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Realistic TRC-454 Service Manual

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REALISTIC[®]

Service Manual

21-1543

TRC-454

C.B. 40-CHANNEL, HANDSET BASE/MOBILE TRANSCEIVER

Catalog Number: 21-1543



CUSTOM MANUFACTURED FOR RADIO SHACK  A DIVISION OF TANDY CORPORATION

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SPECIFICATIONS

GENERAL SPECIFICATIONS

Transmitter	PLL frequency synthesizer, amplitude modulation
Receiver	PLL frequency synthesizer, double heterodyne system
Communicating frequencies	CB, 40 channels
Operating voltage	100-130 V AC/11-16 V DC (positive or negative ground)
Transmitter/Receiver switching	Electronic
Channel selection	Channel scanning circuitry with LED channel indicator

STANDARD TEST CONDITIONS

Supply voltage	13.8 V DC or 120 V AC
Modulation	1 kHz, 30%
Audio output power	500 mW
Audio output load	8 ohms

Antenna impedance 50 ohms (non-inductive load)
 Measurement channel CH. 19
 Ambient conditions
 Temperature 25°C ± 5°C
 Humidity 50% to 70%

RECEIVER SPECIFICATIONS

MEASUREMENT ITEMS	NOMINAL	LIMIT
1. Max. Sensitivity	0.3 μ V	0.5 μ V
2. Sensitivity for 10 dB S/N	0.5 μ V	1.0 μ V
3. Squelch Sensitivity at THD	0.5 μ V	1.0 μ V
4. Squelch Sensitivity at Tight	1 mV	500 – 2000 μ V
5. AGC Figure of Merit (RF input 50 mV, AF – 10 dB)	86 dB	80 dB
6. Overload AGC Characteristics from 50 mV to 1 V		+6 dB, –2 dB
7. Overall Audio Fidelity		
Upper Frequency 2500 Hz	–6 dB	–6 ± 3 dB
Lower Frequency 450 Hz	–6 dB	–6 ± 3 dB
8. Adjacent Channel Selectivity at ±10 kHz	70 dB	60 dB
9. Max. Audio Output Power	5.0 W	4.0 W
10. Audio Output Power at 10% THD	4.0 W	3.0 W
11. THD at 500 mW Output		
RF input 1 mV, 30% Mod.	2%	4%
50% Mod.	4%	6%
80% Mod.	6%	8%
12. S/N Ratio at 1 mV Input	40 dB	35 dB
13. Image Rejection Ratio (1st IF/2nd IF)	76/60 dB	60/50 dB
14. ½ IF Rejection Ratio (2nd IF)	70 dB	60 dB
15. IF Rejection Ratio (1st IF/2nd IF)	70/110 dB	60/100 dB
16. Spurious Rejection Ratio	70 dB	60 dB
17. Skirt Rejection at 20 kHz Single Signal	80 dB	70 dB
18. Cross Modulation	60 dB	50 dB
19. Desensitivity at 1 μ V/10 μ V/100 μ V/1000 μ V desired 20 kHz away, 3 dB desens.	70/64/62/60 dB	60/57/55/50 dB
20. RF Control Range at S/N 10 dB Sens. level	30 dB	24 dB
21. S Meter Sensitivity at "S9"	100 μ V	50 – 200 μ V
22. Delta Tune Frequency +/-	1 kHz	1.3 kHz
23. Oscillator Drop-out Voltage	10.5 V	11.0 V
24. Current Drain at No Signal (DC/AC)	350/170 mA	450/250 mA
at Max. Output Power (DC/AC)	900/250 mA	1200/350 mA
25. Mic Output for 500 mW Audio Standard Output	0.5 mW	0.2 – 1.0 mW

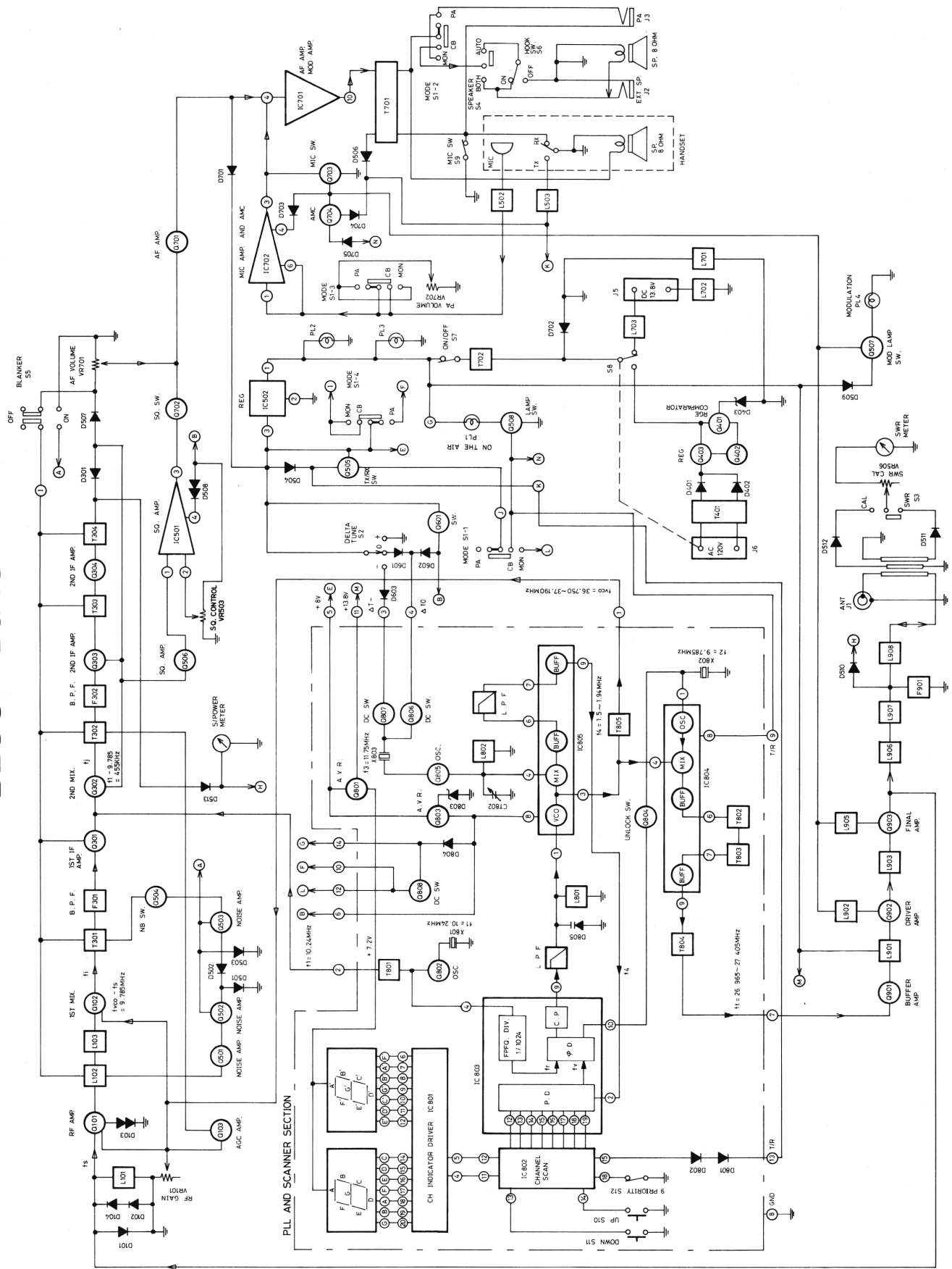
TRANSMITTER SPECIFICATIONS

MEASUREMENT ITEMS	NOMINAL	LIMIT
1. Frequency Tolerance (5 min. after power on)		± 1350 Hz
2. Carrier Power, No Modulation (DC/AC)	4.0 W	3.6 – 4.4 W
3. Modulation Attack Time	20 mSec.	25 mSec.
4. Modulation Release Time	250 mSec.	100 – 500 mSec.
5. Modulation Distortion at 1 kHz, 80% Mod.	3.0%	8.0%
6. Spurious Emission 2nd/3rd/4th/5th/6th/7th/8th 9th/10th		60 dB
7. Modulation Capability Pos./Neg.	95%	80%
8. Current Drain at No Mod. (DC/AC)	1100/300 mA	1400/400 mA
at 80% Mod. (DC/AC)	1600/400 mA	1800/500 mA
9. Modulation Frequency Response (1 kHz, 0 dB Ref.)		
Lower at 450 Hz	–6 dB	–6 ± 3 dB
Upper at 2.5 kHz	–6 dB	–6 ± 3 dB
10. Carrier Power Uniformity, Ch. to Ch. at No Mod.	0.2 W	0.5 W
11. Microphone Sensitivity for 50% Mod.	0.5 mV	1.0 mV
12. AMC Range between 50 and 100%	56 dB	50 dB
13. Occupied Bandwidth +/- 5.0 kHz		25 dB
7.5 kHz		25 dB
10.0 kHz		35 dB
12.5 kHz		35 dB
15.0 kHz		35 dB
17.5 kHz		35 dB
20.0 kHz		35 dB
22.5 kHz		59 dB

PUBLIC ADDRESS SPECIFICATIONS

MEASUREMENT ITEMS	NOMINAL	LIMIT
1. Max. Output Power at 10 mV AF input (DC/AC)	5.0 W	4.0 W
2. 10% THD Output Power (DC/AC)	4.0 W	3.5 W
3. Microphone Sensitivity for 4 W PA Output Power at 1 kHz	5 mV	10 mV
4. Frequency Response at –6 dB Down		
Lower	300 Hz	450 Hz
Upper	2700 Hz	2500 Hz
5. Current Drain at Max. Power (DC/AC)	1.0 A	1.3 A

BLOCK DIAGRAM



CIRCUIT DESCRIPTION

A PLL frequency synthesizer system is used in this transceiver. This system allows you to select any of 40 channels from 26.965 to 27.405 MHz using only three crystals.

PHASE-LOCKED-LOOP FREQUENCY SYNTHESIZER LOGIC (look at the BLOCK DIAGRAM)

A standard frequency (f1) is generated by X801 crystal; this is divided by the FREQUENCY DIVIDER (FREQ. DIV.) and another reference frequency (fr) will be produced at the output of the FREQUENCY DIVIDER.

The FREQUENCY DIVIDER is set up for

$$F = \frac{1}{2} \times \frac{1}{512} = \frac{1}{1024} \text{ (Fixed)}$$

Reference Frequency

$$fr = 10.240 \text{ MHz} \times F$$

$$\text{I.E. } fr = 10.240 \text{ MHz} \times 1/1024 \\ = 10 \text{ kHz}$$

The VOLTAGE CONTROLLED OSCILLATOR (VCO) frequency (fvco) is mixed in MIXER (MIX) of IC805 with the Local Oscillator Frequency (f3) derived from crystal X803 (11.750 MHz) and Q805 which is an oscillator/tripler. This frequency is processed to the LOW-PASS FILTER (L.P.F. which is connected between (6) and (7) of IC805) and a new frequency (f4) results at the output (9) of IC803.

$$f4 = fvco - f3 \times 3 \quad (\text{shown in Chart-1})$$

Eg. Channel 20

$$f4 = 36.990 \text{ MHz} - 11.750 \text{ MHz} \times 3 \\ = 36.990 \text{ MHz} - 35.250 \text{ MHz} \\ = 1.74 \text{ MHz}$$

The heterodyning frequency (f4) is fed to the PROGRAMMABLE DIVIDER (P.D.). The PROGRAMMABLE DIVIDER divides the heterodyning frequency (f4) to 10 kHz by varying the factor "Np" from 150 to 194. Np is controlled by the channel scan IC IC802 which is connected to pins (14) thru (19) of IC801.

$$\text{Variable Frequency } fv = f4/Np$$

PROGRAMMABLE DIVIDER determines Np

$$Np = 150 \text{ to } 194 \quad (\text{shown in Chart-1})$$

Eg. Channel 20

$$Np = 174 \\ fv = 1.74 \text{ MHz}/174 = 10 \text{ kHz}$$

This is how the frequency increments are generated. Now to the PLL.

"fr" and "fv" are compared in the PHASE DETECTOR (φ.D.), which generates a D.C. voltage proportional to the phase difference between fr and fv; this appears at the output terminal of the CHARGE PUMP (C.P.) (Pin (9) of IC803). This D.C. voltage is applied to VCO of IC805 through the LOW-PASS FILTER (L.P.F.), and thus the VCO frequency (fvco) is controlled by this D.C. voltage (the variable capacitance diode D805 changes capacitance in proportion to the reverse bias applied). The PHASE DETECTOR will continuously produce a voltage as long as any phase difference is present.

If there is no phase difference, the PLL circuit will be "locked" (fvco) as follows;

$$fr = fv$$

$$f1 \times F = f4/Np$$

$$f1 \times F = (fvco - f3 \times 3)/Np$$

$$fvco = (f1 \times F \times Np) + 3f3 \quad (\text{shown in Chart-1})$$

Eg. Channel 20

$$fvco = (10.240 \text{ MHz} \times 1/1024 \times 174) + 3 \times 11.750 \text{ MHz} \\ = 10 \text{ kHz} \times 174 + 35.250 \text{ MHz} \\ = 36.990 \text{ MHz}$$

TRANSMITTER (again, look at the BLOCK DIAGRAM)

The VCO frequency (f_{vco}) is added to the MIXER of IC804 and is converted to (f_t) by mixing with the local oscillator frequency (f_2) of crystal controlled oscillator of IC804 as follows;

$$\begin{aligned}\text{Transmitter frequency } f_t &= f_{vco} - f_2 \\ &= f_{vco} - 9.785 \text{ MHz (shown in Chart-1)}\end{aligned}$$

Eg. Channel 20

$$\begin{aligned}f_t &= 36.990 \text{ MHz} - 9.785 \text{ MHz} \\ &= 27.205 \text{ MHz}\end{aligned}$$

f_t is processed to the final RF amplifier (Q903) through T802, T803, T804, Q901, L901, Q902 and L903. The DRIVER (Q902) and the final RF amplifier (Q903) are modulated by IC701 through T701. **IC702 functions as the Automatic Modulation Control (AMC).** The microphone input signal is added to Pin (1) of IC702 through the attenuator and is amplified. As a part of this signal is rectified in IC702, the impedance at Pin (6) of IC702 varies in proportion to the input signal level. If an over-modulated microphone input signal is applied to IC702, the input impedance of IC702 will drop. Therefore the modulation capability does not exceed 100 percent.

Over modulation control with variation of power supply voltage:

The power supply voltage is applied to Pin (8) of IC702. The threshold level of rectifier circuit of IC702 changes in proportion to the power supply voltage. Therefore the modulation capability does not exceed 100 percent. The AMC response (Transient) is determined by C711 and R714 at Pin (4) of IC702.

A special inhibit circuit is used in this transceiver to prevent any undesired signal from being transmitted.

Instant Stop circuit: If there is a phase difference between (f_r) and (f_v) in the PHASE DETECTOR, the unlock DC voltage (which is proportional to the phase difference is generated from Pin (10) of IC803) is applied to the base of Q804. Therefore the oscillator of IC804 will not work. In receive mode, as the D.C. voltage (+8.0 V) is applied to the base of Q505, Q505 will be turned "OFF" and the supply voltage to Pin (8) of IC804 will be removed. Therefore the oscillator of IC804 will not work.

Any spurious radiation near 27 MHz is reduced or eliminated by IC804, IC805, L802, Band-Pass Filter (T802, T803, T804), L901 and L903. Also, any harmonic content of the Transmitter's RF output is reduced or eliminated by L901 thru L908, and F901.

RECEIVER (as shown in BLOCK DIAGRAM)

The incoming signals (f_s) are amplified by the RF amplifier (Q101) and converted to the 1st I.F. (f_i) by the 1ST MIXER (Q102), using (f_{vco}) as the local oscillator signal, as follows:

$$\begin{aligned}\text{1st I.F. } f_i &= f_{vco} - f_s \\ &= 9.785 \text{ MHz}\end{aligned}$$

Eg. Channel 20

$$\begin{aligned}f_i &= 36.990 \text{ MHz} - 27.205 \text{ MHz} \\ &= 9.785 \text{ MHz}\end{aligned}$$

As the standard frequency (f_1) derived from X801 is added to the 2ND MIXER (Q302), the 1st I.F. (f_i) is converted to the 2nd I.F. (f_j) as follows;

$$\begin{aligned}\text{2nd I.F. } f_j &= f_1 - f_i \\ &= 455 \text{ kHz} \\ f_j &= 10.240 \text{ MHz} - 9.785 \text{ MHz} \\ &= 455 \text{ kHz}\end{aligned}$$

The second I.F. is applied through T302, F302, T303, amplified by Q303 and Q304 and applied to T304. The output signal of the DETECTOR (D301) is amplified by the AF amplifier (Q701 and IC701) through the network of the Automatic Noise Limiter circuit and the audio signal is processed to the speaker.

The Transceiver also has a DELTA TUNE circuit. In Receive mode, the local oscillator frequency (f_3) derived from X803 [crystal controlled oscillator (Q805)] can be varied from plus to zero to minus by switching transistor Q807 or Q806. The transceiver also incorporates a NOISE BLANKER circuit, which is composed of Q501, Q502, D501, D502, D503, Q503 and Q504 (to reduce impulse-type interference).

Chart-1

Channel	Np	f4	fvco	ft
1	150	1.50 MHz	36.750 MHz	26.965 MHz
2	151	1.51	36.760	26.975
3	152	1.52	36.770	26.985
4	154	1.54	36.790	27.005
5	155	1.55	36.800	27.015
6	156	1.56	36.810	27.025
7	157	1.57	36.820	27.035
8	159	1.59	36.840	27.055
9	160	1.60	36.850	27.065
10	161	1.61	36.860	27.075
11	162	1.62	36.870	27.085
12	164	1.64	36.890	27.105
13	165	1.65	36.900	27.115
14	166	1.66	36.910	27.125
15	167	1.67	36.920	27.135
16	169	1.69	36.940	27.155
17	170	1.70	36.950	27.165
18	171	1.71	36.960	27.175
19	172	1.72	36.970	27.185
20	174	1.74	36.990	27.205
21	175	1.75	37.000	27.215
22	176	1.76	37.010	27.225
23	179	1.79	37.040	27.255
24	177	1.77	37.020	27.235
25	178	1.78	37.030	27.245
26	180	1.80	37.050	27.265
27	181	1.81	37.060	27.275
28	182	1.82	37.070	27.285
29	183	1.83	37.080	27.295
30	184	1.84	37.090	27.305
31	185	1.85	37.100	27.315
32	186	1.86	37.110	27.325
33	187	1.87	37.120	27.335
34	188	1.88	37.130	27.345
35	189	1.89	37.140	27.355
36	190	1.90	37.150	27.365
37	191	1.91	37.160	27.375
38	192	1.92	37.170	27.385
39	193	1.93	37.180	27.395
40	194	1.94	37.190	27.405

F	1/1024
---	--------

Np: a factor of PROGRAMMABLE COUNTER

ft: Transmitter Frequency

f4: Heterodyning Frequency

F: a factor of FREQUENCY DIVIDER

fvco: VCO Frequency

Chart-2

(SWITCH DATA)

CH	$\bar{D}1$	$\bar{D}2$	$\bar{D}3$	$\bar{D}4$	$\bar{D}5$	$\bar{D}6$
1	○	○			○	
2			○		○	
3	○		○		○	
4	○	○	○		○	
5				○	○	
6	○			○	○	
7		○		○	○	
8			○	○	○	
9	○		○	○	○	
10		○	○	○	○	
11	○	○	○	○	○	
12	○					○
13		○				○
14	○	○				○
15			○			○
16		○	○			○
17	○	○	○			○
18				○		○
19	○			○		○
20	○	○		○		○
21			○	○		○
22	○		○	○		○
23					○	○
24		○	○	○		○
25	○	○	○	○		○
26	○				○	○
27		○			○	○
28	○	○			○	○
29			○		○	○
30	○		○		○	○
31		○	○		○	○
32	○	○	○		○	○
33				○	○	○
34	○			○	○	○
35		○		○	○	○
36	○	○		○	○	○
37			○	○	○	○
38	○		○	○	○	○
39		○	○	○	○	○
40	○	○	○	○	○	○

Note:

○ Mark : Closed

Blank : Open

Off-Set : 131

DISASSEMBLY INSTRUCTIONS

Refer to Figures 1 thru 3.

1. Remove 4 Knobs (81) and (82) .
2. Remove Special Nut (85) and Washer which comes with SWR CALibration Control.
3. Remove 8 screws (shown in Figure 2) on Cabinet bottom.
4. Remove 3 Stud Nuts (92) and Pan Head Tapping Screw (121) on Chassis assembly.
5. Pull out Chassis assembly from Cabinet top.

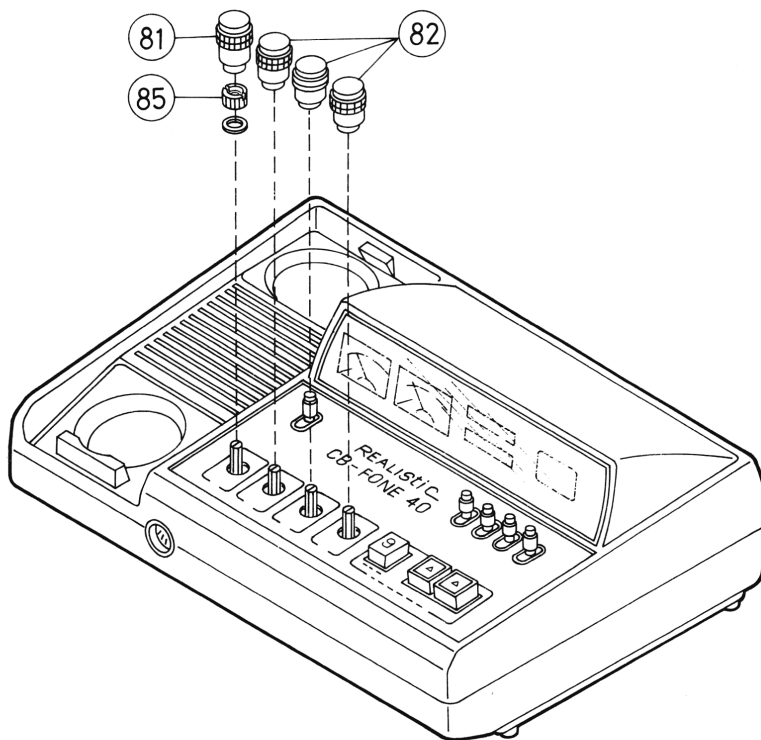


Figure 1

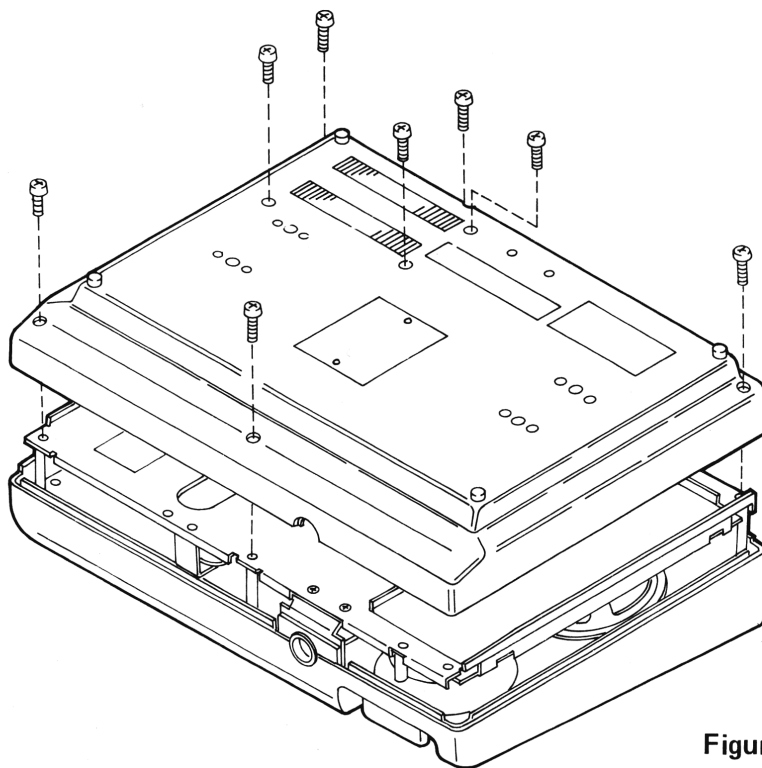


Figure 2

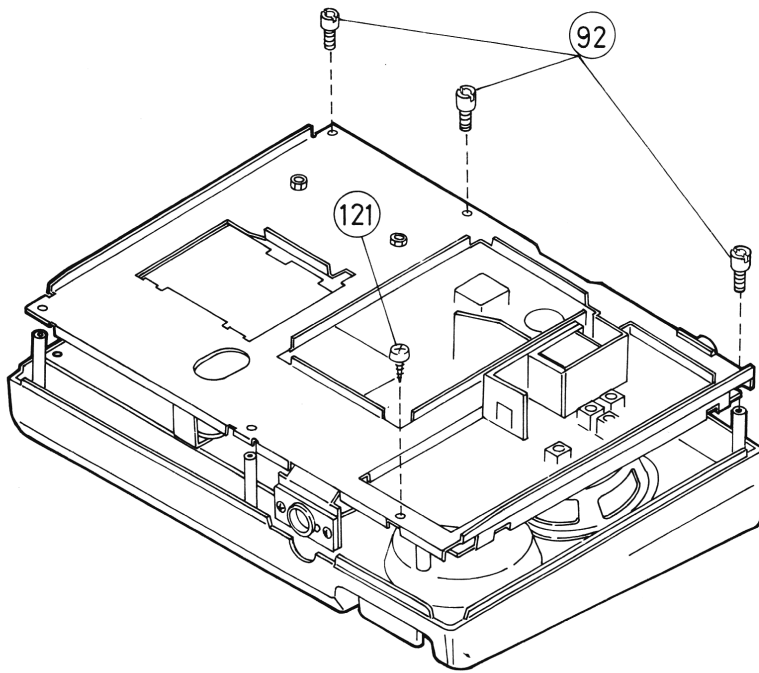


Figure 3

ALIGNMENT INSTRUCTIONS

PLL SECTION

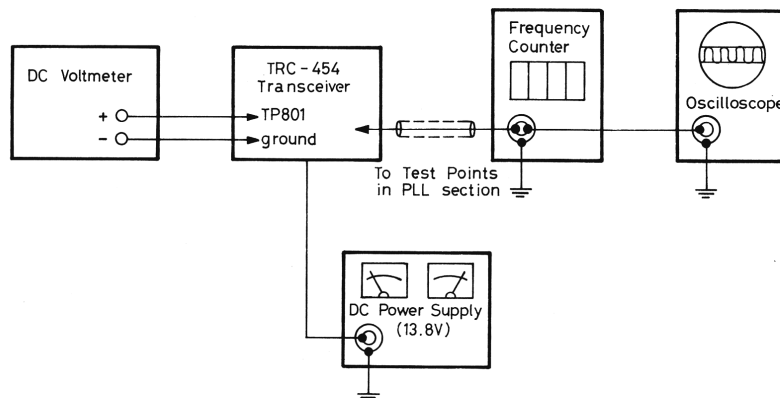
Test Equipment Required

- | | |
|--------------------------|--|
| 1. Frequency Counter | 3. DC Voltmeter (5 volt, high impedance) |
| 2. Oscilloscope (50 MHz) | 4. DC Power Supply (13.8 volt/2 amp.) |

Notes

1. This transceiver meets all requirements of F.C.C. Rules and Regulations, Part 95. Only those persons properly licensed by the F.C.C. are permitted to repair or adjust any malfunctioning unit found to be transmitting illegally. (Refer to F.C.C. Rules and Regulations, Part 95, Sub part D, Section 95.)
Work on Canadian models must conform to D.O.C. standards.
2. Allow test equipment and set at least 15 minutes to warm up before starting the alignment.
3. A non-metallic alignment tool must be used for all alignment.
4. Connection of test equipment is shown in PLL SECTION TEST EQUIPMENT SET-UP DIAGRAM.

PLL SECTION TEST EQUIPMENT SET-UP DIAGRAM



Alignment Procedure

STEP	TRANSCIVER CONDITION	CONNECT	ADJUST	ADJUST FOR
1	Channel: 19 DELTA TUNE: 0 Receive mode	DC Voltmeter to TP801 and ground.	L801	2.5 ± 0.05 V reading on DC Voltmeter.
2	Same as STEP 1	Oscilloscope to TP805 and ground.	T805	Max. amplitude. (Normal: 350 mV p-p)
3	Same as STEP 1	Same as STEP 1	L801	Recheck the voltage on STEP 1. Repeat STEP 1 and STEP 2 as necessary to obtain 2.5 ± 0.05 V reading.
4	Same as STEP 1	Frequency Counter to TP805 and ground.	CT801	37.970 MHz display on Frequency Counter.
5	Same as STEP 1	Oscilloscope to TP802 and ground.	L802	Max. amplitude. (Normal: 3 V p-p)
6	Same as STEP 1	Oscilloscope to TP803 and ground.	T801	Max. amplitude. (Normal: 700 – 800 mV p-p)
7	Channel: 19 Transmit mode	Oscilloscope to TP804 and ground.	T802 T803 T804	Max. amplitude. (Normal: 700 mV p-p)

TRANSMITTER SECTION

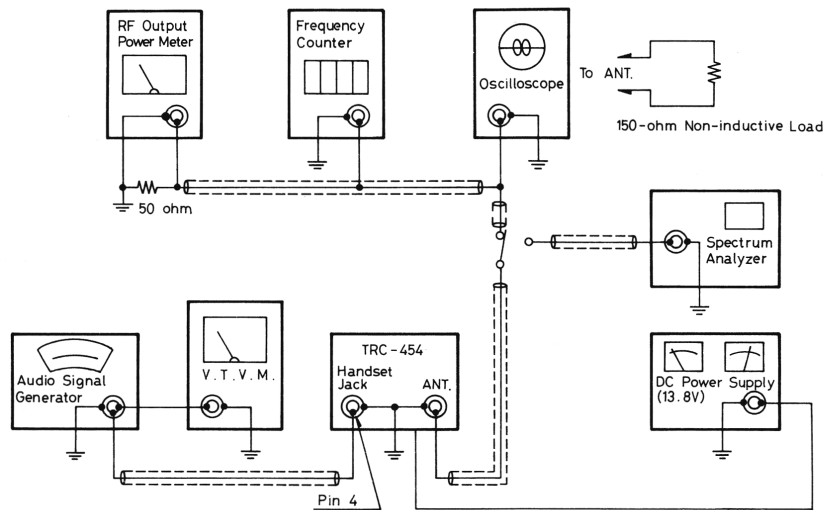
Test Equipment Required

1. RF Output Power Meter
2. 50 ohm Dummy Load (non-inductive)
3. Frequency Counter
4. Oscilloscope (50 MHz)
5. Audio Signal Generator
6. 150-ohm Non-inductive Load
7. DC Power Supply (13.8 volt/2 amp.)
8. V.T.V.M.
9. Field Strength Meter or Spectrum Analyzer

Notes

1. This transceiver meets all requirements of F.C.C. Rules and Regulations, Part 95. Only those persons properly licensed by the F.C.C. are permitted to repair or adjust any malfunctioning unit found to be transmitting illegally. (Refer to F.C.C. Rules and Regulations, Part 95, Sub part D, Section 95.)
Work on Canadian models must conform to D.O.C. standards.
2. Allow test equipment and set at least 15 minutes to warm up before starting the alignment.
3. An RF output power meter or 50 ohm dummy load must be connected to the antenna connector.
4. A non-metallic alignment tool must be used for all alignment.
5. Connection of test equipment is shown in TRANSMITTER TEST EQUIPMENT SET-UP DIAGRAM.

TRANSMITTER TEST-EQUIPMENT SET-UP DIAGRAM



Alignment Procedure

STEP	TRANSCEIVER CONDITION	CONNECT	ADJUST	ADJUST FOR
1	TX mode No modulation Channel: 19 MODE: CB	RF Output Power Meter and Oscilloscope to ANTenna Coax Connector.	L907 L908	27 MHz CARRIER ALIGNMENT Preset the cores of L907 and L908 as follows. L907: To the top of its bobbin L908: 2 turns upward from the top of its bobbin
			L901 L903	Max. RF output.
2	Same as STEP 1	Same as STEP 1	L903	3.8 W RF output reading, turning L903 core clockwise.
3	TX mode MODE: CB METER: CAL to SWR Channel: 19	150-ohm non-inductive load to ANTenna Connector.	VR505	SWR ADJUSTMENT Set METER switch to "CAL". Adjust SWR CAL control so the SWR Meter's pointer is at the "CAL" mark. Set METER switch to "SWR". Adjust VR505 for "3" reading on SWR Meter.
4	Same as STEP 1	Same as STEP 1	VR504	RF METER ADJUSTMENT 3.8 – 4.0 W reading on the built-in RF Meter. Check to be sure this reading corresponds to the reading obtained on RF Power Meter connected to the ANT connector. Be sure to make adjustments within the limitations required by FCC/DOC.

STEP	TRANSCEIVER CONDITION	CONNECT	ADJUST	ADJUST FOR
5	TX mode Modulated Channel: 19 MODE: CB	Audio Signal Generator to Pin 4 (hot) and Pin 1 (ground) of Handset Jack. RF Output Power Meter and Oscilloscope to ANTenna Connector.	VR703	AMC ADJUSTMENT More than 90% modulation on minus and less than 100% modulation on plus, with 500 mV 1000 Hz input from Audio Signal Generator.
6	Same as STEP 1	Field Strength Meter or Spectrum Analyzer to ANTenna Connector.	F901	SPURIOUS ADJUSTMENT Min. 54 MHz output.

RECEIVER SECTION

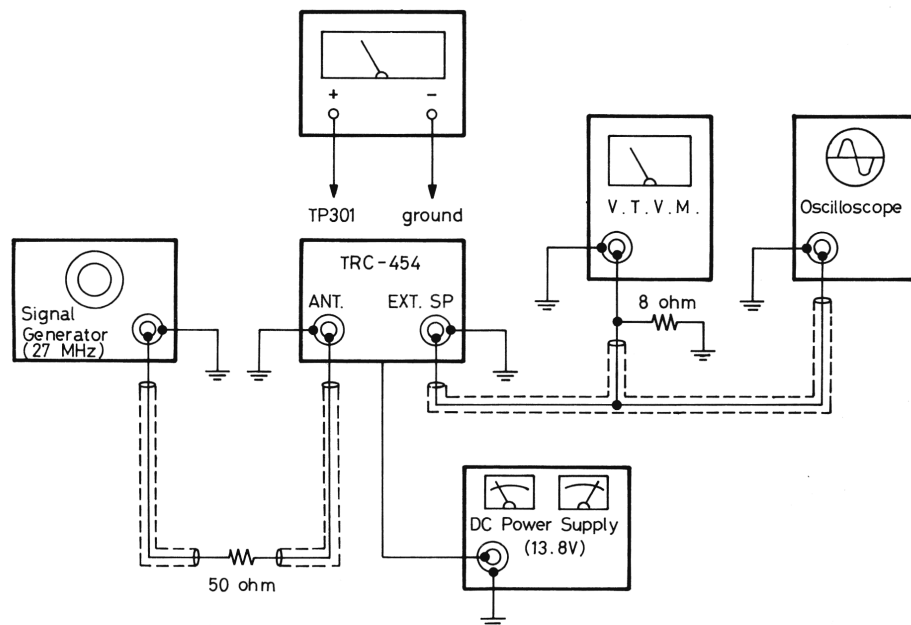
Test Equipment Required

1. Signal Generator (27 MHz band, 50 ohm output impedance, 1000 Hz, 30% modulation)
2. V.T.V.M.
3. Oscilloscope
4. 8 ohm Dummy Load
5. DC Voltmeter (5 V)
6. DC Power Supply (13.8 Volt/2 amp.)

Notes

1. Allow test equipment and set at least 15 minutes to warm up before starting the alignment.
2. Signal input must be kept as low as possible to avoid overload and clipping. (Use highest possible sensitivity for output indication).
3. Output level of test set should be kept under 2 volts.
4. A non-metallic tool must be used for all alignment.
5. Connection of test equipment is shown in RECEIVER TEST EQUIPMENT SET-UP DIAGRAM.

RECEIVER TEST EQUIPMENT SET-UP DIAGRAM



Alignment Procedure

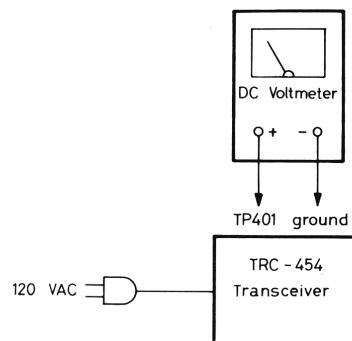
STEP	CONNECT SG	PRESET TRANSCEIVER TO	CONNECT OUTPUT METER	ADJUST	ADJUST FOR
1	No signal input	RX mode	DC Voltmeter to TP301	VR301	AGC VOLTAGE ADJUSTMENT 1.38 – 1.40 reading.
2	To ANTenna Coax Connector Freq.: 27.185 MHz	RX mode SQUELCH: Min Channel: 19 RF GAIN: Max. DELTA TUNE: 0 BLANKER: OUT MODE: CB	V.T.V.M. and Oscilloscope to EXT. SP JACK (J2).	T304 T303 T302 T301 L101 L102 L103	SENSITIVITY ALIGNMENT Max. reading on V.T.V.M.
3	Same as STEP 2	Same as STEP 2	Same as STEP 2	VR102	Max. reading on V.T.V.M., reducing signal input from S.G.
4	Same as STEP 2 100 μ V signal input	Same as STEP 2	Same as STEP 2	VR501	S METER ADJUSTMENT "S9" reading on S meter.
5	Same as STEP 2	RX mode SQUELCH: Max. Channel: 19 RF GAIN: Max. DELTA TUNE: 0 BLANKER: OUT MODE: CB	Same as STEP 2	VR502	SQUELCH ADJUSTMENT Squelch open with 1 mV signal input.

AC-DC CONVERTER SECTION

Test Equipment Required

1. DC Voltmeter (20 volt)

AC-DC CONVERTER TEST EQUIPMENT SET-UP DIAGRAM



Alignment Procedure

STEP	TRANSCEIVER CONDITION	CONNECT	ADJUST	ADJUST FOR
1	RX mode	DC Voltmeter to TP401 and ground.	VR401	13.8 V reading.

TROUBLESHOOTING

RECEIVER SECTION

- (1) Pilot lamp does not light when power switch is turned on.

AC OPERATION:

- Check AC voltage at T401 secondary.
- Check the collector and emitter voltages of Q403.
- Check if S8 in AC 120V JACK is functioning normally.

DC OPERATION:

- Check that power is connected with correct polarity.
 - Check the fuse (3A).
 - Check if power supply circuit is shorted. Is Diode D702 shorted?
 - Check if power circuit is open due to improper wire connection.
- (2) No sound (noise) from speaker.
- Check if MODE Switch is in "CB" position.
 - Try increasing Volume and setting Squelch to "open" position. Can you hear noise?
 - With Handset out of the cradle, SPEAKER Switch set to AUTO or BOTH, are both the built-in and Handset speakers dead?
 - Check if Handset switching is operating correctly.
 - Check with an external speaker.
 - If an external speaker works normally, check the built-in speaker leads. Also, check other leads.
 - Check to be sure the audio circuit is functioning. If you touch the terminals of VOLUME control with your finger, you should hear noise. Thus, you know the audio circuit is functioning.
 - Check the terminal voltages at ④ and ⑩ of IC701.
 - Check the voltage at C726.
 - Check if T701 is shorted or open.
 - Check to be sure S1-2, S4, S6 and J2 are functioning normally.
 - Check the terminal voltages of Q701.
 - Check the base voltage of Q702. It must be "low".
 - Check that Squelch circuit is operating normally.
 - With unit set to CH. 18, check for presence of oscillation at TP805 (36.960 MHz) and TP803 (10.24 MHz) with a Frequency Counter and Oscilloscope. If so, check that all oscillations are strong enough. (Normal values are shown on schematic.)
 - Check components in PLL SECTION.

- (3) Delta Tune switch does not operate normally.

- Connect Voltmeter between the common terminal of Delta Tune switch and ground, and switch Delta Tune switch to -, 0 and +. Does the voltage vary?
- Check the collector voltage of Q601. It should be "low".
- Check the terminal voltages of Q806 and Q807. They should be as follows.
 $\Delta 0$: "high" voltage at the base of Q806
"low" voltage at the base of Q807
 $\Delta -$: "high" voltage at the base of Q807
"low" voltage at the base of Q806

- (4) BLANKER does not operate normally.

- Check the wiring of BLANKER (S5).
- With BLANKER Switch set to "IN", check the terminal voltages of Q501, Q502, Q503 and Q504.

- (5) S meter does not operate normally.

- Check VR501.
- See if output from D513 is proportional to incoming signal.
- Check if C507 is shorted.

TRANSMITTER SECTION

- (1) No output

- Make sure MODE Switch is set to "CB".
- Make sure Handset plug is inserted correctly.
- Check if Handset switching is operating correctly.
- Try replacing Handset.
- If receiver section is operating normally, check for presence of oscillation at Pin ② of IC804 (9.785 MHz) with a Frequency Counter and Oscilloscope. If so, check that the oscillation is strong enough. (Normal value: 1.1 Vp-p)
- Check the terminal voltages of IC804, Q901, Q902 and Q903.

- (2) POWER meter does not operate normally.

- Check VR504.
- Check Diode D510.
- Check C518 and C524.

- (3) No modulation (MODULATION light does not light.)

- Check wiring of Handset Jack.
- Check if S1-3 is functioning normally.
- Check the terminal voltages of IC702.
- Check the base voltage of Q703. It should be "low".

- e. Check if the collector voltage of Q704 is normal value.

NEITHER RECEIVE NOR TRANSMIT

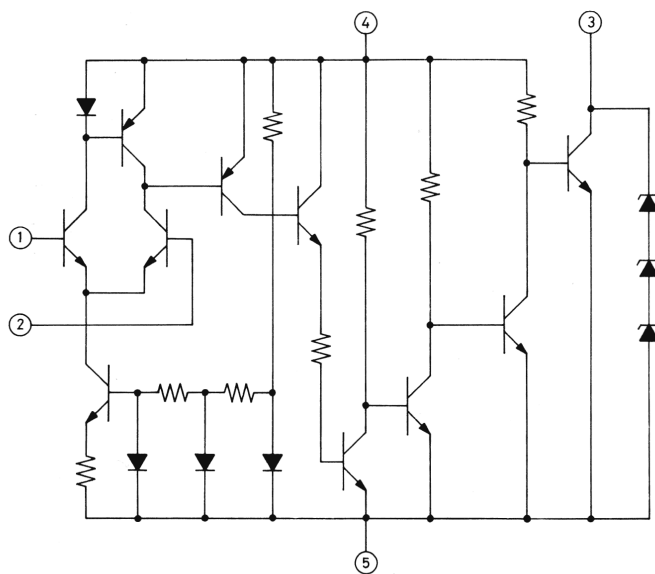
- a. Check for the presence of oscillation at TP805 (36.750 – 37.190 MHz) with a Frequency Counter and Oscilloscope. If so, is it strong enough? (Normal value: 0.18 Vp-p)
- b. Check for the presence of oscillation at TP803 (10.24 MHz) with a Frequency Counter and Oscilloscope. If so, is it strong enough? (Normal value: 0.7 Vp-p)
- c. Check Handset circuit.

SCANNER SECTION

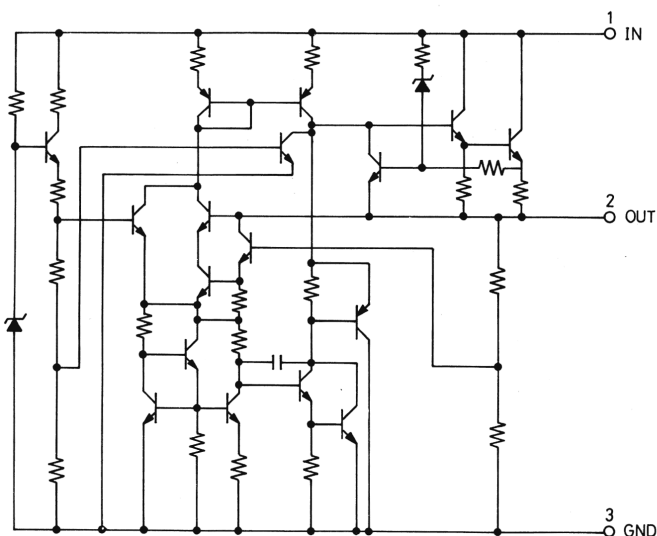
- (1) Doesn't scan
 - a. Check if the oscillation at Pin (19) of IC802 is stopped.
 - b. Check if the voltage at Pin (15) of IC802 is "high".
 - c. Check UP/DOWN Switch itself.
 - d. Check if the PLL circuit is operating normally.
 - e. Check if Q808 is "off".
 - f. Check if the voltage at Pin (18) of IC802 is always "high".
- (2) Channel Indicator doesn't display a operating channel.
 - a. Check if pulse signals come out at Pins (11) and (12) of IC802. They will be added to Pins (4) and (5) of IC801.
- (3) Channel Indicator doesn't display "PA".
 - a. In PA mode, check if the voltage at Pin (10) of IC802 is "low".
 - b. Check if S1-4 is operating normally.
- (4) Channel Indicator doesn't display "PA" in Monitor mode.
 - a. Check if S1-1 is operating normally.

IC INTERNAL CIRCUIT

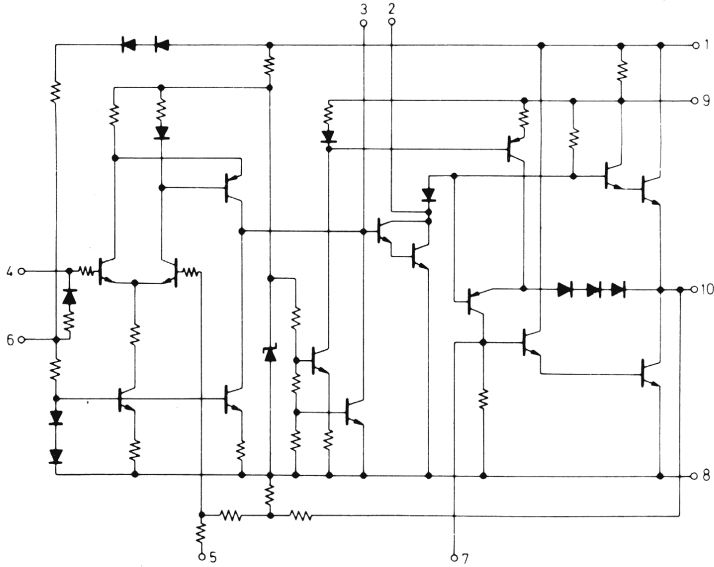
IC501 M51202



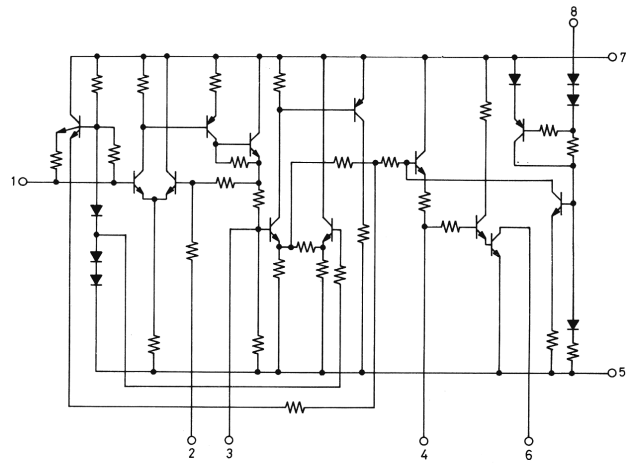
IC502 μ PC14308H



IC701 μ PC1156H

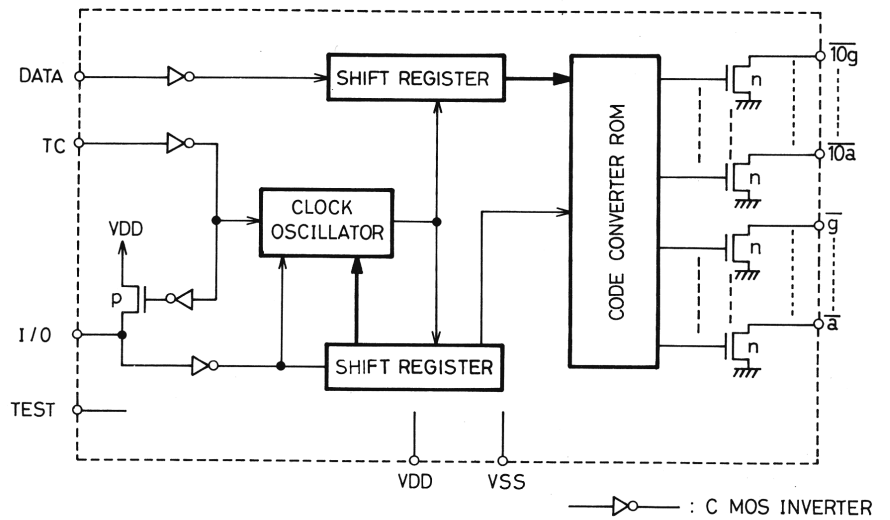


IC702 μ PC1170



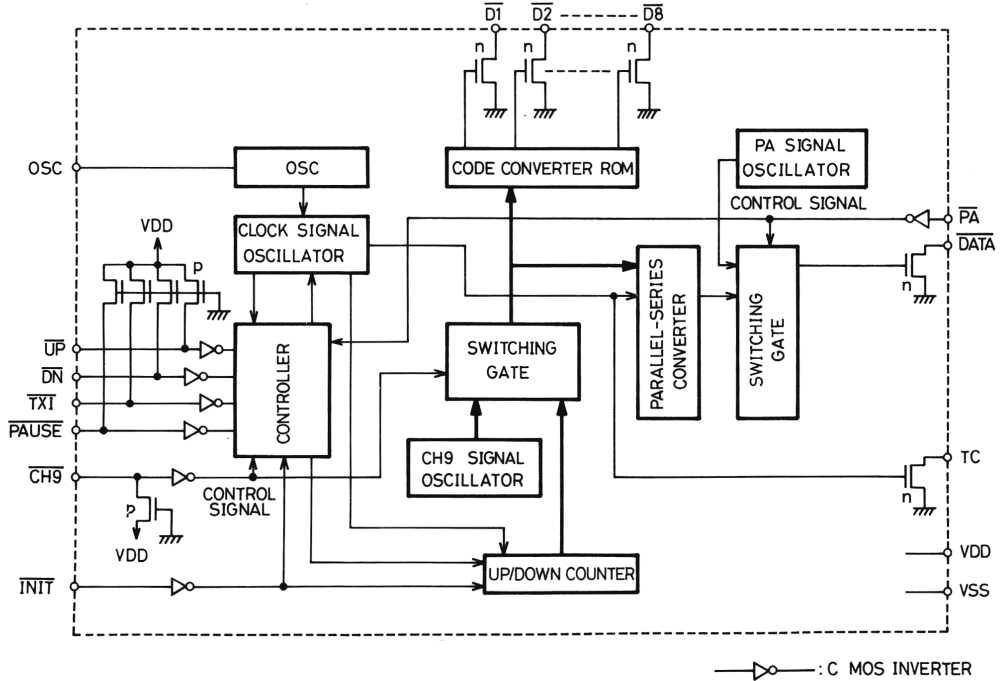
IC801 LC7191

PIN	ABBR.	DESIGNATION
1	I/O	INPUT/OUTPUT TERMINAL
2	VDD	+ SUPPLY VOLTAGE
3	TEST	TEST TERMINAL
4	TC	TIMING CONTROL
5	DATA	DATA INPUT
6	f	LED TERMINAL
7	a	
8	b	
9	g	
10	c	
11	d	GROUND
12	e	
13	VSS	
14	10c	
15	10d	
16	10e	LED TERMINAL
17	10f	
18	10a	
19	10b	
20	10g	



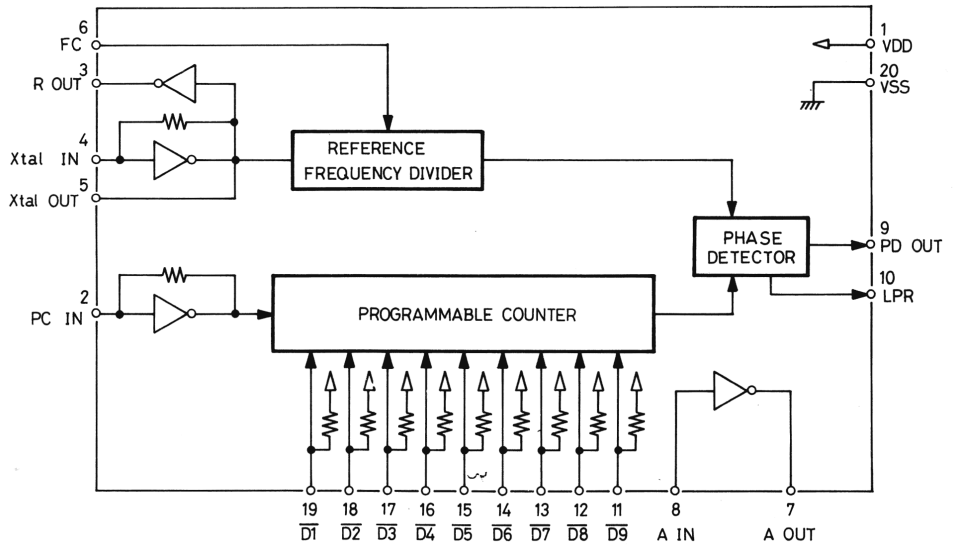
IC802 LC7199

PIN	ABBR.	DESIGNATION
1	VSS	GROUND
2	D1	PROGRAM OUTPUT
3	D2	
4	D3	
5	D4	
6	D5	
7	D6	
8	D7	
9	D8	
10	PA	PA SWITCH
11	DATA	DATA OUTPUT
12	TC	TIMING CONTROL
13	DN	DOWN SWITCH
14	UP	UP SWITCH
15	TXI	TRANSMITTER INHIBIT
16	PAUSE	PAUSE SWITCH
17	VDD	+ SUPPLY VOLTAGE
18	CH9	CH9 SWITCH
19	OSC	OSC TERMINAL
20	INIT	INITIAL SET

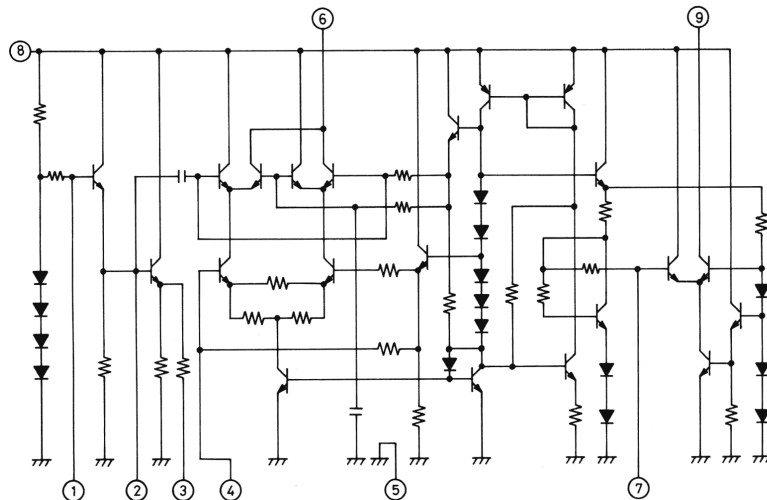


IC803 LC7110

PIN	ABBR.	DESIGNATION
1	VDD	+ SUPPLY VOLTAGE
2	PC IN	PROGRAMMABLE COUNTER INPUT
3	R OUT	REFERENCE FREQUENCY OUTPUT
4	Xtal IN	CRYSTAL ELEMENT INPUT
5	Xtal OUT	
6	FC	FREQUENCY CHOICE
7	A OUT	ACTIVE FILTER AMP. OUTPUT
8	A IN	ACTIVE FILTER AMP. INPUT
9	PD OUT	PHASE DETECTOR OUTPUT
10	LPR	LOCK MONITOR
11	D9	PROGRAM INPUT
12	D8	
13	D7	
14	D6	
15	D5	
16	D4	
17	D3	
18	D2	
19	D1	
20	VSS	GROUND



IC804 IC805 AN103



VOLTAGE CHARTS

1. Power supply voltage = 13.8 VDC/120 VAC
2. All voltages are measured under following conditions.

No signal input	DELTA TUNE: 0
SQUELCH: Min. (unquelched)	VOLUME: Min.
RF GAIN: Max.	Channel: 19
BLANKER: IN	
3. Measured with V.T.V.M.

TRANSISTORS

	RX (V)	TX (V)	
Q101	G1	1.54	1.13
	G2	2.52	0.07
	S	1.54	1.13
	D	7.03	7.98
Q102	G1	1.71	0.55
	G2	2.16	0
	S	2.18	1.13
	D	7.51	7.98
Q103	B	2.80	0.06
	C	6.81	7.46
	E	0	0
Q301	G	0	0
	S	0.38	0.39
	D	4.90	4.90
Q302	B	1.36	0.50
	C	7.05	7.74
	E	0.77	0
Q303	B	1.37	0.51
	C	7.35	8.00
	E	0.68	0
Q304	B	1.25	0.18
	C	7.66	8.00
	E	0.54	0
Q401	B	8.00	8.00
	C	15.00	15.00
	E	7.20	7.20
Q402	B	15.00	15.00
	C	21.50	19.00
	E	14.50	14.50
Q403	B	14.50	14.50
	C	21.50	19.00
	E	14.00	14.00
Q501	B	0.69	0.67
	C	3.41	3.35
	E	0	0

	RX (V)	TX (V)	
Q502	B	0.69	0.67
	C	3.36	3.35
	E	0	0
Q503	B	6.71	6.80
	C	0.05	0
	E	7.24	7.22
Q504	B	0.04	0
	C	0	0
	E	0	0
Q505	B	7.99	7.27
	C	0	7.84
	E	8.01	8.00
Q506	B	1.09(0.75)	0.50
	C	3.24(5.34)	0.72
	E	0.44(0.15)	0
Q507	B	13.80	12.16
	C	0	0.04
	E	13.17	12.73
Q508	B	0	0.80
	C	13.66	0.18
	E	0	0
Q601	B	0.68	0.39
	C	0.05	4.80
	E	0	0
Q701	B	0.87	0.12
	C	5.95	0.76
	E	0.31	0
Q702	B	0.02	0.73
	C	0	0
	E	0	0
Q703	B	0.70	0.28
	C	0	0
	E	0	0
Q704	B	13.73	12.68
	C	0.43	0.17
	E	4.54	7.56

	RX (V)	TX (V)
Q801 B	7.74	7.73
Q801 C	12.49	12.24
Q801 E	7.11	7.10
Q802 B	3.75	3.70
Q802 C	5.40	5.39
Q802 E	3.19	3.18
Q803 B	7.47	7.49
Q803 C	8.02	7.99
Q803 E	6.78	6.82
Q804 B	0.08	0.08
Q804 C	0	1.23
Q804 E	0	0
Q805 B	1.51	1.50
Q805 C	3.62	3.60
Q805 E	0.97	0.95
Q806 B	0.69	0.68
Q806 C	0.01	0
Q806 E	0	0
Q807 B	0	0
Q807 C	0.02	0
Q807 E	0	0
Q808 B	0	0
Q808 C	12.33	12.11
Q808 E	0	0
Q901 B	1.84	1.80
Q901 C	13.67	13.63
Q901 E	1.20	1.23
Q902 B	—	0.10
Q902 C	—	12.00
Q902 E	—	0
Q903 B	—	0.43
Q903 C	—	12.00
Q903 E	—	0

Note: Values in parentheses are measured with SQUELCH set to Max. (Squelch "open") with 1 mV signal input.

IC501

Pin No.	RX (V)	TX (V)
1	2.36 (3.95)	0.53
2	1.96 (3.87)	1.99
3	0.02 (0.02)	3.70
4	5.42 (5.47)	5.50
5	0(0)	0

Note: Values in parentheses are measured with SQUELCH set to Max. (Squelch "open") with 1 mV signal input.

IC502

Pin No.	RX (V)	TX (V)
1	13.73	13.48
2	0	0
3	8.01	8.00

IC701

Pin No.	RX (V)	TX (V)
1	13.66	13.42
2	7.26	7.16
3	1.38	1.37
4	3.41	3.36
5	3.45	3.39
6	4.00	3.96
7	1.29	1.30
8	0	0
9	12.71	12.46
10	6.72	6.61

IC702

Pin No.	RX (V)	TX (V)
1	2.00	2.03
2	2.00	2.03
3	1.35	1.37
4	1.20	0.15
5	0	0
6	0	0
7	7.52	7.52
8	12.29	12.07

IC801

Pin No.	RX (V)	TX (V)
1	6.80	6.80
2	6.80	6.80
3	0	0
4	0.25	0.25
5	0.25	0.25
6	0.14	0.14
7	0.15	0.15
8	0.14	0.14
9	0.15	0.15
10	0.15	0.15
11	0.14	0.14
12	5.77	5.76
13	0	0
14	0.13	0.12
15	5.73	5.72
16	0.12	0.12
17	5.73	5.72
18	5.75	5.74
19	0.12	0.12
20	5.68	5.67

IC803

Pin No.	RX (V)	TX (V)
1	6.83	6.83
2	3.19	3.19
3	3.70	3.70
4	3.06	3.06
5	3.67	3.67
6	6.83	6.83
7	2.50	2.45
8	3.50	3.45
9	3.50	3.45
10	0.08	0.08
11	6.77	6.77
12	0.08	0.08
13	6.76	6.77
14	0.05	0.08
15	6.77	6.77
16	0.08	0.07
17	6.77	6.77
18	6.77	6.77
19	0.06	0.06
20	0	0

IC802

Pin No.	RX (V)	TX (V)
1	0	0
2	0.06	0.06
3	6.75	6.75
4	6.75	6.75
5	0.07	0.07
6	6.75	6.74
7	0.07	0.08
8	6.74	6.74
9	0.08	0.08
10	6.80	6.80
11	0.25	0.25
12	0.25	0.25
13	6.80	6.80
14	6.80	6.80
15	6.80	1.11
16	6.80	6.80
17	6.80	6.80
18	6.80	6.80
19	4.93	4.93
20	6.36	6.36

IC804

Pin No.	RX (V)	TX (V)
1	0	1.24
2	0	0.68
3	0	0.29
4	0	2.70
5	0	0
6	0	5.18
7	0	2.15
8	0	5.19
9	0	5.19

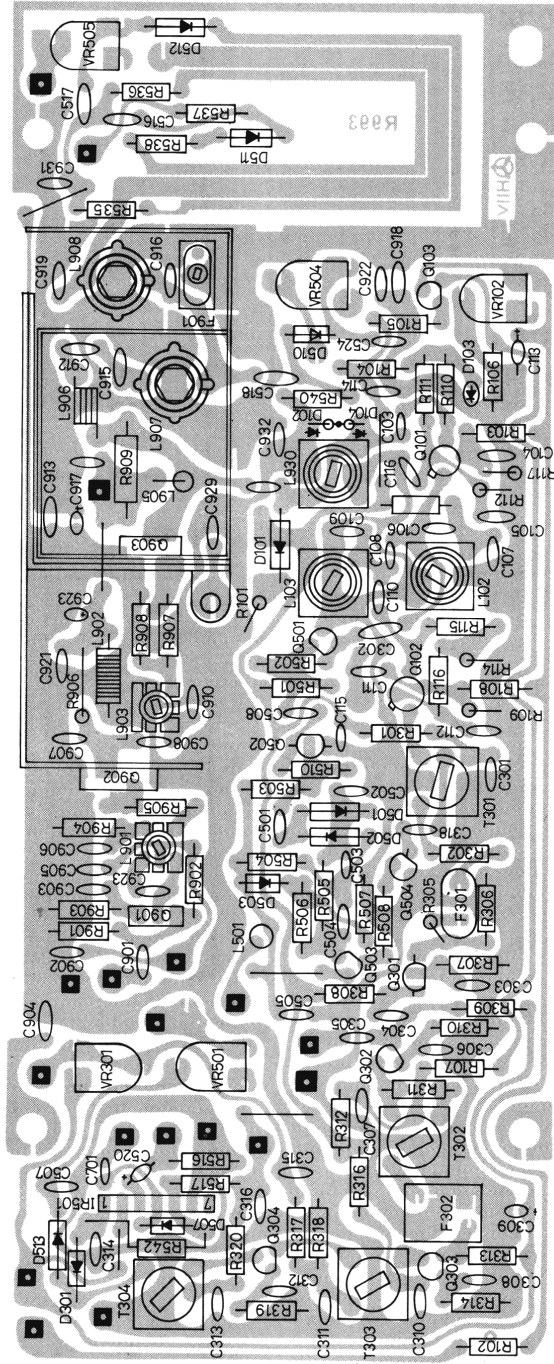
IC805

Pin No.	RX (V)	TX (V)
1	2.59	2.57
2	1.87	1.87
3	1.62	1.63
4	2.67	2.67
5	0	0
6	4.86	4.86
7	2.12	2.13
8	6.83	6.83
9	3.75	3.74

Note: In CB mode

Pin 13/14 when down/up button released

Pin 18 at CH9 priority off



PARTS LIST

Note: Capacitor values of 0.04 μF may use a 0.039 μF . Values of 0.002 μF may use a 0.0022 μF .

Symbol No.	Description				RS Part No.	Mfr's Part No.
CAPACITORS						
C101	22 pF $\pm 5\%$	50V	N220	Ceramic		R-CKD220J
C103	12 pF $\pm 5\%$	50V	N220	Ceramic		R-CKD120J
C104	0.001 μF $\pm 20\%$	50V	YP	Ceramic		R-CKD102M
C105	0.001 μF $\pm 20\%$	50V	YP	Ceramic		R-CKD102M
C106	82 pF $\pm 5\%$	50V	N220	Ceramic		R-CKD820J
C107	0.0022 μF $\pm 20\%$	50V	YP	Ceramic		R-CKD222M
C108	1.5 pF ± 0.25 pF	50V	SL	Ceramic		R-CKD0150C
C109	25 pF $\pm 5\%$	50V	N220	Ceramic		R-CKD250J
C110	390 pF $\pm 5\%$	50V	SL	Ceramic		R-CKD391J
C111	0.001 μF $\pm 20\%$	50V	YP	Ceramic		R-CKD102M
C112	0.01 μF $+80\%-20\%$	25V	YZ	Ceramic		R-CKD103Z
C113	10 μF	10V		Tantalum Electrolytic		CT10106
C114	0.01 μF $+80\%-20\%$	25V	YZ	Ceramic		R-CKD103Z
C115	0.01 μF $+80\%-20\%$	25V	YZ	Ceramic		R-CKD103Z
C116	0.0022 μF $\pm 20\%$	50V	YP	Ceramic		R-CKD222M
C301	0.01 μF $+80\%-20\%$	25V	YZ	Ceramic		R-CKD103Z
C302	5 pF ± 0.25 pF	50V	SL	Ceramic		R-CKD050C
C303	0.01 μF $+80\%-20\%$	25V	YZ	Ceramic		R-CKD103Z
C304	0.0022 μF $\pm 20\%$	50V	YP	Ceramic		R-CKD222M
C305	25 pF $\pm 5\%$	50V	SL	Ceramic		R-CKD250J
C306	0.039 μF $\pm 20\%$	50V		Mylar		R-CQS393M
C307	0.039 μF $+80\%-20\%$	25V	YZ	Ceramic		R-CKD393Z
C308	0.039 μF $\pm 20\%$	50V		Mylar		R-CQS393M
C309	4.7 μF	10V		Tantalum Electrolytic		CT10475
C310	0.033 μF $\pm 20\%$	50V		Mylar		R-CQS333M
C311	0.039 μF $+80\%-20\%$	25V	YZ	Ceramic		R-CKD393Z
C312	0.039 μF $\pm 20\%$	50V		Mylar		R-CQS393M
C313	0.039 μF $\pm 20\%$	50V		Mylar		R-CQS393M
C314	0.01 μF $\pm 20\%$	50V		Mylar		R-CQS103M
C315	0.039 μF $+80\%-20\%$	25V	YZ	Ceramic		R-CKD393Z
C316	0.039 μF $+80\%-20\%$	25V	YZ	Ceramic		R-CKD393Z
C317	0.039 μF $+80\%-20\%$	25V	YZ	Ceramic		R-CKD393Z
C318	0.001 μF $\pm 20\%$	50V	YP	Ceramic		R-CKD102M
C401	0.001 μF $+100\%-20\%$	150VAC	AL	Ceramic		R-CKD102Q
C402	0.001 μF $+100\%-20\%$	150VAC	AL	Ceramic		R-CKD102Q
C403	2200 μF	35V		Electrolytic		CE35228
C404	47 μF	25V		Electrolytic		CE25476
C405	0.047 μF $\pm 20\%$	50V	YZ	Ceramic		R-CKD473M
C406	0.047 μF $\pm 20\%$	50V	YZ	Ceramic		R-CKD473M
C407	0.01 μF $\pm 20\%$	50V	YP	Ceramic		R-CKD103M

Symbol No.	Description				RS Part No.	Mfr's Part No.
CAPACITORS						
C501	220 pF ± 5%	50V	SL	Ceramic		R-CKD221J
C502	0.0033 μF ± 20%	50V	YP	Ceramic		R-CKD332M
C503	50 pF ± 5%	50V	SL	Ceramic		R-CKD500J
C504	0.01 μF + 80%—20%	25V	YZ	Ceramic		R-CKD103Z
C505	0.039 μF + 80%—20%	25V	YZ	Ceramic		R-CKD393Z
C506	3.3 μF	10V		Electrolytic		CE10335
C507	0.039 μF ± 20%	50V		Mylar		R-CQS393M
C508	0.0022 μF ± 20%	50V	YP	Ceramic		R-CKD222M
C509	100 μF	10V		Electrolytic		CE10107
C510	10 μF	16V		Electrolytic		CE16106
C513	33 μF	10V		Electrolytic		CE10336
C514	33 μF	10V		Electrolytic		CE10336
C515	1 μF	50V		Electrolytic		CE50105
C516	0.0047 μF + 80%—20%	25V	YZ	Ceramic		R-CKD472Z
C517	0.0047 μF + 80%—20%	25V	YZ	Ceramic		R-CKD472Z
C518	3 pF ± 0.25 pF	50V	SL	Ceramic		R-CKD030C
C520	1 μF	25V		Tantalum Electrolytic		CT25105
C521	0.0022 μF ± 20%	50V	YP	Ceramic		R-CKD222M
		ONLY FOR U.S.A.				
	0.01 μF ± 20%	50V	YP	Ceramic		R-CKD103M
		ONLY FOR CANADA				
C522	1 μF	35V		Tantalum Electrolytic		CT35105
C523	0.0047 μF ± 20%	50V	YP	Ceramic		R-CKD472M
C524	0.01 μF + 80%—20%	25V	YZ	Ceramic		R-CKD103Z
C701	0.0068 μF ± 20%	50V		Mylar		R-CKD682M
C702	0.001 μF ± 20%	50V	YP	Ceramic		R-CKD102M
C703	0.0047 μF ± 20%	50V	YP	Ceramic		R-CKD472M
C704	0.0047 μF ± 20%	50V		Mylar		R-CQS472M
C705	33 μF	6.3V		Electrolytic		CE063336
C706	33 μF	10V		Electrolytic		CE10336
C707	0.039 μF ± 20%	50V		Mylar		R-CQS393M
C708	0.0022 μF ± 20%	50V	YP	Ceramic		R-CKD222M
C709	0.01 μF ± 20%	50V		Mylar		R-CQS103M
C710	0.0047 μF ± 20%	50V	YP	Ceramic		R-CKD472M
C711	10 μF	10V		Tantalum Electrolytic		CT10106
C712	33 μF	10V		Electrolytic		CE10336
C713	33 μF	10V		Electrolytic		CE10336
C714	0.0047 μF ± 20%	50V	YP	Ceramic		R-CKD472M
C715	0.33 μF	35V		Tantalum Electrolytic		CT35334
C716	0.022 μF ± 20%	50V		Mylar		R-CQS223M
C717	0.0022 μF ± 20%	50V	YP	Ceramic		R-CKD222M

Symbol No.	Description			RS Part No.	Mfr's Part No.
CAPACITORS					
C719	4.7 μ F	10V	Tantalum Electrolytic		CT10475
C720	33 μ F	6.3V	Electrolytic		CE063336
C721	82 pF \pm 5%	50V SL	Ceramic		R-CKD820J
C722	0.039 μ F \pm 20%	50V	Mylar		R-CQS393M
C723	100 pF \pm 5%	50V SL	Ceramic		R-CKD101J
C724	0.22 μ F \pm 20%	50V	Mylar		R-CQS224M
C725	47 μ F	16V	Electrolytic		CE16476
C726	220 μ F	16V SPL	Electrolytic		CE16227
C727	1000 μ F	16V	Electrolytic		CE16108
C728	0.047 μ F +80%–20%	50V YZ	Ceramic		R-CKD473Z
C729	0.047 μ F +80%–20%	50V YZ	Ceramic		R-CKD473Z
C730	0.01 μ F \pm 20%	50V	Mylar		R-CQS103M
C731	0.001 μ F \pm 20%	50V YP	Ceramic		R-CKD102M
		ONLY FOR U.S.A.			
	0.0047 μ F \pm 20%	50V YP	Ceramic		R-CKD472M
		ONLY FOR CANADA			
C732	0.0047 μ F \pm 20%	50V YP	Ceramic		R-CKD472M
C733	0.0047 μ F \pm 20%	50V YP	Ceramic		R-CKD472M
C734	10 μ F	10V	Electrolytic		CE10106
C735	0.039 μ F +80%–20%	25V YZ	Ceramic		R-CKD393Z
C736	0.0047 μ F \pm 20%	50V YP	Ceramic		R-CKD472M
C737	0.0047 μ F \pm 20%	50V YP	Ceramic		R-CKD472M
C738	1 μ F	50V	Tantalum Electrolytic		CT50105
C740	0.0022 μ F \pm 20%	50V YP	Ceramic		R-CKD222M
C741	0.0022 μ F \pm 20%	50V YP	Ceramic		R-CKD222M
		ONLY FOR CANADA			
C801	100 μ F	10V	Electrolytic		CE10107
C802	0.039 μ F +80%–20%	25V YZ	Ceramic		R-CKD393Z
C803	120 pF \pm 5%	50V SL	Ceramic		R-CKD121J
C804	390 pF \pm 5%	50V SL	Ceramic		R-CKD391J
C805	0.039 μ F +80%–20%	25V YZ	Ceramic		R-CKD393Z
C806	10 pF \pm 5%	50V SL	Ceramic		R-CKD100J
C807	390 pF \pm 5%	50V SL	Ceramic		R-CKD391J
C808	120 pF \pm 5%	50V SL	Ceramic		R-CKD121J
C809	100 pF \pm 5%	50V SL	Ceramic		R-CKD101J
C810	27 pF \pm 5%	50V SL	Ceramic		R-CKD270J
C811	47 pF \pm 5%	50V N220	Ceramic		R-CKD470J
C812	0.01 μ F +80%–20%	25V YZ	Ceramic		R-CKD103Z
C813	0.039 μ F +80%–20%	25V YZ	Ceramic		R-CKD393Z
C814	150 pF \pm 5%	50V N220	Ceramic		R-CKD151J
C815	3 pF \pm 0.25 pF	50V SL	Ceramic		R-CKD030C
C816	100 pF \pm 5%	50V N220	Ceramic		R-CKD101J
C817	82 pF \pm 5%	50V N220	Ceramic		R-CKD820J
C818	470 pF \pm 5%	50V SL	Ceramic		R-CKD471J

Symbol No.	Description				RS Part No.	Mfr's Part No.
CAPACITORS						
C819	100 μ F	10V		Electrolytic		CE10107
C820	100 μ F	10V		Electrolytic		CE10107
C821	0.039 μ F + 80%–20%	25V	YZ	Ceramic		R-CKD393Z
C823	200 pF \pm 5%	50V	SL	Ceramic		R-CKD201J
C824	22 pF \pm 5%	50V	N220	Ceramic		R-CKD220J
C825	50 pF \pm 5%	50V	SL	Ceramic		R-CKD500J
C826	30 pF \pm 5%	50V	N220	Ceramic		R-CKD300J
C827	0.0047 μ F + 80%–20%	25V	YZ	Ceramic		R-CKD472Z
C828	82 pF \pm 5%	50V	SL	Ceramic		R-CKD820J
C829	0.0047 μ F + 80%–20%	25V	YZ	Ceramic		R-CKD472Z
C830	0.068 μ F \pm 20%	50V		Mylar		R-CQS683M
C831	0.022 μ F \pm 20%	50V		Mylar		R-CQS223M
C832	0.068 μ F \pm 20%	50V		Mylar		R-CQS683M
C833	82 pF \pm 5%	50V	SL	Ceramic		R-CKD820J
C834	100 pF \pm 5%	50V	SL	Ceramic		R-CKD101J
C835	1 μ F	25V		Tantalum		CT25105
				Electrolytic		
C836	0.47 μ F	35V		Tantalum		CT35474
				Electrolytic		
C837	0.33 μ F	35V		Tantalum		CT35334
				Electrolytic		
C838	33 pF \pm 5%	50V	N220	Ceramic		R-CKD330J
C839	47 pF \pm 5%	50V	N220	Ceramic		R-CKD470J
C840	150 pF \pm 5%	50V	N220	Ceramic		R-CKD151J
C841	35 pF \pm 5%	50V	N220	Ceramic		R-CKD350J
C842	15 pF \pm 5%	50V	SL	Ceramic		R-CKD150J
C843	22 pF \pm 5%	50V	SL	Ceramic		R-CKD220J
C844	15 pF \pm 5%	50V	SL	Ceramic		R-CKD150J
C845	82 pF \pm 5%	50V	SL	Ceramic		R-CKD820J
C846	47 pF \pm 5%	50V	SL	Ceramic		R-CKD470J
C847	0.01 μ F + 80%–20%	25V	YZ	Ceramic		R-CKD103Z
C848	0.039 μ F + 80%–20%	25V	YZ	Ceramic		R-CKD393Z
C849	82 pF \pm 5%	50V	SL	Ceramic		R-CKD820J
C850	47 pF \pm 5%	50V	SL	Ceramic		R-CKD470J
C851	100 pF \pm 5%	50V	N220	Ceramic		R-CKD101J
C852	0.0022 μ F \pm 20%	50V	YP	Ceramic		R-CKD222M
C853	0.0022 μ F \pm 20%	50V	YP	Ceramic		R-CKD222M
C854	0.0047 μ F \pm 20%	50V	YP	Ceramic		R-CKD472M
C855	0.0022 μ F \pm 20%	50V	YP	Ceramic		R-CKD222M
C856	0.0022 μ F \pm 20%	50V	YP	Ceramic		R-CKD222M
				ONLY FOR U.S.A.		
	0.039 μ F + 80%–20%	25V	YZ	Ceramic		R-CKD393Z
				ONLY FOR CANADA		
C857	0.039 μ F + 80%–20%	25V	YZ	Ceramic		R-CKD393Z
				ONLY FOR CANADA		
C901	220 pF \pm 5%	50V	SL	Ceramic		R-CKD221J

Symbol No.	Description	RS Part No.	Mfr's Part No.
CAPACITORS			
C902	0.01 μ F +80%—20% 25V YZ Ceramic		R-CKD103Z
C903	0.0047 μ F \pm 20% 50V YP Ceramic		R-CKD472M
C904	0.01 μ F \pm 20% 50V YP Ceramic		R-CKD103M
C905	0.0022 μ F \pm 20% 50V YP Ceramic		R-CKD222M
C906	0.0022 μ F \pm 20% 50V YP Ceramic		R-CKD222M
C907	82 pF \pm 5% 50V SL Ceramic		R-CKD820J
C908	82 pF \pm 5% 50V N220 Ceramic		R-CKD820J
C910	150 pF \pm 5% 50V N220 Ceramic		R-CKD151J
C911	0.01 μ F +80%—20% 25V YZ Ceramic		R-CKD103Z
C912	0.0022 μ F \pm 20% 50V YP Ceramic		R-CKD222M
C913	0.01 μ F \pm 20% 50V YP Ceramic		R-CKD103M
C915	330 pF \pm 5% 50V SL Ceramic		R-CKD331J
C916	270 pF \pm 5% 50V SL Ceramic		R-CKD271J
C917	0.33 μ F 35V Tantalum Electrolytic		CT35334
C918	0.01 μ F \pm 20% 50V YP Ceramic		R-CKD103M
C919	150 pF \pm 5% 50V SL Ceramic		R-CKD151J
C920	10 pF \pm 5% 50V SL Ceramic		R-CKD100J
C921	0.0047 μ F \pm 20% 50V YP Ceramic		R-CKD472Z
C922	0.01 μ F +80%—20% 25V YZ Ceramic		R-CKD103Z
C923	47 pF \pm 5% 50V N220 Ceramic		R-CKD470J
C925	0.01 μ F \pm 20% 50V Mylar		R-CQS103M
C927	0.001 μ F \pm 20% 50V YP Ceramic		R-CKD102M
C928	0.0022 μ F \pm 20% 50V YP Ceramic		R-CKD222M
C929	0.0047 μ F \pm 20% 50V YP Ceramic		R-CKD472M
C930	0.0022 μ F \pm 20% 50V YP Ceramic		R-CKD222M
C931	0.0022 μ F \pm 20% 50V YP Ceramic		R-CKD222M
C932	0.01 μ F +80%—20% 25V YZ Ceramic		R-CKD103Z
C933	2.2 μ F 50V Tantalum Electrolytic		CT50225

Symbol No.	Ref. No.	Description	RS Part No.	Mfr's Part No.
DIODES				
D101		Diode 1S188 FM A	DX-0551	1S188FMA
D102		Diode 1S1588 or 1SS53	DX-0273	1S1588 or 1SS53
D103		Diode VD1220	DX-0697	VD1220
D104		Diode 1S1588	DX-0273	1S1588
D301		Diode 1S1588	DX-0273	1S1588
D401		Diode DS-130 B		DS-130B
D402		Diode DS-130 B		DS-130B
D403		Diode XZ-070		XZ-070
D501		Diode 1S188 FM A	DX-0551	1S188FMA
D502		Diode 1S188 FM A	DX-0551	1S188FMA
D503		Diode 1S1555	DX-0270	1S1555
D504		Diode ITT73 N	DX-1008	ITT73N
D506		Diode DS-130 E	DX-0099	DS-130E
D507		Diode 1S1588	DX-0273	1S1588
D508		Diode VD1220	DX-0697	VD1220
D509		Diode 1SS53	DX-0322	1SS53
D510		Diode 1S1588	DX-0273	1S1588
D511		Diode 1S188 FM A	DX-0551	1S188FMA
D512		Diode 1S188 FM A	DX-0551	1S188FMA
D513		Diode 1S188 FM A	DX-0551	1S188FMA
D601		Diode 1SS53	DX-0322	1SS53
D602		Diode 1SS53	DX-0322	1SS53
D603		Diode 1S1588 or 1SS53	DX-0273	1S1588 or 1SS53
D701		Diode 1S1588 or 1SS53	DX-0273	1S1588 or 1SS53
D702		Diode DS-130 E	DX-0099	DS-130E
D703		Diode 1S1588 or 1SS53	DX-0273	1S1588 or 1SS53
D704		Diode 1S1587		1S1587
D705		Diode 1S1588 or 1SS53	DX-0273	1S1588 or 1SS53
D801		Diode 1S1588 or 1SS53	DX-0273	1S1588 or 1SS53
D802		Diode 1S1588 or 1SS53	DX-0273	1S1588 or 1SS53
D803		Diode XZ-076	DX-1013	XZ-076
D804		Diode 1S1588 or 1SS53	DX-0273	1S1588 or 1SS53
D805		Diode SVC201	DX-1007	SVC201
	①	LED SL-1291-05 Channel Indicator	L-0849	4-515R001
FILTERS				
F301		HF Filter 9.785 MHz	C-0856	4-253R922

Symbol No.	Ref. No.	Description	RS Part No.	Mfr's Part No.
FILTERS				
F302		HF Filter 455 kHz	C-0857	4-253R920
F901		HF Filter 54 MHz	C-0778	4-253R919
FERRITE BEADS				
FB801		Ferrite Bead Black	HB-4845	123-2-471R104
FB802		Ferrite Bead Blue	HB-7077	123-2-471R105
INTEGRATED CIRCUITS				
IC501	②	IC M51202 MITSUBISHI	MX-3059	M51202
IC502		IC μ PC14308H NEC	MX-3452	μ PC14308H
IC701		IC μ PC1156H NEC including Mica Sheet	MX-3372	μ PC1156H
IC702		IC μ PC1170 NEC	MX-3450	μ PC1170
IC801		IC LC7191 TOKYO-SANYO	MX-3446	LC7191
IC802		IC LC7199 TOKYO-SANYO	MX-3056	LC7199
IC803		IC LC7110 TOKYO-SANYO	MX-3057	LC7110
IC804		IC AN103 O MATSUSHITA	MX-3058	AN1030
IC805		IC AN103 O MATSUSHITA	MX-3058	AN1030
RESISTOR NETWORKS				
IR501		Resistor Network	RX-0034	4-221R80610or 4-221R806
IR801		Resistor Network 680 ohm x 7	RX-0049	4-221R809
IR802		Resistor Network 680 ohm x 7	RX-0049	4-221R809
JACKS				
J1	③	ANTenna Connector	J-0917	4-235R844
J2/3	④	EXTernal SPeaker Jack/PA Speaker Jack	J-0916	4-235R829
J4	⑤	Handset Jack 5-PIN DIN Lock Type	J-6503	4-235R843
J5	⑥	DC 12V Jack 3-PIN	J-6276	4-235R817
J6	⑦	AC 120V Jack including Cover	J-0918	4-235R247A
COILS				
L101		ANT Coil 27 MHz	CA-3379	4-257R815
L102		RF Coil 27 MHz	CA-4498	4-259R828
L103		ANT Coil 27 MHz	CA-3379	4-257R815
L501		Choke Coil 8.2 μ H	CB-2373	4-253R702
L502		Choke Coil 0.95 μ H	CB-2372	4-253R719
L503		Choke Coil 0.95 μ H	CB-2372	4-253R719
L701		Choke Coil	CB-2307	4-253R713
L702		Choke Coil	CB-2307	4-253R713
L703		Choke Coil	CB-2307	4-253R713
L801		OSC Coil 37 MHz	CA-4899	4-258R827
L802		RF Coil 35.25 MHz	CA-4874	4-259R877
L901		RF Coil 27 MHz	CA-3715	4-259R865
L902		Choke Coil	CB-2263	4-253R709

Symbol No.	Ref. No.	Description	RS Part No.	Mfr's Part No.
COILS				
L903		RF Coil 27 MHz	CA-4777	4-259R891
L905		Choke Coil	CB-2263	4-253R709
L906		Choke Coil	CA-3793	4-253R715
L907		RF Coil 27 MHz		4-259R80810
L908		RF Coil 27 MHz		4-259R80710
PLUGS				
PG1		Plug 5-pin for interconnecting wiring	J-6517	4-236R81873
PG2		Plug 8-pin for interconnecting wiring		4-236R82073A
PG3		Plug 5-pin for interconnecting wiring		4-236R81874A
PG4		Plug 4-pin for interconnecting wiring	J-6527	4-236R82600
PG5		Plug 6-pin for interconnecting wiring	J-6518	4-236R81973
PG6		Plug 8-pin for interconnecting wiring	J-6528	4-236R82072
PG7		Plug 7-pin for interconnecting wiring	J-6520	4-236R824
PG8		Plug 9-pin for interconnecting wiring	J-6521	4-236R825
LAMPS				
PL1	⑧	Lamp 14 V/50 mA ON THE AIR	L-0851	4-612R81172
PL2	⑨	Lamp 14 V/80 mA S/RF Meter	L-0852	4-612R81972
PL3	⑩	Lamp 14 V/80 mA SWR Meter	L-0859	4-612R81971
PL4	⑪	Lamp 9 V/35 mA MODULATION	L-0850	4-612R81872
TRANSISTORS				
Q101		FET 3SK59 GR1 TOSHIBA or		3SK59GR1 or
		3SK59 GR2 TOSHIBA		3SK59GR2
Q102		FET 3SK59 GR2 TOSHIBA		3SK59GR2
Q103		Transistor 2SA733 Q NEC or		2SA733Q or
		2SA495 Y TOSHIBA		2SA495Y
Q301		FET 2SK19 Y TOSHIBA		2SK19Y
Q302		Transistor 2SC930 D TOKYO-SANYO		2SC930D
Q303		Transistor 2SC930 D TOKYO-SANYO		2SC930D
Q304		Transistor 2SC930 D TOKYO-SANYO		2SC930D
Q401		Transistor 2SC372 O TOSHIBA		2SC372O
Q402		Transistor 2SC1173 O TOSHIBA		2SC1173O
Q403	⑫	Transistor 2SD234 O TOSHIBA		2SD234O
Q501		Transistor 2SC536 E TOKYO-SANYO or		2SC536E or
		BC408 A PHILLIPS or		BC408A or
		JE9014 B-E NEC		JE9014B-E
Q502		Transistor 2SC536 E TOKYO-SANYO or		2SC536E or
		BC408 A PHILLIPS or		BC408A or
		JE9014 B-E NEC		JE9014B-E
Q503		Transistor 2SA733 Q NEC or		2SA733Q or
		2SA495 Y TOSHIBA		2SA495Y
Q504		Transistor 2SC930 D TOKYO-SANYO or		2SC930D or
		ED1502 E PHILLIPS		ED1502E

Symbol No.	Ref. No.	Description	RS Part No.	Mfr's Part No.
TRANSISTORS				
Q505		Transistor 2SA733 Q 2SA495 Y	NEC or TOSHIBA	2SA733Q or 2SA495Y
Q506		Transistor 2SC536 E	TOKYO-SANYO	2SC536E
Q507		Transistor 2SA952 L	NEC	2SA952L
Q508		Transistor 2SC536 E 2SC372 Y BC408 A	TOKYO-SANYO or TOSHIBA or PHILLIPS	2SC536E or 2SC372Y or BC408A
Q601		Transistor 2SC536 E 2SC372 Y BC408 A	TOKYO-SANYO or TOSHIBA or PHILLIPS	2SC536E or 2SC372Y or BC408A
Q701		Transistor 2SC536 E	TOKYO-SANYO	2SC536E
Q702		Transistor 2SC536 E 2SC372 Y BC408 A	TOKYO-SANYO or TOSHIBA or PHILLIPS	2SC536E or 2SC372Y or BC408A
Q703		Transistor 2SC536 E 2SC372 Y	TOKYO-SANYO or TOSHIBA	2SC536E or 2SC372Y
Q704		Transistor 2SA733 Q	NEC	2SA733Q
Q801		Transistor 2SC1173 O	TOSHIBA	2SC1173O
Q802		Transistor 2SC930 D	TOKYO-SANYO	2SC930D
Q803		Transistor 2SC509 O	TOSHIBA	2SC509O
Q804		Transistor 2SC536 E 2SC372 Y BC408 A	TOKYO-SANYO or TOSHIBA or PHILLIPS	2SC536E or 2SC372Y or BC408A
Q805		Transistor 2SC930 D	TOKYO-SANYO	2SC930D
Q806		Transistor 2SC536 E 2SC372 Y BC408 B	TOKYO-SANYO or TOSHIBA or PHILLIPS	2SC536E or 2SC372Y or BC408B
Q807		Transistor 2SC536 E 2SC372 Y BC408 A	TOKYO-SANYO or TOSHIBA or PHILLIPS	2SC536E or 2SC372Y or BC408A
Q808		Transistor 2SC536 E 2SC372 Y BC408 A	TOKYO-SANYO or TOSHIBA or PHILLIPS	2SC536E or 2SC372Y or BC408A
Q901		Transistor 2SC1166	TOSHIBA	2SC1166
Q902	⑬	Transistor 2SC1957	NEC	2SC1957
Q903	⑭	Transistor 2SC1909	NEC	2SC1909

Symbol No.	Description					RS Part No.	Mfr's Part No.
RESISTORS							
R101	100 ohm	± 5%	¼W	Carbon		R-R101JB	
R102	1K ohm	± 5%	¼W	Carbon		R-R102JB	
R103	10K ohm	± 5%	¼W	Carbon		R-R103JB	
R104	1.5K ohm	± 5%	¼W	Carbon		R-R152JB	
R105	470 ohm	± 5%	¼W	Carbon		R-R471JB	
R106	27K ohm	± 5%	¼W	Carbon		R-R273JB	
R107	1K ohm	± 5%	¼W	Carbon		R-R102JB	
R108	6.8K ohm	± 5%	¼W	Carbon		R-R682JB	
R109	22K ohm	± 5%	¼W	Carbon		R-R223JB	
R110	100K ohm	± 5%	¼W	Carbon		R-R104JB	
R111	82 ohm	± 5%	¼W	Carbon		R-R820JB	
R112	680 ohm	± 5%	¼W	Carbon		R-R681JB	
R113	220 ohm	± 5%	¼W	Carbon		R-R221JB	
R114	820 ohm	± 5%	¼W	Carbon		R-R821JB	
R115	68K ohm	± 5%	¼W	Carbon		R-R683JB	
R116	220 ohm	± 5%	¼W	Carbon		R-R221JB	
R117	100K ohm	± 5%	¼W	Carbon		R-R104JB	
R301	220 ohm	± 5%	¼W	Carbon		R-R221JB	
R302	150 ohm	± 5%	¼W	Carbon		R-R151JB	
R305	220 ohm	± 5%	¼W	Carbon		R-R221JB	
R306	1.5K ohm	± 5%	¼W	Carbon		R-R152JB	
R307	150 ohm	± 5%	¼W	Carbon		R-R151JB	
R308	1.2K ohm	± 5%	¼W	Carbon		R-R122JB	
R309	3.3K ohm	± 5%	¼W	Carbon		R-R332JB	
R310	820 ohm	± 5%	¼W	Carbon		R-R821JB	
R311	10K ohm	± 5%	¼W	Carbon		R-R103JB	
R312	820 ohm	± 5%	¼W	Carbon		R-R821JB	
R313	1.5K ohm	± 5%	¼W	Carbon		R-R152JB	
R314	1K ohm	± 5%	¼W	Carbon		R-R102JB	
R316	1K ohm	± 5%	¼W	Carbon		R-R102JB	
R317	18K ohm	± 5%	¼W	Carbon		R-R183JB	
R318	4.7K ohm	± 5%	¼W	Carbon		R-R472JB	
R319	330 ohm	± 5%	¼W	Carbon		R-R331JB	
R320	220 ohm	± 5%	¼W	Carbon		R-R221JB	
R401	2.7M ohm	± 10%	½W	Solid		R-R275KC	
R402	1.8K ohm	± 10%	½W	Carbon or Solid		R-R182KC	
R403	1K ohm	± 5%	¼W	Carbon		R-R102JB	
R404	390 ohm	± 5%	¼W	Carbon		R-R391JB	
R406	560 ohm	± 5%	¼W	Carbon		R-R561JB	
R501	1K ohm	± 5%	¼W	Carbon		R-R102JB	
R502	100K ohm	± 5%	¼W	Carbon		R-R104JB	
R503	1K ohm	± 5%	¼W	Carbon		R-R102JB	
R504	120K ohm	± 5%	¼W	Carbon		R-R124JB	
R505	560K ohm	± 5%	¼W	Carbon		R-R564JB	

Symbol No.	Description				RS Part No.	Mfr's Part No.
RESISTORS						
R506	820K ohm	± 5%	¼W	Carbon		R-R824JB
R507	4.7K ohm	± 5%	¼W	Carbon		R-R472JB
R508	27K ohm	± 5%	¼W	Carbon		R-R273JB
R509	120 ohm	± 5%	¼W	Carbon		R-R121JB
R510	100K ohm	± 5%	¼W	Carbon		R-R104JB
R513	15K ohm	± 5%	¼W	Carbon		R-R153JB
R514	15K ohm	± 5%	¼W	Carbon		R-R153JB
R515	390 ohm	± 10%	½W	Carbon or Solid		R-R391KC
R516	12K ohm	± 5%	¼W	Carbon		R-R123JB
R517	330K ohm	± 5%	¼W	Carbon		R-R334JB
R519	470 ohm	± 5%	¼W	Carbon		R-R471JB
R520	3.3K ohm	± 5%	¼W	Carbon		R-R332JB
R521	12K ohm	± 5%	¼W	Carbon		R-R123JB
R522	47K ohm	± 5%	¼W	Carbon		R-R473JB
R523	10K ohm	± 5%	¼W	Carbon		R-R103JB
R524	47K ohm	± 5%	¼W	Carbon		R-R473JB
R526	100K ohm	± 5%	¼W	Carbon		R-R104JB
R527	47K ohm	± 5%	¼W	Carbon		R-R473JB
R528	4.7M ohm	± 5%	¼W	Carbon		R-R475JB
R529	1K ohm	± 5%	¼W	Carbon		R-R102JB
R530	1K ohm	± 5%	¼W	Carbon		R-R102JB
R531	1K ohm	± 5%	¼W	Carbon		R-R102JB
R533	4.7K ohm	± 5%	¼W	Carbon		R-R472JB
R534	10K ohm	± 5%	¼W	Carbon		R-R103JB
R535	120 ohm	± 5%	¼W	Carbon		R-R121JB
R536	120 ohm	± 5%	¼W	Carbon		R-R121JB
R537	1K ohm	± 5%	¼W	Carbon		R-R102JB
R538	470 ohm	± 5%	¼W	Carbon		R-R471JB
R540	1K ohm	± 5%	¼W	Carbon		R-R102JB
R541	8.2K ohm	± 5%	¼W	Carbon		R-R822JB
R542	270K ohm	± 5%	¼W	Carbon		R-R274JB
R601	3.3K ohm	± 5%	¼W	Carbon		R-R332JB
R602	33K ohm	± 5%	¼W	Carbon		R-R333JB
R603	33K ohm	± 5%	¼W	Carbon		R-R333JB
R604	6.8K ohm	± 5%	¼W	Carbon		R-R682JB
R702	1K ohm	± 5%	¼W	Carbon		R-R102JB
R703	150K ohm	± 5%	¼W	Carbon		R-R154JB
R704	2.2K ohm	± 5%	¼W	Carbon		R-R222JB
R705	2.2K ohm	± 5%	¼W	Carbon		R-R222JB
R706	390 ohm	± 5%	¼W	Carbon		R-R391JB
R707	47 ohm	± 5%	¼W	Carbon		R-R470JB
R708	27K ohm	± 5%	¼W	Carbon		R-R273JB
R709	4.7K ohm	± 5%	¼W	Carbon		R-R472JB
R710	2.2K ohm	± 5%	¼W	Carbon		R-R222JB
R711	12K ohm	± 5%	¼W	Carbon		R-R123JB

Symbol No.	Description				RS Part No.	Mfr's Part No.
RESISTORS						
R712	1K ohm	± 5%	¼W	Carbon		R-R102JB
R713	180 ohm	± 5%	¼W	Carbon		R-R181JB
R714	68K ohm	± 5%	¼W	Carbon		R-R683JB
R715	3.9K ohm	± 5%	¼W	Carbon		R-R392JB
R716	2.7K ohm	± 5%	¼W	Carbon		R-R272JB
R717	2.7K ohm	± 5%	¼W	Carbon		R-R272JB
R718	3.9K ohm	± 5%	¼W	Carbon		R-R392JB
R719	6.8K ohm	± 5%	¼W	Carbon		R-R682JB
R720	6.8K ohm	± 5%	¼W	Carbon		R-R682JB
R721	1.5K ohm	± 5%	¼W	Carbon		R-R152JB
R722	56 ohm	±10%	2W	Metal Oxide Film		R-RM560KE
R723	470 ohm	±10%	½W	Carbon or Solid		R-R471KC
R724	56 ohm	±10%	2W	Metal Oxide Film		R-RM560KE
R725	56 ohm	±10%	2W	Metal Oxide Film		R-RM560KE
R726	8.2 ohm	±10%	2W	Metal Oxide Film		R-RM0820KE
R727	270K ohm	± 5%	¼W	Carbon		R-R274JB
R728	4.7K ohm	± 5%	¼W	Carbon		R-R472JB
R729	100 ohm	± 5%	¼W	Carbon		R-R101JB
R730	2.2K ohm	± 5%	¼W	Carbon		R-R222JB
R731	1.2K ohm	± 5%	¼W	Carbon		R-R122JB
R732	10K ohm	± 5%	¼W	Carbon		R-R103JB
R733	2.7K ohm	± 5%	¼W	Carbon		R-R272JB
R801	680 ohm	± 5%	¼W	Carbon		R-R681JB
R802	150K ohm	± 5%	¼W	Carbon		R-R154JB
R803	2.7K ohm	± 5%	¼W	Carbon		R-R272JB
R804	3.3K ohm	± 5%	¼W	Carbon		R-R332JB
R805	10K ohm	± 5%	¼W	Carbon		R-R103JB
R806	100 ohm	± 5%	¼W	Carbon		R-R101JB
R807	33K ohm	± 5%	¼W	Carbon		R-R333JB
R808	33K ohm	± 5%	¼W	Carbon		R-R333JB
R809	330 ohm	± 5%	¼W	Carbon		R-R331JB
R810	3.9K ohm	± 5%	¼W	Carbon		R-R392JB
R811	10K ohm	± 5%	¼W	Carbon		R-R103JB
R812	1K ohm	± 5%	¼W	Carbon		R-R102JB
R813	6.8K ohm	± 5%	¼W	Carbon		R-R682JB
R814	8.2K ohm	± 5%	¼W	Carbon		R-R822JB
R815	5.6K ohm	± 5%	¼W	Carbon		R-R562JB
R816	5.6K ohm	± 5%	¼W	Carbon		R-R562JB
R817	180K ohm	± 5%	¼W	Carbon		R-R184JB
R818	10K ohm	± 5%	¼W	Carbon		R-R103JB
R819	10K ohm	± 5%	¼W	Carbon		R-R103JB
R820	680K ohm	± 5%	¼W	Carbon		R-R684JB
R821	100K ohm	± 5%	¼W	Carbon		R-R104JB
R822	15K ohm	± 5%	¼W	Carbon		R-R153JB
R823	1K ohm	± 5%	¼W	Carbon		R-R102JB
R824	5.6K ohm	± 5%	¼W	Carbon		R-R562JB

Symbol No.	Description					RS Part No.	Mfr's Part No.
RESISTORS							
R825	560	ohm	± 5%	¼W	Carbon		R-R561JB
R826	47	ohm	± 5%	¼W	Carbon		R-R470JB
R827	2.2K	ohm	± 5%	¼W	Carbon		R-R222JB
R828	560	ohm	± 5%	¼W	Carbon		R-R561JB
R829	560	ohm	± 5%	¼W	Carbon		R-R561JB
R830	1K	ohm	± 5%	¼W	Carbon		R-R102JB
R831	22	ohm	±10%	½W	Carbon or Solid		R-R220KC
R832	4.7K	ohm	± 5%	¼W	Carbon		R-R472JB
R833	270	ohm	± 5%	¼W	Carbon		R-R271JB
R901	1.8K	ohm	± 5%	¼W	Carbon		R-R182JB
R902	10K	ohm	± 5%	¼W	Carbon		R-R103JB
R903	68	ohm	± 5%	¼W	Carbon		R-R680JB
R904	68	ohm	± 5%	¼W	Carbon		R-R680JB
R905	4.7	ohm	± 5%	¼W	Carbon		R-R0470JB
R906	270	ohm	± 5%	½W	Carbon or Solid		R-R271JC
R907	1.5	ohm	± 5%	¼W	Carbon		R-R0150JB
R908	39	ohm	± 5%	¼W	Carbon		R-R390JB
R909	820	ohm	±10%	½W	Carbon or Solid		R-R821KC
R910	100K	ohm	± 5%	½W	Carbon or Solid		R-R104JC

Symbol No.	Ref. No.	Description	RS Part No.	Mfr's Part No.
SWITCHES				
S1	⑮	Special Switch	MODE	S-5046 4-231R962
S2	⑯	Special Switch	DELTA TUNE	S-5047 4-231R960
S3	⑰	Special Switch	METER	S-5048 4-231R961
S4	⑱	Special Switch	SPEAKERS	S-5048 4-231R961
S5	⑲	Special Switch	BLANKER	S-5048 4-231R961
S6	⑳	Micro Switch	Hook Switch	S-8158 4-231R952
S10	㉑	Push Switch	▽ (DOWN)	S-7344 4-231R829
S11	㉒	Push Switch	△ (UP)	S-7344 4-231R829
S12	㉓	Push Switch	9 PRIORITY	S-7345 4-231R830
SOCKETS				
SO1		Socket	5-pin for interconnecting wiring	J-6522 4-235R84200
SO2		Socket	8-pin for interconnecting wiring	J-6498 4-235R84278
SO3		Socket	5-pin for interconnecting wiring	J-6522 4-235R84200
SO4		Socket	4-pin for interconnecting wiring	J-6524 4-235R84274
SO5		Socket	6-pin for interconnecting wiring	J-6523 4-235R84276
SO6		Socket	8-pin for interconnecting wiring	J-6498 4-235R84278
SO7		Socket	7-pin for interconnecting wiring	J-6525 4-235R850
SO8		Socket	9-pin for interconnecting wiring	J-6526 4-235R851
TRANSFORMERS				
T301		IFT	9.785 MHz	4-256R75330
T302		IFT	455 kHz	4-256R75430
T303		IFT	455 kHz	4-256R70330
T304		IFT	455 kHz	4-256R73430
T401	㉔	Power Transformer	120 V ONLY FOR U.S.A. 126 V ONLY FOR CANADA	TA-0650 4-251R811A 4-251R817
T701	㉔	Output/Modulation		TD-0167 4-254R813
T702		Choke Coil		CB-2306 4-255R810
T801		RF Coil	10.24 MHz	CA-4900 4-259R872
T802		RF Coil	27 MHz	CA-4774 4-259R886
T803		RF Coil	27 MHz	CA-4874 4-259R877
T804		RF Coil	27 MHz	CA-4874 4-259R877
T805		OSC Coil	37 MHz	4-258R823A
VARIABLE RESISTORS				
VR101	㉕	Variable Resistor	10KB RF GAIN	P-0813 4-222R567
VR102		Semi-variable Resistor	5KB	P-6387 4-222R79574
VR301		Semi-variable Resistor	100KB	4-222R79578
VR401		Semi-variable Resistor	300B	4-222R784
VR501		Semi-variable Resistor	10KB	P-6470 4-222R79575
VR502		Semi-variable Resistor	100KB	P-6386 4-222R79578
VR503	㉖	Variable Resistor	100KB SQUELCH	P-0815 4-222R565
VR504		Semi-variable Resistor	50KB	P-6388 4-222R79577

Symbol No.	Ref. No.	Description	RS Part No.	Mfr's Part No.
VARIABLE RESISTORS				
VR505		Semi-variable Resistor 20KB		4-222R79576
VR506	(27)	Variable Resistor 20KB SWR CAL	P-0814	4-222R566
VR701/702/ S7	(28)	Variable Resistor with Switch 50KD: AF Volume 10KD: PA Volume	P-1839	4-222R568
VR703		Semi-variable Resistor 10KB	P-6470	4-222R79575
CRYSTALS				
X801		Crystal 10.24 MHz HC-18U type	MX-2307	4-225R838
X802		Crystal 9.785 MHz HC-18U type	MX-2306	4-225R836
X803		Crystal 11.75 MHz HC-18U type	MX-2335	4-225R841
HANDSET ASSEMBLY				
	(29)	Handset assembly, consisting of following:	Z-3831	4-153R80805
	(30)	Handle		176-2-171R101
	(31)	Cover		176-2-135R129
	(32)	Cover, for Mouthpiece		176-2-133R106
	(33)	Cover, for Handset Speaker		176-2-133R107
	(34)	Push-To-Talk Bar		176-2-161R125
	(35)	Lever, for Push-To-Talk Bar		176-2-254R120
	(36)	Bracket, for Push-To-Talk Bar		176-2-210R119
	(37)	Spring Wire		176-2-482R108
	(38)	Fiber Sheet		176-2-246R106A
	(39)	Rubber Cushion, for Mouthpiece		176-2-445R134A
	(40)	Rubber Cushion, for Handset Speaker, small piece		176-2-445R108A
	(41)	Rubber Cushion, for Handset Speaker, large piece		176-2-445R110A
	(42)	Lug, for holding wires	HB-0821	123-2-472R006
	(43)	Microphone		4-153R808
	(44)	Speaker		4-151R802
	(45)	Special Switch		4-231R956
	(46)	Cord assembly		4-243R40402
	(47)	Net		176-2-244R117
	(48)	Pan Head Tapping Screw, 3 x 6mm, for Handset Cord Mtg.		R-Y113006B
	(49)	Pan Head Tapping Screw, 3 x 8mm, for Cover Mtg.		R-Y113008B
	(50)	Pan Head Tapping Screw, 3 x 8mm, for Bracket Mtg.		R-Y113008B
	(51)	Pan Head Tapping Screw, 3 x 4mm, for Fiber Sheet Mtg.		R-Y113004B
	(52)	Hexagon Nut, 2.6mm, for Special Switch Mtg.		R-Y23260001
	(53)	Pan Head Screw, 2.6 x 8mm, for Special Switch Mtg.		R-Y012608

Symbol No.	Ref. No.	Description	RS Part No.	Mfr's Part No.
HANDSET ASSEMBLY				
	⑤③	Pan Head Screw, 2 x 8mm, for Lever Mtg.		R-Y012008
	⑤④	Spring Washer, 2mm, for Lever Mtg.		R-Y332000
OTHER ELECTRICAL PARTS				
CT801 TH501		Trimmer 30 pF	C-0724	4-224R157
		Thermistor SDT-1000	T-1200	SDT-1000
	⑤⑤	Speaker 77mm ϕ , 8-ohm	S-4598	4-151R811
	⑤⑥	S/RF Meter	M-0348	4-511R803
	⑤⑦	SWR Meter	M-0366	4-511R815
		Power Cord assembly, for AC, ONLY FOR U.S.A., UL approved	W-1937	4-243R21101
		Power Cord assembly, for AC, ONLY FOR CANADA, CSA approved		4-243R403A
		Power Cord assembly, for DC	W-1970	4-243R21202
	⑤⑧	Bushing B-type, for Q403, Q903 and IC701 Mtg.	HB-6080	R-Y61B
		Terminal, for wiring		176-2-382R125A
		Through-Hole Pin		176-2-382R132
	⑤⑨	Mica Sheet, 1S-313B type, for Q403 Mtg.		R-Y621S-313B
	⑥⑩	Silicon Rubber Sheet, for Q902 and Q903 Mtg.		176-2-246R108
	⑥①	Lug, for capacitor wiring		123-2-472R004
		Terminal, for binding AC leads		141-2-382T071
	⑥②	Junction Terminal		176-2-382R134
CABINET				
	⑥③	Cabinet top assembly	Z-3832	176-0-111R157
		— Cabinet top, including Insert Nuts		176-2-111R152
		— Decoration Plate		176-2-143R190A
		— Net, for Speaker cover		176-2-244R119
	⑥④	Cabinet bottom assembly, ONLY FOR U.S.A.	Z-3833	176-0-126R148
		— Cabinet bottom		176-2-126R152
		— Rating Plate		176-2-141R17211
		— Serial Number Plate		176-2-142R125
		— Rivet, for Rating Plate and Serial Number Plate Mtg.		176-2-467R106
		— Bracket, for floor Mtg.		176-2-310R189
		— Rivet, for Bracket Mtg.		176-2-467R005
	⑥④	Cabinet bottom assembly, ONLY FOR CANADA		176-0-126R14810
		— Cabinet bottom		176-2-126R152
		— Rating Plate		176-2-141R17218
		— Serial Number Plate		176-2-142R125
		— Rivet, for Rating Plate and Serial Number Plate Mtg.		176-2-467R106

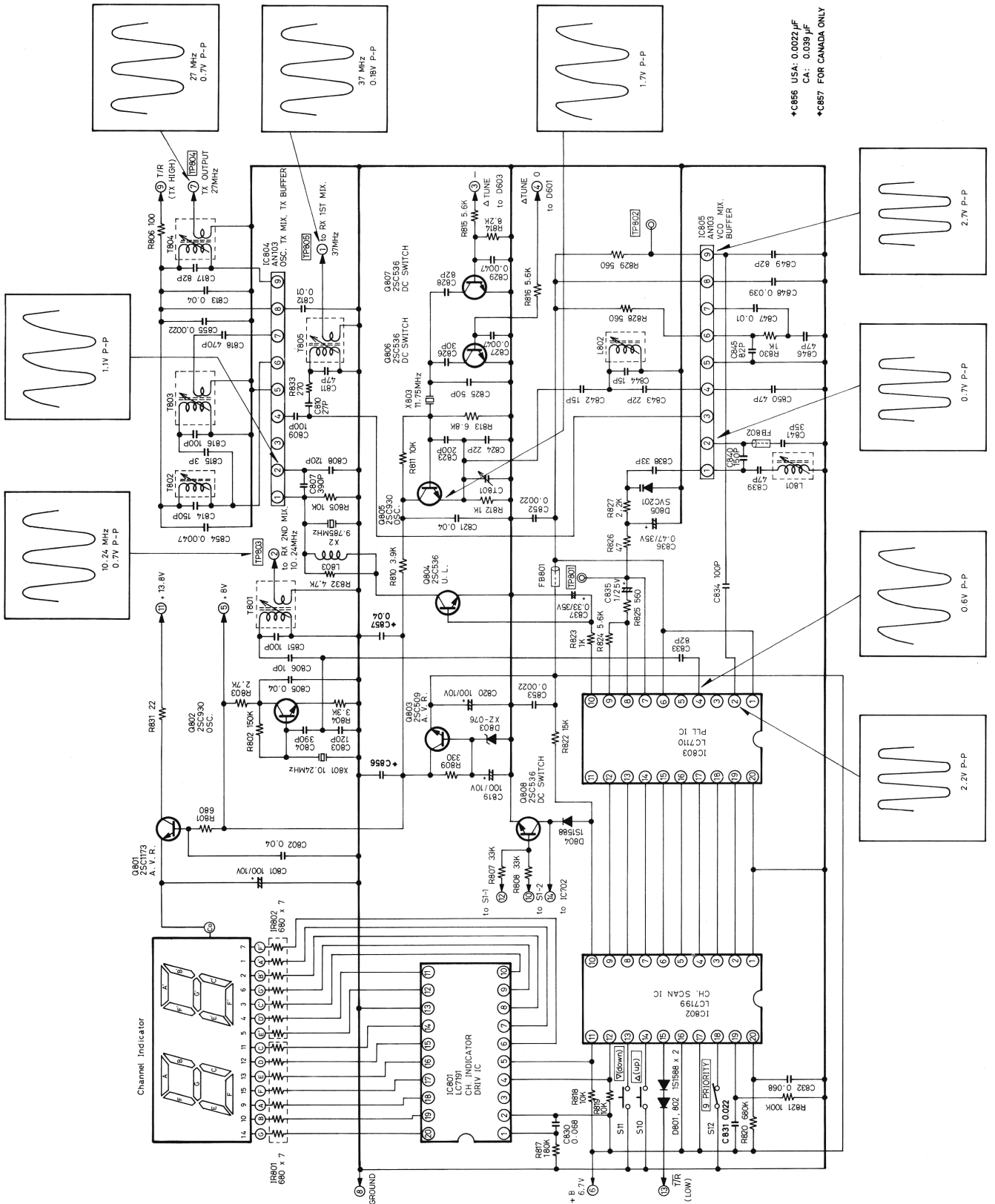
Symbol No.	Ref. No.	Description	RS Part No.	Mfr's Part No.
CABINET				
		↑ Bracket, for floor Mtg.		176-2-310R189
		└ Rivet, for Bracket Mtg.		176-2-467R005
	⑥5	Clear Window	HB-7078	176-2-131R106
	⑥6	┌ Sub-chassis assembly, for indicators		176-0-464R104
		└ Sub-chassis		176-2-464R124
		└ Window, "ON THE AIR"	HB-6334	176-2-132R116
		└ Window, "MODULATION"	HB-6335	176-2-132R11601
	⑥7	Reflector, for "ON THE AIR" and "MODULATION" lamps	HB-7079	176-2-329R106
	⑥8	Plastic Cushion, for meter Mtg.	HB-6336	176-2-446R107
	⑥9	Rubber Cushion, for lamp Mtg.	HB-7080	123-2-445R014
	⑦0	Handset Holder, rear	HB-7081	176-2-254R12501
	⑦1	Handset Holder, front	HB-7082	176-2-210R147
	⑦2	Bracket, for Speaker holder	HB-7083	176-2-310R264
	⑦3	Clamp, for Handset Holder and Micro Switch Mtg.	HB-7084	176-2-310R262
	⑦4	Shaft, for Handset Holder Mtg.		176-2-253R113
	⑦5	Spring Coil, for Handset Holder Mtg.		176-2-481R133A
	⑦6	Stopper, for Hook Switch	HB-7085	176-2-310R263
	⑦7	Spring Coil, for Hook Switch	RB-6035	176-2-481R136
	⑦8	Push Button, PRIORITY Push-Button	K-2790	176-2-161R140
	⑦9	Push Button, Channel Scan Push-Buttons	K-2791	176-2-161R141
	⑧0	Push Button, Hook Switch	K-2792	176-2-161R142
	⑧1	Rotary Knob assembly, SQUELCH, RF GAIN and SWR CALibration Controls	K-2793	176-0-163R144
	⑧2	Rotary Knob assembly, VOLUME with On/OFF switch	K-2794	176-0-163R145
	⑧3	Fiber Sheet, 23φ x 0.3mm, on Speaker		R-Y652303
	⑧4	Lug, for holding Speaker leads		141-2-472T01201
		Fixer, for holding wires		141-2-464T087
	⑧5	Special Nut, for VR506 Mtg.		176-2-415R102B
CHASSIS				
	⑧6	Sub-chassis, right side, for Main P.C. Board Mtg.		176-2-312R104
	⑧7	Sub-chassis, left side, for Main P.C. Board Mtg.		176-2-312R105
	⑧8	Sub-chassis, rear side, for Main P.C. Board Mtg.		176-2-312R106
	⑧9	Bracket, for holding C403	HB-7086	176-2-310R250
	⑨0	Spacer, between ANTenna Connector and Main Chassis	HB-7087	176-2-352R118
	⑨1	Bracket, for Handset Jack Mtg.	HB-7088	176-2-310R248
	⑨2	Stud Nut, for Main Chassis Mtg.	HB-7089	176-2-417R108
	⑨3	Bracket, for VOLUME On/OFF switch Mtg.	HB-7090	176-2-310R249
	⑨4	Heat Sink, for Q403	HH-0251	176-2-368R149

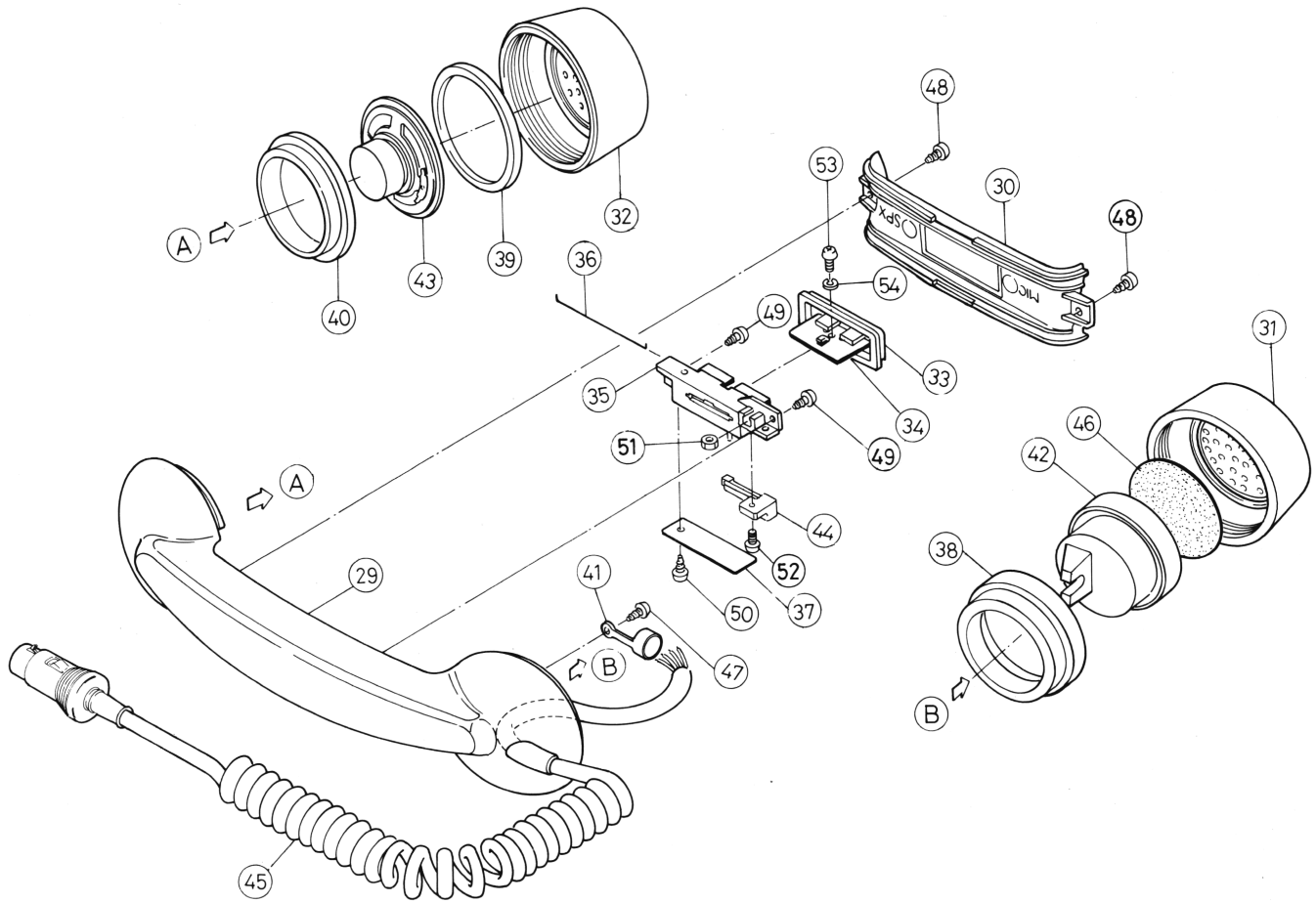
Symbol No.	Ref. No.	Description	RS Part No.	Mfr's Part No.
CHASSIS				
	⑨5	Knob, for Special Switches	K-2795	176-2-162R109
	⑨6	Sub-chassis, for Special Switches Mtg.		176-2-310R261
	⑨7	Heat Sink, for IC701	HH-0252	176-2-368R13101
	⑨8	Plate Nut, for IC701 Mtg.	HB-7091	176-2-411R103
	⑨9	Bracket, for AC 120V Jack Mtg.	HB-6345	176-2-210R115
	⑩0	Terminal, with ANTenna Connector	J-4528	176-2-382R11901
		Spacer, for MODE Switch	HB-7092	176-2-210R148
		Spacer, for METER, DELTA TUNE, BLANKER and SPEAKERS Switches	HB-7093	176-2-210R149
	⑩1	Heat Sink, for Q902	HH-0253	176-2-368R152
	⑩2	Heat Sink assembly, for Q903		176-0-368R105
		Heat Sink	HH-0254	176-2-368R153
		Shield Plate, for TX section		176-2-322R147
		Lug, for capacitor wiring		123-2-472R004
		Toothed Lock Washer, 2.6mm		R-Y342600
		Rivet		176-2-467R102
	⑩3	Bracket, for Handset Jack Mtg.	HB-7094	176-2-210R146
	⑩4	Lug, for holding T401 leads		123-2-472R006
	⑩5	Mask, for Push-Buttons		176-2-135R179A
	⑩6	Mask, for DELTA TUNE, BLANKER, SPEAKERS and MODE Switches	HB-7097	176-2-135R177
	⑩7	Mask, for METER Switch	HB-7098	176-2-135R180
	⑩8	Shield Plate assembly, for PLL section		176-0-322R108
		Shield Plate		176-2-322R149
		Fiber Sheet, 66 x 45.5 x 0.3mm		R-Y656645503
		Shield Case, for PLL section		176-2-322R148
		Shield Cover, for PLL section		176-2-135R182
	⑩9	Bracket, for T401 Mtg.		176-2-310R290
	⑩0	Bracket, for Shield Plate (176-2-322R147) Mtg.		176-2-310R292
	⑩1	TX/RX P.C. BOARD ASSEMBLY	X-7590	4-226R99301
	⑩2	AC-DC CONVERTER P.C. BOARD ASSEMBLY	X-7591	4-226R99401
FASTENERS				
	⑩3	Washer Head Tapping Screw, 3 x 8mm, for Sub-chassis (176-2-422R105) Mtg.		R-Y813008B
	⑩4	Hexagon Nut, 3mm, for LED Channel Indicator Mtg.		R-Y23300001
	⑩5	Pan Head Tapping Screw, 3 x 6mm, for Clamp Mtg.		R-Y113006B
	⑩6	Pan Head Tapping Screw, 3 x 6mm, for Stopper Mtg.		R-Y113006B
	⑩7	Pan Head Tapping Screw, 3 x 8mm, for Speaker Mtg.		R-Y113008B

Symbol No.	Ref. No.	Description	RS Part No.	Mfr's Part No.
FASTENERS				
	(118)	Pan Head Screw, 2 x 10mm, for Micro Switch Mtg.		R-Y012010
	(119)	Plain Washer, 2mm, for Micro Switch Mtg.		R-Y312000
	(120)	Pan Head Tapping Screw, 3 x 6mm, for Handset Holder (Fixed) Mtg.		R-Y113006B
	(121)	Pan Head Tapping Screw, 3 x 10mm, for Main Chassis Mtg.		R-Y113010B
	(122)	Pan Head Screw, 3 x 8mm, for Cabinet bottom Mtg.		R-Y013008
	(123)	Pan Head Screw, 3 x 8mm, for Main Chassis Mtg.		R-Y013008
	(124)	Pan Head Thread Rolling Screw, 3 x 6mm, for Sub-chassis Mtg.		R-Y583006
	(125)	Pan Head Thread Rolling Screw, 3 x 6mm, for DC 12V Jack Mtg.		R-Y583006
	(126)	Pan Head Screw, 2.6 x 12mm, for AC 120V Jack Mtg.		R-Y012612
	(127)	Pan Head Thread Rolling Screw, 3 x 6mm, for TX/RX P.C. Board Mtg.		R-Y583006
	(128)	Toothed Lock Washer, 3mm, for TX/RX P.C. Board Mtg.		R-Y34300002
	(129)	Pan Head Screw, 3 x 8mm, for Q902 Heat Sink and Q903 Heat Sink		R-Y013008
	(130)	Pan Head Screw, 3 x 10mm, for Q903 Mtg.		R-Y013010
	(131)	Plain Washer, 3mm, for Q903 Mtg.		R-Y323000
	(132)	Hexagon Nut, 3mm, for Q903 Mtg.		R-Y23300001
	(133)	Pan Head Screw, 3 x 10mm, for Q902 Mtg.		R-Y013010
	(134)	Hexagon Nut, 3mm, for Q902 Mtg.		R-Y23300001
	(135)	Pan Head Screw, 3 x 6mm, for Heat Sink and Main Chassis		R-Y013006
	(136)	Pan Head Screw, 4 x 10mm, for T401 Mtg.		R-Y014010
	(137)	Spring Washer, 4mm, for T401 Mtg.		R-Y334000
	(138)	Pan Head Thread Rolling Screw, 3 x 6mm, for Q403 Heat Sink and P.C. Board		R-Y583006
	(139)	Pan Head Thread Rolling Screw, 3 x 6mm, for Q403 Heat Sink and Chassis		R-Y583006
	(140)	Pan Head Screw with Plain and Spring Washers, 3 x 10mm, for Q403 Mtg.		R-Y793010
	(141)	Hexagon Nut, 3mm, for Q403 Mtg.		R-Y23300001
	(142)	Flat Head Screw, 2.6 x 4mm, for Handset Jack Mtg.		R-Y022604
	(143)	Pan Head Screw, 3 x 4mm, for Bracket Mtg.		R-Y013004
	(144)	Flat Head Screw, 3 x 6mm, for Bracket (176-2-210R146) Mtg.		R-Y023006
	(145)	Pan Head Screw, 3 x 4mm, for Bracket (176-2-310R249) Mtg.		R-Y013004

Symbol No.	Ref. No.	Description	RS Part No.	Mfr's Part No.
FASTENERS				
	①46	Pan Head Screw with Toothed Lock Washer, 3 x 6mm, for Main P.C. Board Mtg.		R-Y663006
	①47	Pan Head Thread Rolling Screw, 3 x 6mm, for IC701 Head Sink and Chassis		R-Y583006
	①48	Pan Head Screw with Plain and Spring Washers, 3 x 8mm, for IC701 Mtg.		R-Y793008
	①49	Flat Head Screw, 2.6 x 6mm, for IC701 Heat Sink and P.C. Board		R-Y022606
	①50	Pan Head Screw, 3 x 4mm, for Sub-chassis (176-2-310R261) Mtg.		R-Y013004
	①51	Flat Head Screw, 2.6 x 4mm, for Special Switch Mtg.		R-Y022604
	①52	External "E" Ring, 2mm, for Handset Holder Mtg.		R-Y352000
	①53	Flat Head Screw, 2.6 x 6mm, for Heat Sink and TX/RX P.C. Board		R-Y022606

SCHEMATIC DIAGRAM (PLL AND SCANNER SECTION)





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