



## PROGRAM CODE TABLE

Q101 PIN NO.	(14)	(13)	(12)	(11)	(10)	(9)	(8)	(7)	(6)	(5)	(4)	(3)
DIAL	18	4	2	11	18	4	2	11	18	4	2	11
	MHz			100kHz			10kHz					
1	0	0	0	1	0	0	0	1	0	0	0	1
2	0	0	1	1	0	0	1	1	0	0	1	1
3	0	0	1	1	0	0	1	1	0	0	1	1
4	0	0	1	0	0	1	0	1	0	0	1	0
5	0	0	1	0	1	0	1	0	1	0	1	0
6	0	1	1	0	0	1	1	0	0	1	1	0
7	0	1	1	1	0	1	1	1	1	1	1	1
8	1	0	0	0	1	0	0	1	0	0	1	0
9	1	0	0	0	1	0	0	1	0	0	1	0
0	0	0	0	0	0	0	0	0	0	0	0	0

The following example shows how to calculate the frequency division number from the frequency indicated.

Example: Frequency indicated: 144,000 MHz

TX Local frequency = 46,666 MHz

Step = 10 KHz

(144,000 - 46,666 x 3)/10 = 400

RX Local frequency = 43,1016 MHz

1st IF = 10,695 MHz  
 [144,000 - (43,1016 x 3 + 10,695)]/  
 10 = 400

Relationship between PLL programmable divider and frequency

Frequency indication (MHz)	Frequency division number (N)	Q101 (TC9122P) Pin Number											
		14	13	12	11	10	9	8	7	6	5	4	3
144,00	400	0	1	0	0	0	0	0	0	0	0	0	1
144,01	401	0	1	0	0	0	0	0	0	0	0	0	1
144,02	402	0	1	0	0	0	0	0	0	0	0	0	1
		?	?	?	?	?	?	?	?	?	?	?	?
145,00	500	0	1	0	1	0	0	0	0	0	0	0	0
145,50	550	0	1	0	1	0	1	0	1	0	0	0	0
		?	?	?	?	?	?	?	?	?	?	?	?
145,99	599	0	1	0	1	1	0	1	1	0	0	0	1

## 2. REFERENCE FREQUENCY GENERATOR Q102

- Q102 is a PLL frequency synthesizer IC.
  - A 10.240MHz signal is output from pin 1 of Q102.
  - A 10 KHz signal which is obtained by dividing the 10.240MHz reference signal by 1024.
- ## 3. PHASE DETECTOR (P/D) Q103
- The phase of 10 KHz signal output from the reference signal generator is compared with that of the signal from the programmable counter.
  - The 10 KHz signal is applied to pin 8 of Q103 from pin 7 of Q102. The signal from pin 17 of the programmable counter is applied to pin 7 of Q103.

## 4. VCO

- Capacitance of varicap diode Q116 varies when the DC voltage across it varies; therefore the oscillation frequency varies. The modulation signal (voice signal) is applied to the gate of Q119 (2SK192) to vary the voltage between the source and gate.

## 5. LOCAL OSCILLATOR

- The local oscillator circuit consists of X102, X103, X104, X105 and Q106. X102 and X103 are for RX and the latter is used to shift the frequency by -600 KHz. X104 and X105 are for TX and the latter is used to shift the frequency by -600KHz.

- The signal oscillated is tripled at L102 connected to the collector of Q106 (2SC2026). Thus, a 130,305 MHz (129,705 MHz for -600 KHz shift operation) is obtained during reception and a 141,00 MHz signal (140,400 MHz for -600 KHz shift operation) is obtained during transmission. When the +5 KHz switch is pressed, the above frequencies are raised by 5 KHz. The signal is then applied to mixer Q105 (2SC2668).

- When the +5 KHz switch is pressed, Q111, Q112, Q113, Q114, Q125 and Q126 conduct to short circuit L108, L109, L110 and L111 so that inductance is lowered and the frequency is raised.

## 6. WIDE BAND MIXER

- The signal from the VCO is buffered by Q120 and Q121 (2SC2668) and applied to the base of wide band mixer Q105. The signal from the local oscillator is also applied to the base of Q105 via C124. The wide band mixer mixes these two signals to generate the 4.00 to 7.995 MHz signal.
- The signal from Q105 passes through LPF (consisting of C122, L101 and C121) and is amplified with Q104 (2SC2668). The signal is then applied to pin 2 of Q101. L102 is adjusted so that the level of this signal is 1.8 Vp-p during reception at 145.35 MHz.

## 7. OUTPUT AMPLIFIER

- The signal from the VCO is amplifier with Q123 (2SC2668) and applied to the source of QR23 via filter L118 and coupling capacitor CR11 during reception while it is applied to the TX younger amplifier (QT57) through CT82 during transmission.

## 8. UNLOCK SWITCH

- Q115 (2SA1048) is used as an unlock switch. If the unlock switch circuit operates during transmission, the level of the TX +B (5V) line drops to 0V and the TX prior amplifier stops operation.
- If the PLL circuit unlocks, the voltage at pin 4 of phase detector Q103 drops to turn on Q115. This cuts off QT58 and stops operation of the TX prior amplifier, preventing unnecessary radio waves from being transmitted.

## POWER SUPPLY SECTION

- The voltage regulator uses the series regulating circuit consisting of OS09, OS10, OS11 and OS12. This regulator supplies 5V stably when the source voltage is 5.5 to 11.0V.
- 9.6V is applied to OS10 and OS12. OS12 forms a switching circuit which utilizes the pinch-off characteristic of FET and generates a control voltage for OS11. The current flowing through Zener diode OS08 is applied to the base of OS09. OS09 controls the base current of OS11 and the base current of OS10 is controlled through RS19.
- If the source voltage drops below 9.6V, the regulator operates as follows. The voltage applied to the base of OS11 from OS12 drops. The current through OS08 decreases so that the base current of OS09 decreases. This increases the base voltage of OS11 so that the output voltage is kept to 5V.
- If the source voltage rises above 9.6V, the regulator operates as follows. The voltage applied to OS11 through OS12 increases. The base current of OS09 increases so that the base current of OS11 decreases. This makes OS10 to operate to lower the output voltage.
- During reception, the PTT switch is off, so the base voltage of OS07 is 5V. Therefore, the base voltage of OS03 is relatively low and it is on. At this time, the base voltage of OS06 is low so that OS05 is off. Thus, the level of the TX5V line is 0V.
- 6V for RX is generated from the voltage of the RX5V line by the voltage boost circuit consisting of OS03 and OS02.
- During transmission, the PTT switch is on and the base voltage of OS08 is 3V. Therefore, OS07 is on and OS03 is off. Thus, the voltage of the RX5V line is 0V. At this time, the base voltage of OS06 is high so that the base voltage of OS05 is low. Thus, the TX5V line is active.

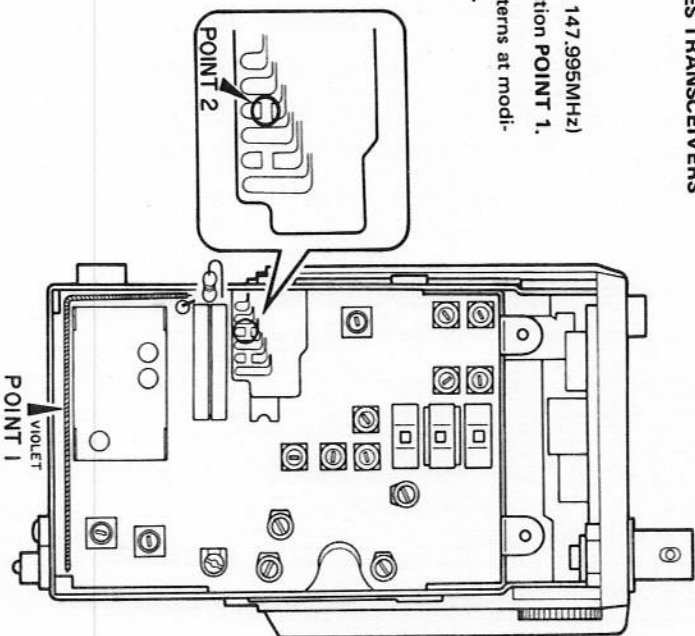
## SERVICE GUIDE

### MODIFYING THE C110 SERIES TRANSCEIVERS

#### C110W → C110E

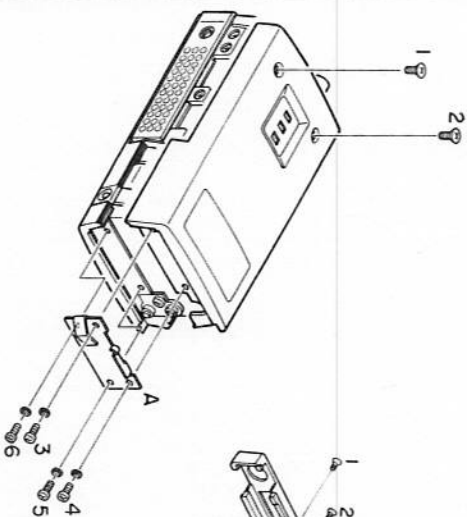
144,000 to 145,995MHz →  
144,000 to 147,995MHz)

- Cut the violet wire at modification POINT 1.
- Connect the flexible PWB patterns at modification POINT 2 by soldering.



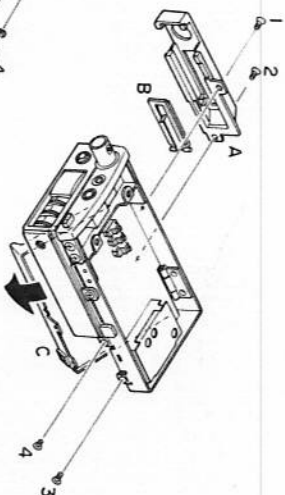
#### CASE REMOVAL

Remove screws 1, 2, and 3 to 6, then remove A to remove the case.



#### BOARD REMOVAL

Remove screws 1 and 2, then remove A and B. Next, remove screws 3 and 4 and open chassis C.



## PLL SECTION

- **Checking the reference frequency**
  1. Connect a frequency counter to TP2 (C115).
  2. Confirm that it reads 10.240 MHz ± 100 Hz.
- **Adjusting local frequency**
  1. Set the thumb wheel switches to 145.35 MHz.
  2. Connect an RF VTVM to TP1 (RR05).
  - 3(\*). Position the cores of L104, L105, L106, L107, L108, L109, L110 and L111 slightly below their center. Adjust L102 so that the voltage at TP4 (R101) becomes 1.8 Vp-p.
  4. Transmit and confirm that the voltage is 1.8 Vp-p or more.
  5. Confirm that the RX local frequency is around 129.305 MHz and TX local frequency is around 140.00 MHz.
- **Adjusting VCO frequency**
  1. Connect an accurate DC voltmeter to TP3 (R124).
  2. Set the frequency to 144.00 MHz for the C110E and C110W.
  3. Adjust L116 so that the voltmeter reads 1.7V for the C110E and C110W.
  4. Transmit and adjust C143 so that the voltmeter reads 2.0V for the C110E and C110W.

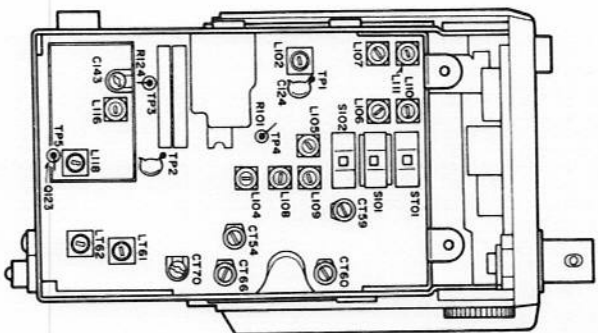
## TRANSMITTER SECTION

- 1(\*). Center CT59, CT60, CT66, CT67 and CT70.
2. Adjust L118, LT61, LT62, CT59, CT60, CT66, CT67 and CT70 so that the power consumption is maximized. At this time, the RF output will be 2.5W and the load current will be about 750 mA.
3. The difference between the RF power at 144.00 MHz and that at 147,995 MHz should be 0.4W or less. (Typ. 0.3W)
4. If the power consumption at high frequencies differs from that at low frequencies, adjust LT61, CT70 and CT66 so that they are balanced.

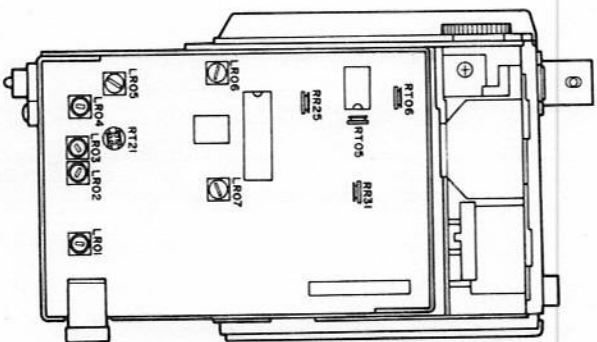
- **Adjusting transmission and receiving frequencies**
  1. Connect the frequency counter to TP5 (CT82).
  2. Set the thumb wheel switch to 145.02 MHz.
  3. Transmit and press the +5 KHz switch, then adjust L106 so that the frequency counter reads 145.025 MHz ± 100 Hz.

4. Set S102 to the -600 KHz position and adjust L107 so that the frequency counter reads 144.425 MHz ± 100 Hz. Reset the +5 KHz switch and S102 and adjust L110 so that the frequency counter reads 145.02 MHz ± 100 Hz. Set S102 to the -600 KHz position and adjust L111 so that the frequency counter reads 144.42 MHz ± 100 Hz. Reset S102.
  4. Receive and press the +5 KHz switch. Adjust L104 so that the frequency counter reads 134.330 MHz ± 100 Hz. Set S101 to the -600 KHz position and adjust L105 so that the frequency counter reads 133.730 MHz ± 100 Hz. Resets these switches and adjust L108 so that the frequency counter reads 134.325 MHz ± 100 Hz. Set S101 to the -600 KHz position and adjust L109 so that the frequency counter reads 133.725 MHz ± 100 Hz.
  5. Repeat steps 3 and 4 several times.
- **Adjusting deviation**
    1. Set the thumb wheel switch to 145.02 MHz.
    2. Turn RT21 all the way to the right.
    3. Apply a 1000 Hz, 100 mV (open voltage) signal to the MIC terminal.
    4. Transmit and adjust RT21 so that the deviation is ± 5 KHz.
    5. Decrease the level of the input signal until the deviation is ± 3 KHz, then confirm that the level of the input signal is 3 to 5 mV.
  - **Adjusting tone burst**
    1. Set the thumb wheel switch to 145.02 MHz.
    2. Press the CALL switch to transmit.
    3. Adjust RT05 so that the AF frequency counter reads 1750 Hz.
    4. Adjust RT06 so that the deviation is ± 3.5 KHz.
  - **Meter adjustment**
    1. Set the power supply voltage to 5.5V.
    2. Adjust RR31 so that the meter needle points a position between the red and green markings.

# ADJUST AND TEST POINT LOCATIONS



PLL, TX



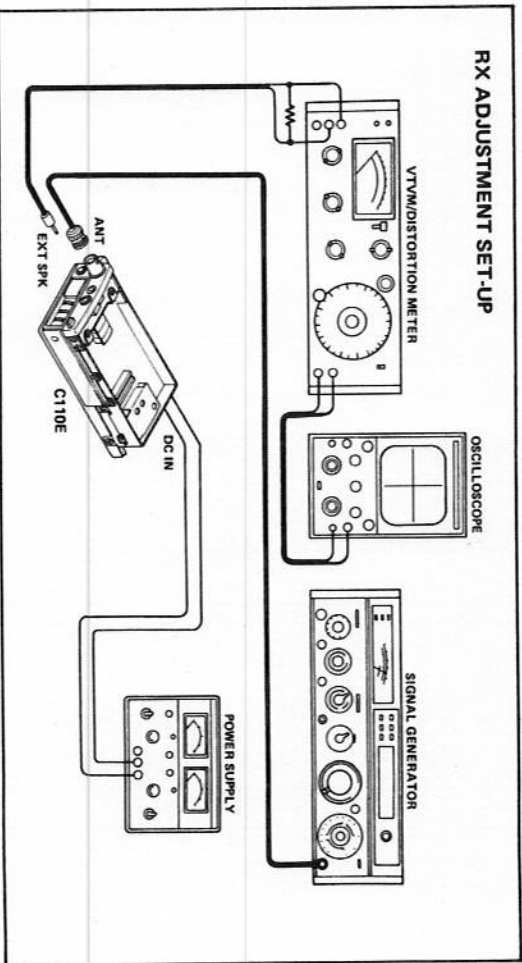
Rx

## ADJUSTMENT PROCEDURES STANDARD ADJUSTMENT CON- DITIONS

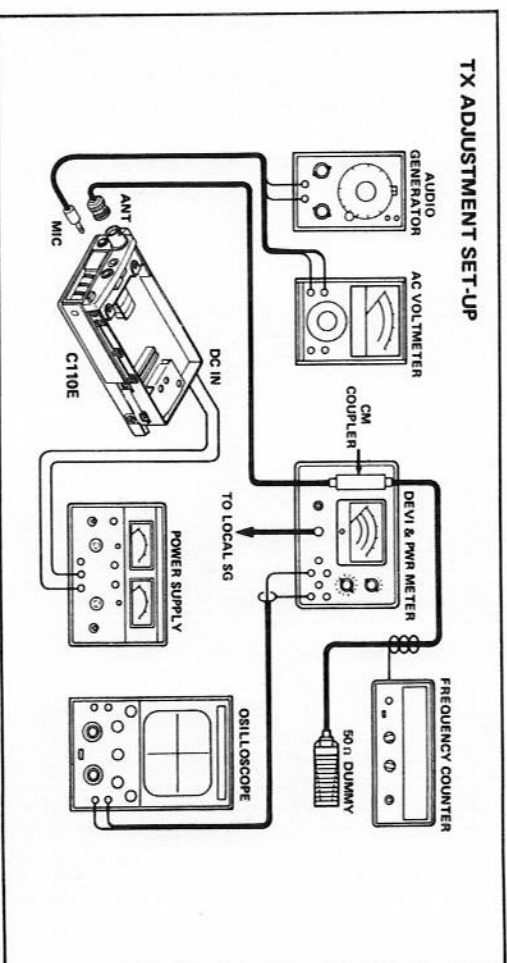
Rated power supply voltage . . . . . 9.6V DC  
Receiver output . . . . . 150 mW  
Receiver load . . . . . 8.0 ohms  
Deviation . . . . .  $\pm 3$  kHz at 1000 Hz  
Transmitter load . . . . . 50 ohms  
Receiving frequency . . . . . 145.04 MHz  
Transmitting frequency . . . . . 145.02 MHz  
SQL control setting . . . . . Leftmost position  
VOL control setting . . . . . Appropriate position

- (1) Perform adjustment under the above conditions unless otherwise specified.
- (2) Items indicated with "\*" should be adjusted only after components have been replaced.

### RX ADJUSTMENT SET-UP



### TX ADJUSTMENT SET-UP



## RECEIVER SECTION

### • Adjusting sensitivity

1. Connect an 8-ohm load, VTVM and oscilloscope to the speaker terminal.
2. Generate a 145.04 MHz signal modulated at 1000 Hz with an deviation of  $\pm 3.0$  KHz with the RF SG. Set the output level to the minimum level required for adjustment.
3. Adjust LR07 so that the speaker output level is maximized. (About 2.0V at 8 ohms)
4. Adjust LR05 and LR06 so that the VTVM reading is maximized.

Note: Since the VTVM reading becomes too large as adjustment proceeds, lower the SG output level at an appropriate timing. If LR05 is not adjusted properly, the distortion ratio will increase.

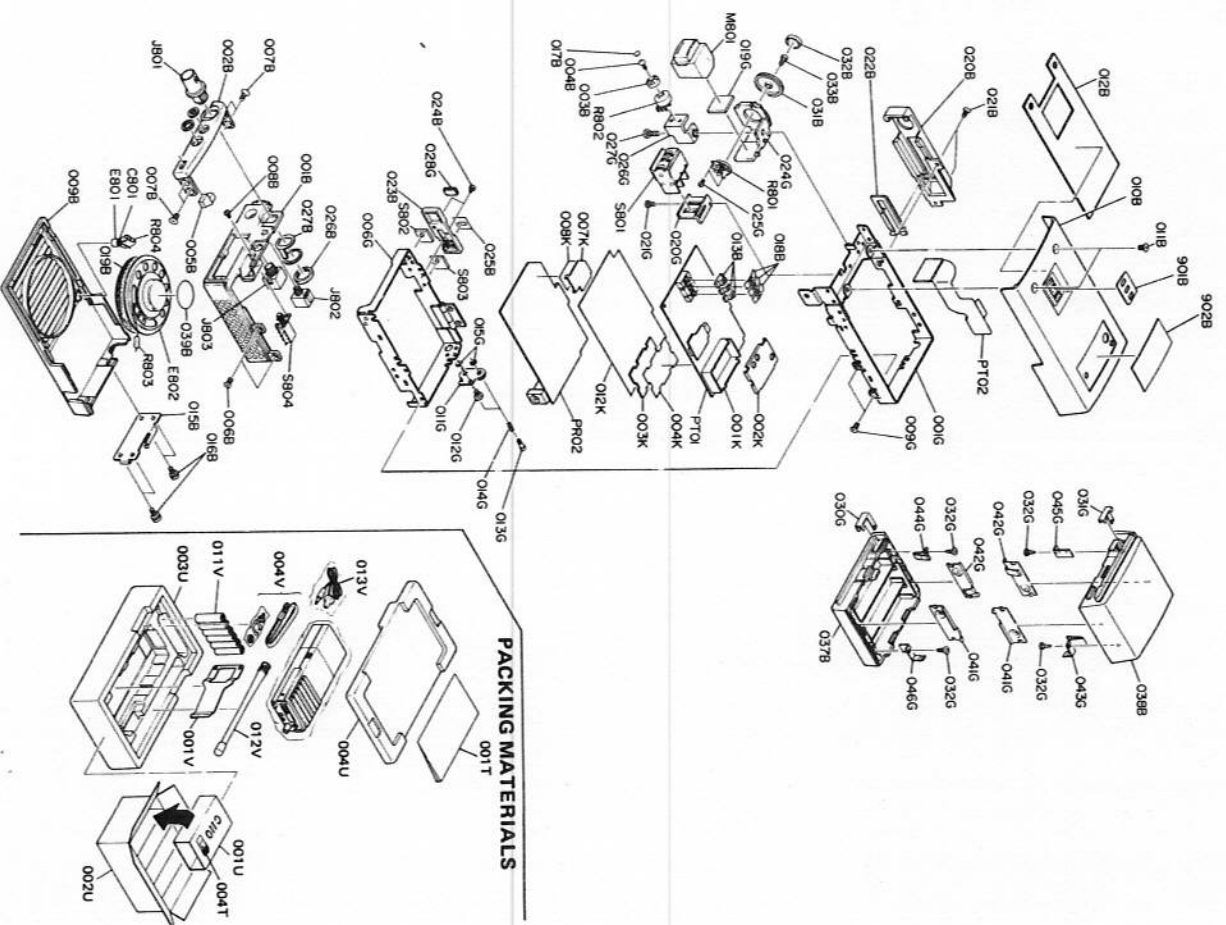
### • Adjusting RF circuit

1. Connect the SG to the antenna terminal. Generate an unmodulated 145.04 MHz signal of 40 dB with the SG.
2. Adjust LR01, LR02, LR03 and LR04 so that the S meter reading is maximized. Since the S meter reading becomes too large as adjustment proceeds, lower the SG output level at an appropriate timing.

### • Adjusting the S meter

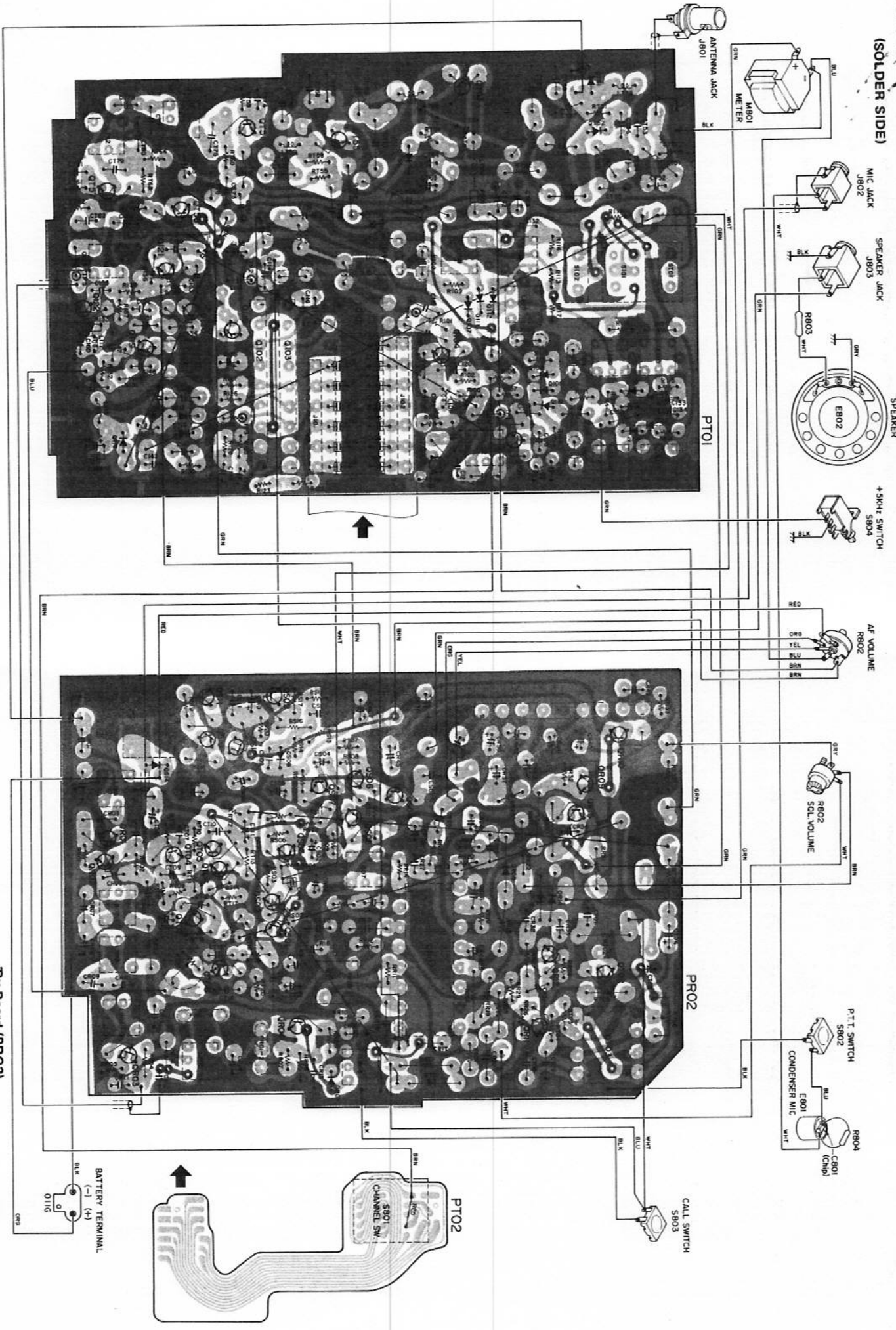
Apply a 15 dB signal modulated with 1000 Hz ( $\pm 3.0$  KHz deviation) to the antenna terminal from the SG. Adjust RR 25 so that the S meter reads S-6.

## EXPLODED PARTS VIEW AND PARTS LIST



# COMPONENT LOCATIONS AND WIRE CONNECTIONS

(SOLDER SIDE)



PLL Tx Board (PTO1)

Rx Board (PRO2)

MECHANISM

ELECTRICAL

REF. DESIG.	QTY	PART NO.	DESCRIPTION
0018	1	2212063010	Ecutechion, Meter/Channel
0028	1	2212083120	Ecutechion, Ant/EXT
0038	1	2212154030	Knob, SOL
0048	1	5106140450	P.H.M. Screw
0058	1	2212270010	Button, Call
0068	2	51040204E0	P.H.M. Screw
0078	4	51042604E0	P.H.M. Screw
0088	1	51060204E0	P.H.M. Screw
0098	1	2212064010	Case, Rear
0108	1	2212064020	Case, Rear
0118	2	51140305E9	O.C.H.M. Screw
0128	1	2212109060	Shield, Slide Switch
0138	3	2212154040	Knob, Slide Switch
0158	1	2212151010	Spring
0168	4	51102804E0	B.H.M. Screw
0178	1	2212285030	Indicator, SOL Knob
0188	3	2212303020	Mask, Slide Switch
0198	1	2212202010	Net, Speaker
0208	1	2212063130	Ecutechion, PTT
0218	2	51040204E0	F.H.M. Screw
0228	1	2212154010	Knob, PTT
0238	1	2212271010	Holder, PTT/Lamp SW.
0248	2	51060204E0	P.H.M. Screw
0258	1	2212303010	Mask, Lamp
0268	1	53228119E0	S.C. Nut, Antenna Jack
0278	1	2212154020	Knob, VOL
0288	1	2212067010	Cap. VOL Knob
0298	1	5106170450	P.H.M. Screw
0308	1	2212064030	Case, Battery: Front
0318	1	2212064040	Case, Battery: Rear
0328	1	2212120060	Insulator, SPK
0338	1	2212265110	Indicator, Slide SW.
0348	1	2212265120	Indicator, Name Plate(C110E)
0358	1	2212265140	Indicator, Name Plate(C110E)
0368	1	2212105500	Chassis Assembly, Main
0378	1	2212105510	Chassis Assembly, Sub
0388	4	51040204E0	F.H.M. Screw
0398	1	2212271020	Holder, (+) (-) Terminal
0408	1	51102804E0	B.H.M. Screw
0418	2	2212154020	Connector, (+) (-)
0428	1	2212154030	Spring
0438	2	64001200E0	RG Ring, E Type
0448	1	2212056030	Button, Meter
0458	1	2212271030	Holder, CH Switch
0468	1	51060204E0	P.H.M. Screw
0478	2	2212271040	Holder, VOL
0488	2	51281603U0	P.H. Tapped Screw
0498	1	2212271050	Holder, SOL
0508	1	51102808E0	B.H.M. Screw
0518	1	22120560E0	Button, PTT Knob
0528	1	22120560F0	Connector, Battery(-)
0538	1	2212123070	Connector, Battery(+)
0548	1	2212123080	Connector, Battery(+)
0558	4	51380205P0	P.H. Tapped Screw
0568	3	2212056040	Button, Chassis
0578	2	2212123010	Connector, Battery Terminal (A)
0588	2	2212123020	Connector, Battery Terminal (B)
0598	1	2212123030	Connector, Battery Terminal (C)
0608	1	2212123040	Connector, Battery Terminal (D)
0618	1	2212123050	Connector, Battery Terminal (E)
0628	1	2212123060	Connector, Battery Terminal (F)
0638	2	2212274010	Reflector, Lamp

REF. DESIG.	QTY	PART NO.	DESCRIPTION
001K	1	2212109110	Shield, Case
002K	1	2212109120	Shield, Lid
003K	1	2212109130	Shield, Lid
004K	1	2212120110	Shield
007K	1	2212109140	Lid, Shield
008K	1	2212120140	Insulator, Shield
012K	1	2212120080	Insulator, TX, RX PWB
CG01	1	DK56102300	Ceramic Cap. 1000pF ±10%, Chip
EB01	1	MS50000100	Condenser Mic
EB02	1	CG09030390	Speaker, 8Ω
J801	1	YJ10001620	Jack, Antenna
J802	1	YJ01000590	Jack, Mic
J803	1	YJ01000570	Jack, Speaker
M801	1	IM11020030	Meter, 500μA
R801	1	BR11030010	Variable Resistor 10KΩ(B)
R802	1	BR05020010	Variable Resistor 5KΩ(B)
R803	1	GU05039120	Resistor 3.91Ω ±5% 1/2W
R804	1	GU05033180	Resistor 33KΩ ±5% 1/8W
SC04040010	1	SC04040010	Switch, Channel
SP01010680	1	SP01010680	Switch, PTT
SP01010690	1	SP01010690	Switch, Call
SP01010690	1	SP01010690	Switch, +5KHz
001T	1	2212851010	PACKING
004T	2	9622019010	Instructions
001U	1	2212804110	Serial No. Card
002U	1	2212809010	Sleeve
003U	1	2212809010	Master Carton(1/5)
004U	1	2212809020	Cushion
001V	1	2212286010	Hook, Belt Clip
004V	1	2212156010	Strap, Hand
011V	6	Z801030010	Battery, UM3 1.5V
012V	1	YR99020120	Antenna
013V	1	ZE10080240	Earphone

REF. DESIG.	QTY	PART NO.	DESCRIPTION
PR02	1	YF22120090	PR02-RX-REG CIRCUIT BOARD P.W. Board, RX-RG
CR01	1	DK17102300	PR02-CAPACITORS
CR02	1	DD15670370	Ceramic 8pF ±20%
CR03	1	DD15670370	Ceramic 8pF ±5%
CR04	1	DK17102300	Ceramic 1000pF ±20%
CR05	1	DD11080330	Ceramic 8pF ±20%
CR06	1	DD11080330	Ceramic 8pF ±20%
CR07	1	DD11080330	Ceramic 8pF ±20%
CR08	1	DD11080330	Ceramic 8pF ±20%
CR09	1	DD11080330	Ceramic 8pF ±20%
CR10	1	DD11080330	Ceramic 8pF ±20%
CR11	1	DD15101370	Ceramic 100pF ±5%
CR12	1	DK17102300	Ceramic 1000pF ±20%
CR13	1	DK17102300	Ceramic 4pF ±0.25pF
CR14	1	DD106040370	Ceramic 1000pF ±20%
CR15	1	DK17102300	Ceramic 1000pF ±20%
CR16	1	DK17102300	Ceramic 1000pF ±20%
CR17	1	DK17102300	Ceramic 1000pF ±20%
CR18	1	DK17102300	Ceramic 1200pF ±5%
CR19	1	DD15121370	Ceramic 0.022uF ±5%
CR20	1	DF1522310	Film 0.022uF ±5%
CR21	1	DF1522310	Film 10pF ±0.5pF
CR22	1	DD1100370	Ceramic 100pF ±20%
CR23	1	EV22801680	Elect 2.2uF
CR24	1	EJ10406010	Elect 0.1uF
CR25	1	DK17102300	Ceramic 1000pF ±20%
CR26	1	DK17102300	Ceramic 1000pF ±20%
CR27	1	DS17103010	Elect 0.22uF
CR28	1	EV22801680	Elect 2.2uF
CR29	1	EJ22405010	Elect 0.22uF
CR30	1	DD15221370	Ceramic 220pF ±5%
CR31	1	DK17102300	Ceramic 1000pF ±20%
CR32	1	DK17102300	Ceramic 1000pF ±20%
CR33	1	DK17102300	Ceramic 1000pF ±20%
CR34	1	DK17102300	Ceramic 1000pF ±20%
CR35	1	EJ10701010	Elect 100uF
CR36	1	EJ10701010	Elect 100uF
CR37	1	EJ10601610	Elect 1000pF ±20%
CR38	1	DK17102300	Ceramic 1000pF ±20%
CR39	1	EJ22405010	Elect 0.22uF
CR40	1	EJ10601610	Elect 10uF
CR41	1	E47600610	Elect 47uF
CR42	1	EJ22600610	Elect 22uF
CR43	1	DK17102300	Ceramic 1000pF ±20%
CR44	1	EJ10403580	Elect 0.1uF
CR45	1	EJ10700610	Elect 100uF
CR46	1	EJ33600610	Elect 33uF
CS01	1	DK17102300	Ceramic 1000pF ±20%
CS02	1	E47602510	Elect 47uF
CS03	1	EJ10405010	Elect 0.1uF
CS04	1	E47601610	Elect 47uF
CS05	1	DK17102300	Ceramic 1000pF ±20%
CS06	1	EJ10700610	Elect 100uF
CS07	1	EJ10700610	Elect 100uF
CS08	1	E47600610	Elect 47uF
CS09	1	DK17102300	Ceramic 1000pF ±20%
CS10	1	EJ10405010	Elect 0.1uF
CS11	1	DK17102300	Ceramic 1000pF ±20%
CS12	1	EJ10700610	Elect 100uF
CS14	1	DK56102300	Ceramic 1000pF ±10%, Chip

REF. DESIG.	QTY	PART NO.	DESCRIPTION
CT01	1	DK17102300	Ceramic 1000pF ±20%
CT02	1	E47600610	Elect 47uF
CT03	1	DF15103310	Film 0.01uF ±5%
CT04	1	EV10403580	Film 0.01uF ±5%
CT05	1	DF15103310	Film 0.01uF ±5%
CT06	1	EJ10405010	Elect 0.1uF
CT07	1	DK16471300	Ceramic 470pF ±10%
CT08	1	EJ10601610	Elect 10uF
CT09	1	DK16471300	Ceramic 470pF ±10%
CT10	1	DK16471300	Ceramic 470pF ±10%
CT11	1	EJ10505010	Elect 1uF
CT12	1	DK17102300	Ceramic 1000pF ±20%
CT13	1	EJ22600610	Elect 22uF
CT14	1	DF15102310	Film 4700pF ±5%
CT15	1	DF15472310	Film 4700pF ±5%
CT16	1	DD15101370	Ceramic 100pF ±5%
CT17	1	DK17102300	Ceramic 1000pF ±20%
RR01	1	GD05102180	PR02-RESISTORS (All Resistors are 5% & 1/8W)
RR02	1	GD05104180	10KΩ
RR03	1	GD05082180	1KΩ
RR04	1	GD05082180	6.8KΩ
RR05	1	GD05221180	2.2KΩ
RR06	1	GD05221180	2.2KΩ
RR07	1	GD05221180	2.2KΩ
RR08	1	GD05682180	6.8KΩ
RR09	1	GD05104180	10KΩ
RR10	1	GD05102180	1KΩ
RR11	1	GD05152180	1.5KΩ
RR12	1	GD05102180	1.5KΩ
RR13	1	GD05472180	4.7KΩ
RR14	1	GD05223180	2.2KΩ
RR15	1	GD05223180	2.2KΩ
RR16	1	GD05823180	8.2KΩ
RR17	1	GD05103180	10KΩ
RR18	1	GD05102180	1KΩ
RR19	1	GD05274180	270KΩ
RR20	1	GD05153180	15KΩ
RR21	1	GD05152180	1.5KΩ
RR22	1	GD05472180	4.7KΩ
RR23	1	GD05332180	3.3KΩ
RR24	1	GD05472180	4.7KΩ
RR25	1	RA01030620	10KΩ(B), Variable
RR26	1	GD05104180	100KΩ
RR27	1	GD05332180	3.3KΩ
RR28	1	GD05224180	220KΩ
RR29	1	GD05332180	3.3KΩ
RR30	1	GD05104180	100KΩ
RR31	1	RA01040270	100KΩ(B), Variable
RR32	1	GD05472180	4.7KΩ
RR33	1	GD05472180	4.7KΩ
RR35	1	GD05271180	270Ω

REF. DESIG.	QTY	PART NO.	DESCRIPTION
RS01	1	GD05473180	47KΩ
RS02	1	GD0532180	3.3KΩ
RS03	1	GD05103180	10KΩ
RS04	1	GD05103180	10KΩ
RS05	1	GD05103180	10KΩ
RS06	1	GD0532180	3.3KΩ
RS07	1	GD05103180	10KΩ
RS08	1	GD05103180	10KΩ
RS09	1	GD05103180	10KΩ
RS10	1	GD05103180	10KΩ
RS11	1	GD05473180	47KΩ
RS12	1	GD05473180	47KΩ
RS13	1	GD05473180	47KΩ
RS14	1	GD05473180	47KΩ
RS15	1	GD05473180	47KΩ
RS16	1	GD05473180	47KΩ
RS17	1	GD05473180	47KΩ
RS18	1	GD05473180	47KΩ
RS19	1	GD05473180	47KΩ
RS20	1	GD05473180	47KΩ
RS21	1	GD05473180	47KΩ
RS22	1	GD05473180	47KΩ
RT01	1	GD05223180	22KΩ
RT02	1	GD05223180	22KΩ
RT03	1	GD05223180	22KΩ
RT04	1	GD05223180	22KΩ
RT05	1	GD05223180	22KΩ
RT06	1	GD05223180	22KΩ
RT07	1	GD05223180	22KΩ
RT08	1	GD05223180	22KΩ
RT09	1	GD05223180	22KΩ
RT10	1	GD05223180	22KΩ
RT11	1	GD05223180	22KΩ
RT12	1	GD05223180	22KΩ
RT13	1	GD05223180	22KΩ
RT14	1	GD05223180	22KΩ
RT15	1	GD05223180	22KΩ
RT16	1	GD05223180	22KΩ
RT17	1	GD05223180	22KΩ
RT18	1	GD05223180	22KΩ
RT19	1	GD05223180	22KΩ
RT20	1	GD05223180	22KΩ
RT21	1	GD05223180	22KΩ
RT22	1	GD05223180	22KΩ
RT23	1	GD05223180	22KΩ
RT24	1	GD05223180	22KΩ

REF. DESIG.	QTY	PART NO.	DESCRIPTION
GS01	1	HT110481Y0	Transistor
GS02	1	HT1324581Y0	Transistor
GS03	1	HT110481Y0	Transistor
GS04	1	HT1324581Y0	Transistor
GS05	1	HT110481Y0	Transistor
GS06	1	HT1324581Y0	Transistor
GS07	1	HT110481Y0	Transistor
GS08	1	HT1324581Y0	Transistor
GS09	1	HT110481Y0	Transistor
GS10	1	HT1324581Y0	Transistor
QS11	1	HT326031F0	Transistor
QS12	1	HF20192180	F.E.T.
QS13	1	HD20028100	Diode
QT01	1	HD20011050	Diode
QT02	1	HT110481Y0	Transistor
QT03	1	HT1324581Y0	Transistor
QT04	1	HT1324581Y0	Transistor
QT05	1	HT110481Y0	Transistor
QT06	1	HT1324581Y0	Transistor
QT07	1	HT1324581Y0	Transistor
QT08	1	HT1324581Y0	Transistor
FR01	1	XU2106959H	Crystal
FR02	1	FC455304E0	Crystal Filter
JS01	1	Y040001090	Jack
LA01	1	LAE5012000	Ant. Coil, LCO57
LA02	1	LAE5012000	Ant. Coil, LCO57
LA03	1	LAE5012000	Ant. Coil, LCO57
LA04	1	LAE5011900	Ant. Coil, LCO55
LA05	1	LAE5011700	Ant. Coil, LCO55
LA06	1	LAE5011800	Ant. Coil, LCO71
LA07	1	LAE5011800	Ant. Coil, LCO71
PT01	1	YF221Z006F	P.W. Board, TX/P.LL

REF. DESIG.	QTY	PART NO.	DESCRIPTION
CS01	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS02	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS03	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS04	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS05	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS06	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS07	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS08	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS09	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS10	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS11	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS12	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS13	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS14	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS15	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS16	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS17	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS18	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS19	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS20	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS21	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS22	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS23	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS24	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS25	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS26	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS27	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS28	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS29	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS30	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS31	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS32	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS33	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS34	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS35	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS36	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS37	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS38	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS39	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS40	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS41	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS42	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS43	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS44	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS45	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS46	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS47	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS48	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS49	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS50	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS51	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS52	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS53	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS54	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS55	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS56	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS57	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS58	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS59	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS60	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS61	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS62	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS63	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS64	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS65	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS66	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS67	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS68	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS69	1	PT01-CAPACITORS	1000pF ±10%, Chip
CS70	1	PT01-CAPACITORS	1000pF ±10%, Chip

REF. DESIG.	QTY	PART NO.	DESCRIPTION
CT71	1	DD15320370	Ceramic 33pF 5%
CT72	1	DD15220370	Ceramic 22pF 5%
CT73	1	DD15220370	Ceramic 22pF 5%
CT74	1	DD15220370	Ceramic 22pF 5%
CT75	1	DD15220370	Ceramic 22pF 5%
CT76	1	DD15220370	Ceramic 22pF 5%
CT77	1	DD15220370	Ceramic 22pF 5%
CT78	1	DD15220370	Ceramic 22pF 5%
CT79	1	DD15220370	Ceramic 22pF 5%
CT80	1	DD15220370	Ceramic 22pF 5%
CT81	1	DD15220370	Ceramic 22pF 5%
CT82	1	DD15220370	Ceramic 22pF 5%
CT83	1	DD15220370	Ceramic 22pF 5%
CT84	1	DD15220370	Ceramic 22pF 5%
CT85	1	DD15220370	Ceramic 22pF 5%
CT86	1	DD15220370	Ceramic 22pF 5%
CT87	1	DD15220370	Ceramic 22pF 5%
CT88	1	DD15220370	Ceramic 22pF 5%
CT89	1	DD15220370	Ceramic 22pF 5%
CT90	1	DD15220370	Ceramic 22pF 5%
CT91	1	DD15220370	Ceramic 22pF 5%
CT92	1	DD15220370	Ceramic 22pF 5%
CT93	1	DD15220370	Ceramic 22pF 5%
CT94	1	DD15220370	Ceramic 22pF 5%
CT95	1	DD15220370	Ceramic 22pF 5%
CT96	1	DD15220370	Ceramic 22pF 5%
CT97	1	DD15220370	Ceramic 22pF 5%
CT98	1	DD15220370	Ceramic 22pF 5%
CT99	1	DD15220370	Ceramic 22pF 5%
CT00	1	DD15220370	Ceramic 22pF 5%



## 7. SPECIFICATIONS

### 1. General

Frequency . . . . . 144 - 148 MHz (E)  
 144 - 146 MHz (W)

Type of emission . . . . . F3  
 Microphone input impedance . . . . . 600 ohms  
 Speaker impedance . . . . . 8 ohms  
 Operating voltage . . . . . 5.5 - 11V  
 Power supply . . . . . 6 size-AA dry cells or nicad batteries  
 Antenna impedance . . . . . 50 ohms  
 Dimensions . . . . . 167(H) x 65(W) x 34(D) mm  
 Weight . . . . . 470g (including batteries and antennal)

### 2. Receiver

Receiving system . . . . . Double superheterodyne  
 IF . . . . . 1st IF 10.695 MHz  
 . . . . . 2nd IF 455 KHz  
 Sensitivity . . . . . -3 dB (20 dB OS)  
 . . . . . -7 dB (12 dB SINAD)  
 . . . . . ±7 KHz (-6 dB)  
 Pass band . . . . . ± KHz (-60 dB)  
 Selectivity . . . . . -12 dB  
 Squelch sensitivity . . . . . 0.3W (10% distortion, 8 ohm load)  
 Audio output . . . . . Approx. 20 mA (no signal received)  
 Current consumption . . . . .

### 3. Transmitter

Transmission output . . . . . Hi 2.5W (with CNB110)  
 . . . . . Low 0.15W  
 Spurious ratio . . . . . 60 dB  
 Maximum deviation . . . . . 5 KHz  
 Modulating method . . . . . Reactance modulation  
 Audio frequency response . . . . . 300 to 3000 Hz  
 Current consumption . . . . . Approx. 750 mA (at 9V)

The above specifications and appearance are subject to modification without prior notice.

REF. DESIG.	QTY	PART NO.	DESCRIPTION	REF. DESIG.	QTY	PART NO.	DESCRIPTION
RT51	1	GD06103180	10KΩ	L101	1	LC18220010	Choke Coil, 8.2uH
RT52	1	GD06221180	220Ω	L102	1	LA55012000	Ant. Coil, LC057
RT53	1	GD06181180	180Ω	L103	1	LC16810010	Choke Coil, 0.68uH
RT54	1	GD06220180	22Ω	L104	1	LA55012100	Ant. Coil, LC100
RT55	1	GD06220140	22Ω	L105	1	LA55012100	Ant. Coil, LC100
RT56	1	GD06220140	82Ω	L106	1	LA55012100	Ant. Coil, LC100
RT57	1	GD06072180	2.2Ω	L107	1	LA55012100	Ant. Coil, LC100
RT58	1	GD0607180	47Ω	L108	1	LA55016180	Ant. Coil, LC102
RT59	1	GD0607180	2.7Ω	L109	1	LA55016180	Ant. Coil, LC102
RT60	1	GD06470180	47Ω	L110	1	LA55016190	Ant. Coil, LC099
RT61	1	GD05101180	100Ω	L111	1	LA55016190	Ant. Coil, LC099
RT62	1	GD05392180	39KΩ	L112	1	LC11230010	Choke Coil, 12uH
RT63	1	GD05682180	6.8KΩ	L113	1	LC11230010	Ant. Coil, LD024
RT64	1	GD05101180	100Ω	L114	1	LF90070010	Ant. Coil, LD024
RT65	1	GD05221180	220Ω	L115	1	LF90070010	Ant. Coil, LD024
				L116	1	LA55012200	Ant. Coil, LC101
				L117	1	LC16810010	Choke Coil, 0.68uH
				L118	1	LA55012000	Ant. Coil, LC057
				L119	1	LC14500020	Choke Coil, LE027
				L120	1	LC14500020	Choke Coil, LE027
				L121	1	LC11310090	Ant. Coil, LE025
				L122	1	LC11310090	Ant. Coil, LE025
				L123	1	LC14500020	Choke Coil, LE027
				L124	1	LC11210240	Choke Coil, LE080
				L125	1	LC13110010	Choke Coil, LE029
				L126	1	LC14310010	Choke Coil, LE028
				L127	1	LC11110030	Choke Coil, 3.3uH
				L128	1	LC13320050	Choke Coil, 3.3uH
				L129	1	LA55012000	Ant. Coil, LC057
				L130	1	LA55012000	Ant. Coil, LC057
				L131	1	SS02020920	Slide Switch, RX
				L132	1	SS01020470	Slide Switch, TX
				L133	1	SS01020470	Slide Switch, RF
				L134	1	XJ119001L0	Crystal, 10.240MHz
				L135	1	XC30800110	Crystal, 43.10166MHz
				L136	1	XC30800210	Crystal, 43.30166MHz
				L137	1	XC30800310	Crystal, 46.86666MHz
				L138	1	XC30800410	Crystal, 46.86666MHz
				L139	1	WE22120010	P.W. Board, Flexible
				L140	1	SC04040010	Switch, Channel
				L141	1	MI301	
				L142	1	2SC1947	
				L143	1	1S1655	
				L144	1	2SC2053	
				L145	1	2SC1730(K)	
				L146	1	2SC2668(O)	
				L147	1	2SB562(IC)	
				L148	1	PT01	
				L149	1	MI301	
				L150	1	2SC1947	
				L151	1	1S1655	
				L152	1	2SC2053	
				L153	1	2SC1730(K)	
				L154	1	2SC2668(O)	
				L155	1	2SB562(IC)	
				L156	1	PT01	
				L157	1	MI301	
				L158	1	2SC1947	
				L159	1	1S1655	
				L160	1	2SC2053	
				L161	1	2SC1730(K)	
				L162	1	2SC2668(O)	
				L163	1	2SB562(IC)	
				L164	1	PT01	
				L165	1	MI301	
				L166	1	2SC1947	
				L167	1	1S1655	
				L168	1	2SC2053	
				L169	1	2SC1730(K)	
				L170	1	2SC2668(O)	
				L171	1	2SB562(IC)	
				L172	1	PT01	
				L173	1	MI301	
				L174	1	2SC1947	
				L175	1	1S1655	
				L176	1	2SC2053	
				L177	1	2SC1730(K)	
				L178	1	2SC2668(O)	
				L179	1	2SB562(IC)	
				L180	1	PT01	
				L181	1	MI301	
				L182	1	2SC1947	
				L183	1	1S1655	
				L184	1	2SC2053	
				L185	1	2SC1730(K)	
				L186	1	2SC2668(O)	
				L187	1	2SB562(IC)	
				L188	1	PT01	
				L189	1	MI301	
				L190	1	2SC1947	
				L191	1	1S1655	
				L192	1	2SC2053	
				L193	1	2SC1730(K)	
				L194	1	2SC2668(O)	
				L195	1	2SB562(IC)	
				L196	1	PT01	
				L197	1	MI301	
				L198	1	2SC1947	
				L199	1	1S1655	
				L200	1	2SC2053	
				L201	1	2SC1730(K)	
				L202	1	2SC2668(O)	
				L203	1	2SB562(IC)	
				L204	1	PT01	
				L205	1	MI301	
				L206	1	2SC1947	
				L207	1	1S1655	
				L208	1	2SC2053	
				L209	1	2SC1730(K)	
				L210	1	2SC2668(O)	
				L211	1	2SB562(IC)	
				L212	1	PT01	
				L213	1	MI301	
				L214	1	2SC1947	
				L215	1	1S1655	
				L216	1	2SC2053	
				L217	1	2SC1730(K)	
				L218	1	2SC2668(O)	
				L219	1	2SB562(IC)	
				L220	1	PT01	
				L221	1	MI301	
				L222	1	2SC1947	
				L223	1	1S1655	
				L224	1	2SC2053	
				L225	1	2SC1730(K)	
				L226	1	2SC2668(O)	
				L227	1	2SB562(IC)	
				L228	1	PT01	
				L229	1	MI301	
				L230	1	2SC1947	
				L231	1	1S1655	
				L232	1	2SC2053	
				L233	1	2SC1730(K)	
				L234	1	2SC2668(O)	
				L235	1	2SB562(IC)	
				L236	1	PT01	
				L237	1	MI301	
				L238	1	2SC1947	
				L239	1	1S1655	
				L240	1	2SC2053	
				L241	1	2SC1730(K)	
				L242	1	2SC2668(O)	
				L243	1	2SB562(IC)	
				L244	1	PT01	
				L245	1	MI301	
				L246	1	2SC1947	
				L247	1	1S1655	
				L248	1	2SC2053	
				L249	1	2SC1730(K)	
				L250	1	2SC2668(O)	
				L251	1	2SB562(IC)	
				L252	1	PT01	
				L253	1	MI301	
				L254	1	2SC1947	
				L255	1	1S1655	
				L256	1	2SC2053	
				L257	1	2SC1730(K)	
				L258	1	2SC2668(O)	
				L259	1	2SB562(IC)	
				L260	1	PT01	
				L261	1	MI301	
				L262	1	2SC1947	
				L263	1	1S1655	
				L264	1	2SC2053	
				L265	1	2SC1730(K)	
				L266	1	2SC2668(O)	
				L267	1	2SB562(IC)	
				L268	1	PT01	
				L269	1	MI301	
				L270	1	2SC1947	
				L271	1	1S1655	
				L272	1	2SC2053	
				L273	1	2SC1730(K)	
				L274	1	2SC2668(O)	
				L275	1	2SB562(IC)	
				L276	1	PT01	
				L277	1	MI301	