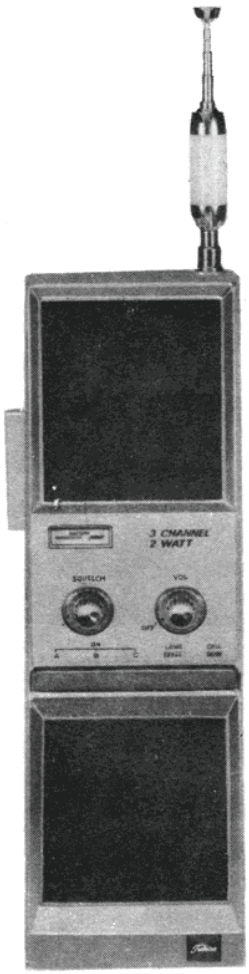
Toshiba

SERVICE DATA

TRANSCEIVER



MODEL

ZS-7222A

TOKYO SHIBAURA ELECTRIC CO., LTD.
2-1, 5-CHOME, GINZA, CHUO-KU, TOKYO, JAPAN

GENERAL

The TOSHIBA 2W Transceiver ZS-7222A is a hand held 3-channel transceiver designed to operate with an input of 2 watts to the final RF power stage.

It is intended for use in class D Citizens Radio Service under conditions prescribed in Part 95 of the FCC Rules and Regulations. This requires a simple licensing procedure and permits operation on channel 1 through 23.

Housed in a metal case, the ZS-7222A is designed easy to operate with push-button 3-CHANNEL selector, CALL SIGN and LONG RANGE switches.

The multi stage transmitter is equipped with DYNAMIC MICROPHONE, CALL and LONG RANGE circuitry for greater "talk power".

The sensitive superheterodyne receiver with RF amplifier includes many features ... an efficient squelch control circuit which quiets the receiver when a signal is not being received, Automatic Gain Control to prevent overloading on strong signals and maintain uniform sound output, and Automatic Noise Limiter to reject electrical noise from being heard in the speaker.

SPECIFICATIONS

REGULATION	Meets F.C.C. & D.O.T.
FREQUENCY RANGE	26.965 to 27.255 MHz (channel 1-23)
NUMBER OF CHANNELS	3
FREQUENCY TOLERANCE	Within 0.005%
OPERATING FREQUENCY	Supplied with one set of crystals for channel 11, (27.085 MHz) in position A. May be operated on any other channel by inserting crystals in position B and C.
TRANSMITTER	Crystal controlled, amplitude collector modulated.
POWER INPUT	2 Watt input to final RF power amplifier.
MODULATION	High level push-pull modulator with LONG RANGE.

CALL	Tone frequency 2 kHz
RECEIVER	Crystal controlled superheterodyne with RF amplifier and Noise Limiter
SENSITIVITY	50 mW or more at 1 μV input 1 μV for 10 dB $\frac{S+N}{N}$ or better
BAND WIDTH	More than 6 kHz at -6 dB
SELECTIVITY	More than 20 dB at +10 kHz
SQUELCH RANGE	1 μV to 50 μV
AGC FIGURE OF MERIT	More than 60 dB
AUDIO OUTPUT	Maximum more than 500 mW
ANTENNA	48 inch center-loaded telescoping antenna
POWER SUPPLY	12 volts D.C
BATTERY DRAIN	On Transmitter { unmodulated 300 mA; 100% modulated 500 mA }
	On Receiver { Squelch on 20 mA; maximum volume 130 mA }
SEMI-CONDUCTORS	2SC371 Transmit oscillator
	2SC482 Transmit driver
	2SC502 Transmit final RF power amplifier
	2SA518 Receiver RF amplifier
	2SA518 Mixer
	2SA468 Local oscillator
	2SA49 1st IF amplifier
	2SA53 2nd IF amplifier
	2SB54 1st Squelch amplifier
	2SB54 2nd Squelch amplifier
	2SB54 1st AF amplifier
	2SB54 2nd AF amplifier
	2SB415, 2SB415 } AF power amplifier / modulator
	1N60 Receiver Detector / AGC

	1N60	Squelch
	1N60	LONG RANGE
	1S34	Automatic Noise Limiter
	D91A	Temperature compensating thermistor
	D33A	Temperature compensating thermistor
DIMENSION	10 3/64"H x 3 15/64" W x 3 49/64" D max	
WEIGHT	2.8 lbs (including 10 batteries)	

TO REMOVE CONTROL KNOBS, loosen the set screw (b) on the control knobs (a).

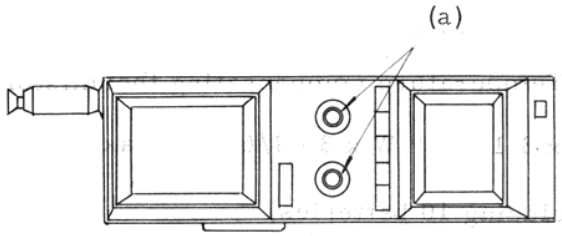


Fig. 1-1

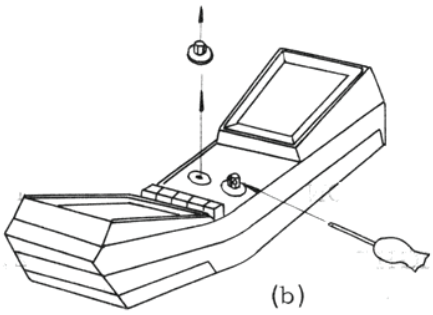


Fig. 1-2

TO REMOVE ELASTIC HAND STRAP, loosen holdfast (a) as shown in Fig.2-2.

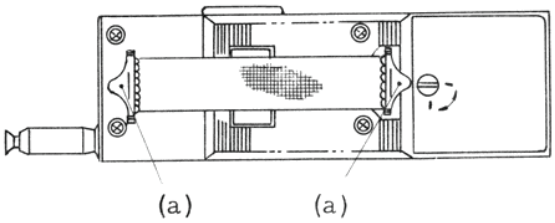


Fig. 2-1

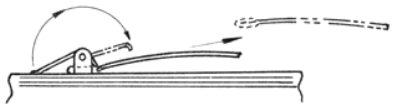


Fig. 2-2

TO OPEN CABINET, remove rear cover by loosing screw (a) as shown in Fig. 3-1 and Fig. 3-2.

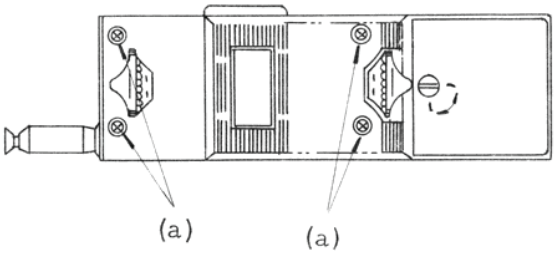


Fig. 3-1

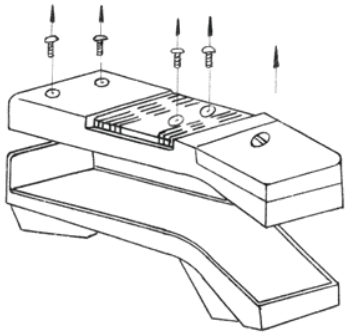


Fig. 3-2

TO REMOVE BATTERY CONNECTOR, unsnap the battery connector (a) from the battery holder (b) as shown in Fig. 4-1 and Fig. 4-2.

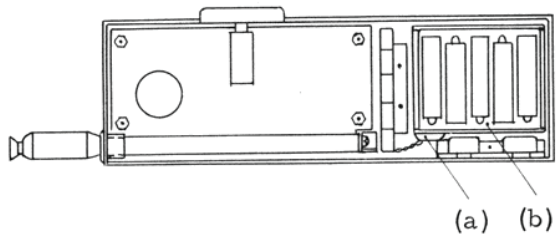


Fig. 4-1

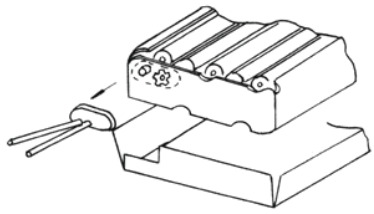


Fig. 4-2

TO REMOVE THE TELESCOPING ANTENNA, take out the antenna mounting-fixture screw (a) and antenna holding screw (b), then pull out the telescoping antenna as shown in Fig. 5-2.

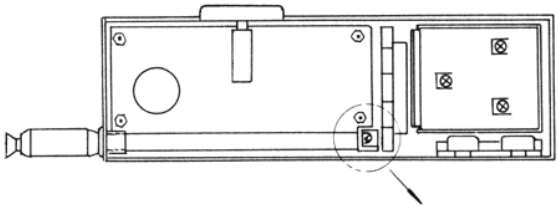


Fig. 5-1

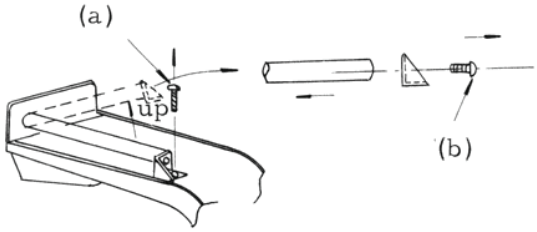


Fig. 5-2

TO REMOVE BATTERY COMPARTMENT HOLDER, remove the three screws (a) on battery compartment holder.

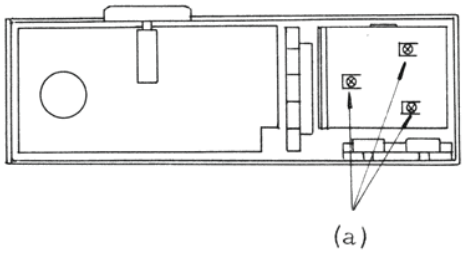


Fig. 6-1

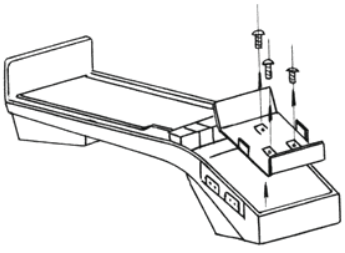


Fig. 6-2

TO REMOVE PRINTED CIRCUIT BOARD, remove five screws (a. and b.) on the printed circuit board.

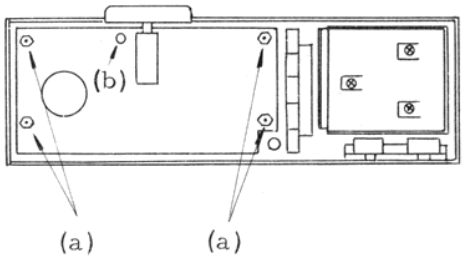


Fig. 7-1

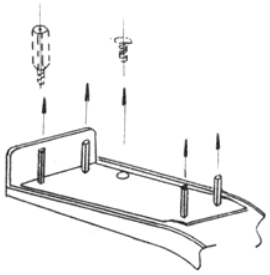


Fig. 7-2

TO REMOVE THE PUSHBUTTON SWITCH,remove two screws (a) on the switch holder.

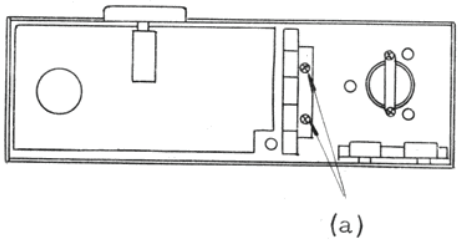


Fig. 8-1

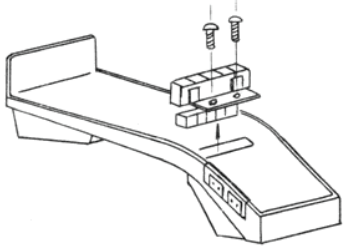


Fig. 8-2

TO REMOVE THE JACKS,remove two screws (a) on the jack holder.

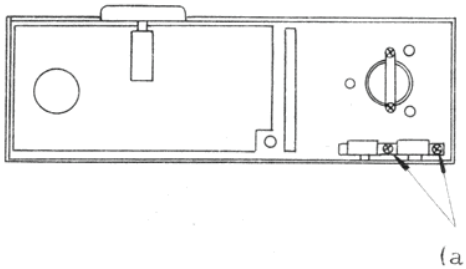


Fig. 9-1

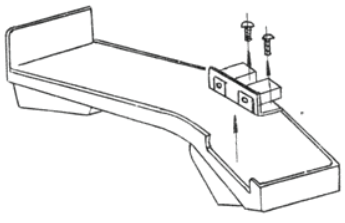


Fig. 9-2

TO REMOVE THE PRINTED CIRCUIT BOARD (a), PUSHBUTTON SWITCH (b) AND JACKS (c) FROM THE CABINET as shown in Fig. 10.

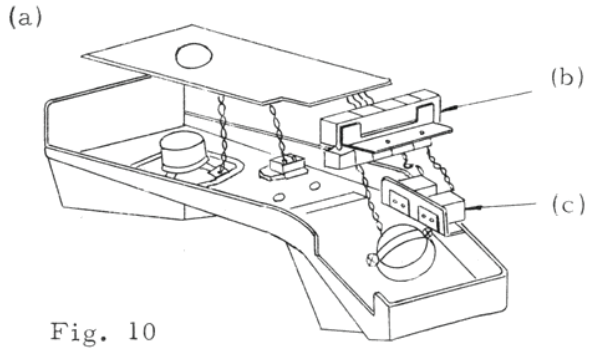


Fig. 10

TO REMOVE THE BATTERY METER,

(1) remove the screw (a) on the battery meter clamp,

(2) take off battery meter clamp (b) and pull out battery meter as shown in Fig. 11-2.

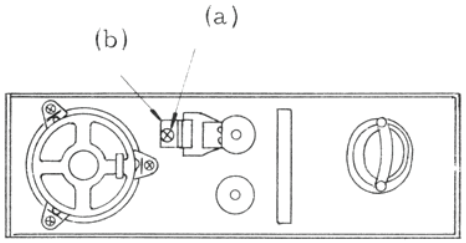


Fig. 11-1

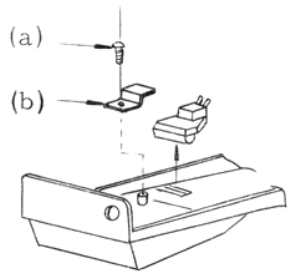


Fig. 11-2

TO REMOVE THE SPEAKER,

(1) remove three screws (a) as shown in Fig. 12-1,

(2) take off three speaker clamps (b) and pull out speaker as shown in Fig. 12-2.

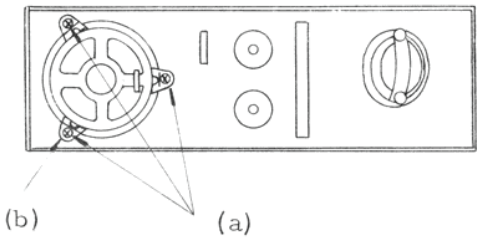


Fig. 12-1

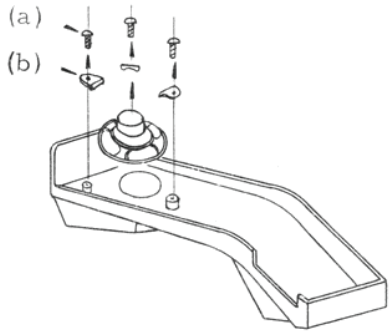


Fig. 12-2

TO REMOVE DYNAMIC MICROPHONE,

(1) remove two screws (a) as shown in Fig. 13-1,

(2) take off microphone clamp (b) and pull out dynamic microphone as shown in Fig. 13-2.

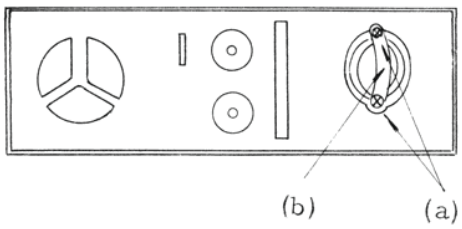


Fig. 13-1

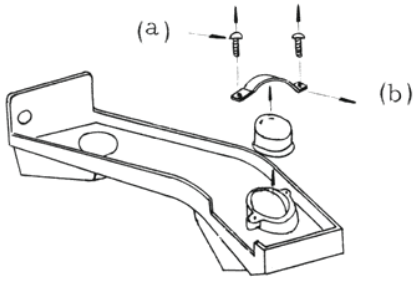
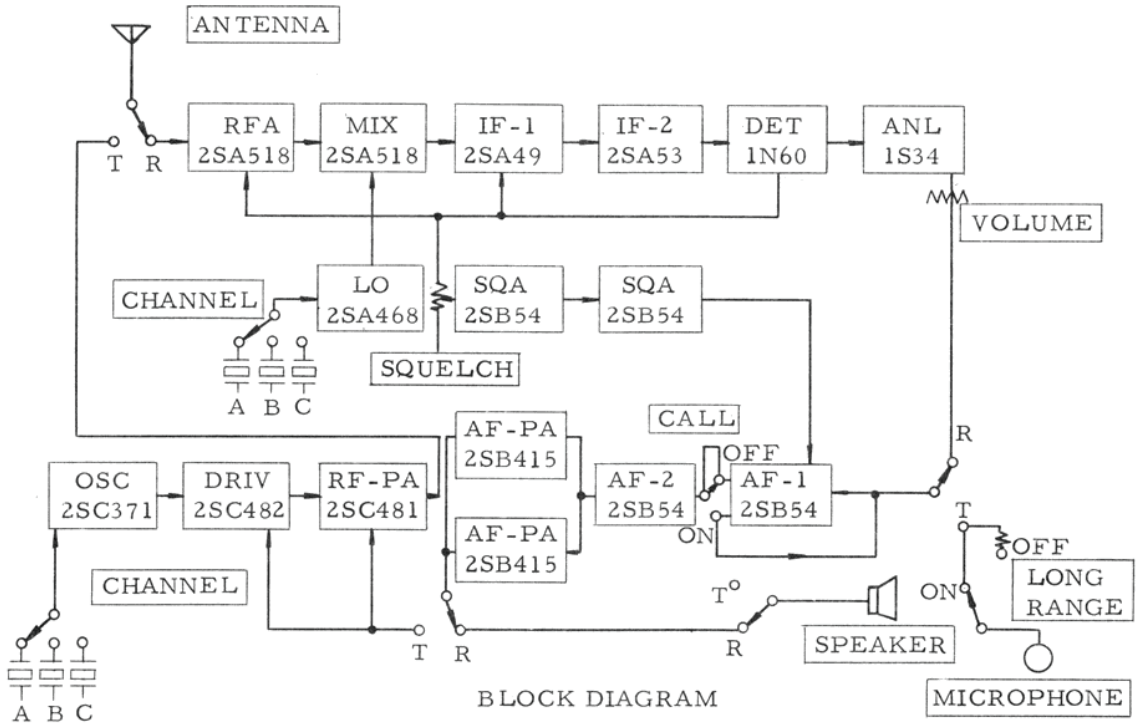
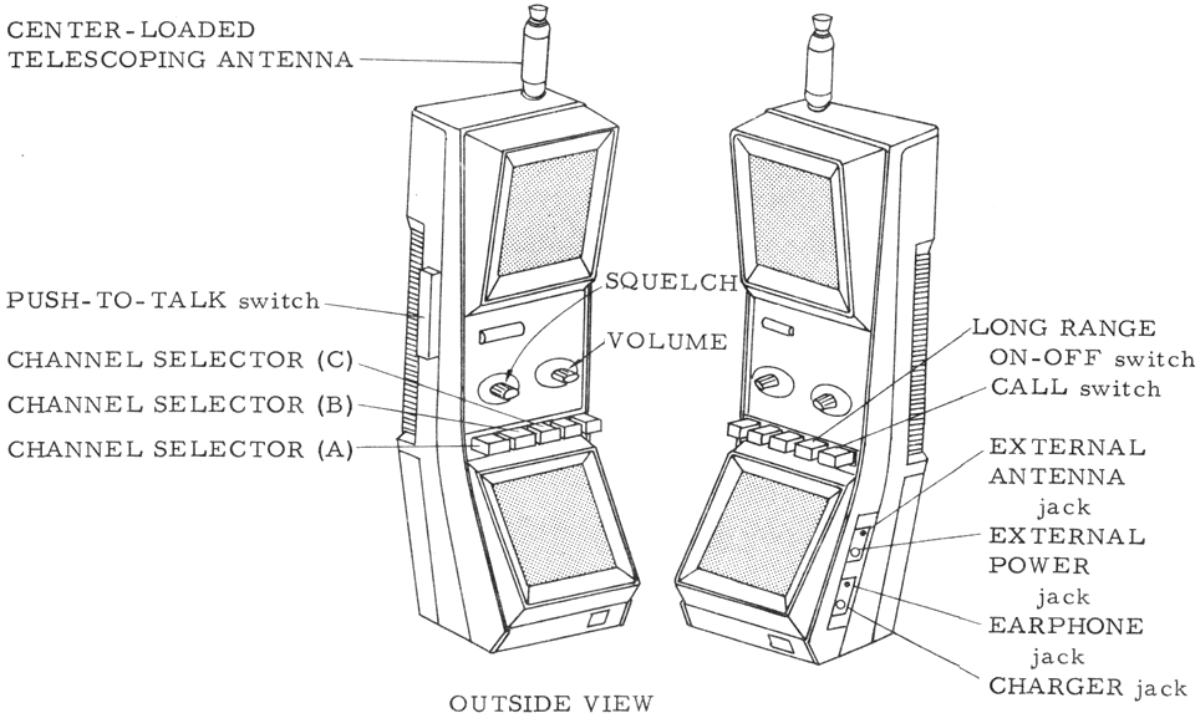


Fig. 13-2



BLOCK DIAGRAM



OUTSIDE VIEW

TROUBLE SHOOTING

Precautions in trouble shooting

1. Power supply is 12V DC.
2. When an external power source is used, care must be taken to observe proper polarity and voltage.
3. The power supply circuit of the set is designed for positive and negative ground system. Red lead is positive and black lead is negative.
4. Before checking the current and voltage, examine for disconnected leads and damage to any of the parts.

Measurement of total current

Measure total current by inserting an ammeter in series in either one of the power supply leads. Connect a dummy load or a 50 ohm power meter to the antenna jack (J1) on the set.

No signal total current at receiving (squelch-on) 18 mA —— 25 mA

No signal total current at transmitting (no modulation) 250 mA —— 350 mA

	TRANSISTOR VOLTAGE					
	E		B		C	
	R	T	R	T	R	T
TR 1	-0.45V	0	-0.67V	0	-8.8V	0
TR 2	-1.7V	0	-2.0V	0	-8.4V	0
TR 3	-0.5V	0	-0.7V	0	-9.2V	0
TR 4	-2.8V	0	-3.0V	0	-7.6V	0
TR 5	-1.8V	0	-2.0V	0	-5.5V	0
TR 6	0	0	0	0	-0.2V	0
TR 7	0	0	-0.2V	0	-0.04V	0
TR 8	0	-8V	0	-7.2V	0	0
TR 9	0	-12V	0	-12V	0	0
TR10	0	-12V	0	-12V	0	0
TR11	-0.9V	-0.9V	-1.0V	-1.0V	-6V	-6V
TR12	-1.2V	-1.2V	-1.4V	-1.4V	-10.8V	-10.8V
TR13	-0.02V	-0.01V	-0.14V	-0.14V	-12V	-12V
TR14	-0.02V	-0.01V	-0.14V	-0.14V	-12V	-12V

NOTES:
1. Voltage are negative with respect to ground.
2. Voltage readings are taken with the volume control minimum and crystal removed.
3. Squelch OFF.

Transmitting condition

SYMBOL	CHECK FOR
No current flow	Bad contact of battery or power source and power supply lines, bad contact of switch and faults in the power supply circuits.
Excessive current flow (short-circuited)	Short-circuit in the power supply circuits, grounded or short-circuited output transformer (T-15), defective electrolytic capacitors in the power supply circuits, or defective TR10, 13 or 14.
Current normal but no modulation	Defective speaker-microphone or bad contact in PUSH-TO-TALK switch S1b or S1c.
Insufficient current flow	Bad contact in PUSH-TO-TALK switch S1a, S1d, S1e or SELECTOR switch S2-1a, S2-2a, S2-3a, defective TR8, TR9, TR10 or crystal.

Receiving condition

SYMBOL	CHECK FOR
No current flow	Bad contact of battery or power source circuits, bad contact of switch and faults in the power supply circuits.
Excessive current flow (short-circuited)	Short-circuit in the wiring of the power supply circuits, grounded or layer short of output transformer (T15), defective electrolytic capacitors in the power supply circuits or grounding of the power supply switch.
Excessive current flow	Grounding of the primary side of T3, T4, T5, T6, T7 or T14, defective TR13 and TR14.
Normal current but no sound	Defective receiver crystal, shorted or open secondary of output transformer (T15-8Ω), short-circuit in the primary of the output transformer (T15-50Ω), speaker lead wires disconnected, open speaker voice coil, defective contacts in volume circuit, PUSH-TO-TALK switch S1c, or earphone jack J2, CALL switch S2-5b, defective diode CD1 or CD3, SQUELCH control R28 disconnected.
Insufficient flow (less than 15mA)	Defective resistor R22, bad contact in PUSH-TO-TALK switch S1d.

DETAILS OF TROUBLE SHOOTING

OSCILLATOR STAGE

1. Voltage of various points

ITEM OF CHECK	Normal voltage	Abnormal voltage	Causes of trouble	Signs of trouble
TR8 collector to ground.	0 V	Too high	T8 disconnected	No oscillation
TR8 base to ground.	-7.2V	Zero or too low	R41 short-circuited or the resistance of R42 large.	No oscillation
		Too high	R41 disconnected, the resistance of R42 small, Defective TR8.	No oscillation
TR8 emitter to ground.	-8 V	Zero or too low	R43 disconnected or its resistance too high, C41 short-circuited, Bad contact in PUSH-TO-TALK switch S1e or T15, defective TR8.	No oscillation

NOTE: Voltage readings are taken with the crystals removed. If the voltage is measured with the crystal in place, inverse bias voltage will appear between the base and emitter.
Therefore, the crystal should be removed at the time of measuring voltage.

2. Trouble at the normal voltage

ITEM OF CHECK	CAUSES OF TROUBLE	SIGNS OF TROUBLE
Base side.	Bad contact in CHANNEL switch S2-1a, S2-2a, S2-3a, defective crystal.	No oscillation
Emitter side.	C41 disconnected.	Insufficient output
Collector side.	TR8 disconnected, ferrite core of T8 broken or cracked, detuned T8.	Insufficient output or no oscillation

TRANSMIT DRIVER STAGE

1. Voltage of various points

ITEM OF CHECK	Normal voltage	Abnormal voltage	Causes of trouble	Signs of trouble
TR9 emitter to ground.	-12V	Zero or too low	Bad contact in PUSH-TO-TALK switch Sld, T15 disconnected, defective TR9.	No oscillation, insufficient output

2. Trouble at the normal voltage

ITEM OF CHECK	CAUSES OF TROUBLE	SIGNS OF TROUBLE
Base side.	Secondary of the T8 disconnected or short-circuited, defective oscillator stage, detuned T8.	No output or insufficient output
Emitter side.	C43 disconnect.	Insufficient output
Collector side.	L1 short-circuited, C44 disconnected, Disconnected or detuned T9.	No output or insufficient output.

TRANSMIT POWER AMPLIFIER STAGE

1. Voltage of various points

ITEM OF CHECK	Normal voltage	Abnormal voltage	Causes of trouble	Sings of trouble
TR10 emitter to ground.	-12V	0	Bad contact in PUSH-TO-TALK switch Sld, T15 disconnected, disconnected TP4.	No oscillation, insufficient output

2. Trouble at the normal voltage

ITEM OF CHECK	CAUSES OF TROUBLE	SIGNS OF TROUBLE
Base side.	Secondary of the T9 disconnected or short-circuited, defective driver stage, detuned T9.	No output or insufficient output
Emitter side.	C45, C47, C48, C49 disconnected or short-circuited. Disconnected or detuned T11 and T12.	No output or insufficient output

RF AMPLIFIER STAGE

1. Voltage of various points.

ITEM OF CHECK	Normal voltage	Abnormal voltage	Causes of trouble	Signs of trouble
TR1 collector to ground.	-8.8V	0	T3 or R3 disconnected.	No sound
TR1 base to ground.	-0.67V	Zero or too low	R1 disconnected or its resistance too high, C4 short-circuited.	Low sensitivity or no sound
		Too high	Defective TR1	
TR1 emitter to ground.	-0.45V	Zero or too low	R2 disconnected or its resistance too low, C5 short-circuited.	Low sensitivity or no sound
		Too high	Defective TR1, R2 resistance too high.	

2. Trouble at the normal voltage

ITEM OF CHECK	CAUSES OF TROUBLE	SIGNS OF TROUBLE
Collector side.	T3 short-circuited. T3 ferrite core broken or cracked, detuned T3.	Low sensitivity
Base side.	T2 short-circuited or its ferrite core broken or cracked, detuned T2, Disconnected or insufficient capacity of C4.	Low sensitivity or abnormal sound
Emitter side.	Disconnected or insufficient capacity of C5.	Low sensitivity

MIXER STAGE

1. Voltage of various points

ITEM OF CHECK	Normal voltage	Abnormal voltage	Causes of trouble	Signs of trouble
TR2 collector to ground.	-8.4V	0	T4 or R8 disconnected	No sound
TR2 base to ground.	-2.0V	Zero or too low	R7 disconnected, C8 short-circuited	No sound
		Too high	R4 disconnected, resistance of R7 too low, defective TR2.	Tone quality abnormal or no sound
TR2 emitter to ground.	-1.7V	Zero or too low	R5 disconnected or its resistance too low, C9 short-circuited.	No sound
		Too high	Defective TR2, R5 resistance is too high.	Tone quality abnormal

2. Trouble at the normal voltage.

ITEM OF CHECK	CAUSES OF TROUBLE	SIGNS OF TROUBLE
Base side.	Insufficient capacity of C8, C8 disconnected, T3 short-circuited, T3 ferrite core broken or cracked, detuned T3. Defective local oscillator stage.	Low sensitivity or no sound.
Emitter side.	C28 disconnected, defective T7 or defect in TR5.	Low sensitivity or no sound.
Collector side.	T4 short-circuited.	No sound.

NOTE: For checking local oscillation, insert high-frequency vacuum tube voltmeter (AC 1 V range) between the test point TP3 on the secondary side of T7 and ground.
If the oscillating voltage is between 0.1V to 0.2V, this stage is operating.

LOCAL OSCILLATOR STAGE

For checking local oscillator, insert high-frequency vacuum-tube voltmeter (about AC 0.5V range) between the check point TP3 on the secondary side of T7 and the ground. If the oscillating voltage measures from AC 0.1 V to 0.2V this stage is operating properly.

1. Voltage of various points.

Note: If the voltage is measured with the crystal inserted, inverse voltage will appear between the base and emitter.
Therefore the crystal should be removed when measuring voltage.

ITEM OF CHECK	Normal voltage	Abnormal voltage	Causes of trouble	Signs of trouble
TR5 collector to ground.	-5.5V	0	T7 disconnected	No sound
TR5 base to ground.	-2.0V	Too high	R23 disconnected, R25 small or short-circuited, defective TR5	No sound
		Too low	R23 small R25 large	No sound
		0 V	R23 short-circuited, R25 disconnected or C26 short-circuited	No sound
TR5 emitter to ground.	-1.8V	Zero or too low	R24 short-circuited or small, defective TR5	No sound
		Too high	R24 disconnected or large	No sound

2. Trouble at the normal voltage.

ITEM OF CHECK	CAUSES OF TROUBLE	SIGNS OF TROUBLE
Base side.	Disconnected or, insufficient capacity of C20.	Sensitivity
	Defective crystal, trouble in S2b.	No sound
Emitter side.	Defective C27.	Insufficient sensitivity or no sound
Collector side.	T7 short-circuited, ferrite core of T7 broken or cracked, C28 short-circuited or disconnected.	No sound or insufficient sensitivity

I.F. AMPLIFIER STAGE (1ST, 2ND I.F. AMP)

1. Voltage of various points

ITEM OF CHECK	Normal voltage	Abnormal voltage	Causes of trouble	Signs of trouble
TR4 collector to ground.	-7.6V	0	T6 disconnected	No sound
TR4 base to ground.	-3.0V	Zero or too low	T5 disconnected, R14 disconnected, C16 short-circuited	No sound
		Too high	R12 disconnected, R14 too low, C18 short-circuited, defective TR4.	Tone quality abnormal or no sound
TR4 emitter to ground.	-2.8V	Too low	C19 short-circuited. R13 too low, defective TR4	No sound or Low sensitivity
		Too high	Defective TR4, R13 too high	Tone quality abnormal or no sound
TR3 collector to ground.	-9.2V	0	T5 disconnected	No sound
TR3 base to ground.	-0.7V	0	T4 disconnected, R9 disconnected, C12 or C13 short-circuited	No sound
		Too high	R11 disconnected, C14 short-circuited, R9 too low, defective TR3	Tone quality abnormal or no sound
TR3 emitter to ground.	-0.5V	Too low	Defective TR3, R10 too small, C15 short-circuited	Low sensitivity
		Too high	Defective TR3, R10 resistance too high	Tone quality abnormal or no sound

2. Trouble at the normal voltage

ITEM OF CHECK	CAUSES OF TROUBLE	SIGNS OF TROUBLE
Base side.	T4, T5 short-circuited.	No sound
	Faults in C13, C14, C16, C18.	Low sensitivity or oscillation at I.F. stage
Emitter side.	Faults in C15, C19 (open circuit)	Low sensitivity
Collector side.	T5, T6 short-circuited.	No sound

DETECTOR STAGE

ITEM OF CHECK	CAUSES OF TROUBLE	SIGNS OF TROUBLE
Input side.	T6 disconnected or short-circuited.	No sound
Output side.	Defective variable resistor contact. (R21)	Noise generated
	Defective C22, CD1.	Tone quality abnormal and sensitivity lowered

NOTE: Disconnect one terminal of diode CD1 and measure its resistance. Exact diagnosis of the diode is difficult, but the ratio of reverse to forward direction should be greater than 100:1.

AUTOMATIC NOISE LIMITER

Disconnect one terminal of diode CD-2 and measure its resistance. The ratio of reverse to forward direction should be greater than 100:1. Next, check the constants of the circuit.

Then, if R19 is open or if R18 is small or short-circuited sensitivity will be low.

If R16 is open or if C24 is open or shorted, severe noise will be generated.

SQUELCH AMPLIFIER STAGE

When signals (signal injector, etc.) are supplied to the base of TR6, the signals will be produced in the output.

The squelch amplifier stage is functioning properly if the signals from the output are reduced to zero when squelch control is turned clock wise. If this stage does not function check the voltage of various points of TR6 and TR7.

1. Voltage of various points in squelch-off

ITEM OF CHECK	Normal voltage	Abnormal voltage	Causes of trouble	Signs of trouble
TR6 collector to ground.	-0.3V	Less than -0.22V	Defective R29 or TR6.	No sound
		Zero or too low	C31 shorted, R29 disconnected defective TR6 and TR7.	No sound
TR6 base to ground.	0 V	-0.2V	Defective squelch volume R28.	No sound
TR7 collector.	0.05V	Too high	Defective R28, R30 shorted, defective TR7.	No sound

2. Voltage of various points in squelch-on

ITEM OF CHECK	Normal voltage	Abnormal voltage	Causes of trouble	Signs of trouble
TR6 collector and TR7 base to ground.	-0.1V	Too high	R29 short-circuited, defective TR6 and TR7 or squelch volume.	Sound
TR6 base to ground.	-0.25V	0 V	C30 short-circuited	Sound
TR7 collector to ground.	-3.0V	Zero or too low	Disconnected R30, defective R28, TR6 or TR7.	Sound
		Too high	R30 shorted.	No sound (even when squelch-off

3. Trouble at the normal voltage

ITEM OF CHECK	CAUSES OF TROUBLE	SIGNS OF TROUBLE
TR7 collector side.	Defective CD3.(shorted).	No sound (even when squelch-OFF)
	Disconnected CD3.	Sound (even when squelch-ON)

A.F. AMPLIFIER STAGE (1ST, 2ND, PA AMP)

1. Voltage of various points

ITEM OF CHECK	Normal voltage	Abnormal voltage	Causes of trouble	Signs of trouble
TR13, 14 collector to ground.	-12V	0	Primary side of the output transformer T15 disconnected or open.	No sound
TR13, 14 base to ground.	-0.14V	0	Secondary side of the input transformer T14 open, R70 open, or short-circuited or too low thermistor.(R67)	Tone quality abnormal
		Too high	Resistance of thermistor R67 and R69 too high*.	Tone quality and volume abnormal
TR13, 14 emitter to ground.	-0.01V	0	Defective TR13, TR14 R71 or R72 resistance too low.	Tone quality and volume abnormal
		Too high	Defective TR13, TR14, R71 or R72 resistance too large	
TR12 collector to ground.	-10.8V	0	T14 disconnected.	No sound
TR12 base to ground.	-1.4V	Zero or too low	R63 or R66 disconnected, R64 short-circuited.	No sound
		Too high	R64 disconnected, defective TR12.	Tone quality and volume abnormal or no sound
TR12 emitter to ground.	-1.2V	Zero or too low	C61 short-circuited, the resistance of R65 too low.	No sound or Tone quality abnormal
		Too high	Defective TR12, R65 resistance too large.	Tone quality and volume abnormal

ITEM OF CHECK	Normal voltage	Abnormal voltage	Causes of trouble	Signs of trouble
TR11 collector to ground.	-6.0V	Zero or too low	R59 or R60 disconnected, C59 short-circuited.	No sound or tone quality abnormal
TR11 base to ground.	-1V	Zero or too low	R57 disconnected, C55, C56 short-circuited.	No sound
		Too high	Defective TR11, R54 or R55 disconnected.	No sound or tone quality and volume abnormal
TR11 emitter to ground.	-0.9V	Zero or too low	C57 short-circuited, the resistance of R58 too low.	No sound or tone quality abnormal
		Too high	Defective TR11, resistance of R58 too large, SQUELCH circuit abnormal.	Tone quality and volume abnormal

NOTE: * Thermistor R67 should have a resistance value of 80 to 110 ohms at 25° C.

2. Trouble at the normal voltage

T14, T15 short-circuited ..... No sound or tone quality abnormal.

LONG RANGE STAGE

1. Voltage of various points

ITEM OF CHECK	Normal voltage	Abnormal voltage	Causes of trouble	Signs of trouble
Diode CD4 (between CD4 and ground.)	-0.8V	Zero or too low	Break down of CD4.	Modulation low
			Disconnected R73 or R74.	Over modulation
		Too high	C65 short-circuited.	Low modulation or modulated wave abnormal

2. Trouble at the normal voltage

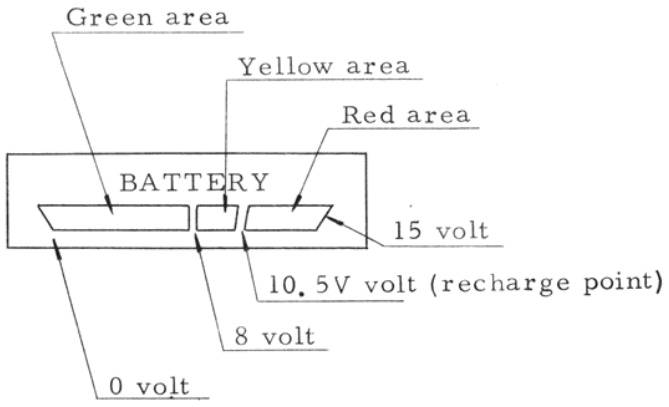
C65 disconnected ..... Over modulation

CALL STAGE

ITEM OF CHECK	CAUSES OF TROUBLE	SIGNS OF TROUBLE
CALL circuit.	CALL switch S2-5a, S2-5b. disconnected, C51 ~ 54 or R51 ~ 53 disconnected.	No oscillation

BATTERY INDICATOR STAGE

1. Normal indication



2. State of trouble

ITEM OF CHECK	CAUSES OF TROUBLE	SIGNS OF TROUBLE
Battery indicator.	Disconnected R76, R78 or defective M1.	No indication
	Insufficient indication.	R76, R78 too large or defective M1
	Exessive indication.	R76, R78 too small or defective M1

ALIGNMENT INSTRUCTIONS

This transceiver meets all requirements of F.C.C. Rules & Regulation, Part 95. This requires a simple licensing procedure and permits operation.
However, only those persons properly licenced by the F.C.C. are permitted to repair or adjust any mulfunctioning unit found to be transmitting illegally.
(Refer to F.C.C. Reles & Regulations, Part 19, Subpart "D", Section 19.71)

PRECAUTIONS

1. Use new batteries
2. When an external power source is to be utilized, care must be taken to observe the proper voltage and polarity.
3. The power supply circuit of the unit is designed for positive and negative ground system.
   A red wire attached to the battery snap is positive and the black one is negative.
4. Special care should be taken to avoid damaging the various coil cores while making adjustment since the core material is easily shattered.

TRANSMITTER ALIGNMENT

Equipment Required

1. Power meter (27MHz 2 Watt 50 ohm)
2. Indicating wave meter (see diagram)

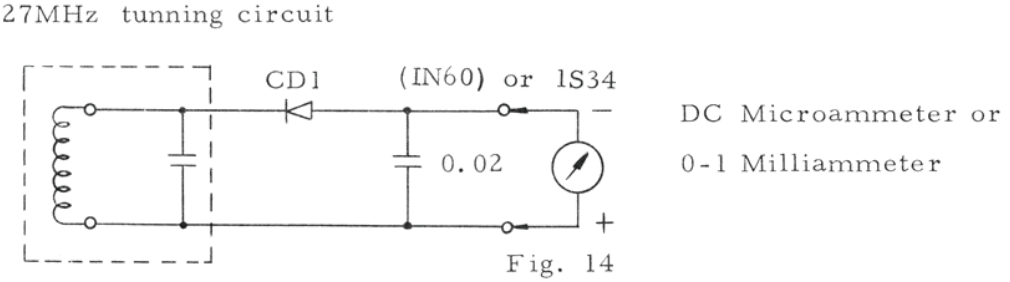


Fig. 14

Align as follows:

1. Connect the power meter to the EXT. ANT. jack.

2. Remove back cover from set.

3. Switch set on.

4. Observe power meter and tune T8 (transmitter oscillator coil) to obtain maximum reading.

   Turn the core 1 turn farther into the bobbin than where the maximum reading was obtained.

NOTE: T10 is adjusted at the factory and should not require field adjustment, unless oscillator components are replaced.

5. Tune the T9, T11 (Transmitter tank coil) to obtain maximum reading on the power meter.

NOTE: When the power meter indicates a power more than 3/4 watts at 12 volt DC, transmitter stage is normal. (measurement circuit as shown Fig. 15.)

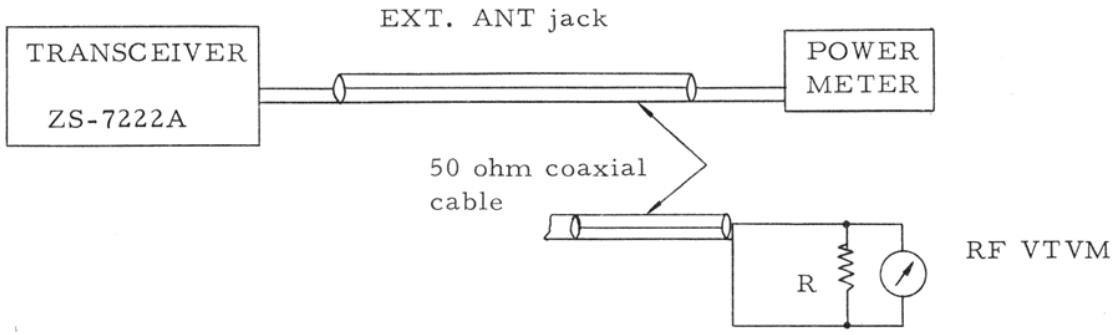


Fig. 15 R:RF resistor 50 ohm 1 WATT

NOTE: In cases where an RF resistor and VTVM are used instead of a power meter, RF power is calculated as follows:

$$\text{RF Power} = \frac{e^2}{R}$$

"e" is the reading on the VTVM.

When the meter indicates a voltage greater than 6 volts, the transmitter stage is normal.

6. Remove the power meter from the EXT. ANT jack and extend the antenna to it full length, place the indicating wave meter, near the transceiver antenna.

7. Observe indicating wave meter (see diagram above) and tune T1 (loading coil) to obtain maximum.

RECEIVER ALIGNMENT

Equipment Required

1. RF VTVM
2. Multipurpose Signal Generator (S.S.G.)
3. Oscilloscope
4. 0.01 mfd. capacitor

Align as follows:

1. Remove cabinet back and switch unit on.
2. Inject a 455 kHz 30% modulated signal at TP1 (base of TR2) using a 0.01 mfd. capacitor in series with the signal generator cable.
   Connect the signal cable ground terminal to chassis ground.

NOTE: Input signal should be kept to a minimum to avoid receiver limiting action.

3. Connect an oscilloscope and VTVM to EAR jack 8 ohm dummy load (as shown in Fig. 16)
4. Adjust S.S.G to 455 kHz, keep the output as small as possible and keep the volume setting at maximum.
   Then, adjust IF transformer T4, T5 and T6 a few times repeatedly for maximum deflection of the VTVM.
5. Connect a signal generator to the EXT.ANT on the unit and inject a 27 MHz 30% modulated signal.

NOTE: Maintain signal setting at the lowest usable level to avoid receiver limiting action.

6. Adjust T2 (receiver antenna coil) T3 (receiver tank coil) and T7 (receiver oscillator coil) for a maximum indication on the oscilloscope or VTVM. Tune the T7 core 1 turn farther into the bobbin than when the maximum reading was obtained.
7. Connect dummy load (R=8 ohm) and VTVM to the EAR jack as shown in Fig. 16. Turn the Squelch control to minimum and turn the volume control to maximum.

If the VTVM indicates a voltage greater than 0.63 volt at 1 μV signal input level at the receiver antenna, the receiver sensitivity is normal.

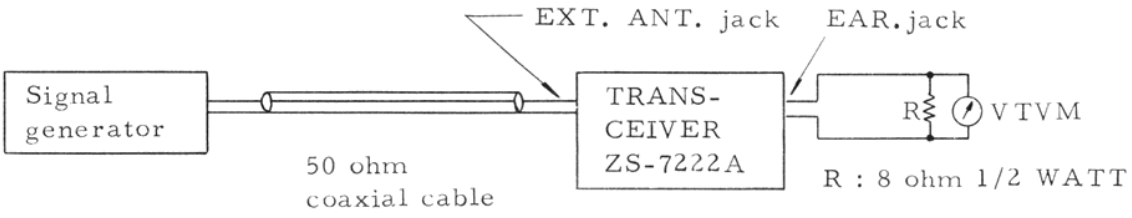
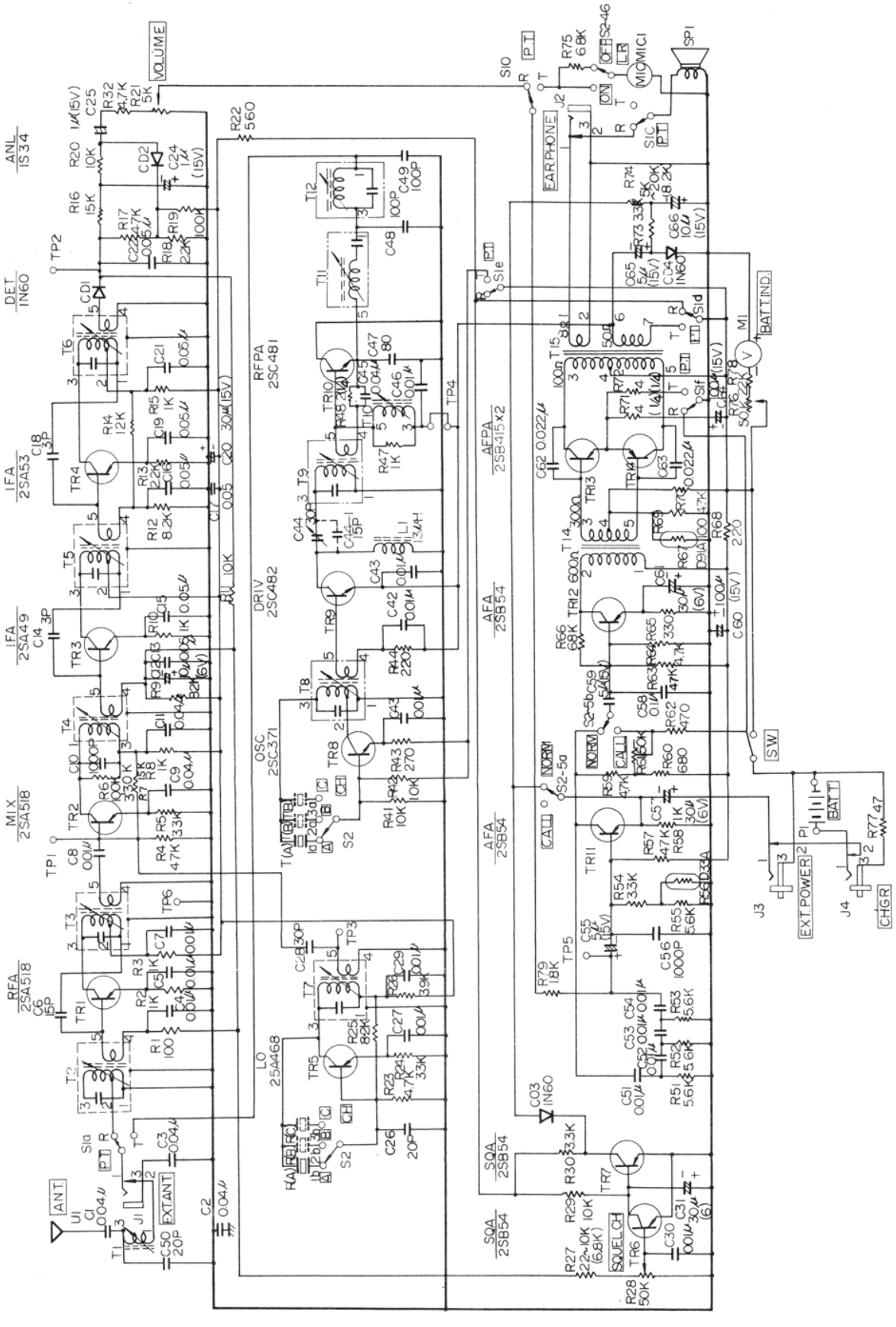


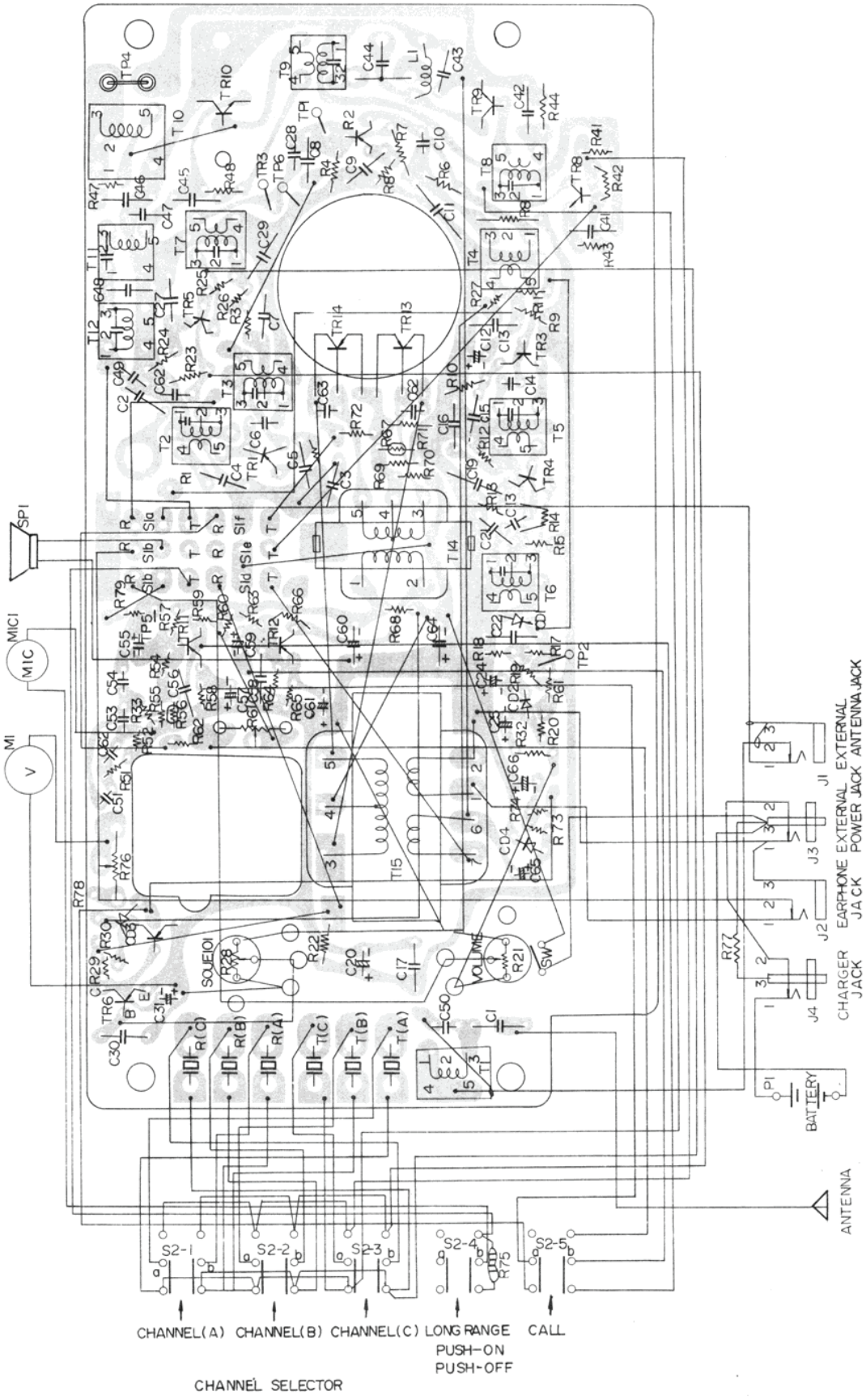
Fig. 16

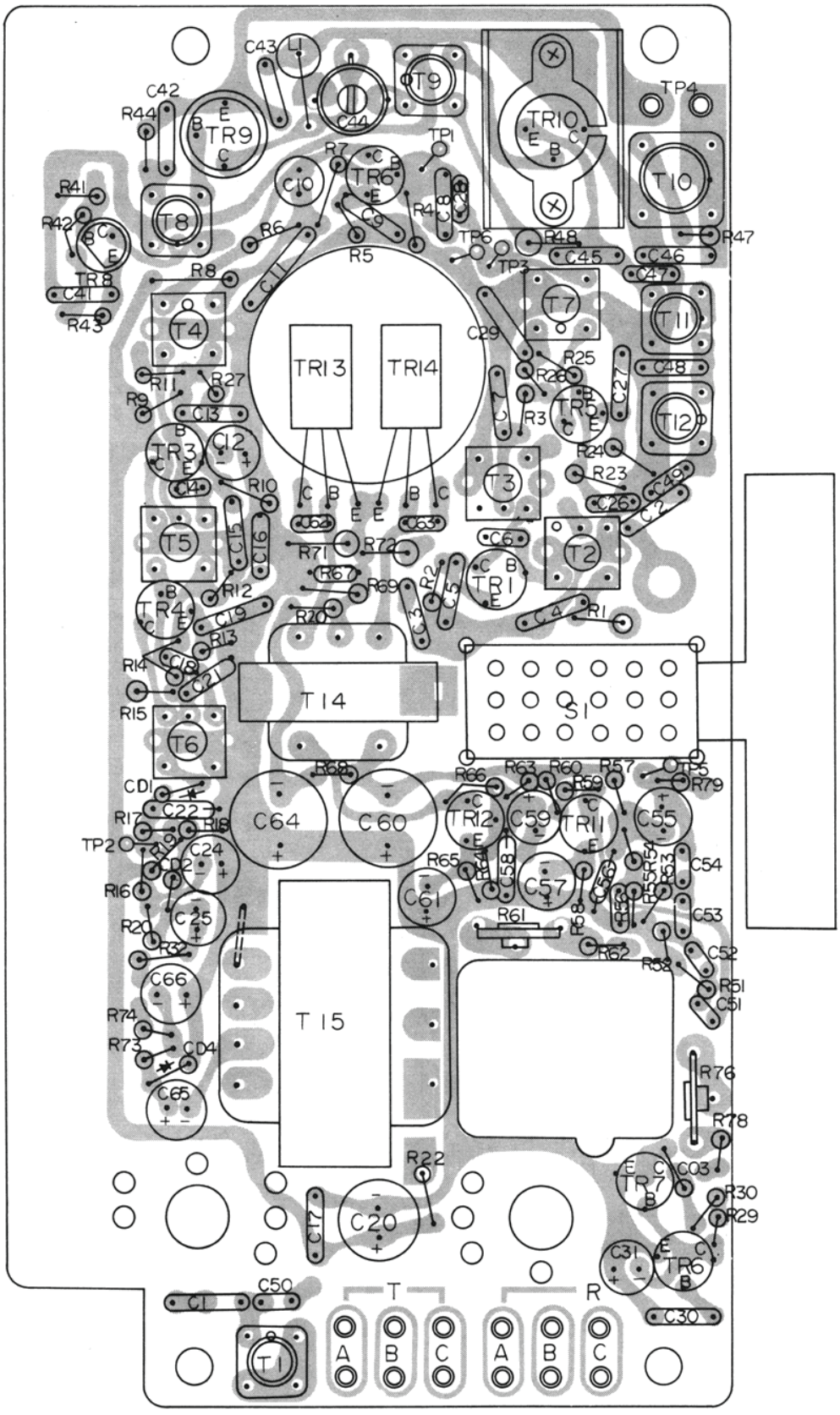
NOTE; The input level is the voltage at the 50 ohm antenna terminal on the test meter.

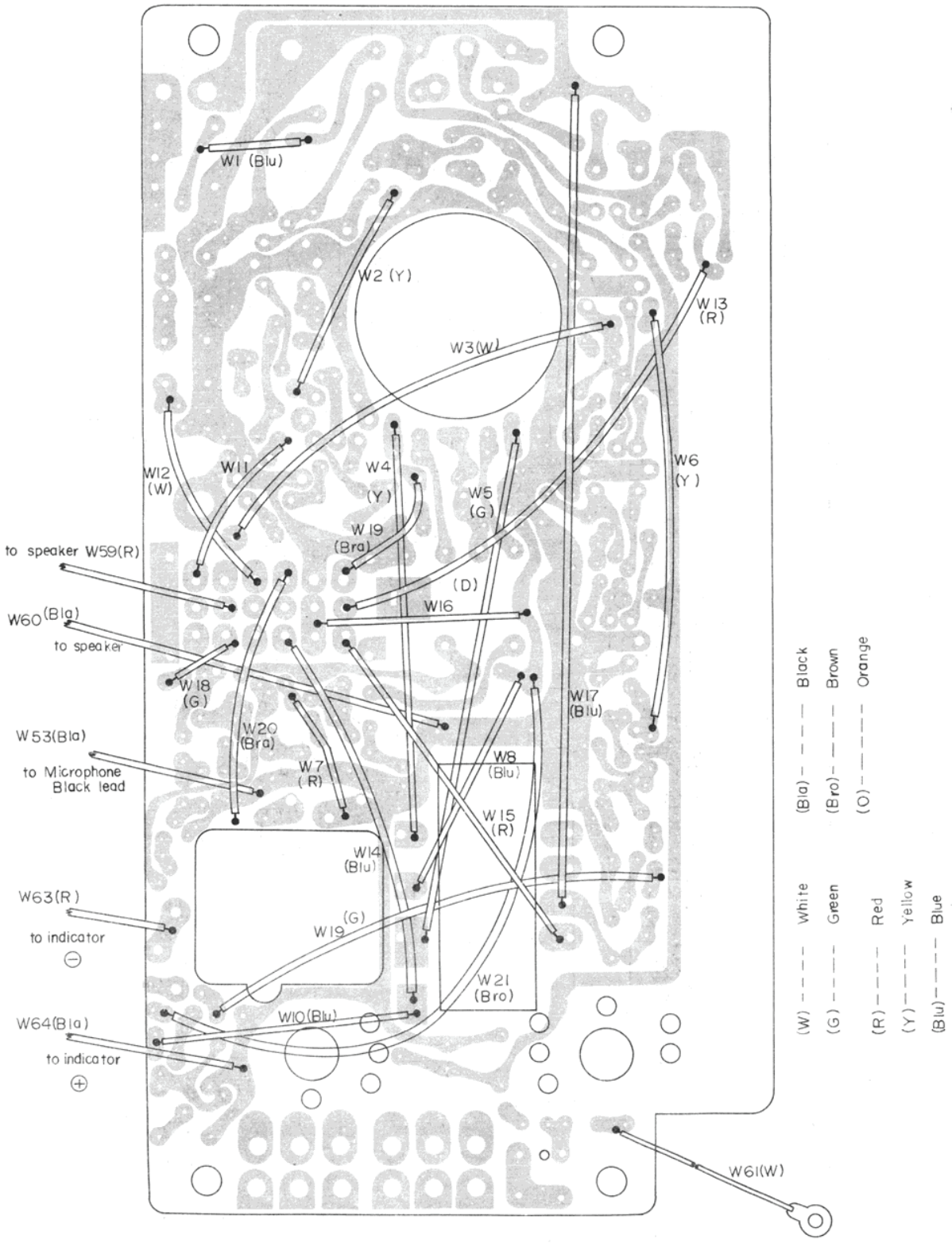
8. Disconnect test equipment and reassemble the transceiver.

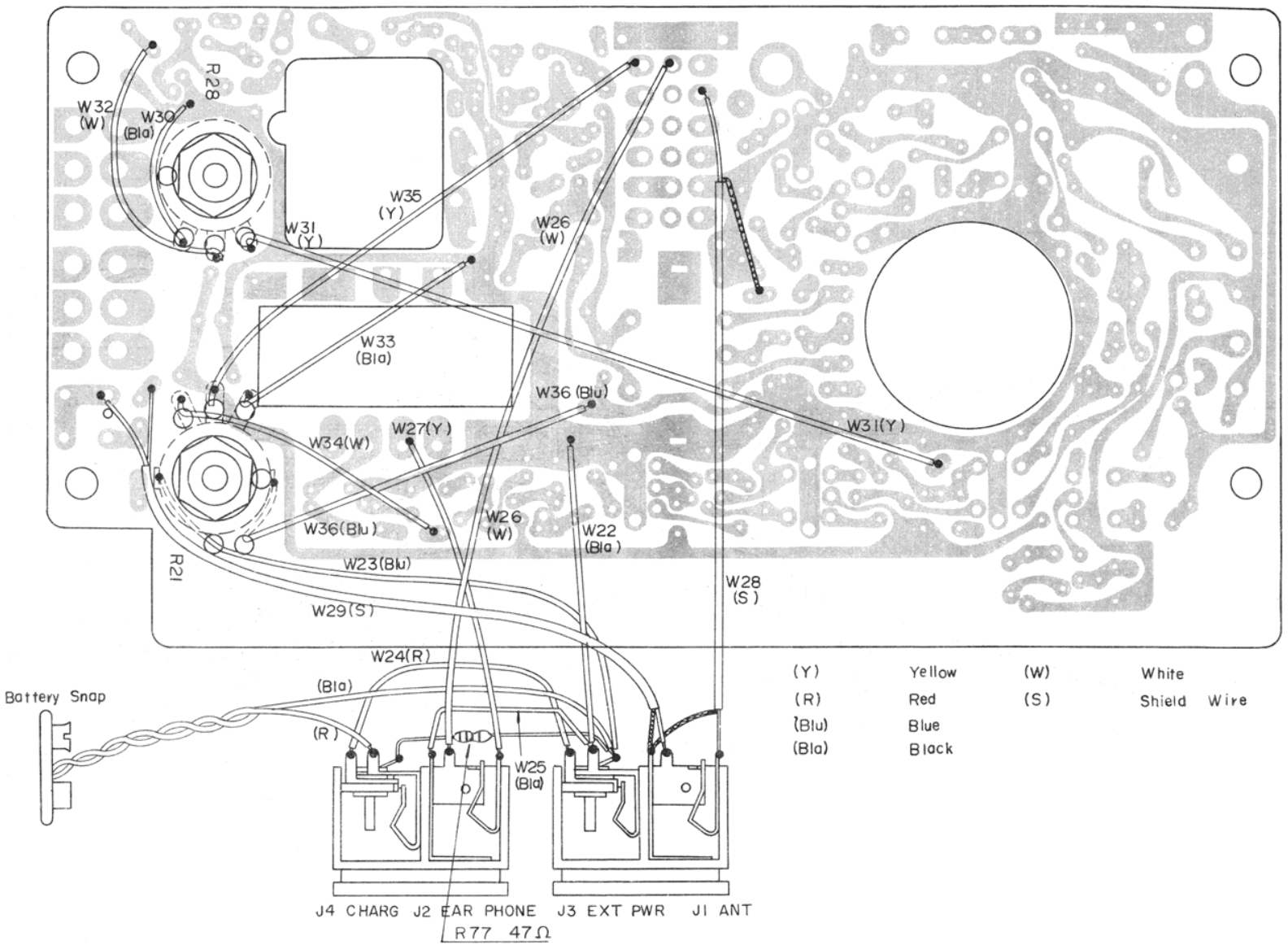
NOTE: Since T1 are correctly adjusted for the transmitter they will not require readjustment for the receiver and therefore, their cores should not be moved.

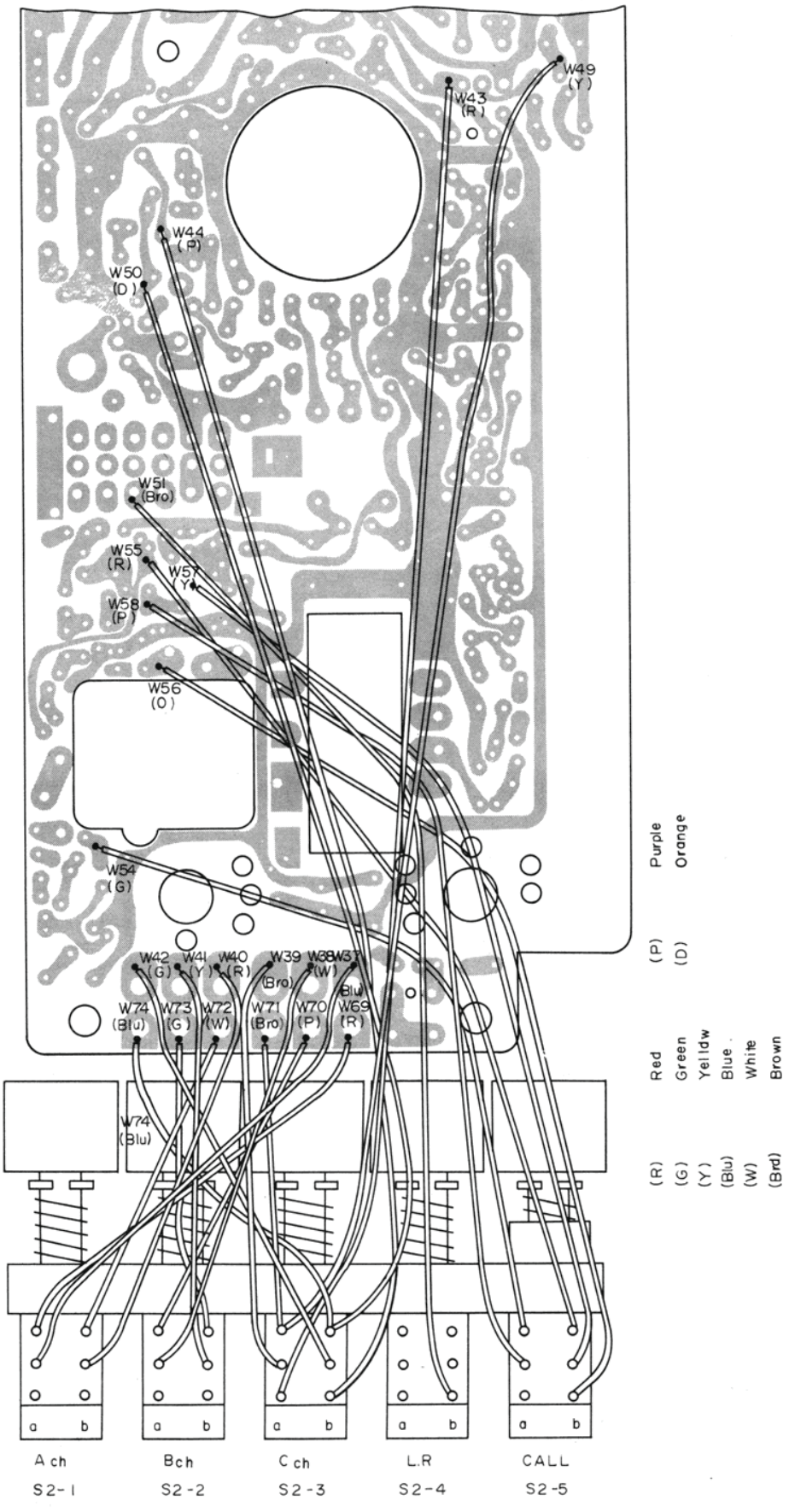

ANT
EXTANT
VOLUME
EARPHONE
MIC/MIC1
SP1
BATT IND.
EXT POWER
CHGR
BATT
SQUELCH
CALL
NORM
SW
RFA 2SA518
MIX 2SA518
IFA 2SA49
IFA 2SA53
DET IN60
ANL IS34
OSC 2SC371
DRIV 2SC482
RFPA 2SC481
AFPA 2SB415x2
AFA 2SB54
SQA 2SB54
LO 2SA468


SP1
MIC1
MIC
MI
V
S2-1
S2-2
S2-3
S2-4
S2-5
CHANNEL(A)
CHANNEL(B)
CHANNEL(C)
LONG RANGE
PUSH-ON
PUSH-OFF
CALL
CHANNEL SELECTOR
J1 EXTERNAL ANTENNA JACK
J2 EXTERNAL POWER JACK
J3 EARPHONE JACK
J4 CHARGER JACK
P1 BATTERY
ANTENNA
VOLUME
SQUELCH


C43
L1
C42
R44
TR9
T9
TP4
TR10
TP1
R7
TR6
C10
T10
R41
R42
T8
R6
C9
R4
TP6
R48
R47
TP3
C45
C46
C47
R5
R8
TR8
C41
R43
T4
T7
T11
C29
TR13
TR14
R25
R28
C48
R11
R27
R9
C13
R3
TR5
C27
T12
TR3
C12
R24
R23
C14
R10
T3
C49
C26
C62
C63
C6
T5
C15
C16
R71
R72
T2
R67
R69
TR1
C5
R2
C3
R12
TR4
C19
R20
C4
R1
R13
R14
C18
C21
T14
S1
R15
T6
R68
R66
R63
R60
R57
TP5
R79
CD1
C22
C64
C60
TR12
C59
TR11
C55
R17
R18
TP2
C24
R65
C58
C57
C54
R16
CD2
C61
R64
R55
R54
R53
C25
R61
C53
R20
R32
R58
R62
R52
C52
C66
R51
C51
R74
T15
R73
CD4
R76
C65
R78
R22
TR7
C03
R30
R29
C20
CT7
C31
TR6
C50
C1
T
R
C30
T1
A
B
C
A
B
C


W1 (Blu)
W2 (Y)
W3(W)
W13 (R)
W12 (W)
W11
W4 (Y)
W5 (G)
W6 (Y)
W19 (Bra)
(D)
W16
to speaker W59(R)
W60(Bla)
to speaker
W18 (G)
W17 (Blu)
W20 (Bra)
W53(Bla)
to Microphone Black lead
W7 (R)
W8 (Blu)
W15 (R)
W14 (Blu)
W63(R)
to indicator
⊖
W19 (G)
W21 (Bro)
W64(Bla)
to indicator
⊕
W10(Blu)
W61(W)
(W) - - - - White
(G) - - - - Green
(R) - - - - Red
(Y) - - - - Yellow
(Blu) - - - - Blue
(Bla) - - - - Black
(Bro) - - - - Brown
(O) - - - - Orange


R28
W32 (W)
W30 (Bla)
W35 (Y)
W31 (Y)
W26 (W)
W33 (Bla)
W36 (Blu)
W27(Y)
W34(W)
W31(Y)
W26 (W)
W22 (Bla)
W36(Blu)
W23(Blu)
W28 (S)
R21
W29(S)
W24(R)
(Bla)
Battery Snap
(R)
W25 (Bla)
J4 CHARG J2 EAR PHONE J3 EXT PWR J1 ANT
R77 47Ω
(Y) Yellow
(R) Red
(Blu) Blue
(Bla) Black
(W) White
(S) Shield Wire


W49 (Y)
W43 (R)
W44 (P)
W50 (D)
W51 (Bro)
W55 (R)
W57 (Y)
W58 (P)
W56 (O)
W54 (G)
W42 (G)
W41 (Y)
W40 (R)
W39 (Bro)
W38 (W)
W37 (Blu)
W74 (Blu)
W73 (G)
W72 (W)
W71 (Bro)
W70 (P)
W69 (R)
W74 (Blu)
a b
A ch
S2-1
B ch
S2-2
C ch
S2-3
L.R
S2-4
CALL
S2-5
(P) Purple
(D) Orange
(R) Red
(G) Green
(Y) Yelldw
(Blu) Blue
(W) White
(Brd) Brown

TOSHIBA 2 WATTS TRANSCEIVER

ZS-7222A

REPLACEMENT PARTS LIST

Sym-bol	Stock No.	Name of part	Description	Q'ty	

TRANSISTORS & DIODES

TR1		Transistor	Toshiba 2SA518	1	
TR2		Transistor	Toshiba 2SA518	1	
TR3		Transistor	Toshiba 2SA 49	1	
TR4		Transistor	Toshiba 2SA 53	1	
TR5		Transistor	Toshiba 2SA468	1	
TR6		Transistor	Toshiba 2SB 54	1	
TR7		Transistor	Toshiba 2SB 54	1	
TR8		Transistor	Toshiba 2SC371	1	
TR9		Transistor	Toshiba 2SC482	1	
TR10		Transistor	Toshiba 2SC481	1	
TR11		Transistor	Toshiba 2SB 54	1	
TR12		Transistor	Toshiba 2SB 54	1	
TR13		Transistor	Toshiba 2SB415	1	
TR14		Transistor	Toshiba 2SB415	1	
CD1		Diode	Toshiba 1N60	1	
CD2		Diode	Toshiba 1S34	1	
CD3		Diode	Toshiba 1N60	1	
CD4		Diode	Toshiba 1N60	1	

COILS & TRANSFORMERS

T1	20084	RF transformer	Antenna matching	Mark : 1	1
T2	20053	RF transformer	Receive antenna	Mark : 2	1
T3	20054	RF transformer	Receive tank	Mark : 3	1
T4	20017	IF transformer	455 KHz	Mark : 0743	1
T5	20018	IF transformer	455 KHz	Mark : 07B1	1
T6	20019	IF transformer	455 KHz	Mark : 07C1	1
T7	20055	RF transformer	Receive oscillator	Mark : 7	1
T8	20056	RF transformer	Transmit oscillator	Mark : 8	1
T9	20085	RF transformer	Transmit driver	Mark : 9	1
T10	20086	RF coil	Neutralization	Mark : 10	1
T11	20059	RF transformer	Transmit PA tank	Mark : 11	1
T12	20060	RF transformer	Transmit 2f trap	Mark : 12	1
T14	20024	AF transformer	Input transformer	Mark : 14	1
T15	20061	AF transformer	Output transformer	Mark : 15	1
L1	20026	RF choke coil	13 μH		1

Sym-bol	Stock No.	Name of part	Description	Q'ty	

CAPACITORS

C1	30006	Ceramic capacitor	0.04 mfd +100, -0% 50V	1	
C2	30006	Ceramic capacitor	0.04 mfd +100, -0% 50V	1	
C3	30006	Ceramic capacitor	0.04 mfd +100, -0% 50V	1	
C4	30005	Ceramic capacitor	0.01 mfd +100, -0% 50V	1	
C5	30005	Ceramic capacitor	0.01 mfd +100, -0% 50V	1	
C6	30044	Ceramic capacitor	15 mmfd ±10% 50V	1	
C7	30005	Ceramic capacitor	0.01 mfd +100, -0% 50V	1	
C8	30005	Ceramic capacitor	0.01 mfd +100, -0% 50V	1	
C9	30006	Ceramic capacitor	0.04 mfd +100, -0% 50V	1	
C10	30045	Polysterene capacitor	1000 mmfd ±5% 50V	1	
C11	30006	Ceramic capacitor	0.04 mfd +100, -0% 50V	1	
C12	30067	Electrolytic capacitor	10 mfd +100, -10% 6V	1	
C13	30046	Ceramic capacitor	0.05 mfd +80, -20% 12V	1	
C14	30002	Ceramic capacitor	3 mmfd ±0.5mmfd 50V	1	
C15	30046	Ceramic capacitor	0.05 mfd +80, -20% 12V	1	
C16	30046	Ceramic capacitor	0.05 mfd +80, -20% 12V	1	
C17	30046	Ceramic capacitor	0.05 mfd +80, -20% 12V	1	
C18	30002	Ceramic capacitor	3 mmfd ±0.5mmfd 50V	1	
C19	30046	Ceramic capacitor	0.05 mfd +80, -20% 12V	1	
C20	30069	Electrolytic capacitor	30 mfd +100, -10% 15V	1	
C21	30046	Ceramic capacitor	0.05 mfd +80, -20% 12V	1	
C22	30046	Ceramic capacitor	0.05 mfd +80, -20% 12V	1	
C24	30070	Electrolytic capacitor	1 mfd +150, -0% 15V	1	
C25	30070	Electrolytic capacitor	1 mfd +150, -0% 15V	1	
C26	30016	Ceramic capacitor	20 mmfd ±10% 50V	1	
C27	30005	Ceramic capacitor	0.01 mfd +100, -0% 50V	1	
C28	30003	Ceramic capacitor	30 mmfd ±10% 50V	1	
C29	30005	Ceramic capacitor	0.01 mfd +100, -0% 50V	1	
C30	30005	Ceramic capacitor	0.01 mfd +100, -0% 50V	1	
C31	30060	Electrolytic capacitor	30 mfd +100, -0% 6V	1	
C41	30005	Ceramic capacitor	0.01 mfd +100, -0% 50V	1	
C42	30005	Ceramic capacitor	0.01 mfd +100, -0% 50V	1	
C43	30005	Ceramic capacitor	0.01 mfd +100, -0% 50V	1	
C44	30074	Semi-fixed capacitor	8.5 ~ 30 mmfd	1	
C45	30006	Ceramic capacitor	0.04 mfd +100, -0% 50V	1	
C46	30005	Ceramic capacitor	0.01 mfd +100, -0% 50V	1	
C47	30029	Ceramic capacitor	80 mmfd ±10% 50V	1	
C48	30018	Ceramic capacitor	100 mmfd ±10% 50V	1	
C49	30018	Ceramic capacitor	100 mmfd ±10% 50V	1	
C50	30016	Ceramic capacitor	20 mmfd ±10% 50V	1	
C51	30007	Mylarfilm capacitor	0.01 mfd ±20% 50V	1	
C52	30007	Mylarfilm capacitor	0.01 mfd ±20% 50V	1	
C53	30007	Mylarfilm capacitor	0.01 mfd ±20% 50V	1	
C54	30007	Mylarfilm capacitor	0.01 mfd ±20% 50V	1	
C55	30071	Electrolytic capacitor	5 mfd +100, -0% 15V	1	
C56	30030	Ceasmic capacitor	1000 mmfd +100, -0% 50V	1	

Sym-bol	Stock No.	Name of part	Description	Q'ty	

CAPACITORS

C57	30068	Electrolytic capacitor	30	mfd	+100,	-0%	6V	1	
C58	30047	Ceramic capacitor	0.1	mfd	±20%		12V	1	
C59	30071	Electrolytic capacitor	5	mfd	+100,	-0%	15V	1	
C60	30073	Electrolytic capacitor	100	mfd	+100,	-0%	15V	1	
C61	30068	Electrolytic capacitor	30	mfd	+100,	-0%	6V	1	
C62	30075	Mylarfilm capacitor	0.022	mfd	±20%		50V	1	
C63	30075	Mylarfilm capacitor	0.022	mfd	±20%		50V	1	
C64	30073	Electrolytic capacitor	100	mfd	+100,	-0%	15V	1	
C65	30071	Electrolytic capacitor	5	mfd	+100,	-0%	15V	1	
C66	30072	Electrolytic capacitor	10	mfd	+100,	-0%	15V	1	

RESISTORS

R1	40141	Carbon fixed resistor	100	ohm	±10%	1/8W	1	
R2	40148	Carbon fixed resistor	1	Kohm	±10%	1/8W	1	
R3	40148	Carbon fixed resistor	1	Kohm	±10%	1/8W	1	
R4	40153	Carbon fixed resistor	4.7	Kohm	±10%	1/8W	1	
R5	40151	Carbon fixed resistor	3.3	Kohm	±10%	1/8W	1	
R6	40165	Carbon fixed resistor	100	Kohm	±10%	1/8W	1	
R7	40159	Carbon fixed resistor	15	Kohm	±10%	1/8W	1	
R8	40148	Carbon fixed resistor	1	Kohm	±10%	1/8W	1	
R9	40164	Carbon fixed resistor	82	Kohm	±10%	1/8W	1	
R10	40148	Carbon fixed resistor	1	Kohm	±10%	1/8W	1	
R11	40157	Carbon fixed resistor	10	Kohm	±10%	1/8W	1	
R12	40156	Carbon fixed resistor	8.2	Kohm	±10%	1/8W	1	
R13	40150	Carbon fixed resistor	2.2	Kohm	±10%	1/8W	1	
R14	40158	Carbon fixed resistor	12	Kohm	±10%	1/8W	1	
R15	40148	Carbon fixed resistor	1	Kohm	±10%	1/8W	1	
R16	40159	Carbon fixed resistor	15	Kohm	±10%	1/8W	1	
R17	40153	Carbon fixed resistor	4.7	Kohm	±10%	1/8W	1	
R18	40150	Carbon fixed resistor	2.2	Kohm	±10%	1/8W	1	
R19	40165	Carbon fixed resistor	100	Kohm	±10%	1/8W	1	
R20	40157	Carbon fixed resistor	10	Kohm	±10%	1/8W	1	
R21	40136	Variable resistor	5 Kohm ±20% 4/100W w/switch				1	
R22	40146	Carbon fixed resistor	560	ohm	±10%	1/8W	1	
R23	40153	Carbon fixed resistor	4.7	Kohm	±10%	1/8W	1	
R24	40151	Carbon fixed resistor	3.3	Kohm	±10%	1/8W	1	
R25	40156	Carbon fixed resistor	8.2	Kohm	±10%	1/8W	1	
R26	40152	Carbon fixed resistor	3.9	Kohm	±10%	1/8W	1	
R27	40155	Carbon fixed resistor	6.8	Kohm	±10%	1/8W	1	
R28	40137	Variable resistor	50	Kohm	±20%	4/100W	1	
R29	40157	Carbon fixed resistor	10	Kohm	±10%	1/8W	1	
R30	40151	Carbon fixed resistor	3.3	Kohm	±10%	1/8W	1	
R32	40153	Carbon fixed resistor	4.7	Kohm	±10%	1/8W	1	

Sym-bol	Stock No.	Name of part	Description	Q'ty	

RESISTORS

R41	40157	Carbon fixed resistor	10	Kohm	±10%	1/8W	1	
R42	40157	Carbon fixed resistor	10	Kohm	±10%	1/8W	1	
R43	40143	Carbon fixed resistor	270	ohm	±10%	1/8W	1	
R44	40142	Carbon fixed resistor	220	ohm	±10%	1/8W	1	
R47	40148	Carbon fixed resistor	1	Kohm	±10%	1/8W	1	
R48	40139	Carbon fixed resistor	2	ohm	±10%	1/4W	1	
R51	40154	Carbon fixed resistor	5.6	Kohm	±10%	1/8W	1	
R52	40154	Carbon fixed resistor	5.6	Kohm	±10%	1/8W	1	
R53	40154	Carbon fixed resistor	5.6	Kohm	±10%	1/8W	1	
R54	40151	Carbon fixed resistor	3.3	Kohm	±10%	1/8W	1	
R55	40154	Carbon fixed resistor	5.6	Kohm	±10%	1/8W	1	
R56	40037	Thermistor	D33A					
R57	40162	Carbon fixed resistor	47	Kohm	±10%	1/8W	1	
R58	40148	Carbon fixed resistor	1	Kohm	±10%	1/8W	1	
R59	40153	Carbon fixed resistor	4.7	Kohm	±10%	1/8W	1	
R60	40147	Carbon fixed resistor	680	ohm	±10%	1/8W	1	
R61	40167	Semi-fixed resistor	50	Kohm	±20%	4/100W	1	
R62	40145	Carbon fixed resistor	470	ohm	±10%	1/8W	1	
R63	40162	Carbon fixed resistor	47	Kohm	±10%	1/8W	1	
R64	40153	Carbon fixed resistor	4.7	Kohm	±10%	1/8W	1	
R65	40144	Carbon fixed resistor	330	ohm	±10%	1/8W	1	
R66	40163	Carbon fixed resistor	68	Kohm	±10%	1/8W	1	
R67	40035	Thermistor	D91A				1	
R68	40142	Carbon fixed resistor	220	ohm	±10%	1/8W	1	
R69	40141	Carbon fixed resistor	100	ohm	±10%	1/8W	1	
R70	40153	Carbon fixed resistor	4.7	Kohm	±10%	1/8W	1	
R71	40138	Carbon fixed resistor	4	ohm	±10%	1/4W	1	
R72	40138	Carbon fixed resistor	4	ohm	±10%	1/4W	1	
R73	40151	Carbon fixed resistor	3.3	Kohm	±10%	1/8W	1	
R74	40156	Carbon fixed resistor	8.2	Kohm	±10%	1/8W	1	
R72	40155	Carbon fixed resistor	6.8	Kohm	±10%	1/8W	1	
R76	40167	Semi-fixed resistor	50	Kohm	±20%	4/100W	1	
R77	40140	Carbon fixed resistor	47	ohm	±10%	1/8W	1	
R78	40160	Carbon fixed resistor	22	Kohm	±10%	1/8W	1	
R79	40149	Carbon fixed resistor	1.8	Kohm	±10%	1/8W	1	

SWITCH

S1	60047	Push-to-Talk switch	6 circuit- 2 positions	1	
S2	60048	Push switch	5 blocks	1	

Sym-bol	Stock No.	Name of part	Description	Q'ty	

SPEAKER, MICROPHONE & EARPHONE

SP1	50009	Speaker	2-1/4" 8 ohm	1	
MIC1	50010	Dynamic microphone	200 ohm	1	
	50002	Earphone	8 ohm	1	

CRYSTAL

T(A)	70011	Transmit crystal HC-25/u	Specify channel No. and	1	
T(B)	70011	Transmit crystal HC-25/u	frequency	1	
T(C)	70011	Transmit crystal HC-25/u		1	
R(A)	70012	Receive crystal HC-25/u	Specify channel No. and	1	
R(B)	70012	Receive crystal HC-25/u	frequency	1	
R(C)	70012	Receive crystal HC-25/u		1	

MISCELLANEOUS

U1	60046	Antenna	11 sections 49" center loaded	1	
M1	89021	Battery meter	DC 400 μA	1	
J1, 3	60031	Jack	External Antenna & Power	1	
J2, 4	60031	Jack	Earphone & Charger	1	
	60033	Crystal pin	For HC-25/u	14	
P1	60009	Battery snap	Battery	1	
	91015	Battery compartment		1	
	93027	Label	Battery compartment	1	
	92053	Printed circuit board	QBA-7222A	1	
	91044	Antenna bracket		1	
	91005	Antenna bushing		1	
	94001	Antenna lug	ET-3	1	
	90016	Radiator	For TR13, 14 (2SB415)	1	
	90017	Radiator	For TR10 (2SC481)	1	
	92054	Radiator holder	For TR10 (2SC481)	1	
	92023	Speaker clamp		3	
	92052	Switch holder	With sub P. C. board	1	
	92051	Battery meter clamp		1	
	92050	Microphone clamp		1	
	92030	Jack holder		1	
	92049	Battery compartment holder		1	
	91042	Microphone protector		1	
	91042	Bushing	For knob	2	
	95044	Screw	For P. C. board & cover	2	
	95045	Screw	For P. C. board & rear cover	2	
	95030	Screw	PP2 x 12 for radiator	2	

Sym-bol	Stock No.	Name of part	Description	Q'ty	

MISCELLANEOUS

	95003	Screw	PP2.6 x 4 for speaker clamp & battery meter clamp	4	
	95004	Screw	PP2.6 x 6 for P.C. board, rear cover, microphone clamp, jack holder, battery compartment holder & switch holder	14	
	95028	Screw	PP2.6 x 12 for radiator	1	
	95029	Screw	PP2.6 x 16 for radiator	1	
	95047	Screw	PP3 x 0.5 x 8 for antenna	2	
	95046	Nut	LN2 for radiator	2	
	95021	Nut	N2 for radiator	2	
	95006	Spring washer	SW2.6 for speaker clamp, battery meter clamp, microphone clamp & switch holder, jack holder	11	
	95007	Spring washer	SW3 for antenna	2	
	95008	Washer	2W2.6 for rear cover & jack holder	6	

CABINET

	90027	Front cabinet complete		1	
	90028	Rear cover complete		1	
	90029	Volume knob		2	
	96029	Name plate		1	
	85010	Identification card		1	
	82028	Instruction book		1	
	85019	Regulation book		1	
	84050	Gift box		1	
	84051	Unit package		1/10	