.335
27.345	(34)	166	10.240	10	38.620	36.960	11.275	1.660	27.345
27.355	(35)	167	10.240	10	38.630	36.960	11.275	1.670	27.355
27.365	(36)	168	10.240	10	38.640	36.960	11.275	1.680	27.365
27.375	(37)	169	10.240	10	38.650	36.960	11.275	1.690	27.375
27.385	(38)	170	10.240	10	38.660	36.960	11.275	1.700	27.385
27.395	(39)	171	10.240	10	38.670	36.960	11.275	1.710	27.395
27.405	(40)	172	10.240	10	38.680	36.960	11.275	1.720	27.405

CRYSTAL

X 1	crystal	10.240MHz = f_1
X 2	crystal	36.960MHz = f_4
X 3	crystal	11.275MHz = f_5

Table 1 FREQUENCY OF SYNTHESIS CHART

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

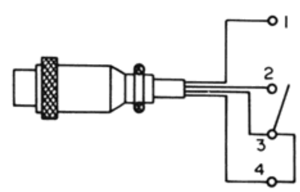
[NOTE]

–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 3 to be connected to it.



1. SIGNAL INPUT
2. PRESS-TO-TALK
3. SWITCH
4. COMMON

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

Figure 3 CONNECTION OF MICROPHONE PLUG

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

STEP	CONNECTION OF MEASURING INSTRUMENT	ADJUSTMENT	PROCEDURE
1 (10.240MHz)	Connect a frequency counter, through 5pF capacitor, to the test point [201] (the terminal No. 1 of IC-201).	C202	Adjust so that the frequency counter reads within 10.240MHz ± 300Hz. (The oscillation voltage then is about 0.4 to 0.5V . . . . . . the value on RF V.T.V.M.)
2 (36.960MHz)	1) Connect an RF voltmeter to the test point [211] (the base of Q205). 2) Make the secondary of V.C.O. coil T201 be short-circuited.	T203	1) Adjust so that the RF voltmeter reads the maximum. 2) Next, rotate the core of T203 counterclockwise so that such maximum reading of the voltmeter is lowered by 0.5dB. (The oscillation voltage then is about 0.7 to 1.2V.)
3 (36.960MHz)	1) Connect the frequency counter, through 5pF capacitor, to the test point [211] (the base of Q205). 2) Make the secondary of V.C.O. coil T201 be short-circuited.	C222	Adjust so that the frequency counter reads within 36.960MHz ± 300Hz.
4 (V.C.O.)	1) Connect a DC V.T.V.M. to the test point [205] (the terminal No. 1 of IC-202). 2) Connect the frequency counter, through 5pF capacitor, to the test point [206] (the secondary of T201).	T201	1) Set the channel selector to "19" channel. 2) Adjust so that the DC V.T.V.M. reads exactly 3.0V. 3) Make sure the frequency counter is reading 38.460MHz. (The oscillation voltage at the test point [206] is about 0.7 to 1.2V.) 4) Set in turn the channel selector to "1" channel and/or "40" channel and make sure the DC V.T.V.M. reads within 2.0V to 4.0V.
5 (P.L.L. Lock)	Connect the DC V.T.V.M. to the test point [204] (the terminal No. 4 of IC-202).		Make sure the DC V.T.V.M. is reading about 6.4V. If it otherwise reads "0" this means the P.L.L. has not been locked.
6 (38MHz Filter)	Connect a synchroscope to the test point [208] (the output terminal of the filter coil T202).	T202	1) Set the channel selector to "19" 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. Note: Generally speaking, the T202 requires no alignment even at the time of parts replacement since it has been factory-delivered only after undergoing the alignment.

RECEIVER ALIGNMENT

STEP	CONNECTION OF MEASURING INSTRUMENT	ADJUSTMENT	PROCEDURE
1 (11.730MHz)	Connect the frequency counter, through 5pF capacitor to the test point [3] (the secondary of T6)	T6	Adjust so that the frequency counter reads within 11.730MHz ± 300Hz. (The oscillation voltage then is about 0.5 to 0.9V.)
2 (IF)	1) Connect an AC V.T.V.M. to both sides of the speaker voice coil lug. 2) Connect a signal generator, through 0.01MFD capacitor, to the test point [1] (the base of Q2). 3) Set the signal generator to 11.275MHz, modulation 1000H, 30%. Note: Be sure to connect the ground wire of signal generator to the ground of the external antenna socket.	T5 T4 T3	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 27.185MHz (19 channel), modulation 1000Hz, 30%.	T2 T1	1) Set the channel selector to 19 channel. 2) Adjust the AC V.T.V.M. until it reads the maximum.

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 Q305 may be damaged.

–2– When making the connection of measuring instruments, see Figure 4.

STEP	CONNECTION OF MEASURING INSTRUMENT	ADJUSTMENT	PROCEDURE
1 (11.275MHz)	1) Connect the frequency counter, through 5pF capacitor, to the test point [302] (the drain of Q301). 2) Make the secondary of V.C.O. coil T201 be short-circuited.	T301	Adjust so that the frequency counter reads within 11.275MHz ± 300Hz. (The oscillation voltage then is about 0.8 to 1.8V.)
2 (27MHz Filter)	Connect the synchroscope to the test point [304] (the secondary of T302).	T302	1) Set the channel selector to "19" 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. Note: Generally speaking, the T302 requires no alignment even at the time of parts replacement since it has been factory-delivered only after undergoing the adjustment.
3 (Driver)	1) Remove the plug which have been inserted in the test points [309] and [310] of the set. 2) Connect in turn DC milliammeter, through the RF rejection filter shown in Figure 5, to the test points [309] and [310] .	T303	Adjust so that the DC milliammeter connected to the test point [310] reads the maximum (driver current).
4 (Driver)	Same as the above	T304	Adjust so that the DC milliammeter connected to the test point [310] indicates the dip point. The amperage then is about 60 to 90 mA.
5 (Final)	Same as the step 3	L302	Adjust so that the DC milliammeter connected to the test point [309] reads 450 ± 30 mA (final current).
6 (π-Filter)	Connect the RF output power meter and 50 ohms dummy load to the antenna socket.	L303	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.)
7	Repeat the steps 3 to 6 until the best results will be obtained.		
8 (Second harmonic)	Connect the RF output power meter, 50 ohms dummy load and spectrum analyzer (or field strength meter), through CM coupler, to the antenna socket.	L305	1) Set the channel selector to "19" channel. 2) Adjust so that 54MHz output component (second harmonic) becomes the minimum on the spectrum analyzer (or field strength meter).
9 (Third harmonic)	Same as the above.	L304	1) Set the channel selector to "19" channel. 2) Adjust so that 81MHz output component (third harmonic) becomes the minimum on the spectrum analyzer (or field strength meter).

STEP	CONNECTION OF MEASURING INSTRUMENT	ADJUSTMENT	PROCEDURE
10 (Modulation)	1) Connect the RF output power meter, 50 ohms dummy load and synchroscope, through CM coupler, to the antenna socket. 2) Connect audio signal generator, attenuator and AC V.T.V.M. to the microphone socket (using the microphone plug shown in Figure 3). 3) Keep the output of signal generator to 1000Hz, 1V.	R112	1) Turn R112 clockwise until the modulation limiter circuit stops its function. 2) Make the attenuator operate so that the modulation factor of RF output waveform appeared on the synchroscope becomes 50%. Then adjust the attenuator so that the microphone input signal increases 20dB over the original one. (The microphone input then is about 30mV.) 3) Adjust R112 so that the modulation factor of RF output waveform appeared on the synchroscope becomes about 80%. (See Figure 6.)

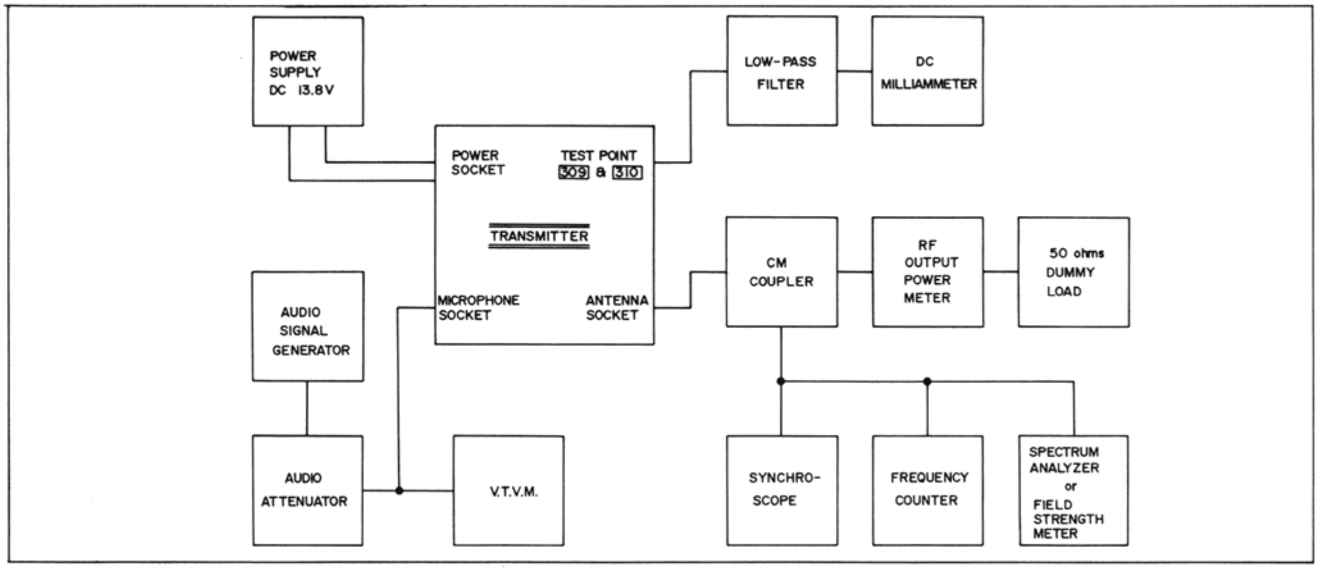
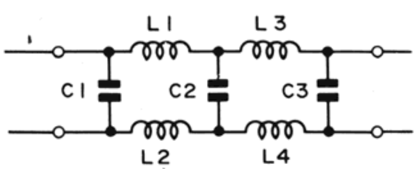


Figure 4



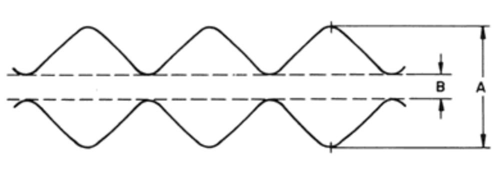
C1, C2, C3 : 0.047µF (Ceramic)

L1, L2, L3, L4 : about 25µH

Figure 5 RF REJECTION FILTER (LOW-PASS FILTER)

SIGNAL/RF POWER METER ADJUSTMENT

STEP	CONNECTION OF MEASURING INSTRUMENT	ADJUSTMENT	PROCEDURE
1	Connect the signal generator to the antenna socket and set the frequency to 27.185MHz ("19" channel) and the modulation to 1000Hz, 30%. Keep the output of signal generator to 40dB.	R19	1) Set the channel selector to "19" channel. 2) Adjust so that the signal/RF power meter indicates "9" on the "SIGNAL" scale.
2	Connect the RF output power meter and 50 ohms dummy load to the antenna socket.	R319	1) Set the channel selector to "19" 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 R319 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 80% :

If A = 4 is supposed,

B = 0.44 is resulted.

Figure 6

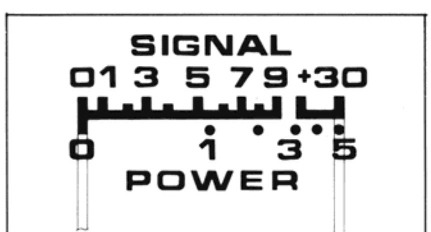
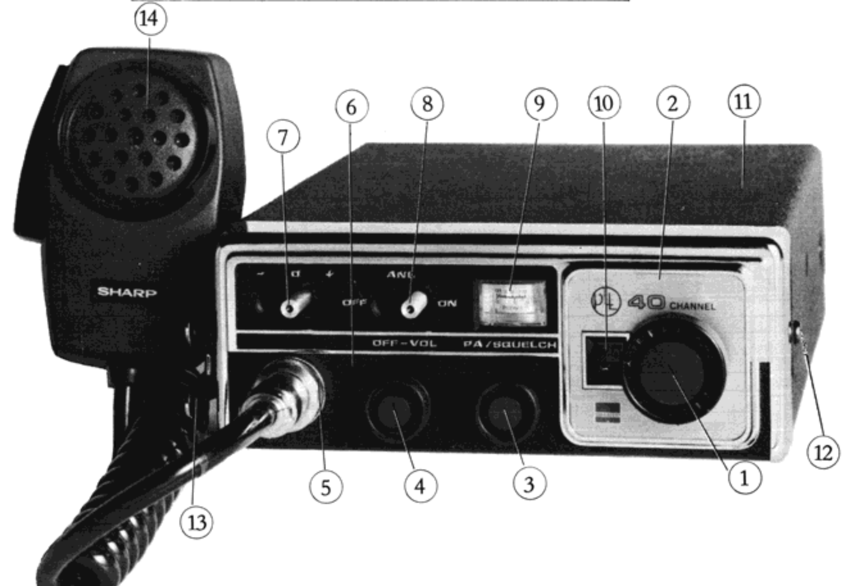


Figure 7 SIGNAL/RF POWER METER (ME601)

FRONT PARTS LAYOUT



① Channel Selector Knob (JKNBN0097AFSA)
② Indication Metal, 40 Channel (HINDM1121AFSA)
③ Squelch/P.A. Switch Knob (JKNBN0098AFSA)
④ Off-On/Volume Knob (JKNBN0098AFSA)
⑤ Microphone Socket (QSOCZ2465AFZZ)
⑥ Front Panel (GWAKP1064AFSA)
⑦ Delta Fine Tuning Switch Knob (JKNBM0236AFSA)
⑧ A.N.L. Switch Knob (JKNBM0236AFSA)
⑨ SIGNAL/RF POWER Meter (RMTRE0061AFZZ)
⑩ Lens, Channel Indication (PLNS-0008AFSA)
⑪ Cabinet, Top (GCABB-3031AFSA)
⑫ Cabinet, Bottom (GCABA3432AFSA)
⑬ Microphone Hanger (PHAG-8001AFFC)
⑭ Microphone Assembly (RMICD0206AFZZ)

Figure 8 FRONT PARTS LAYOUT

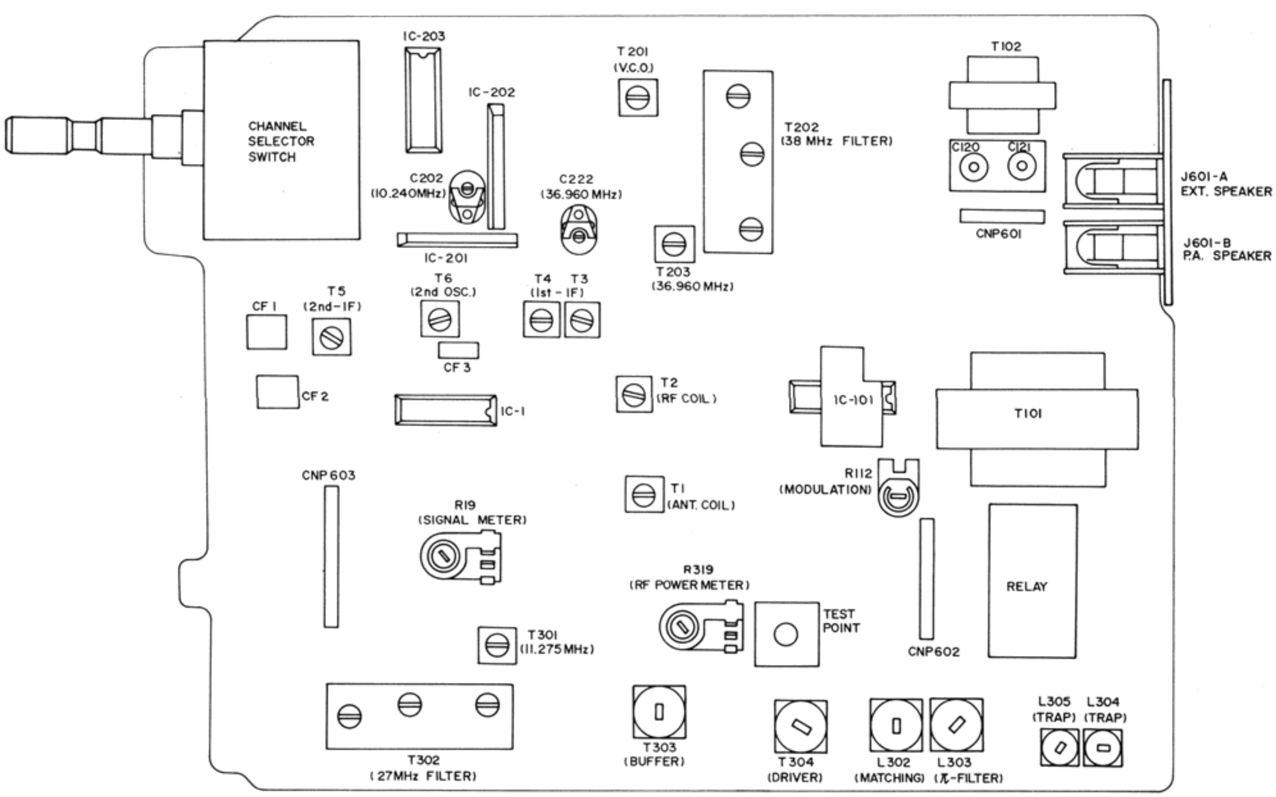


Figure 9 ALIGNMENT POINTS

CHANNEL SELECTOR SWITCH

Connection table of channel selector switch (SW4) for each channel.

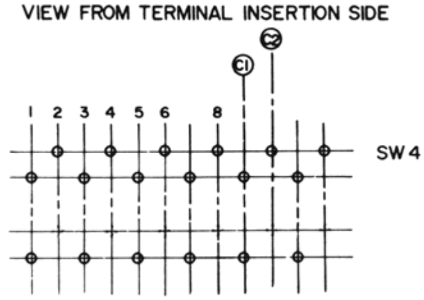
TERMINAL NO. OF THE SW4-A (1st)	1	2	3	4	5	6	–	–	8	N
CHANNEL / TERMINAL NO. OF IC-203	1(1)	2(2)	3(4)	4(8)	5(16)	6(32)	7(64)	8(128)	12	
1									●	128
2	○									129
3		○							●	130
4			○						●	132
5	○		○							133
6		○	○							134
7	○	○	○							135
8	○			◎					●	137
9		○		◎					●	138
10	○	○		◎						139
11			○	◎					●	140
12		○	○	◎						142
13	○	○	○	◎						143
14					◎				●	144
15	○				◎					145
16	○	○			◎					147
17			○		◎				●	148
18	○		○		◎					149
19		○	○		◎				●	150
20				◎	◎				●	152
21	○			◎	◎					153
22		○		◎	◎				●	154
23	○		○	◎	◎				●	155
24	○	○		◎	◎				●	156
25			○	◎	◎				●	157
26		○	○	◎	◎					158
27	○	○	○	◎	◎					159
28						◎			●	160
29	○					◎				161
30		○				◎			●	162
31	○	○				◎				163
32			○			◎			●	164
33	○		○			◎				165
34		○	○			◎			●	166
35	○	○	○			◎				167
36				◎		◎			●	168
37	○			◎		◎				169
38		○		◎		◎			●	170
39	○	○		◎		◎				171
40			○	◎		◎			●	172

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 SW4-A shows that this terminal comes in contact with the COMMON terminal if the set gets in a channel-to-channel situation.
4. The terminal No. 8 of IC203 is always in connection with +B and kept to "HIGH" level.

QSW-R0139AFZZ

VIEW FROM TERMINAL INSERTION SIDE



MOUNTING FASE

Table 2 CHANNEL SELECTOR SWITCH

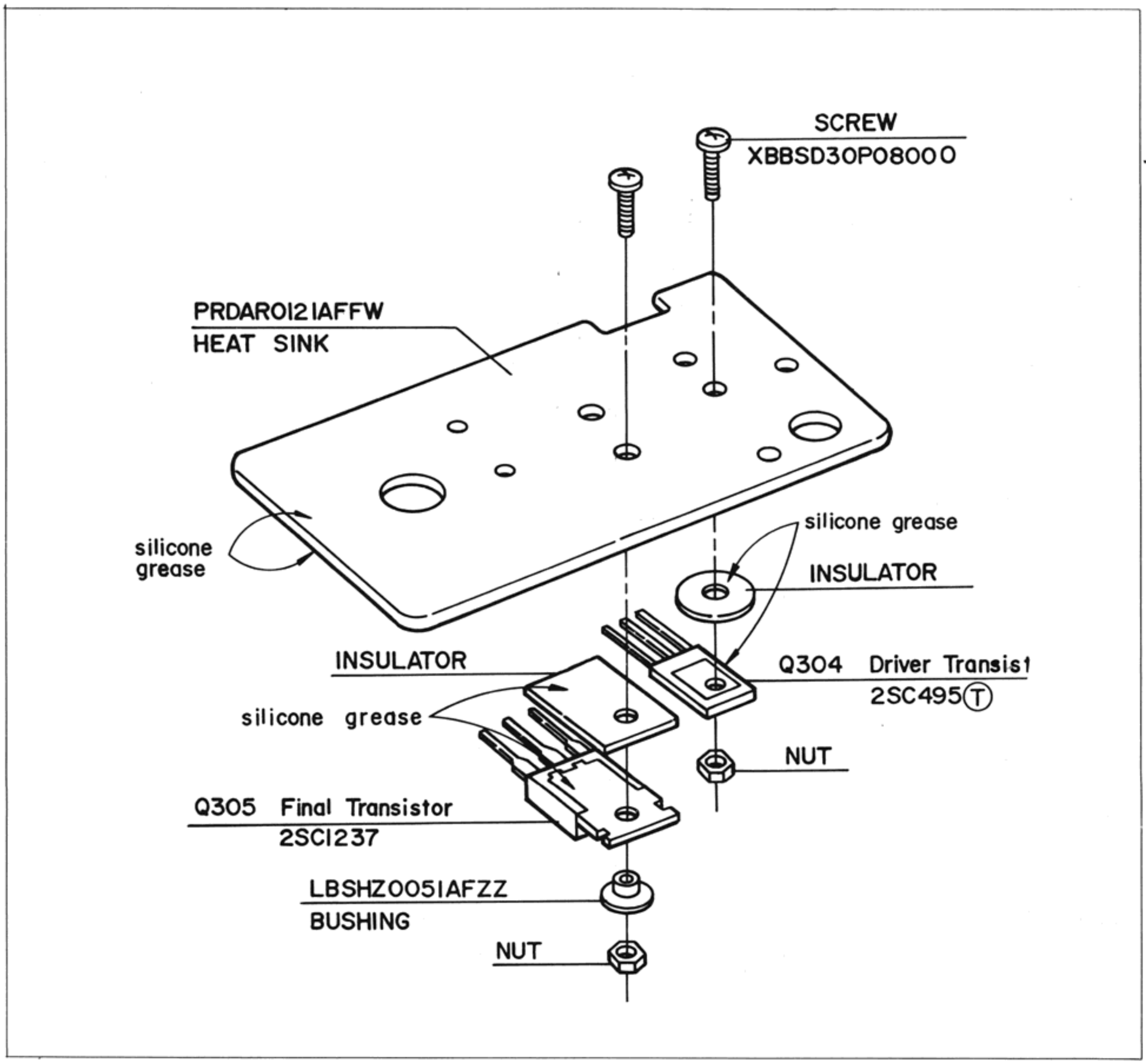


Figure 12 HOW TO SET THE TRANSISTOR Q304 AND Q305

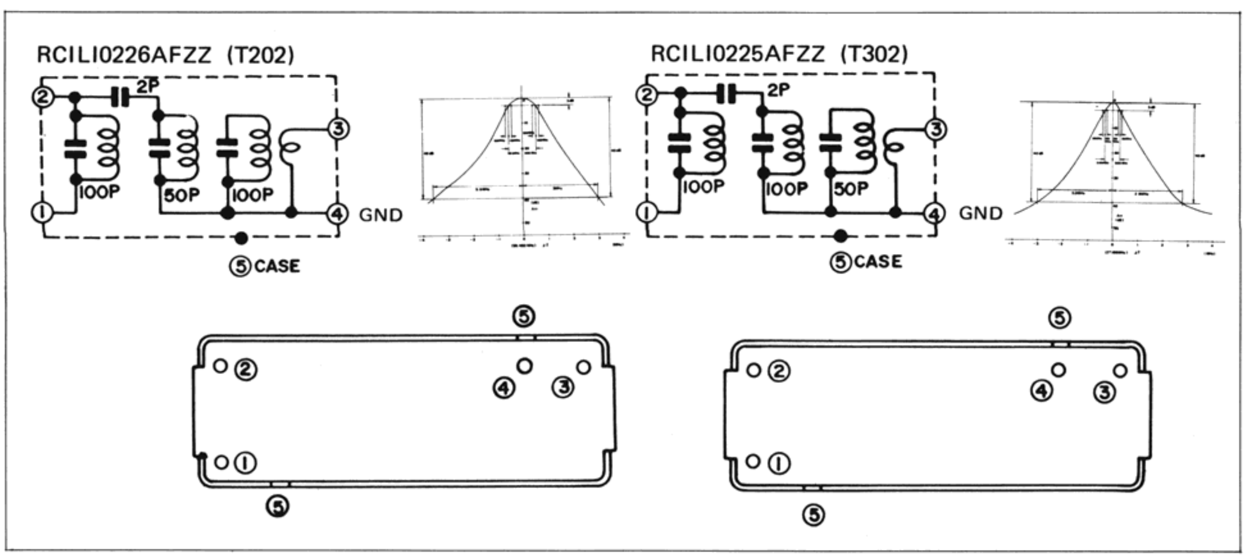


Figure 13 TRANSFORMERS (T202 and T302) BASING

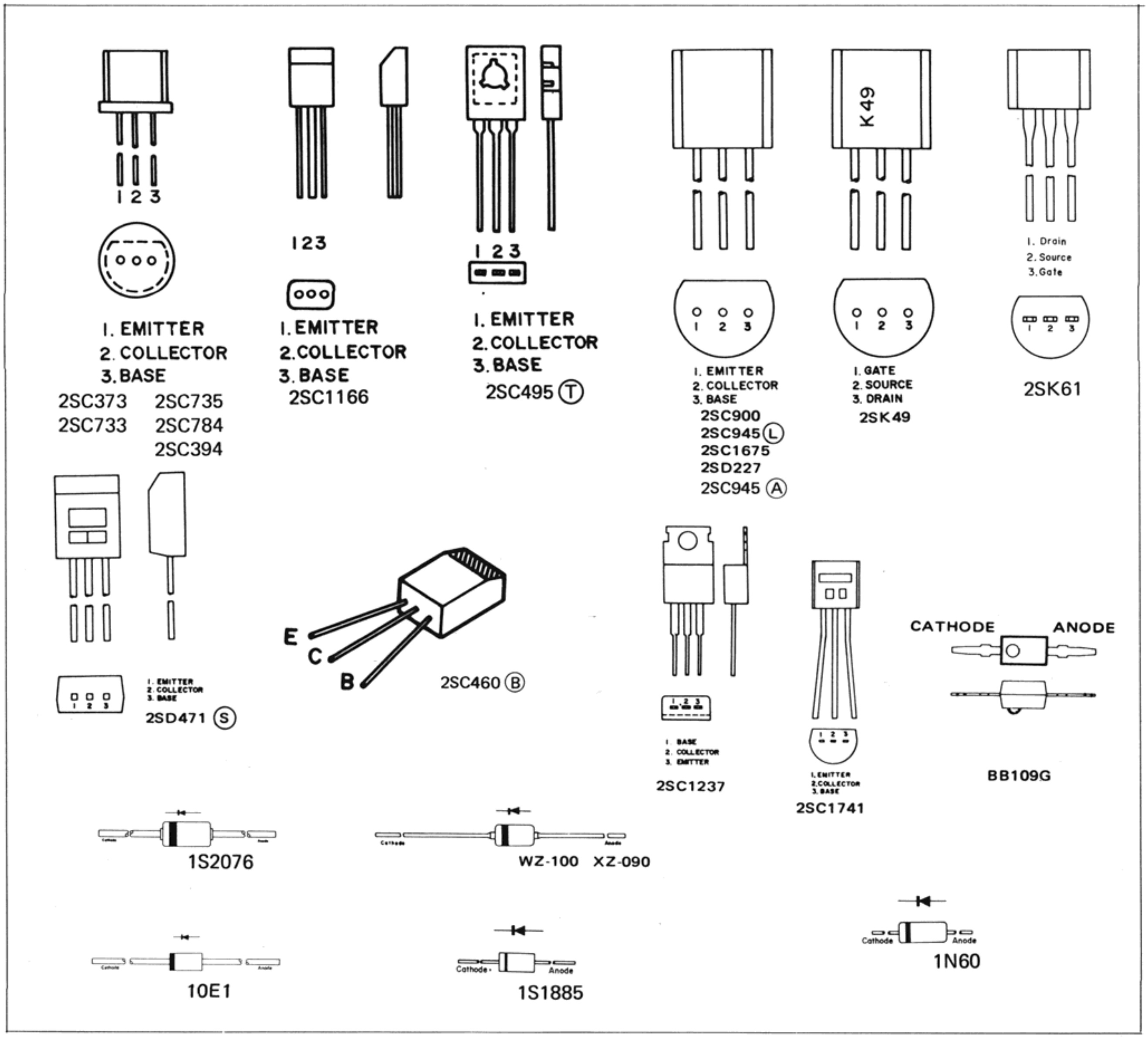


Figure 14 SEMICONDUCTORS BASING

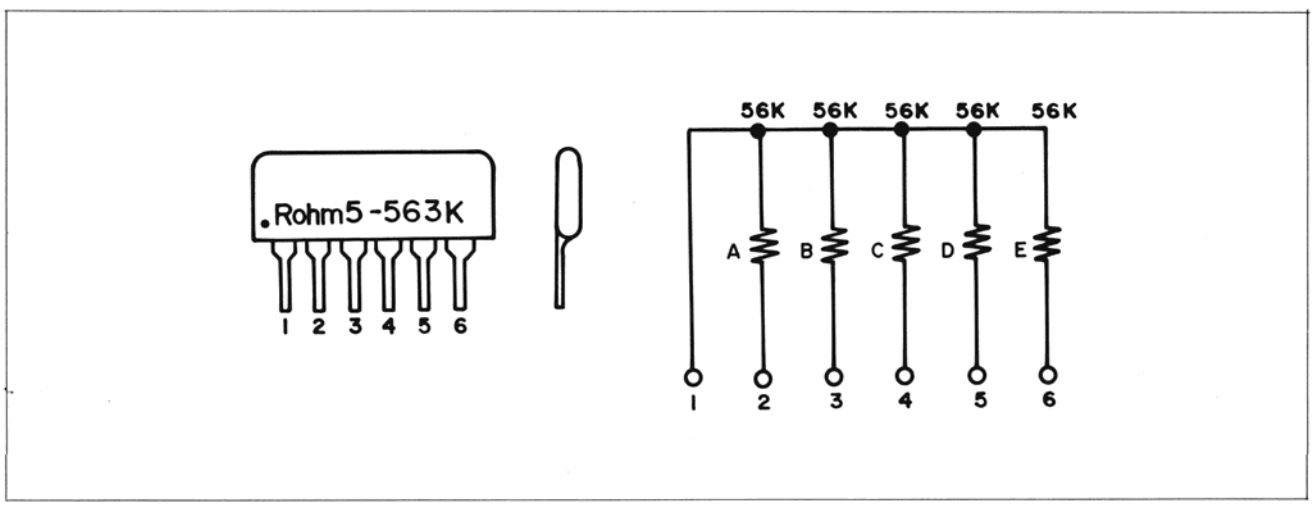


Figure 15 RESISTOR ARRAY

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

INTEGRATED CIRCUITS

REF. NO.	PART NO.	DESCRIPTION	PRICE
IC1	RH-IX1030AFZZ	2nd-IF Amplifier and Detector	
IC101	RH-IX1020AFZZ	Driver and Audio Amplifier	
IC201	RH-IX1039AFZZ	Oscillator and Divider	
IC202	RH-IX1038AFZZ	Phase Comparator and Low Pass Filter	
IC203	RH-IX1061AFZZ	Programmable Divider	

TRANSISTORS

REF. NO.	PART NO.	DESCRIPTION	PRICE
Q1	VS2SC1675M/-1 or VS2SC784-R/1F	RF Amplifier (2SC1675 M or 2SC784 R)	
Q2	VS2SC1675M/-1 or VS2SC394-Y/-1	1st-Mixer (2SC1675 M or 2SC394 Y)	
Q3	VS2SC945AK/-1 or VS2SC373-G/-1	AGC Amplifier (2SC945 AK or 2SC373)	
Q4	VS2SC945AP/-1 or VS2SC373-G/-1	AGC Amplifier (2SC945 AP or 2SC373)	
Q6	VS2SC460-B/-1 or VS2SC394-Y/-1	2nd-Mixer (2SC460 B or 2SC394 Y)	
Q101	VS2SC945LP/-1	AF Amplifier (2SC945 LP)	
Q102	VS2SD227-V/-1 or VS2SC735-Y/-1	Modulation Limiter Amplifier (2SD227 V or 2SC735 Y)	
Q103	VS2SC945AP/-1 or VS2SC373-G/-1	Modulation Limiter Amplifier (2SC945 AP or 2SC373)	
Q104	VS2SC900-U/-1 or VS2SC733-B/-1	Squelch Voltage Amplifier (2SC900 U or 2SC733 BL)	
Q201	VS2SC945AP/-1 or VS2SC373-G/-1	P.L.L. Synthesizer, Gate (2SC945 AP or 2SC373)	
Q202	VS2SC945AP/-1 or VS2SC394-Y/-1	P.L.L. Synthesizer, Buffer (2SC945 AP or 2SC394 Y)	
Q203	VS2SK49-F//-1 or VS2SK61-Y//-1	P.L.L. Synthesizer, FET, V.C.O. (Voltage Controlled Oscillator) (2SK49 F or 2SK61 Y)	
Q204	VS2SC945AP/-1 or VS2SC373-G/-1	P.L.L. Synthesizer, Buffer (2SC945 AP or 2SC373)	
Q205	VS2SC945AP/-1 or VS2SC373-G/-1	P.L.L. Synthesizer, Mixer (2SC945 AP or 2SC373)	
Q206	VS2SK61-Y//-1 or VS2SK49-F//-1	P.L.L. Synthesizer, FET, 36.960MHz Oscillator (2SK61 Y or 2SK49 F)	
Q207	VS2SD471-S/-1 or VS2SC1741//-1	P.L.L. Synthesizer, Voltage Regulator (2SD471 S or 2SC1741)	
Q301	VS2SK49-F//-1 or VS2SK61-Y//-1	Transmitter, FET, Crystal (11.275MHz) Oscillator (2SK49 F or 2SK61 Y)	
Q302	VS2SC945AP/-1 or VS2SC735-Y/-1	Transmitter, 27MHz Mixer (2SC945 AP or 2SC735 Y)	
Q303	VS2SC1166-Y-1 or VS2SC1166-O-1	Transmitter, Buffer Amplifier (2SC1166 Y or O)	
Q304	VS2SC495-T/-1	Transmitter, Driver (2SC495 T)	
Q305	VS2SC1237-/1F	Transmitter, Final (2SC1237)	

DIODES

REF. NO.	PART NO.	DESCRIPTION	PRICE
D1	VHD1S2076//-1	Static Protector (1S2076)	
D2	VHD1S2076//-1	Static Protector (1S2076)	
D3	VHEWZ-100//1F	Zener Diode, Voltage Regulator (10V ±0.5V)	
D4	VHD1N60////-1	A.N.L. (Automatic Noise Limiter) (1N60)	
D5	VHD1N60////-1	AGC Detector (1N60)	
D6	VHD1N60////-1	AGC Detector (1N60)	
D7	VHD1S2076//-1	Static Protector (1S2076)	
D8	VHD1N60////-1	S (Signal) Meter (1N60)	
D9	VHD1N60////-1	Overload (1N60)	
D101	VHD1N60////-1	Modulation Detector (1N60)	
D102	VHD1S1885//-1	Circuit Protector (1S1885)	
D103	VHD10E1////-1	Protector (10E1)	
D201	VHEXZ-090//-1	Zener Diode, Voltage Regulator (9V ±0.25V)	
D202	VHCBB109G//-1	Varicap, V.C.O. (BB109G)	
D301	VHD1S2076//-1	RF Power Meter (1S2076)	

CRYSTALS

REF. NO.	PART NO.	DESCRIPTION	PRICE
X1	RCRSB0053AFZZ	10.240MHz	
X2	RCRSB0054AFZZ	36.960MHz	
X3	RCRSB0015AFZZ	11.275MHz	
X4	RCRSB0016AFZZ	11.730MHz	

CERAMIC FILTERS

REF. NO.	PART NO.	DESCRIPTION	PRICE
CF1	RFILA0055AFZZ	455kHz, 2nd-IF	
CF2	RFILA0050AFZZ	455kHz, 2nd-IF	
CF3	RFILA0001AFZZ	455kHz	

COILS

REF. NO.	PART NO.	DESCRIPTION	PRICE
L1	RCILZ0014AGZZ	2nd-IF, 1mH	
L101	RCILC0023AFZZ	AF Choke	
L102, L103, L104	RCILC0011AFZZ	RF Choke	
L201	RCILC0024AFZZ	Low Pass Filter	
L301	RCILC0011AFZZ	RF Choke	
L302	RCILR0135AFZZ	Transmitter, Matching (Loading)	
L303	RCILR0055AFZZ	Transmitter, π-Filter	
L304	RCILC0055AFZZ	Trap, 81MHz	
L305	RCILC0055AFZZ	Trap, 54MHz	
L306	RCILR0310AFZZ	Choke	
L601, L602	RCILC0059AFZZ	Power Choke	

PARTS LIST

TRANSFORMERS

REF. NO.	PART NO.	DESCRIPTION	PRICE
T1	RCILA0377AFZZ	Antenna	
T2	RCILR0304AFZZ	RF	
T3	RCILI0210AFZZ	1st-IF (11.275MHz)	
T4	RCILI0210AFZZ	1st-IF (11.275MHz)	
T5	RCILI0154AFZZ	2nd-IF (455kHz)	
T6	RCILI0210AFZZ	2nd Local Oscillator (11.730MHz)	
T101	RTRNM0050AFZZ	Output and Modulation	
T102	RTRNC0003AFZZ	Power Choke	
T201	RCILB0383AFZZ	Voltage Controlled Oscillator	
T202	RCILI0226AFZZ	38MHz Filter	
T203	RCILB0383AFZZ	36.960MHz Oscillator	
T301	RCILB0378AFZZ	Transmitter, 11.275MHz Oscillator	
T302	RCILI0225AFZZ	Transmitter, 27MHz Filter	
T303	RCILB0221AFZZ	Transmitter, Buffer	
T304	RCILR0037AFZZ	Transmitter, Driver	

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	VCKZPU1HF103Z	.01MFD	
C5	VCKYPU1HB223M	.022MFD, 50V, ±20%, Ceramic	
C6	VCKYPU1HB472M	.0047MFD, 50V, ±20%, Ceramic	
C7	VCKZPU1HF223Z	.022MFD	
C8	VCKZPU1HF103Z	.01MFD	
C9	VCCSPU1HL2R0C	2PF, 50V, ±0.25PF, Ceramic	
C10	VCCSPU1HL150J	15PF, 50V, ±5%, Ceramic	
C11	VCKYPU1HB472M	.0047MFD, 50V, ±20%, Ceramic	
C12	VCCSPU1HL330J	33PF, 50V, ±5%, Ceramic	
C13	VCKZPU1HF103Z	.01MFD	
C15	VCKZPU1HF103Z	.01MFD	
C16	VCKZPU1HF103Z	.01MFD	
C17	VCQYKU1HM103M	.01MFD, 50V, ±20%, Mylar	
C20	VCQYKU1HM223M	.022MFD, 50V, ±20%, Mylar	
C22	VCCSPU1HL121J	120PF, 50V, ±5%, Ceramic	
C23	VCKYPU1HB102M	.001MFD, 50V, ±20%, Ceramic	
C24	VCCSPU1HL820J	82PF, 50V, ±5%, Ceramic	
C25	VCKZPU1HF103Z	.01MFD	
C26	VCKZPU1HF103Z	.01MFD	
C30	VCKYPU1SD103Z	.01MFD (Z5T), 30V, +80 −20%, Ceramic	
C31	VCCSPU1HL470J	47PF, 50V, ±5%, Ceramic	
C32	VCKZPU1HF103Z	.01MFD	
C33	VCQYKU1HM333M	.033MFD, 50V, ±20%, Mylar	
C35	VCCSPU1HL120J	12PF, 50V, ±5%, Ceramic	
C36	VCCSPU1HL470J	47PF, 50V, ±5%, Ceramic	
C37	VCCSPU1HL681J	680PF, 50V, ±5%, Ceramic	
C101	VCQYKU1HM333M	.033MFD, 50V, ±20%, Mylar	
C102	VCQYKU1HM102M	.001MFD, 50V, ±20%, Mylar	
C104	VCQYKU1HM153M	.015MFD, 50V, ±20%, Mylar	
C106	VCQYKU1HM223M	.022MFD, 50V, ±20%, Mylar	
C107	VCQYKU1HM222M	.0022MFD, 50V, ±20%, Mylar	
C108	VCQYKU1HM103M	.01MFD, 50V, ±20%, Mylar	
C109	VCQYKU1HM102M	.001MFD, 50V, ±20%, Mylar	
C119	VCKZPU1HF104Z	.1MFD	
C122	VCKZPU1HF104Z	.1MFD	
C123	VCKZPU1HF103Z	.01MFD	
C124	VCKZPU1HF103Z	.01MFD	
C125	VCQYKU1HM222M	.0022MFD, 50V, ±20%, Mylar	
C126	VCQYKU1HM333M	.033MFD, 50V, ±20%, Mylar	
C127	VCKZPU1HF103Z	.01MFD	
C131	VCKZPU1HF222Z	.0022MFD	
C201	VCCCPU1HH150J	15PF(CH), 50V, ±5%, Ceramic	
C202	RTO-H1009AFZZ	Trimmer Capacitor, 10.240MHz Oscillator	
C203	VCCCPU1HH100F	10PF(CH), 50V, ±1PF, Ceramic	
C205	VCKZPU1HF103Z	.01MFD	
C206	VCKZPU1HF103Z	.01MFD	
C207	VCKZPU1HF103Z	.01MFD	
C208	VCCCPU1HH180J	18PF(CH), 50V, ±5%, Ceramic	
C209	VCCCPU1HH100F	10PF(CH), 50V, ±1PF, Ceramic	
C210	VCKZPU1HF103Z	.01MFD	
C211	VCCUPU1HJ150J	15PF (UJ), 50V, ±5%, Ceramic	
C213	VCCCPU1HH220J	22PF (CH), 50V, ±5%, Ceramic	
C214	VCCSPU1HL680J	68PF, 50V, ±5%, Ceramic	
C215	VCQYKU1HM223M	.022MFD, 50V, ±20%, Mylar	
C216	VCCSPU1HL121J	120PF, 50V, ±5%, Ceramic	
C218	VCCCPU1HH5R0C	5PF (CH), 50V, ±0.25PF, Ceramic	
C219	VCKZPU1HF103Z	.01MFD	
C220	VCCCPU1HH5R0C	5PF (CH), 50V, ±0.25PF, Ceramic	
C222	RTO-H1009AFZZ	Trimmer Capacitor, 36.960MHz Oscillator	
C223	VCKZPU1HF103Z	.01FMD	
C224	VCKYPU1SD103Z	.01MFD (Z5T), 30V, +80 −20%, Ceramic	
C226	VCCSPU1HL390J	39PF, 50V, ±5%, Ceramic	
C227	VCKYPU1HB102M	.001MFD, 50V, ±20%, Ceramic	
C228	VCCCPU1HH5R0C	5PF (CH), 50V, ±0.25PF, Ceramic	
C230	VCCUPU1HJ120J	12PF (UJ), 50V, ±5%, Ceramic	
C231	VCKZPU1HF103Z	.01MFD	
C232	VCKZPU1HF103Z	.01MFD	
C233	VCCSPU1HL680J	68PF, 50V, ±5%, Ceramic	
C301	VCCSPU1HL560J	56PF, 50V, ±5%, Ceramic	
C302	VCKZPU1HF103Z	.01MFD	
C304	VCCSPU1HL330J	33PF, 50V, ±5%, Ceramic	
C305	VCCSPU1HL101J	100PF, 50V, ±5%, Ceramic	
C308	VCKZPU1HF103Z	.01MFD	
C309	VCKZPU1HF103Z	.01MFD	
C310	VCCSPU1HL151J	150PF, 50V, ±5%, Ceramic	
C311	VCCSPU1HL180J	18PF, 50V, ±5%, Ceramic	
C312	VCKZPU1HF103Z	.01MFD	
C313	VCKZPU1HF103Z	.01MFD	
C314	VCCSPU1HL221J	220PF, 50V, ±5%, Ceramic	
C315	VCCSPU1HL471J	470PF, 50V, ±5%, Ceramic	
C316	VCCSPU1HL220J	22PF, 50V, ±5%, Ceramic	
C317	VCKYPU1SD103Z	.01MFD (Z5T), 30V, +80 −20%, Ceramic	
C318	VCCSPU1HL511J	510PF, 50V, ±5%, Ceramic	
C319	VCKYPU1SD103Z	.01MFD (Z5T), 30V, +80 −20%, Ceramic	
C320	VCKYPU1SD103Z	.01MFD (Z5T), 30V, +80 −20%, Ceramic	
C321	VCCSPU1HL181J	180PF, 50V, ±5%, Ceramic	

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	PRICE
C322	VCCSPU1HL680J	68PF, 50V, ±5%, Ceramic	
C324	VCCSPU1HL220J	22PF, 50V, ±5%, Ceramic	
C325	VCCSPU1HL560J	56PF, 50V, ±5%, Ceramic	
C326	VCKZPU1HF103Z	.01MFD	
C327	VCCSPU1HL101J	100PF, 50V, ±5%, Ceramic	
C328	VCCSPU1HL4R0C	4PF, 50V, ±0.25PF, Ceramic	
C329	VCCSPU1HL560J	56PF, 50V, ±5%, Ceramic	
C330	VCCSPU1HL220J	22PF, 50V, ±5%, Ceramic	
C402	VCKYPU1SD103Z	.01MFD (Z5T), 30V, +80 −20%, Ceramic	
C404	VCKZPU1HF103Z	.01MFD	
C405	VCKZPU1HF103Z	.01MFD	
C406	VCKZPU1HF223Z	.022MFD	
C407	VCKZPU1HF103Z	.01MFD	
C408	VCKZPU1HF103Z	.01MFD	
C409	VCKZPU1HF103Z	.01MFD	
C410	VCKYPU1HB103M	.01MFD, 50V, ±20%, Ceramic	
C411	VCKYPU1SD103Z	.01MFD (Z5T), 30V, +80 −20%, Ceramic	
C412	VCKYPU1SD103Z	.01MFD (Z5T), 30V, +80 −20%, Ceramic	
C414	VCKZPU1HF103Z	.01MFD	
C420	VCCSPU1HL151J	150PF, 50V, ±5%, Ceramic	
C421	VCCSPU1HL151J	150PF, 50V, ±5%, Ceramic	
C422	VCCSPU1HL151J	150PF, 50V, ±5%, Ceramic	
C423	VCCSPU1HL151J	150PF, 50V, ±5%, Ceramic	
C424	VCKZPU1HF103Z	.01MFD	
C601	VCKZPU1HF103Z	.01MFD	
C602	VCCSPU1HL221J	220PF, 50V, ±5%, Ceramic	
C603	VCCSPU1HL221J	220PF, 50V, ±5%, Ceramic	
C604	VCKZPU1HF103Z	.01MFD	
C701	VCCSPU1HL820J	82PF, 50V, ±5%, Ceramic	
C702	VCCSPU1HL330J	33PF, 50V, ±5%, Ceramic	
C703	VCQYKU1HM153M	.015MFD, 50V, ±20%, Mylar	

ELECTROLYTIC CAPACITORS

REF. NO.	PART NO.	DESCRIPTION	PRICE
C14	VCEAAU1AW107Y	100MFD, 10V, +50 −10%	
C18	VCEAAU1CW106Y	10MFD, 16V, +50 −10%	
C27	VCEAAU1HW105A	1MFD, 50V, +75 −10%	
C28	VCEAAU1EW475A	4.7MFD, 25V, +75 −10%	
C29	VCEAAU1CW106Y	10MFD, 16V, +50 −10%	
C34	VCEAAU1CW106Y	10MFD, 16V, +50 −10%	
C103	VCEAAU1EW475A	4.7MFD, 25V, +75 −10%	
C105	VCEAAU1CW106Y	10MFD, 16V, +50 −10%	
C110	VCEAAU1CW476Y	47MFD, 16V, +50 −10%	
C111	VCEAAU1AW336Y	33MFD, 10V, +50 −10%	
C112	VCSATU1VF104M	.1MFD, 35V, ±20%, Tantalum	
C113	VCEAAU1CW476Y	47MFD, 16V, +50 −10%	
C114	VCSATU1VF104M	.1MFD, 35V, ±20%, Tantalum	
C115	VCEAAU1AW477Y	470MFD, 10V, +50 −10%	
C116	VCEAAU1CW108Y	1000MFD, 16V, +50 −10%	
C117	VCEAAU1EW475A	4.7MFD, 25V, +75 −10%	
C118	VCEAAU1CW106Y	10MFD, 16V, +50 −10%	
C128	VCEAAU1CW106Y	10MFD, 16V, +50 −10%	
C204	VCEAAU1HW105A	1MFD, 50V, +75 −10%	
C212	VCAAAU1AB105M	.1MFD, 10V, ±20%, Aluminum	
C217	VCEAAU1CW106Y	10MFD, 16V, +50 −10%	
C225	VCEAAU1AW107Y	100MFD, 10V, +50 −10%	
C229	VCEAAU1AW108Y	1000MFD, 10V, +50 −10%	
C323	VCAAKU0XA474M	.47MFD, 6.3V, ±20%, Aluminum	
C413	VCEAAU1CW106Y	10MFD, 16V, +50 −10%	

RESISTORS

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

REF. NO.	PART NO.	DESCRIPTION	PRICE
R1	VRD-SU2EY562J	5.6K ohm	
R2	VRD-SU2EY152J	1.5K ohm	
R3	VRD-ST2EE102J	1K ohm	
R5	VRD-SU2EY333J	33K ohm	
R6	VRD-SU2EY472J	4.7K ohm	
R7	VRD-SU2EY102J	1K ohm	
R9	VRD-SU2EY153J	15K ohm	
R10	VRD-SU2BY102J	1K ohm, 1/8W, ±5%, Carbon	
R12	VRD-ST2EE151J	150 ohm	
R13	VRD-SU2EY472J	4.7K ohm	
R14	VRD-SU2EY223J	22K ohm	
R15	VRD-SU2EY153J	15K ohm	
R16	VRD-SU2EY223J	22K ohm	
R17	VRD-SU2EY124J	120K ohm	
R19	RVR-M0119AFZZ	5K (B) ohm, Pot., S (Signal) Meter Adjust	
R20	VRD-ST2EE224J	220K ohm	
R21	VRD-ST2EE223J	22K ohm	
R22	VRD-ST2EE272J	2.7K ohm	
R23	VRD-ST2EE471J	470 ohm	
R24	VRD-ST2EE224J	220K ohm	
R25	VRD-ST2EE333J	33K ohm	
R29	VRD-ST2EE103J	10K ohm	
R30	VRD-ST2EE472J	4.7K ohm	
R31	VRD-ST2EE473J	47K ohm	
R32	VRD-SU2EY103J	10K ohm	
R35	VRD-SU2EY333J	33K ohm	
R36	VRD-SU2EY472J	4.7K ohm	
R37	VRD-SU2EY222J	2.2K ohm	
R38	VRD-ST2EE122J	1.2K ohm	
R39	VRD-ST2EE473J	47K ohm	
R40	VRD-SU2EY100J	10 ohm	
R41	VRD-ST2EY683J	68K ohm	
R102	VRD-ST2EE331J	330 ohm	
R103	VRD-ST2EY104J	100K ohm	
R104	VRD-ST2EE154J	150K ohm	
R105	VRD-ST2EE153J	15K ohm	
R106	VRD-ST2EE102J	1K ohm	
R107	VRD-ST2EE103J	10K ohm	
R108	VRD-ST2EE331J	330 ohm	
R109	VRD-ST2EE222J	2.2K ohm	
R110	VRD-ST2EE333J	33K ohm	
R111	VRD-ST2EE2R2J	2.2 ohm	
R112	RVR-M0116AFZZ	1K (B) ohm, Modulation Level Adjust	
R113	VRD-ST2EE103J	10K ohm	
R114	VRD-SU2EY222J	2.2K ohm	
R115	VRD-ST2EE220J	22 ohm	
R116	VRD-ST2EY332J	3.3K ohm	
R117	VRS-PT3DB2R2K	2.2 ohm, 2W, ±10%, Oxide Film	
R202	VRD-ST2EY563J	56K ohm	
R203	VRD-SU2EY103J	10K ohm	
R204	VRD-SU2EY222J	2.2K ohm	
R205	VRD-ST2EY224J	220K ohm	
R206	VRD-SU2EY151J	150 ohm	
R207	VRD-SU2EY471J	470 ohm	

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	PRICE
R208	VRD-ST2EY823J	82K ohm	
R209	VRD-SU2EY331J	330 ohm	
R210	VRD-SU2EY105J	1 Meg ohm	
R216	VRD-SU2EY104J	100K ohm	
R217	VRD-ST2EY104J	100K ohm	
R218	VRD-SU2EY122J	1.2K ohm	
R219	VRD-SU2EY124J	120K ohm	
R220	VRD-SU2EY102J	1K ohm	
R221	VRD-SU2EY154J	150K ohm	
R222	VRD-ST2EY105J	1 Meg ohm	
R223	VRD-ST2EE470J	47 ohm	
R224	VRD-SU2EY182J	1.8K ohm	
R225-A~E	RMPTC0003AFZZ	Resistor Array, 56K ohm x 5	
R226	VRD-SU2EY563J	56K ohm	
R301	VRD-ST2EE105J	1 Meg ohm	
R302	VRD-SU2EY102J	1K ohm	
R304	VRD-ST2EE223J	22K ohm	
R305	VRD-ST2EE332J	3.3K ohm	
R306	VRD-ST2EE101J	100 ohm	
R307	VRD-ST2EE470J	47 ohm	
R308	VRD-ST2EE223J	22K ohm	
R309	VRD-ST2EE332J	3.3K ohm	
R310	VRD-ST2EE101J	100 ohm	
R311	VRD-ST2EE101J	100 ohm	
R312	VRD-SU2EY680J	68 ohm	
R313	VRD-ST2HA220K	22 ohm, 1/2W, ±10%, Carbon	
R314	VRD-ST2HA471J	470 ohm, 1/2W, ±5%, Carbon	
R315	VRD-ST2EE332J	3.3K ohm	
R316	VRD-ST2EE392J	3.9K ohm	
R318	VRD-ST2HA220K	22 ohm, 1/2W, ±10%, Carbon	
R319	RVR-M0010AFZZ	30K (B) ohm, Pot., RF Power Meter Adjust	
R701/ SW2-A, B	RVR-B0137AFZZ	10K (B) ohm, Squelch/P.A. Switch	
R702/ SW1	RVR-D0104AFZZ	5K (D) ohm, Off-On/Volume Control	
R703	VRD-ST2HA220K	22 ohm, 1/2W, ±10%, Carbon	

MISCELLANEOUS

REF. NO.	PART NO.	DESCRIPTION	PRICE
	GCAB-3031AFSA	Cabinet, Top	
	GCABA3432AFSA	Cabinet, Bottom	
	GWAKP1064AFSA	Front Panel	
	HDALP0363AFSA	Drum, Channel	
	HINDM1121AFSA	Indication Metal, 40 Channel	
	JHNDM3051AF00	Mobile Mounting Bracket	
	JKNBM0236AFSA	Knob, A.N.L. Switch and Delta Fine Tuning Switch	
	JKNBN0097AFSA	Knob, Channel Selector	
	JKNBN0098AFSA	Knob, Off-On/Volume and Squelch/P.A. Switch	
	LBSHZ0051AFZZ	Bushing, Transistor Q305	
	LCHSZ0055AFFN	Chassis, Front	
	LX-BZ0021AGFD	Bolt (5ϕ x 8mm)	
	LX-BZ0053AFFD	Bolt (5ϕ x 10mm)	
	LX-NZ0052AFFD	Nut, Front Chassis	
	PCAPH0001AGZZ	Cap, A.N.L. Switch	
	PCOVM8052AF00	Cover, A.N.L. and Delta Fine Tuning Switches	
	PCOVU7105AFZZ	Meter Cover, Shade	
	PCOVU8040AF00	Cover, Volume and Squelch Control	
	PCUSU0157AF00	Cushion, Meter	
	PCOVS3058AFFW	Shield Cover, P.C. Board Component Side	
	PCOVS3059AFFW	Sheild Cover, P.C. Board Wiring Side	
	PCUSS0081AF00	Sponge, Shield Cover (P.C.B. Wiring Side)(50 x 30 x 7mm)	
	PCUSS0082AF00	Sponge, Bottom Cabinet, Top Cabinet (50 x 20 x 3mm)	
	PCUSS0084AF00	Sponge, Bottom Cabinet, Top Cabinet (140 x 8 x 3mm)	
	PCUSS0085AF00	Sponge, Bottom Cabinet (75 x 8 x 3mm)	
	PCUSS0086AF00	Sponge, Shield Cover (P.C.B. Wiring Side)(30 x 15 x 9mm)	
	PCOVU3108AF00	Cover, Lens	
	PLNS-0008AFSA	Lens, Channel Indicator	
	PFLT-0127AF00	Felt, Chassis (60 x 13 x 0.5mm)	
	PFLT-0301AF00	Felt, Top Cabinet, Bottom Cabinet (130 x 7mm)	
	PFLT-0303AF00	Felt, Bottom Cabinet (105 x 50mm)	
	PGUMM0002AF00	Rubber Washer, Mounting Bracket	
	PGUMM0113AFZZ	Rubber, Shield Cover (P.C.B. Component Side)	
	PHAG-8001AFFC	Hanger, Microphone	
	PRDAR0121AFFW	Heat Sink, Transistors (Q304 and Q305)	
	PRDAR0122AFFW	Heat Sink, Integrated Circuit IC101	
CNP601	QCNCM0503SGZZ	Plug, 5 Pin	
CNP602	QCNCM0806SGZZ	Plug, 8 Pin	
CNP603	QCNCM0902AGZZ	Plug, 9 Pin	
CNP604	QCNCM110HAFZZ	Plug, 8 Pin (U-bend)	
CNP605	QCNCM111KAFZZ	Plug, 10 Pin (U-bend)	
CNP606	QCNCM131BAFZZ	Plug, 2 Pin	
CNS601, CNS602-A, CNS603, CNS604, CNS605	QCNW-0138AFZZ	Connection Cord with Socket Assembly	
CNS602-B	QCNW-0195AFZZ	Connection Cord with Socket, Microphone	
CNS606	QCNW-0194AFZZ	Connection Cord with Socket, Speaker	
F1	QFS-A232AAFNA	Fuse, 2.3 Ampere	
	QFSHJ9052AFZZ	Power Supply Cord with Fuse Holder and Socket	
J601-A, B	QJAKB0050AFZZ	Jack, External Speaker (J601-A) and P.A. Speaker (J601-B)	
	QPLGE0403AGZZ	Plug, Test Point $\boxed{309}$ and $\boxed{310}$	
	QPWBF0576AFZZ	Printed Circuit Board, Main Circuit	
	QPWBF0578AFZZ	Printed Circuit Board, Volume	
	QPWBF0580AFZZ	Printed Circuit Board, Power Supply	
	QSOCE0401AFZZ	Socket, Test Point $\boxed{309}$ and $\boxed{310}$	
PG601	QSOCZ2464AFZZ	Plug, Power Supply	
SO601	QSOCZ2453AFZZ	Socket, External Antenna (50 ohms)	
SO602	QSOCZ2465AFZZ	Socket, Microphone	

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	PRICE
SW1/ R702	RVR-D0104AFZZ	5K (D) ohm, Off-On/Volume Control	
SW2-A, B/R701	RVR-B0137AFZZ	10K (B) ohm, Squelch/P.A. Switch	
SW3	QSW-B0028AGZZ	Switch, A.N.L.	
SW4	QSW-R0139AFZZ	Switch, Channel Selector	
SW5	QSW-B0003AFZZ	Switch, Delta Fine Tuning	
SW6-A ~D/ RY101	RRLYZ0007AFZZ	Relay with Receiver /Transmitter Switch	
C120, C121	RC-KZ1009AFZZ	Feed Through Capacitors with Bracket	
	RCORF0050AFZZ	Ferrite Core	
PL1	RLMPM0058AFZZ	Lamp, Illumination (14V, 80mA)	
	RMICD0206AFZZ	Microphone Assembly (with Press-to-talk Switch)	
ME601	RMTRE0061AFZZ	Meter, Signal/RF Power	
SP601	VSP0080P-208A	Speaker, 8 ohms	
	XBBSC30W08000	Screw ($3\phi \times 8$mm), Plus and Minus	
	XNESD50-40000	Nut (5ϕ)	
	XWHSD30-05000	Washer (3ϕ)	
	XWHSD50-05000	Washer (5ϕ)	
	XWSSJ50-13000	Spring Washer (5ϕ)	