

**SR** STANDARD  
**C58**  
ALL MODE TRANSCEIVER  
INSTRUCTION / MANUAL



**STANDARD COMMUNICATIONS CORP.**

## INSTRUCTION MANUAL SECTION

We are confident that you will be entirely satisfied with your 144 MHz band all-mode Transceiver Model C58. Our very strict quality control and inspection ensure that each transceiver unit leaves the factory in perfect condition. If the unit is damaged or fails to operate properly, immediately contact your dealer.

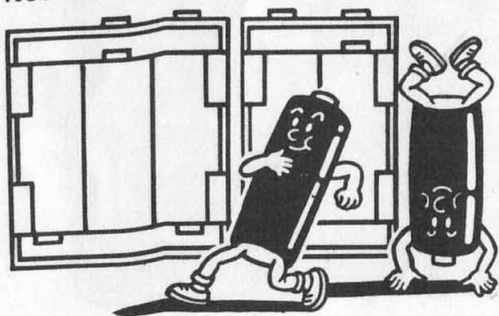
To obtain the best performance and longest use from your transceiver, study these instructions carefully.

### ACCESSORIES

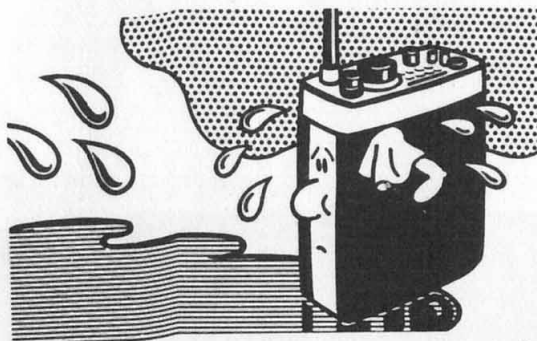
- Hand-held microphone with UP-DOWN switch (MP-716) . . . . . 1
- Helical antenna . . . . . 1
- Shoulder belt . . . . . 1
- External power plug . . . . . 1
- Instruction manual . . . . . 1
- Schematic diagram . . . . . 1

## 1. PRECAUTIONS

- Note the following precautions before use.



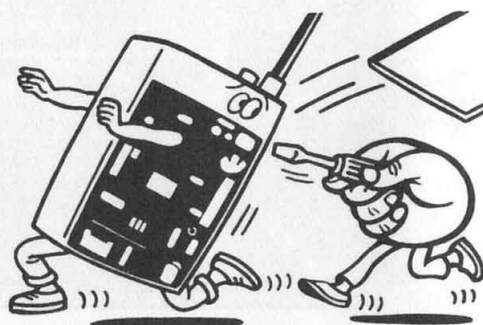
1. When inserting battery packs in the unit, check that their polarity is correct.



3. The unit should be operated under the circumstance where it will not be subject to temperature or humidity extreme or excessive dusts.

## 2. FEATURES

1. The compact, high-performance model provides all-mode operations including FM, SSB (USB and LSB) and CW on the two-meter band (144 MHz).
2. Superior operability is achieved by microprocessor control associated with large-capacity storage.
3. 4 VFO is incorporated, providing 100 Hz frequency stepping.
4. The front-end section of the unit uses a N channel cascade MOS FET, which achieves high sensitivity and signal-to-noise ratio.
5. The three-pole helical resonator improves intermodulation rejection.
6. The multi-purpose LCD (liquid crystal display) provides clear numerical frequency readout even under the direct sunlight.
7. Hand-held microphone with channel UP/DOWN switch.
8. RIT, NB and side-tone circuits incorporated.
9. A new built-in 1750 Hz tone burst generator is provided for driving in repeater operation.
10. A variety of options are available. Combined with a linear amplifier and mobile bracket, the unit provides 25-watt mobile operation.



2. The coil slugs and trimmer capacitors in your unit are factory adjusted. Do not try re-adjustment.

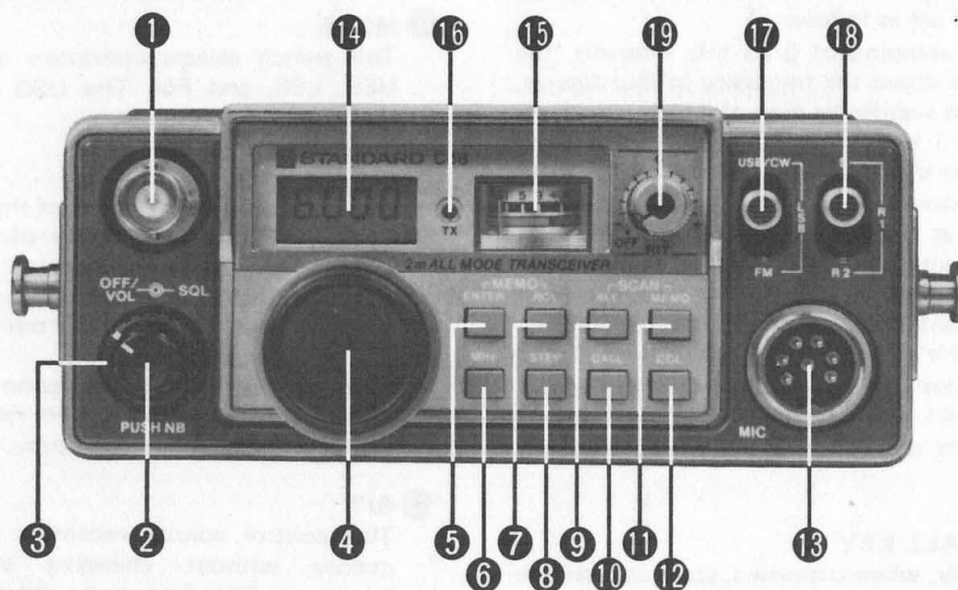


4. The unit operates on +12 VDC battery power. Large vehicles usually use a +24 VDC battery source, which is not usable for powering the unit.



## 3. PANEL FEATURES

### ■ FRONT PANEL FEATURES



#### 1 BNC CONNECTOR

This connector accepts the supplied helical antenna for portable operation.

#### 2 POWER/VOLUME/PUSH N.B

This knob serves to tripple purpose: a power switch, volume control, and noise blanker (N.B) on/off switch. When the knob is turned fully counterclockwise, the power to the unit is turned off.

To apply power to the transceiver, rotate the knob clockwise beyond the detent OFF position; further clockwise rotation of the OFF/VOL control will increase output volume level.

Each depression of the OFF/VOL control knob turns on and off the noise blanker function alternately. When the noise blanker is on, a dot appears at the top-right corner of the LCD display.

(NOTE: The N.B functions in the SSB or CW mode only, not in the FM mode.)

When the unit is powered from built-in batteries, the internal memory is backed up by them even if the OFF/VOL control is set at OFF. The back-up current is approximately 40  $\mu$ A.

#### 3 SQL (SQUELCH) CONTROL

The SQL control is used to suppress annoying FM background noise heard when no input signal is present. Set this control at a point where background noise just disappears. The SQL circuitry acts only in FM mode.

#### 4 TUNING CONTROL

This digital VFO control knob is used to tune in the desired operation channel frequency. While this knob is turned in either direction, tuning frequency steps up or down at the specified stepping intervals.

This rotary-switch control permits free rotation, allowing for skipping from the top to bottom or bottom to top channel frequencies.

#### 5 MEMO ENTRY KEY

Press this key to store the selected channel frequency in the memory. The memory can store up to 5 frequency data of FM, SSB and CW modes.

#### 6 MHz

This key switch is used to select a desired transmission/reception frequency band from among 144, 145, 146, and 147 MHz bands. Depressing the key can raise continually the frequency band upward in steps of 1 MHz starting with the 144 MHz band.

#### 7 MEMO RCL KEY

This key is used to recall stored channel frequencies. Each time it is pressed, frequency data stored in memory addresses M1 ~ M5. The recalled memory address is displayed at the bottom of the frequency readout along with memory mark "M".

## 8 STEP

This key selects channel frequency stepping interval from 5/25 kHz, 1 kHz and 100 Hz. Frequency readouts for each stepping interval are as follows:

In the stepping of 5/25 kHz intervals, the readout shows the frequency in four figures, the least significant digit of which represents that of 1 kHz. The 0.5 kHz is indicated by a dot at the lower right of the readout. In the stepping of 1 kHz intervals, two dots appear at the left of the readout. The least significant digit indicates that of 1 kHz. In the stepping of 100 Hz intervals, the least significant digit indicates that of 100 Hz. The MHz's indication is given by a dot(s) at the left of the readout. One dot represents 144 and 146 MHz's frequencies and two dots are 145 and 147 MHz's frequencies.

## 9 SCAN ALL KEY

This key, when depressed, scans up over the currently-selected MHz band in 100 Hz, 1 kHz, 5 kHz or 25 kHz steps.

## 10 CALL

Press this key to transmit a tone burst signal for repeater driving (tone frequency: 1750Hz).

## 11 SCAN MEMO

When this key is depressed, channel frequencies stored in the memory are sequentially scanned from M1.

## 12 CCL KEY

This key is used to initialize all the unit's operation mode of the unit.

## 13 MIC JACK

This jack accepts the supplied microphone.

## 14 FREQUENCY AND MODE DISPLAY

This LCD readout provides frequency and mode display such as SCAN, MEMO, and N.B.

## 15 METER

The meter checks input signal strength (S), transmission power (RF) and battery voltage. The meter is switched automatically between S and RF as the unit is switched from the reception to transmission mode. When you wish to check battery voltage with the meter, set the rear slide switch to the BAT CHECK position.

## 16 TX INDICATOR

This goes on when the unit is set up for the transmission mode.

## 17 MODE

This switch selects operation mode from USB, LSB, and FM. The USB position is shared by the CW mode.

## 18 RPT SWITCH

This switch can select either of the simplex, repeater R1, or R2 mode of operation. S mode: For ordinary simplex operation. R1 mode: Shifts the reception frequency upward by 600 kHz from that of the simplex operation.

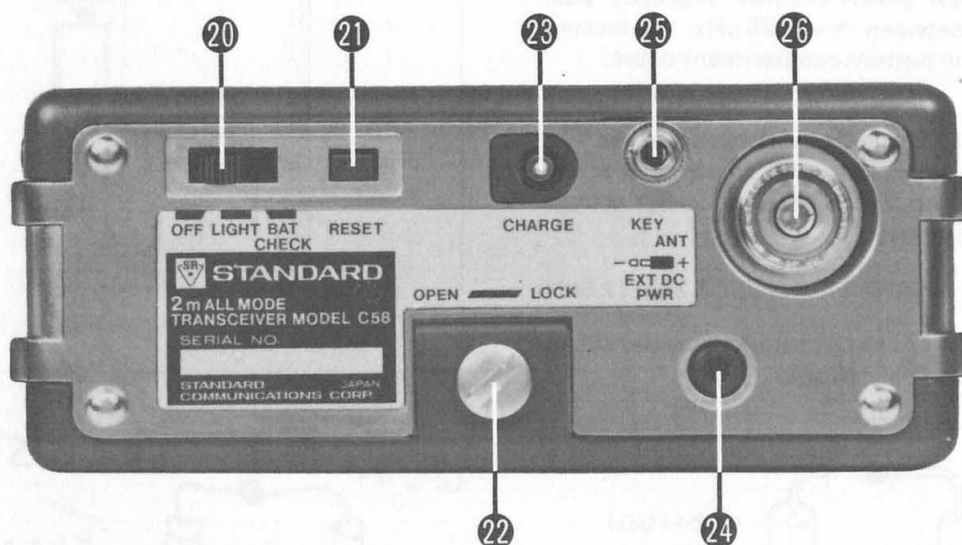
R2 mode: Shifts the transmission frequency upward by 600 kHz from that of the simplex operation.

## 19 RIT

This control adjusts receiver's tuning frequency without changing transmission frequency. The frequency obtained in the center position (0) of this control corresponds to that at the RIT-OFF position. The RIT control is effective in all operation modes.



## ■ REAR PANEL FEATURES



### 20 LIGHT/BAT CHECK SWITCH

In the LIGHT position, the LCD and meter lamps glow. The BAT CHECK position causes the front meter to function as a battery voltage indicator while all the lamps are left on. The OFF position turns off all lamps.

### 21 RESET SWITCH

This pushswitch, when depressed, resets the internal microprocessor to its initial state. If microprocessor error takes place due to chattering, ect., depress this button.

### 22 BATTERY COMPARTMENT COVER RETENTION SCREW

To open the battery compartment cover, loosen this screw with a coin.

### 23 CHARGE SOCKET

This socket accepts a Ni-Cad battery charger (see Fig. 2).

### 24 EXT. PWR SOCKET

This socket accepts an external DC power-source supplied via the DC adaptor supplied with the unit. See Fig. 7.

### 25 KEY

This terminal accepts a CW key with a 3.5 mm plug.

### 26 ANT RECEPTALCE

This M-type socket accepts an external antenna with an impedance of 50Ω.

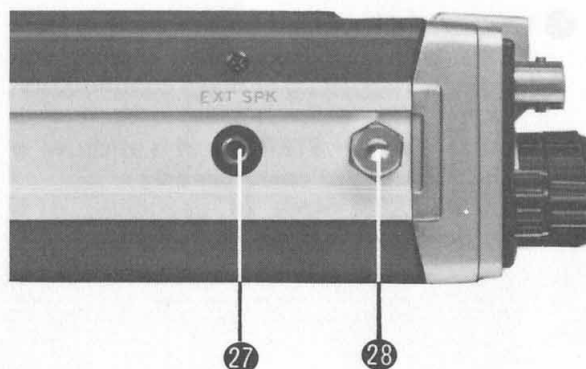
## ■ SIDE PANEL

### 27 EXT SPK JACK

This jack accepts an external speaker or earphone with an impedance of 8Ω.

### 28 STRAPPING POST

Attach the supplied shoulder belt to this post. See Fig. 6.



## ■ INTERNAL SWITCH

### 29 CH STEP SWITCH

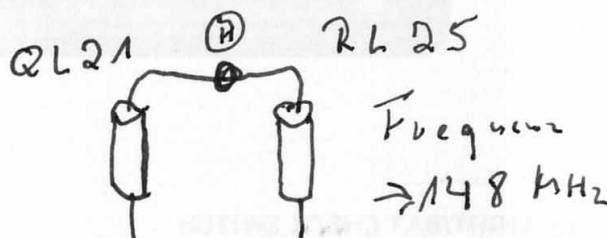
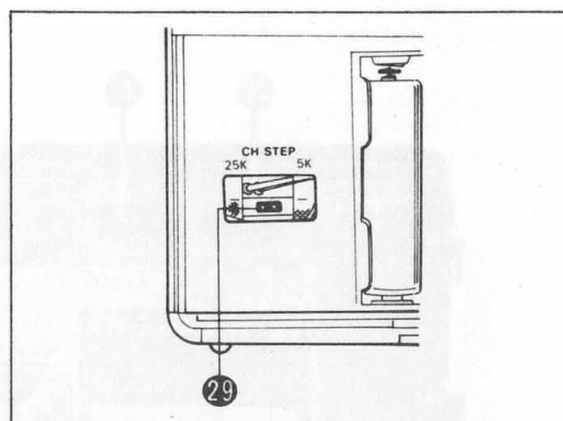
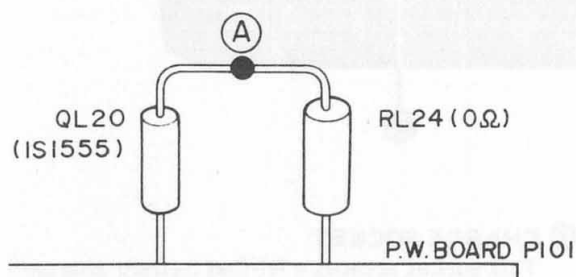
This switch selects channel frequency scan stepping between 5 and 25 kHz. It is located behind the battery compartment cover.

#### NOTE:

The CH STEP switch is effective in the FM mode of operation only. In the SSB mode of operation, it is automatically set to 5 kHz's stepping.

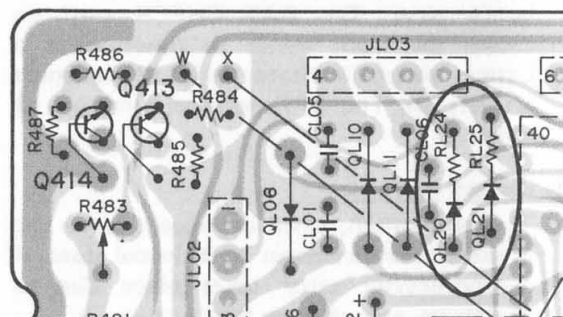
### CHANGING CHANNEL STEP TO 25k/12.5kHz

The channel step can be changed from 5k/25kHz to 25k/12.5kHz as follows.



### Changing Procedure

1. Cut off lead (A) between QL20 and RL24 to obtain 25k/12.5kHz channel step mode. When the leads are reconnected, the channel step returns to 5k/25kHz.
2. When lead (A) is cut, the QL20 and RL24 become unstable. Take care not to short-circuit these parts.
3. In the SSB mode of operation, it is automatically set to 12.5kHz stepping.



## ■ MICROPHONE

### 30 PTT BUTTON

To put the transceiver into the transmission mode, push the PTT button.

### 31 UP-DOWN CHANNEL CONTROL BUTTON

If the button is held down, channel frequency is stepped up or down continuously.

NOTE: The CH STEP switch is effective in the FM mode of operation only.

In the SSB mode of operation, it is automatically set to 5 kHz stepping.





## 4. BEFORE OPERATION

### 4.1 INSTALLING BATTERY PACKS

Install the specified battery packs in the unit's battery compartment of the unit as follows:

1. Loosen screw (22) on the rear of the unit with a coin and open the battery compartment cover (see Fig. 1).
2. The supplied battery holders are designed to hold 6 and 4 battery cells each. The smaller holder has a dummy cell in it.
3. Use nine manganese or alkaline battery cells (UM-3 1.5 V) with the dummy cell left installed in the smaller holder.
4. Use ten rechargeable Ni-Cad battery cells (1.2 V) with the dummy cell removed from the smaller battery holder.
5. After mounting batteries in the battery holders, install the holders in the battery compartment of the unit as illustrated below. Close the compartment lid and tighten screw (22) with a coin.

### NOTE:

When using UM-3 battery cells (1.5 V), leave the dummy cell in the smaller battery holder.

### HANDLING PRECAUTIONS FOR DRY CELLS

Careless handling of dry cells may result in electrolyte leakage or bursting. Note the following points.

1. When installing, be certain that their polarity is correct.
2. Do not mix new and used battery cells.
3. Some types of dry cells with similar shapes may have different voltages. Be sure to use the same type of battery cells.
4. Some types of dry cells are rechargeable while other types are not. Carefully read the notes on the cells before use.

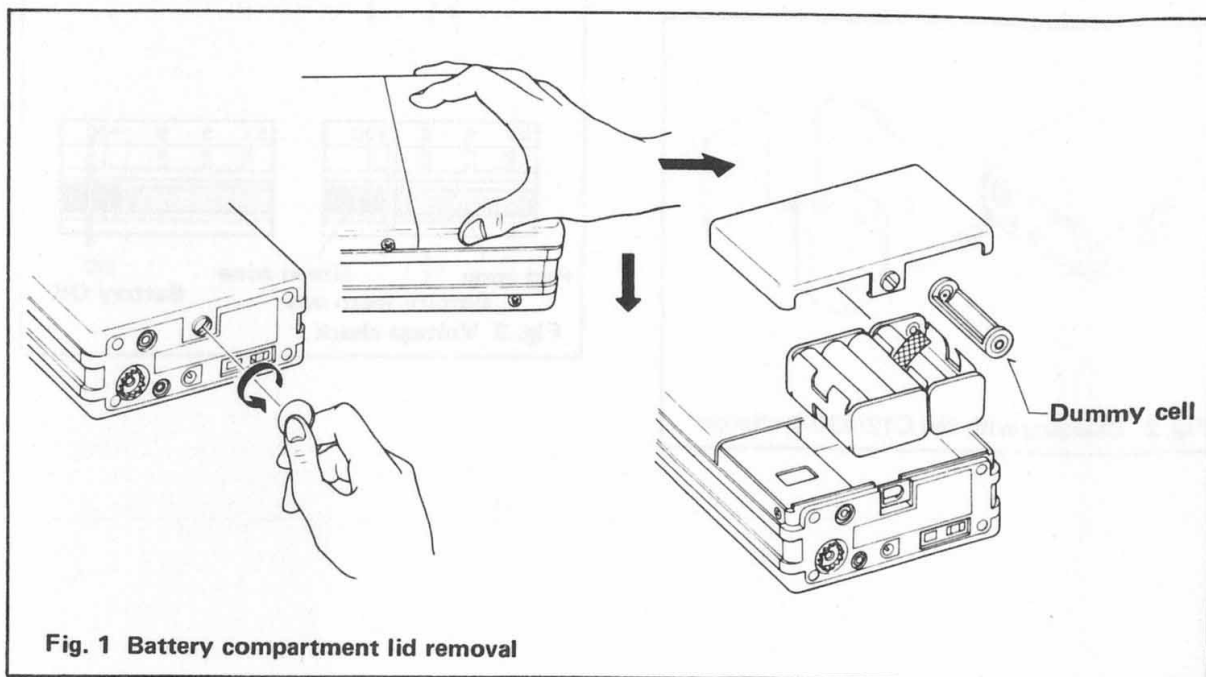


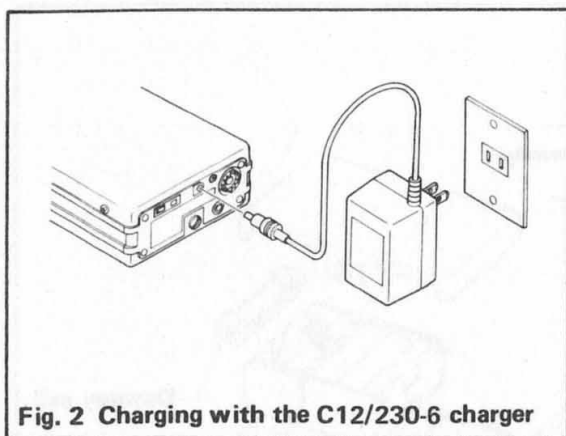
Fig. 1 Battery compartment lid removal

## 4.2 RECHARGING Ni-Cad BATTERY CELLS

1. Ni-Cad battery cells used in the unit require recharging before the meter pointer falls into the red zone.
2. When recharging the battery, be sure to turn the POWER/VOL control fully counter-clockwise to the OFF position.
3. Plug the optional charger into the charging socket (23) on C58 for charging (see Fig. 2). Optional charger: C12/230-6, 10 hours for 80% charging.

### CAUTION:

1. Do not try to recharge unchargeable batteries such as UM-3 manganese or alkaline cells.
2. Avoid overcharging, as it shortens battery life.  
For normal charging efficiency, the Ni-Cad cells should be charged under an environment temperature of more than 0°C.
3. The battery charger is not usable as an external power source.

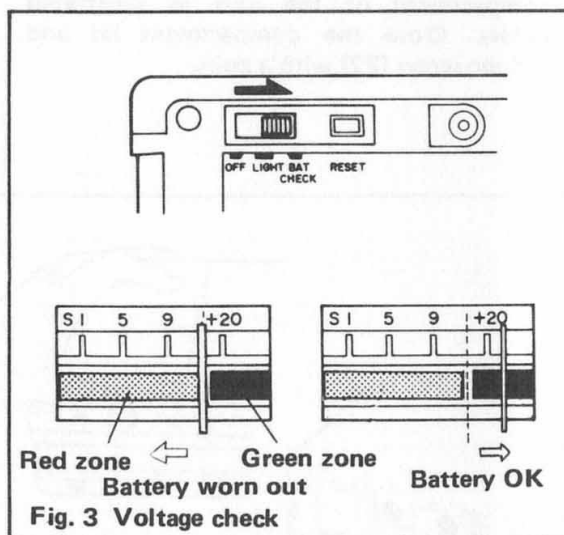


## 4.3 SUPPLY VOLTAGE CHECK

Check the supply voltage as follows:

1. Set the LIGHT/BAT CHECK switch (20) to the BAT CHECK position.
2. Turn the POWER/VOL control clockwise until the POWER switch clicks on. The lamps will glow and the meter will indicate the voltage supplied from the battery.
3. If the meter pointer is in the red zone on the meter scale (Fig. 3), the battery cells require replacement or recharging. When the battery cells installed in the unit are of UM-3 manganese or alkaline type, replace them. If they are rechargeable Ni-Cad cells, recharge them.

When the transceiver is powered from an external power source, the meter will indicate the external source voltage.



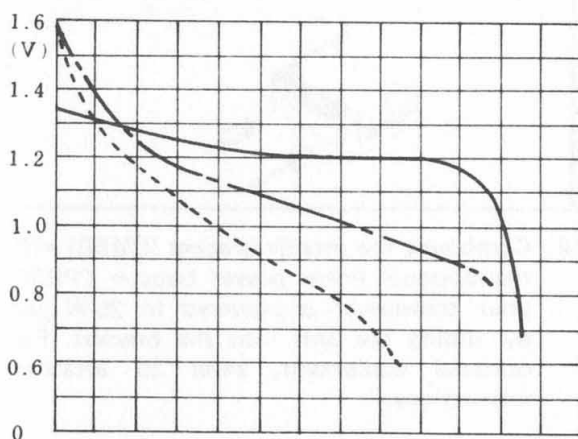


## 4.4 BATTERY TYPES AND THEIR CHARACTERISTICS

Different types of batteries have different discharging characteristics (see Fig. 4).

The manganese and alkaline batteries have a relatively linear discharging characteristic, while the Ni-Cad battery has a sudden voltage drop after it maintaining a relatively constant output voltage level.

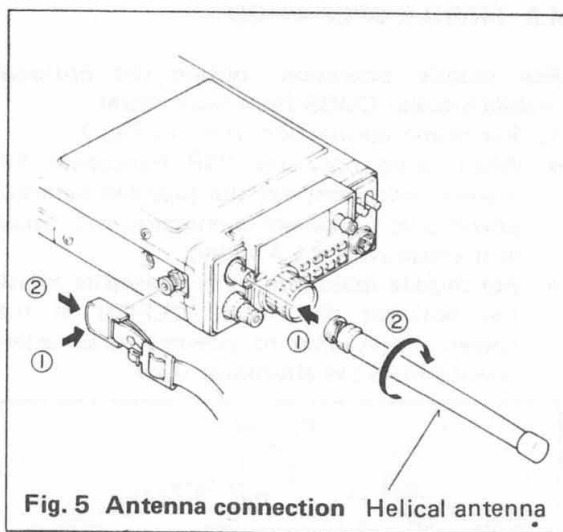
When used in the C58 transceiver, fully charged Ni-Cad batteries operate for approximately 2.5 hours for repetitions of one-minute transmission, one-minute reception, and 8-minute stand-by. The manganese battery cells allow an operating duration of approximately 2 hours in the same operation mode.



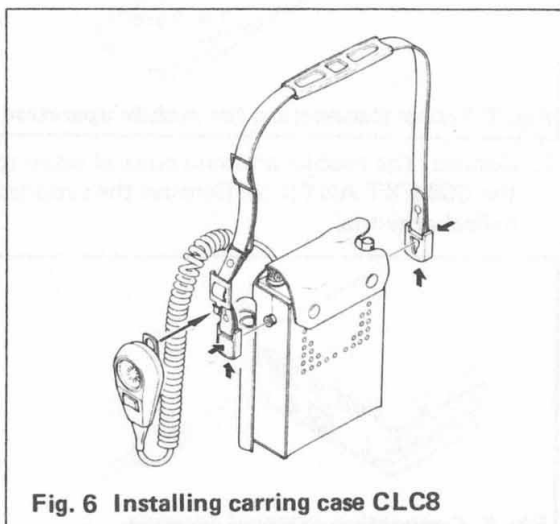
**Ni-Cad Battery** —————  
**SUM-3 (manganese battery)** - - - - -  
**UM-3 (manganese battery)** .....  
**Fig. 4 Discharge characteristics**

## 4.5 PORTABLE OPERATION

1. For portable operation, attach the supplied helical antenna to the BNC connector.
2. Attach the supplied shoulder belt to the strapping posts on the unit, and replace the microphone hanger in a convenient position on the shoulder belt. For mounting instructions, see Figs. 5 and 6.
3. We recommend the use of the optional carrying case CLC8, which will protect your equipment from possible damage and provide better maneuverability.



**Fig. 5 Antenna connection** Helical antenna



**Fig. 6 Installing carrying case CLC8**

## 4.6 BACK-UP POWER FOR MICRO-PROCESSOR

The internal microprocessor is always backed up by the batteries even when the OFF/VOL control on the unit is set to the OFF position, so that stored channel frequency information remains intact.

Since the required back-up current is only approximately  $40 \mu A$ , it consumes only very little battery power. However, if the unit is to be left unused for a prolonged period of time, it is advisable that the batteries be removed from the unit.

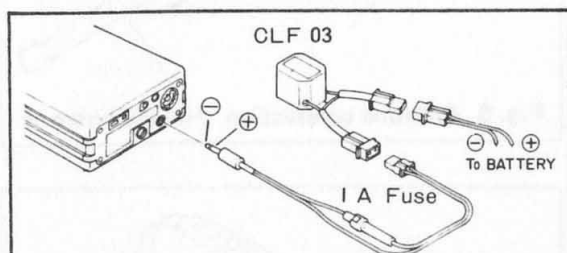
## 4.7 EARPHONE

The EXT SPK jack on the unit accepts an external speaker (C207) with the rated impedance of  $8 \Omega$  or your earphone with a 3.5 mm  $\phi$  plug.

## 4.8 MOBILE OPERATION

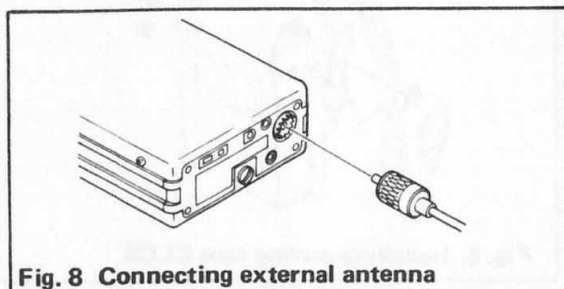
For mobile operation, obtain the optional mobile bracket CMB8 from your dealer.

1. For power connection, refer to Fig. 7.
- When using only the C58 transceiver for mobile operation, use the supplied external power plug for power connection and install in it a fuse with a 1 A rating.
- For mobile operation, it is advisable to use the optional line filter (CLF03) in the power supply line to prevent noise interference from the alternator wire.



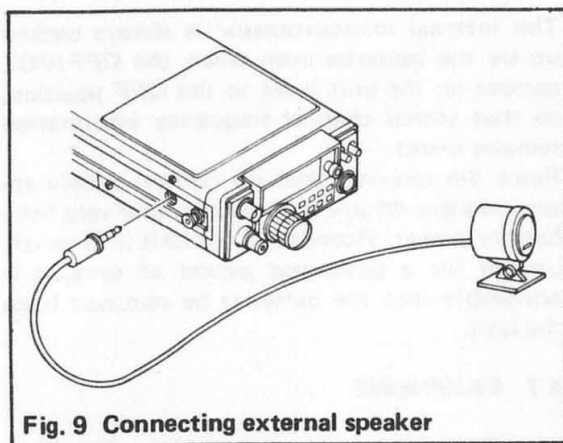
**Fig. 7 Power Connection for mobile operation**

2. Connect the mobile antenna coaxial cable to the C58 EXT ANT jack. Remove the supplied helical antenna.



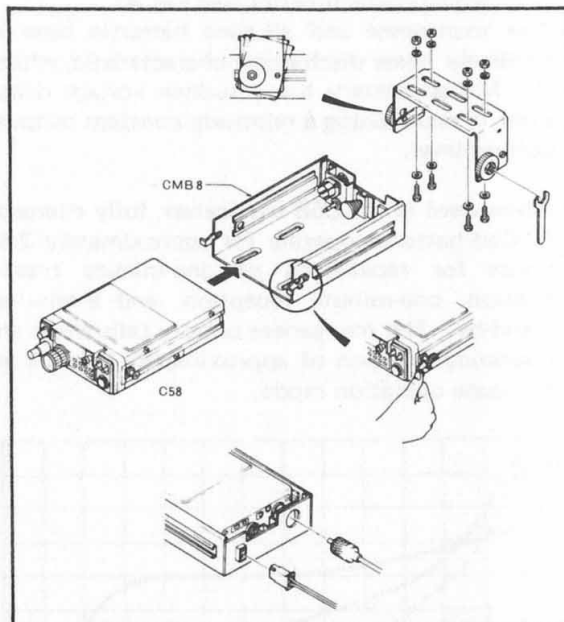
**Fig. 8 Connecting external antenna**

When using external speaker C207 (option), connect the cord to EXT SPK jack.

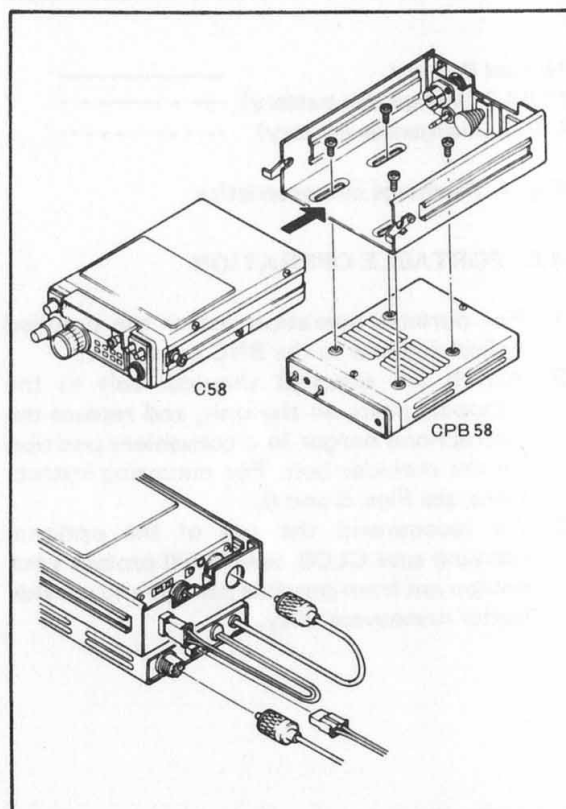


**Fig. 9 Connecting external speaker**

3. The use of mobile bracket CMB8 will allow you to pop in or out C58 with the pop-out gear on the bracket, resulting in improved use.



4. Combining the mobile bracket (CMB8) with the optional linear power booster CPB58, your transceiver is powered to 25 W just by sliding the unit into the bracket. For optional equipment, refer to attached instructions.





## 4.9 BASE STATION OPERATION

1. When the unit is to be powered from a commercial AC power source via a regulated DC power supply (13.8 V, more than 1 A), use the supplied external power plug for connection and install in it a fuse with a 1 A rating.

For connection of power supply, refer to Fig. 11.

When the transceiver unit is used with the power booster (CPB58), use a power supply of more than 6 A.

2. When using an external antenna for base station operation, disconnect the supplied helical antenna from its front socket.

If the antenna you use has an extremely poor SWR, not only unsatisfactory transceiver performance but TVI may result. Adjust SWR always below 1.5.

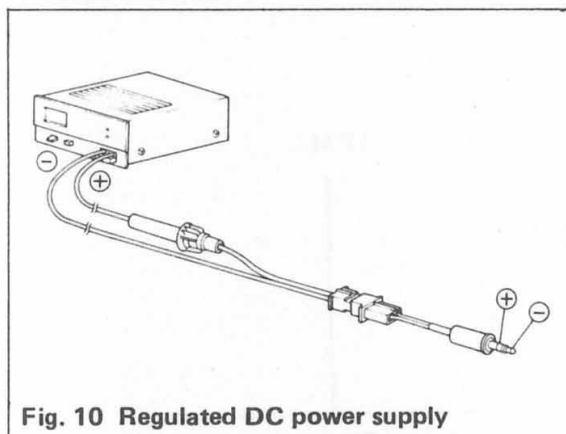


Fig. 10 Regulated DC power supply

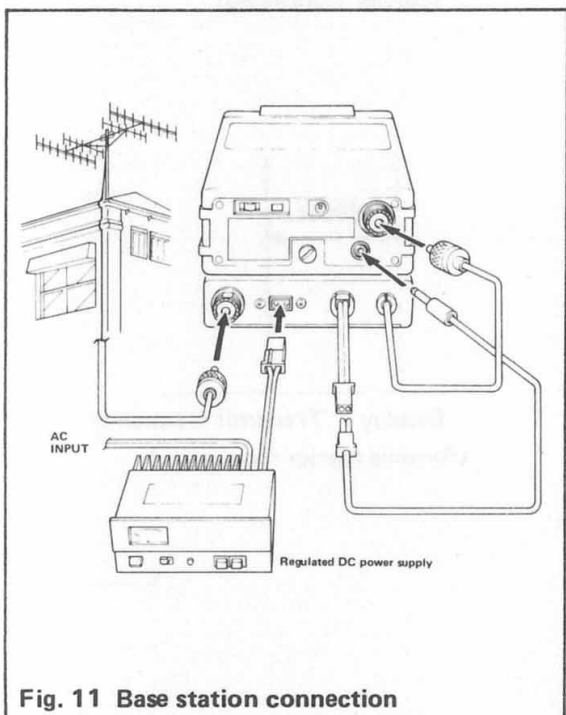


Fig. 11 Base station connection

## 4.10 MICROPROCESSOR MALFUNCTION

If the frequency readout or transceiver operation is not normal, or the operation keys don't work, depress the RESET button on the rear of the unit.

With resetting, the frequency readout will indicate "6.000" in the S mode, "6.600" in the R1 mode, or "6.000" in the R2 mode. The depression of the RESET button will erase the entire memory contents.

## 4.11 MICROPROCESSOR BACK-UP WHEN USING AN EXTERNAL POWER SUPPLY

When the transceiver is used for mobile or base-station operation, the internal microprocessor is not backed up unless the battery cells are installed.

To back up the microprocessor, install 4 alkaline batteries or 3 manganese batteries and one dummy cell into the larger battery cartridge. When rechargeable batteries are used, no dummy cell is required. The back-up current is only approximately 40  $\mu$ A, which permits extended battery life.

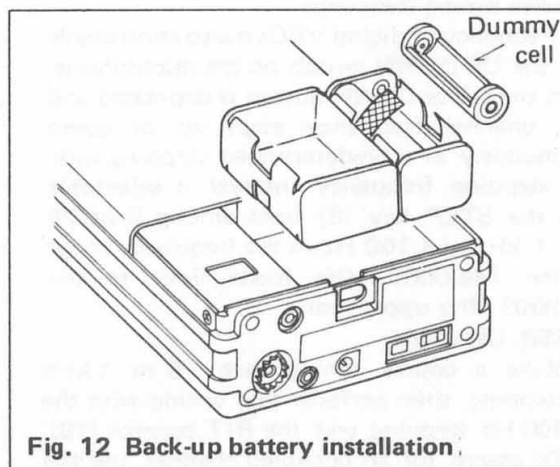


Fig. 12 Back-up battery installation

## 5. OPERATING INSTRUCTIONS

### 5.1 MODE SWITCH OPERATIONS

#### 1. USB/CW (UPPER SIDE BAND)

SSB operations on the 2-meter band usually use the USB. CW mode operation is obtained by plugging a CW key into the KEY jack (26) on the rear of the unit. (For operations other than the CW mode, keep your CW key pulled out of the KEY jack (26).)

#### 2. LSB (LOWER SIDE BAND)

The LSB mode operations are usually used for satellite communications.

#### 3. FM

This position permits operations identical to those with conventional FM transceivers operating on the 2-meter band.

### 5.2 DIGITAL VFO

#### 1. TUNING PROCEDURE

Tuning frequency is controlled with the Tuning control (4). Clockwise rotation of this control increases tuning frequency.

The frequency of digital VFOs is also controllable with the UP-DOWN switch on the microphone. When the UP or DOWN button is depressed and held, channel frequency steps up or down continuously at a predetermined stepping rate. The stepping frequency interval is selectable with the STEP key (8) from among 5 or 25 kHz, 1 kHz and 100 Hz in the frequency range of the 146.0000 MHz lower limit to the 147.9999 MHz upper limit.

##### a. SSB. CW mode

Make a course tuning with 5 or 1 kHz stepping, then perform fine tuning with the 100 Hz stepping and the RIT control (19). To search for an occupied channel, use the 1 kHz stepping first, and when you hear a beat, use the 100 Hz stepping to approach and "zero-in" the target channel.

Before using the RIT control, tune in the desired frequency until the clearest audible output is obtained.

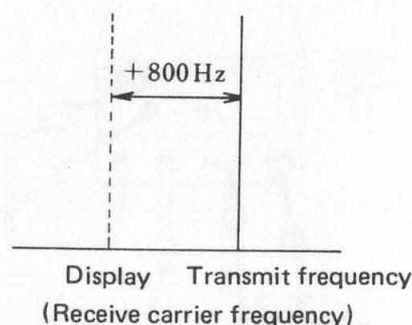
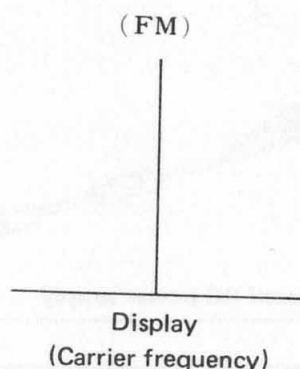
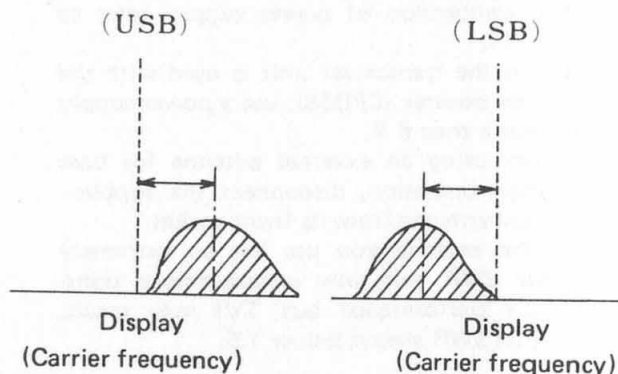
##### b. FM MODE

In the FM mode, tuning with the 5 or 25 kHz frequency stepping would be most convenient. Either 5 or 25 kHz stepping can be selected with the CH STEP switch (29) on the left to the battery compartment.

## 2. FREQUENCY DISPLAY

In the FM or SSB mode, the digital frequency display on the C58 indicates the carrier frequency, or the exact operation frequency.

In the CW mode, the readout displays the receive carrier frequency. The transmit frequency is 800 Hz higher than this receive carrier frequency.



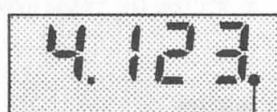


- **Tuning frequency stepping and frequency readout**

The tuning frequency in the frequency readout steps up or down at the frequency interval selected with the STEP key. When one or more digits which are not displayed in the frequency readout are not zero, a dot goes on at the bottom right corner of the display.

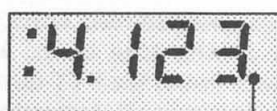
A 100 Hz's digit which is not displayed is represented with the lower right dot lit if other than "0". To clear the 100 Hz's indication, increase the frequency.

**[Example 1] Display for 144.1234 MHz**



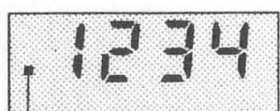
(5/25 kHz STEP)

Dot goes on as 100 Hz's digit is 4.



(1kHz STEP)

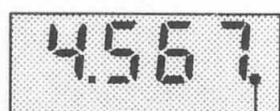
Dot goes on as 100 Hz's digit is 4.



(100Hz STEP)

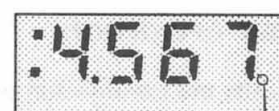
Only lower dot goes on to indicate even MHz's digit of 144 MHz and 146 MHz band.

**[Example 2] Display for 144.5670 MHz**



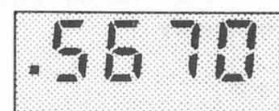
(5/25 kHz STEP)

Dot goes on as 1 kHz's digit is 7.



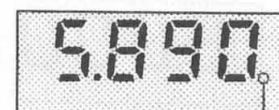
(1kHz STEP)

Dot remains off as 100 Hz's digit is 0.



(100Hz STEP)

**[Example 3] Display for 145.8900 MHz**



(5/25 kHz STEP)

Dot remains off as 100 Hz's digits are 0.



(1kHz STEP)

Dot remains off as the 100 Hz's digit is 0.



(100Hz STEP)

Both upper and lower dots go on to indicate odd MHz's digit of 145 MHz and 147 MHz band.

## 5.3 REPEATER OPERATION

The C58 can shift the transmission or reception frequency upward by 600 kHz for repeating operation. It also has a new tone burst feature for driving the repeater.

### 1. S, R1 and R2 operation frequency indications

[Example] For 146.00 MHz simplex operation frequency

- S mode

(RX)



(TX)



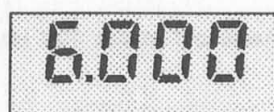
- R1 mode

(RX)



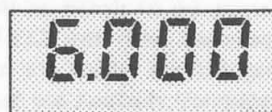
Reception frequency is shifted by +600 kHz.

(TX)

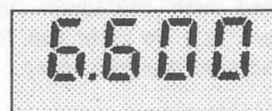


- R2 mode

(RX)



(TX)



Transmission frequency is shifted by +600 kHz.

### 2. CALL key feature

The CALL key is used to manually transmit the repeater driving tone burst of 1750 Hz. While the key is depressed, the tone burst is on the air.

### 3. PTT button-operated tone burst.

The repeater driving tone burst, also, can be transmitted with use of the PTT button in place of the CALL key manual depression. Depress the PTT button two times continually. The tone burst will be on the air for around one second.

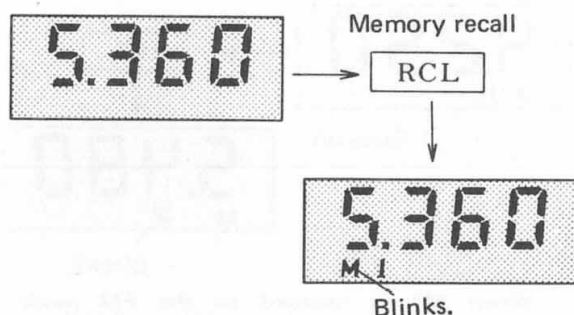


## 5.3 MEMORY OPERATIONS

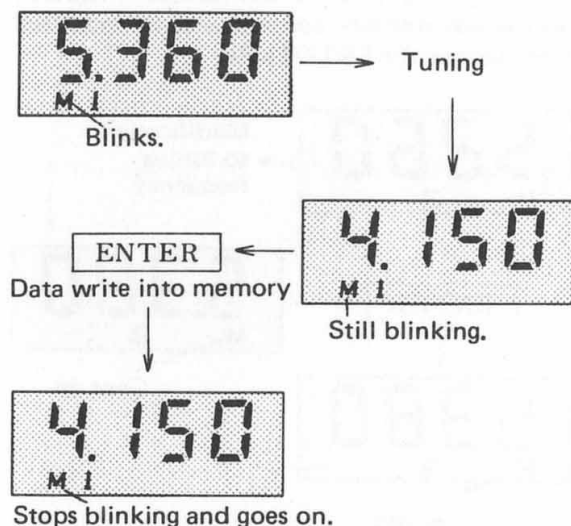
The C58 contains 5 independent memories, each storing a channel frequency, operation mode, and channel stepping interval. The memory operation feature is very convenient to access frequencies of frequent use (club channels, etc.).

### 1. To write data into memory:

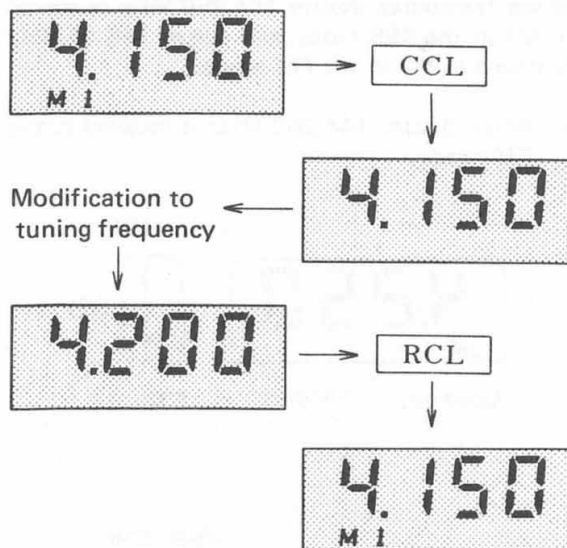
Depress the RCL key (7). When no data is stored in memory M1, the frequency displayed just before the RCL key depression will be displayed and mark "M" will start blinking.



The blinking "M" indicates that no data is stored in M1. Tune in the desired frequency with the Tuning control (4), MHz key (6), STEP key (8), or UP-DOWN switch (31). Depress key ENTER (5) to store the tuned frequency; mark "M" will stop blinking. You have now stored the desired channel frequency data into memory M1.



Depress key CCL (12) to drop the memory recall mode; mark "M1" will go off. To recall the stored frequency again, depress RCL key.



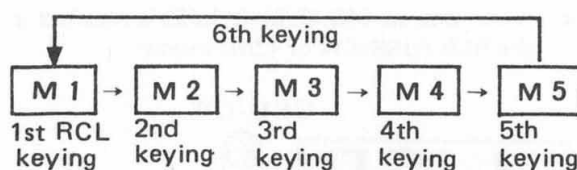
Other channel frequency data can be stored in memories M2–M5 with the same procedure as described just above.

### 2. MEMORY RECALL (1)

[for the same mode]

Pressing the RCL key initially recalls a frequency datum stored in memory M1. Pressing it a second time recalls a frequency datum stored in M2.

Each time the RCL key is depressed, frequency data are recalled sequentially from memory addresses M1 through M5.



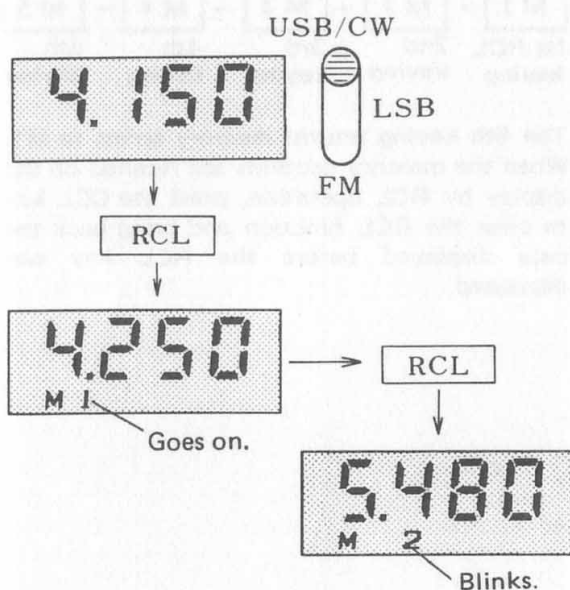
The 6th keying returns memory access to M1. When the memory contents are recalled on the display by RCL operation, press the CCL key to clear the RCL function and bring back the data displayed before the RCL key was depressed.

[for different modes]

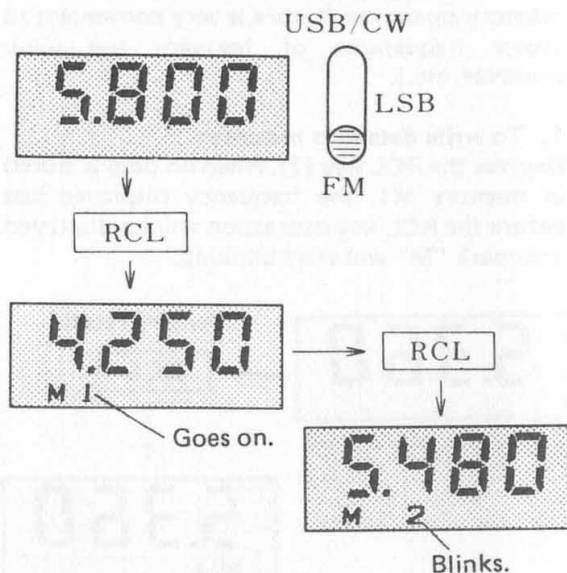
When frequency datum 144.250 MHz is stored in M1 in the SSB mode, and datum 145.48 MHz is stored in M2 in the FM mode:

- 
- USB/CW
- LSB
- FM
- Goes on. Blinks
- ↓
- USB/CW
- LSB
- FM
- Goes on.

- When datum 145.48 MHz (M2) is recalled in the SSB (USB/CW or LSB) mode:

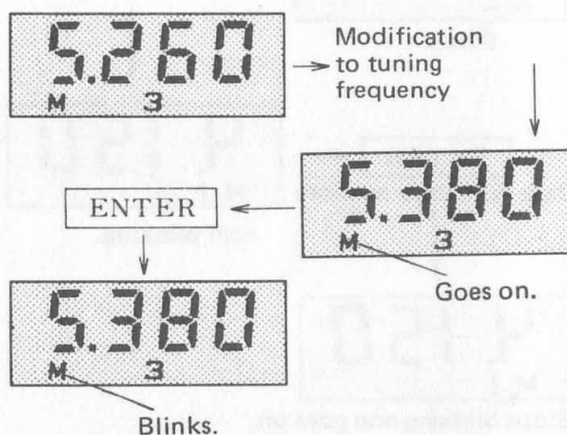


- When recalled in the FM mode:



The memory mode in which frequency datum is stored can be identified by blinking memory addresses (1 – 5).

To rewrite a frequency datum stored in a memory, first tune in the desired frequency into which memory content is to be modified, then depress the ENTER key.



15

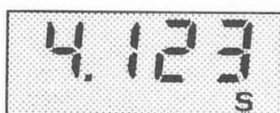
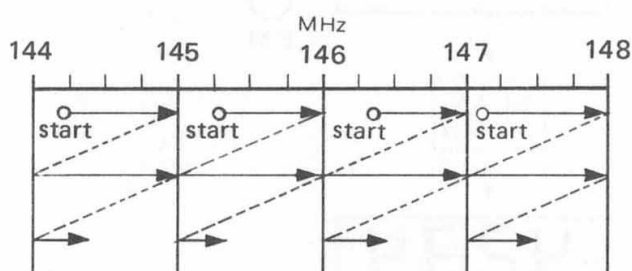


## 5.5 FREQUENCY SCANNING

There are two channel frequency scanning systems depending on operation modes. The FM mode uses the BUSY SCAN system in which scan stops at a channel where an input signal is present, and starts again when the input signal ceases. The SSB mode uses the FREE SCAN system in which channel frequencies are scanned regardless of the presence/absence of input signals.

### a. All scan

- Depress the SCAN ALL key (9) to start scanning the entire channel frequencies in the mega-hertz band now selected. The scan step interval is selectable with the STEP key (8) from 5/25 kHz, 1 kHz, and 100 Hz.
- During scanning, mark "S" is displayed at the bottom right corner of the display. When scanning is stopped at a busy channel in the FM mode, depressing the SCAN ALL key again will restart scanning.



Scan busy indicator

- To stop scanning, depress the CCL key (12) or the PTT button (30). The frequency readout will stop at the frequency displayed just before the CCL key or PTT button is depressed, and scan busy indicator "S" will go off.

### b. Memory scan

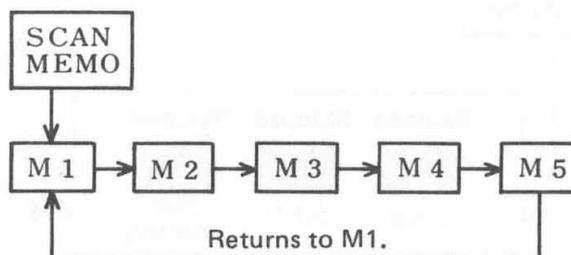
When the SCAN MEMO key (11) is depressed, channel frequencies stored in memory addresses M1–M5 are scanned sequentially. During scanning, mark "S" and the pertinent memory addresses M1–M5 are displayed in the frequency readout.

Since the C58's memory also holds operation mode information as well as frequency data, only the channel frequencies stored in a certain operation mode are scanned in that mode. In other words, channel frequencies stored in the FM mode are scanned in the FM mode; and those stored in the SSB mode are scanned in the SSB mode.

When no frequency datum is stored in any memory addresses, they are skipped in any operation mode.

#### [Example 1]

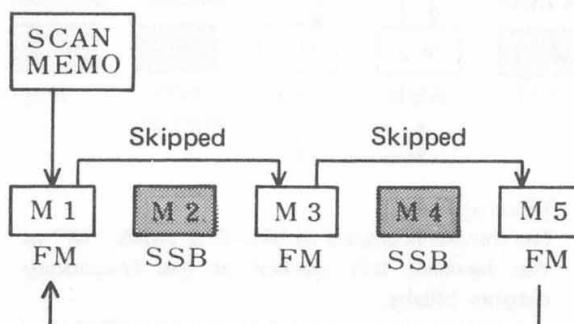
When frequency data are stored in memories M1 through M5 in the same mode:



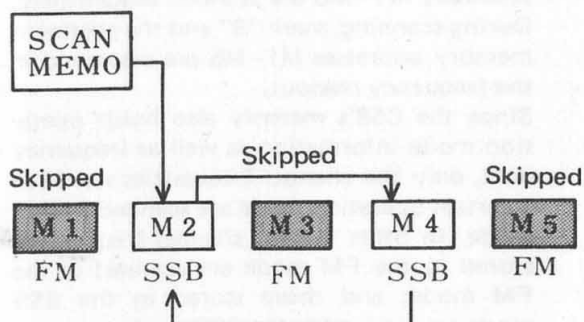
#### [Example 2]

When the FM mode uses memories M1, M3, and M5, and the SSB mode uses memories M2 and M4:

- M2 and M4 are skipped in the FM mode.



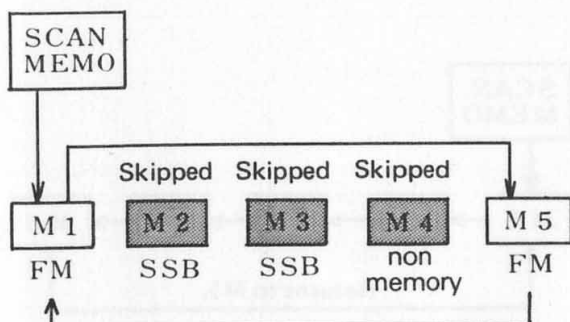
- M1, M3, and M5 are skipped in the SSB mode.



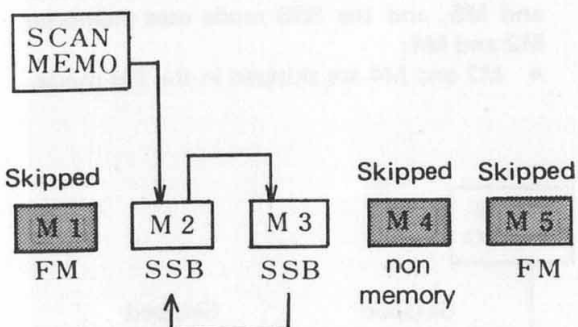
### [Example 3]

When the FM mode uses memories M1 and M2, and the SSB mode uses memories M2 and M3, and no datum is stored in M4:

- M2, M3, and M4 are skipped in the FM mode.



- M1, M4, and M5 are skipped in the SSB mode.



### [Example 4]

No datum is stored in M1–M5, mark “M” at the bottom left corner of the frequency display blinks.

5.800

SCAN  
MEMO

5.800  
M S

Blinks

### [Example 5]

When all stored data are those written in an irrelevant mode, mark “S” blinks at the bottom right corner of the display:

Data are written in M1–M5 in the FM mode.

USB/CW

4.234

LSB  
FM

SCAN  
MEMO

4.234  
M S

Blinks.



## c. Scan rate

In the SCAN MEMO mode, each channel is scanned at approximately 1 second rate.

In the FM mode, scanning is automatically restarted 1.5 second after the input signal ceases at the pertinent channel. This delay time prevents erroneous channel step-out due to momentary signal intermission or other causes.

|                  | 5k/25k   | 1k       | 100Hz     |
|------------------|----------|----------|-----------|
| Channels/<br>sec | 4 CH     | 8 CH     | 16 CH     |
| Time/<br>channel | 250 msec | 125 msec | 62.5 msec |

## 5.6 RIT (RECEIVER INCREMENTAL TUNING) OPERATIONS

The RIT feature changes receiver's tuning frequency while keeping transmission frequency constant. The variable frequency range is approximately  $\pm 1$  kHz.

The frequency obtained at the 0 (center) position of the RIT control is almost identical to that obtained at the OFF position of the control. Turning the RIT control clockwise beyond the 0 position increases receiver's tuning frequency over the transmission frequency, and turning it counterclockwise below the 0 position decreases tuning frequency below the transmission frequency. In this case, however, the frequency readout in the display remains unchanged. The RIT control is useful when the frequency of the mate station gradually deviates from its original channel frequency during communication. In such a case, turn the RIT on and follow up the mate station until the best tuning is recovered. When communication is over, be sure to set the RIT control to OFF.

## 5.7 NOISE BLANKER (NB)

The noise blanker is intended to suppress impulsive noise interference from automobiles, etc. It is especially useful for mobile operations. The NB is not effective in the FM mode. When the operation mode is switched from the SSB into FM, the NB is automatically switched off, and it remains off even if operation mode is switched back to SSB. In such a case, the PUSH NB switch must be depressed again to activate the internal NB circuit.

## 5.8 METER

### a. S (Input signal strength)

Indicates received signal strength. Signal strength of approximately 20 dB $\mu$  corresponds to "S9" on the meter scale.

### b. RF (Transmission power)

Indicates transmitter's emission power. The rated power into 50-ohm load corresponds to +20 on the meter scale. (If your antenna has a poor SWR, the meter reading may deviate from this value.)

### c. Supply voltage (BAT CHECK)

Indicates the supply voltage when the rear switch (20) is at the BAT CHECK position. The red zone on the meter scale indicates supply voltage below 9.6 V.

## 5.9 CW OPERATIONS

For CW operation, set the MODE switch (17) to USB/CW, and plug your key into the rear KEY jack (26) on your unit as shown in Figure 14. For transmission, make keying while depressing the PTT switch. As you make keying, the internal side-tone circuit is activated to provide keying tone of approximately 800 Hz from the speaker. (The C58 does not use the semi-break-in system, and always requires PTT switch operation for CW transmission.)

During reception, zero-in is accomplished by setting the keying tone from the mate station to approximately 800 Hz (side tone). The KEY jack accepts a standard 3.5 mm dual-conductor plug.

Using the internal side-tone circuit, you can practice CW keying. To do this, connect your key as shown in Figure 14 and set the MODE switch to FM. Tune in a vacant channel and turn the squelch control (3) fully clockwise. As you are keying, keying side tone will be heard through the speaker. (If, in this case, the PTT switch is depressed, unwanted CW emission will result. Be sure to leave your rig in the reception mode.)

### NOTE:

To make transmission in any mode other than the CW, keep your key pulled out of the KEY jack.

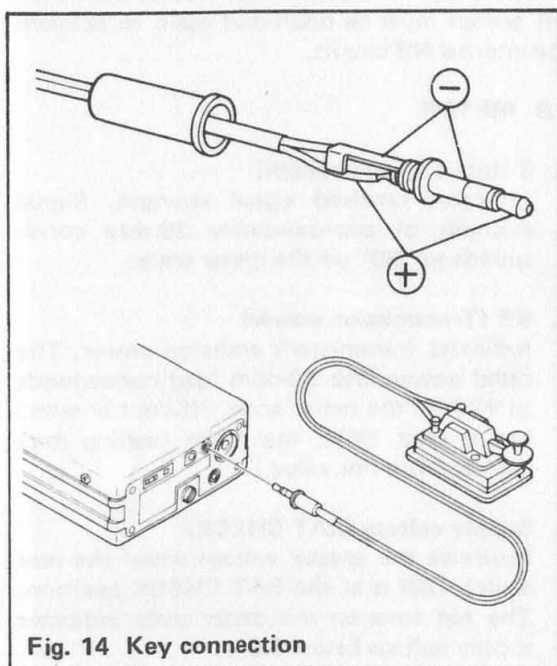
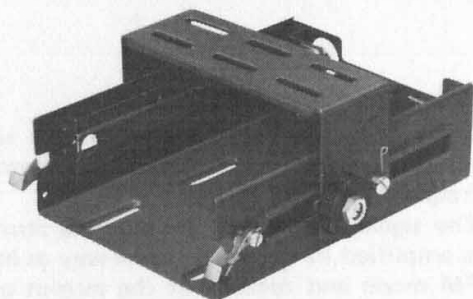


Fig. 14 Key connection



## 6. OPTIONAL ACCESSORIES

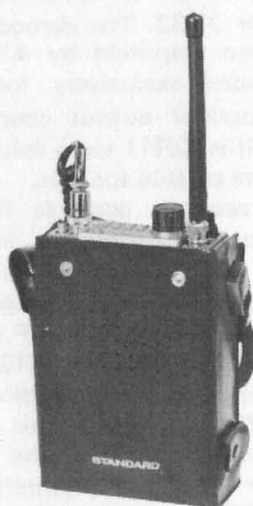
To use the C58 effectively, employ the following optional accessories.



• Mobil bracket CMB8



• Linear power amp. CPB58



• Carrying case CLC-8



• External speaker C207M



## SERVICE MANUAL SECTION

### THEORY OF OPERATION

#### RECEIVER SECTION

##### 1. FM RECEIVER

- The FM receiver section of the C58 uses the double superheterodyne system plus quadrature FM detector. The 1st and 2nd intermediate frequencies are 10.7 MHz and 455 kHz respectively.
- The signal coupled to the antenna terminal J806 (BNC) or J804 (M type) goes to RF amplifier QR01 (2SK241) via an antenna switch. After amplified by QR01, the signal couples to the 1st mixer, where it is mixed with the local frequency from the PLL, down into the 1st IF signal of 10.7 MHz. The 1st IF signal goes through crystal filter FR01 and 1st IF amplifier QR03 (2SK241), before coupled to integrated circuit QR08 (MC3357).
- QR08 contains a 2nd mixer, IF amplifier, quadrature detector, noise amplifier for squelch, squelch switching amplifier, and 2nd local oscillator.
- The signal coupled to pin 16 of QR08 is internally mixed with the 2nd local frequency (10.245 MHz) to be converted into the 2nd IF signal of 455 kHz. The 2nd IF signal goes through ceramic filters FR03 and FR04, is amplified by an internal limiting amplifier, and then demodulated by the quadrature detector. The detector output is output to pin 9 of the same IC.
- The detector output is amplified by AM amplifier QR09 (FM only), goes through a volume control, and is finally amplified by AF power amplifier QR11 ( $\mu$ PC-575C2) to drive the built-in speaker, E801.
- The squelch circuit uses QR08's internal active high-pass filter (with noise amplifier) to extract noise component (approx. 5 kHz) from the detector output. The noise component is rectified by diodes QR34 and QR35 into a corresponding DC voltage, which is coupled to pin 12 of QR08. The squelch control is connected across pin 12 of QR08 and the ground to control the squelch level. When the squelch is activated (no noise heard from the speaker), pin 14 of QR08 has a high impedance; when the squelch is inactive, pin 14 is internally grounded. When the squelch is active, therefore, pin 14 of QR08 is pulled up to approximately 3.6 V via RR73 (10 k $\Omega$ ). This potential makes pin 8 of QR11 high via QR40, turning QR11 off. When the squelch is inactive

(noise heard from the speaker), pin 14 of QR08 is at the ground level, causing pin 8 of QR11 to be set low. This turns QR11 on to cause audible noise heard through the speaker.

##### 2. SSB RECEIVER SECTION

- C58's SSB receiver section uses the single superheterodyne system with intermediate frequency of 10.7 MHz.
- The signal coupled to the antenna terminal is amplified in much the same way as in the FM mode and appears at the output of IF amplifier QR03. The output of QR03 couples to another IF amplifier QR04, QR05 and QR06 (MOS FET). The output of the IF amplifier goes to SSB detector 2R32. The demodulated AF signal is then amplified by AF amplifier QR07 provided exclusively for SSB. The AF amplifier output couples to AF power amplifier QR11 via a volume control and drives the built-in speaker.
- The AGC network controls RF and IF amplifier gain according to input signal strength, by controlling the potential at the 1st gate of each FET over a range from 0 to -1 volt. The AGC picks up IF signal from the collector of IF amplifier QR06 via CR73 (15pF). This is rectified by diodes QR37, QR38, QR39 and QR44 into a negative voltage, which is coupled to the 1st gates of RF amplifier QR01 and IF amplifiers QR03, QR04 and QR05 to control each amplifier gain. The attack and release time of the AGC network is determined by QR01, CR71, RR74 and CR75.

##### 3. NOISE BLANKER (N.B.)

When the N.B. switch is set to ON in the SSB mode, a voltage of approximately +5 VDC is applied at pin 1 of JT01. This voltage causes to close the N.B. switch (QR07 and QR08), which supplies necessary power to the N.B. circuit.

The noise component picked up from the collector of IF amplifier QR03 is amplified by N.B. amplifiers QN02 and QN03. The output of the N.B. amplifier is rectified by QN30 and QN31 to drive N.B. switch QN05. When N.B. switch QN05 is closed (when pulse noise input is preset), a reverse bias is applied to a N.B. gate QR30 to block the pulse noise input.

For signals with relatively high mean level, such as adjacent station signals or tuning signals, the AGC (QN06) provided within the N.B. network is activated to retain the N.B. gate on by controlling the noise amplifier gain.



## 4. S METER

The S meter circuit is shared by the FM and SSB modes, and utilizes their AGC characteristics. The positive terminal of the meter is connected to pin 2 of JR02, which couples to the +5 V voltage regulator output, QR05 (2nd gate) via RR58, RR57 and RR56. The negative terminal of the meter is connected to pin 1 of JR02, which couples to the source of QR05 via QR33. As the 1st gate of QR05 varies into a negative potential according to input signal strength, QR05's source current is decreased, which causes the source voltage to drop below that in the no signal state. As a result, a current flows from the positive terminal of the meter through the source resistor (RR38) of QR05, causing the meter to deflect accordingly.

## TRANSMITTER SECTION

### 1. FM TRANSMITTER

- The signal from an external microphone (MP716) goes through microphone amplifier Q201b, limiter amplifier Q202a, and roll-off filter Q202b, and couples to varicap diode Q111 in the VCO to provide direct frequency modulation on the VCO output.
- The PLL output is coupled to the gate of balanced mixer QT08 and QT09, where it is mixed with FM subcarrier to provide a carrier-frequency signal. The carrier-frequency signal goes, via pin 1 of JT06, through the linear amplifier stage, APC amplifier QB01, TX amplifier QB02, TX driver QB03 and TX final amplifier QB05 and finally couples to the antenna via an antenna switch.
- The APC network picks up the carrier signal from the output of the linear amplifier. The carrier is rectified by QB07 and QB08 and coupled to QB09 (APC-DC amplifier), which controls the 2nd gate potential of the APC amplifier to keep the RF output power always constant.

### 2. SSB TRANSMITTER

- The signal from the external microphone is amplified by microphone amplifier Q201b and SSB microphone amplifiers QT06 and QT07 before coupled to balanced modulator QT34, where the subcarrier is subject to amplitude modulation with the microphone signal to create side bands. The carrier is suppressed with RT18 and CT24. The side bands are amplified by younger amplifier QT05, then coupled to an SSB bandpass filter. The upper or lower side band output from the band-pass filter is amplified by another younger amplifier QR04. The

output of QR04 couples to a balanced mixer, of which output is amplified by linear amplifiers in much the same way as FM signals and finally coupled to the antenna via the antenna switch.

### • CW operation

In the CW mode, reception frequency agrees with the USB frequency, while transmission frequency is 800 Hz higher than reception frequency.

When a CW key is plugged into the KEY jack and the PTT button is depressed, the output of a subcarrier oscillator goes through a balanced modulator (QT34), younger amplifier (QT05), SSB BPF and another younger amplifier (QR04) and couples to balanced mixer comprised of QT08 and QT09, where it is mixed with the local frequency signal from the PLL to create a carrier frequency signal. When the key is closed while the PTT button is held down, the source and emitter of linear amplifiers QB01 and QB02 are grounded via resistors. As a result, the carrier signal is amplified and coupled to the antenna.

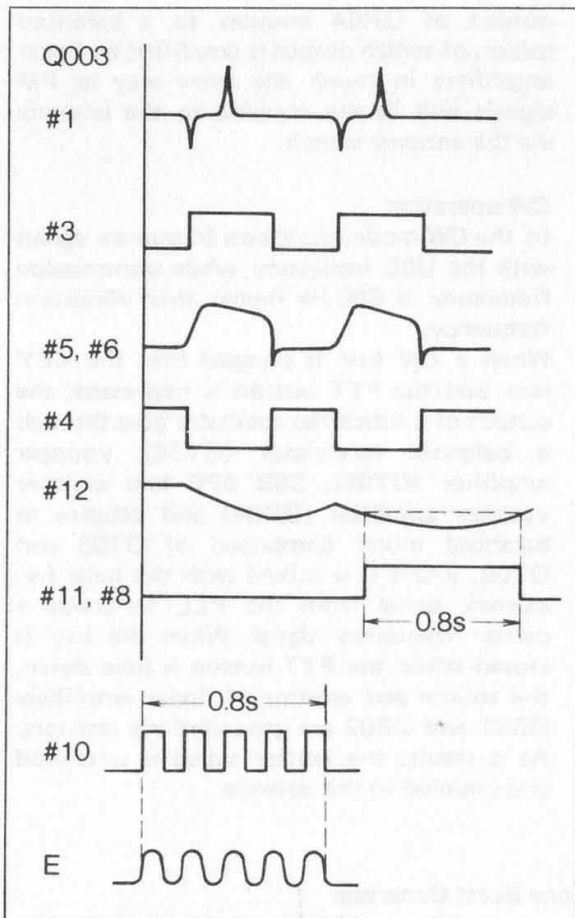
## Tone Burst Generator

### When the PTT switch is used:

When the PTT switch is pressed initially, the potential at terminal A in the schematic diagram lowers. This causes #1 of Q003 to lower momentarily, causing #3 of Q003 to rise. As a result, #5 and #6 of Q003 also rise, which lowers #4 of Q003. The potential at #12 and #13 of Q003 starts dropping but does not reach its lowest level, leaving the tone burst circuit inactive.

When the PTT switch is pressed twice consecutively, the potential at #12 and #13 of Q003 goes to its lowest level. This causes #11 of Q003 to rise, activating the tone burst generator. The potential at #12 and #13 of Q003 gradually increases, and #11 of Q003 is maintained at a high level for 0.8 seconds. This means that the tone burst signal is transmitted for only 0.8 seconds when the PTT switch is pressed a second time.

The output of the tone burst generator is level-adjusted by R010, then applied to the PLL modulator via R011 and C006.

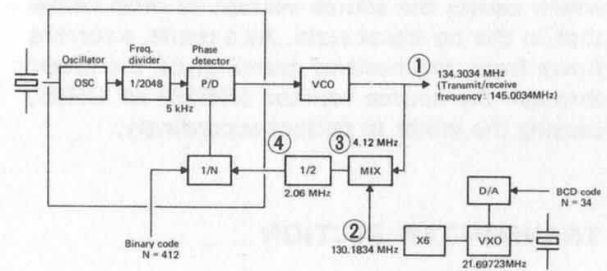


When the CALL button on the C58 is used:

- Pushing the CALL button applies a voltage, +9V, to terminal B in the schematic diagram. This brings up the potential at the base of Q001, turning it on and therefore causing terminal A to lower, putting transceiver in the TX mode.
- As a high level is applied to #5 and #6 of Q003 through Q002, #4 of Q003 is maintained at a low level while the CALL button is held down. Number 12 and #13 of Q003 are lowered, raising #11 and #8, which activates the tone-burst generator.
- When the CALL button is released, Q001 is turned off. This causes terminal A to rise, putting the transceiver in the RX mode.
- Q006, a voltage regulator, holds the voltage at Q003 at +9V.

## PLL SECTION

- The PLL block in the C58 is controlled by 8 bit binary codes (9 bit PLL codes with its MSB fixed at high level) and 2 BCD digits for D/A conversion, both furnished with the internal microprocessor. The output frequency of the PLL is 10.7 MHz lower than the frequency readout.



[Example] 145.0034 MHz in FN Mode

### NOTE:

- F in frequency (3) remains unchanged over a range from 145.0000 ~ 145.0099 MHz (frequency (4) also remains unchanged.).
- PLL local frequency (2) changes over a range from 130.1800 ~ 130.1899 MHz.
- Output frequency (1) changes over a range from 134.3000 ~ 134.3099 MHz.
- Binary code and F in frequencies (3) and (4) change at 5 kHz interval.
- In each 5 kHz span wherein binary code remains unchanged, PLL local oscillation (2) changes to activate 1 kHz and 100 Hz steps.

| TX · RX                    | ① | ② | ③             | ④ |
|----------------------------|---|---|---------------|---|
| 145.0000—134.3000—130.1800 |   |   | 4.1200—2.0600 |   |
| 145.0001—134.3001—130.1801 |   |   | 4.1200—2.0600 |   |
| ⋮                          | ⋮ | ⋮ | ⋮             | ⋮ |
| 145.0099—134.3099—130.1899 |   |   | 4.1200—2.0600 |   |
| 145.0100—134.3100—130.1800 |   |   | 4.1300—2.0650 |   |

Remains unchanged.

### 1. PLL INTEGRATED CIRCUIT (Q106)

The PLL integrated circuit contains the following functional blocks on a single chip:

- Master oscillator: 10.24 MHz
- Phase detector (P/D)
- Programmable counter (1/N)
- Unlock detector



## (1) Programmable counter (1/N)

The 8-bit binary code and one high-level bit (9 bits in all) furnished from the microprocessor determine the dividing ratio, N, for the programmable counter. The signal frequency from a pre-scaler is divided according to by the programmed dividing ratio and coupled to the phase detector (P/D).

## (2) Phase detector (P/D)

The P/D detects the phase difference between the 5 kHz reference frequency (10.24 MHz master oscillation divided by 2048) and the programmable counter output. The detected differential phase signal is obtained at pin 7 of the IC, and is converted into a DC voltage by a C/R integration network. The DC voltage is coupled to varicap diode Q110, which controls VCO output frequency.

| BAND | FREQ. READ | FREQ. DIV. | BINARY CODE    |                |                |                |                |                |                |                |                | D/A IND. | A/B CODE |   |
|------|------------|------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------|----------|---|
|      |            |            | R <sub>8</sub> | R <sub>7</sub> | R <sub>6</sub> | R <sub>5</sub> | R <sub>4</sub> | R <sub>3</sub> | R <sub>2</sub> | R <sub>1</sub> | R <sub>0</sub> |          | A        | B |
| A    | 144.000    | 312        | 1              | 0              | 0              | 1              | 1              | 1              | 0              | 0              | 0              | 00       | 1        | 0 |
|      | 144.005    | 312        | 1              | 0              | 0              | 1              | 1              | 1              | 0              | 0              | 0              | 50       | 1        | 0 |
|      | 144.010    | 313        | 1              | 0              | 0              | 1              | 1              | 1              | 0              | 0              | 1              | 00       | 1        | 0 |
|      | ⋮          |            |                |                |                |                |                |                |                |                |                |          |          |   |
|      | 144.995    | 411        | 1              | 1              | 0              | 0              | 1              | 1              | 0              | 1              | 1              | 50       | 1        | 0 |
|      | 145.000    | 412        | 1              | 1              | 0              | 0              | 1              | 1              | 1              | 0              | 0              | 00       | 1        | 0 |
|      | 145.005    | 412        | 1              | 1              | 0              | 0              | 1              | 1              | 1              | 0              | 0              | 50       | 1        | 0 |
|      | ⋮          |            |                |                |                |                |                |                |                |                |                |          |          |   |
|      | 145.985    | 510        | 1              | 1              | 1              | 1              | 1              | 1              | 1              | 1              | 0              | 50       | 1        | 0 |
|      | 145.990    | 511        | 1              | 1              | 1              | 1              | 1              | 1              | 1              | 1              | 1              | 00       | 1        | 0 |
| B    | 145.995    | 511        | 1              | 1              | 1              | 1              | 1              | 1              | 1              | 1              | 1              | 50       | 1        | 0 |
|      | 146.000    | 312        | 1              | 0              | 0              | 1              | 1              | 1              | 0              | 0              | 0              | 00       | 0        | 1 |
|      | 146.005    | 312        | 1              | 0              | 0              | 1              | 1              | 1              | 0              | 0              | 0              | 50       | 0        | 1 |
|      | 146.010    | 313        | 1              | 0              | 0              | 1              | 1              | 1              | 0              | 0              | 1              | 00       | 0        | 1 |
|      | ⋮          |            |                |                |                |                |                |                |                |                |                |          |          |   |
|      | 146.995    | 411        | 1              | 1              | 0              | 0              | 1              | 1              | 0              | 1              | 1              | 50       | 0        | 1 |
|      | 147.000    | 412        | 1              | 1              | 0              | 0              | 1              | 1              | 1              | 0              | 0              | 00       | 0        | 1 |
|      | 147.005    | 412        | 1              | 1              | 0              | 0              | 1              | 1              | 1              | 0              | 0              | 50       | 0        | 1 |
|      | ⋮          |            |                |                |                |                |                |                |                |                |                |          |          |   |
|      | 147.985    | 510        | 1              | 1              | 1              | 1              | 1              | 1              | 1              | 1              | 0              | 50       | 0        | 1 |
| A    | 147.990    | 511        | 1              | 1              | 1              | 1              | 1              | 1              | 1              | 1              | 1              | 00       | 0        | 1 |
|      | 147.995    | 511        | 1              | 1              | 1              | 1              | 1              | 1              | 1              | 1              | 1              | 50       | 0        | 1 |
|      | 144.000    | 312        | 1              | 0              | 0              | 1              | 1              | 1              | 0              | 0              | 0              | 00       | 1        | 0 |

## 2. VCO

The VCO in the C58 consists of an oscillator (Q112) and a buffer amplifier (Q113).

The VCO output frequency is controlled by the varicap diode (110) to which the control voltage is furnished from the PLL IC. The maximum frequency variation span is 6 MHz.

## 3. LOCAL OSC

The minimum frequency step is 10 kHz as seen in the PLL code Table above. As the C58 changes it in steps of 1 kHz and 100 Hz, however, the local OSC (VXO circuit) in the PLL varies between 0.0 and 9.9 kHz. The VXO circuit, also, shifts the frequency by  $\pm 1.5$  kHz in each of the USB, LSB and FM modes of operation.

### (1) VXO circuit

The C58 has two VXOs: one is for the band A ranging from 144.0000 to 145.9999 Mhz and the other for the band B from 145.0000 to 147.9999 MHz. The VXO for the band A is an oscillator, consisting of a crystal X102 (21.6975 MHz) and Q303, the frequency of which is changed by two varicaps Q301 and Q302 and L301. The varicap Q301, which is for shifting the frequency depending on the mode of operation, has a bias around 4V applied. Q302 has an applied voltage changing depending on the 1 kHz's or 100 Hz's digit of an operation frequency displayed as controlled by the signal output of the D/A converter.

The VXO for the band B consists of a crystal X103 (22.0308 MHz), Q305, Q306 and Q307. Switching from the band A to B and vice versa is made in a way that the microprocessor controls a switching circuit, consisting of Q308, Q309, Q310 and Q311.

### (2) 6-fold frequency multiplier (Q304)

The signal output of the VXO circuit is frequency-multiplied by 6 through Q304, L302 and L303. The frequency-multiplied signal is injected into a mixer, consisting of Q103.

## 4. DIGITAL TO ANALOG CONVERTER

### (Q401)

The D/A converter converts the 1 kHz/100 Hz BCD data (2 digits) from the microprocessor into the corresponding analog voltages. It consists of bit weighting resistors R451 ~ R457, R461 ~ R467 and R471, output span control

resistors R480 and R481 and output buffer Q401. The minimum and maximum output voltages are obtained when the BCD input code is 00 and 99 respectively. The D/A converter output is coupled to Q302 and Q306 in the VXO circuit to control the 1 kHz and 100 Hz orders of the PLL output.

## D/A INPUT CODES

|                           | 1              | 2              | 4              | 8              | 10             | 20             | 40             | 80             |
|---------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Display                   | D <sub>0</sub> | D <sub>1</sub> | D <sub>2</sub> | D <sub>3</sub> | D <sub>4</sub> | D <sub>5</sub> | D <sub>6</sub> | D <sub>7</sub> |
| 00                        | 0              | 0              | 0              | 0              | 0              | 0              | 0              | 0              |
| 01                        | 1              | 0              | 0              | 0              | 0              | 0              | 0              | 0              |
| 02                        | 0              | 1              | 0              | 0              | 0              | 0              | 0              | 0              |
|                           |                |                |                |                |                |                |                |                |
| 09                        | 1              | 0              | 0              | 1              | 0              | 0              | 0              | 0              |
| 10                        | 0              | 0              | 0              | 0              | 1              | 0              | 0              | 0              |
| 11                        | 1              | 0              | 0              | 0              | 1              | 0              | 0              | 0              |
|                           |                |                |                |                |                |                |                |                |
| 19                        | 1              | 0              | 0              | 1              | 1              | 0              | 0              | 0              |
| 20                        | 0              | 0              | 0              | 0              | 0              | 1              | 0              | 0              |
| 21                        | 1              | 0              | 0              | 0              | 0              | 1              | 0              | 0              |
|                           |                |                |                |                |                |                |                |                |
| 97                        | 1              | 1              | 1              | 0              | 1              | 0              | 0              | 1              |
| 98                        | 0              | 0              | 0              | 1              | 1              | 0              | 0              | 1              |
| 99                        | 1              | 0              | 0              | 1              | 1              | 0              | 0              | 1              |
| 00                        | 0              | 0              | 0              | 0              | 0              | 0              | 0              | 0              |
| Fre-<br>quency<br>display |                |                |                |                |                |                |                |                |

The output to the D/A converter has two digit BCD coding each having 4 bits.

## 5. SHIFT CIRCUIT

The shift circuit shifts PLL output frequency by +1.5 kHz for the USB mode and -1.5 kHz for the LSB mode with respect to the frequency in the FM mode. It also provides frequency variation controlled by the RIT control (approx.  $\pm 1$  kHz).

Shift voltages provided by R402, R404 and R406 for each mode are coupled to Q301 and Q305 via buffer Q201-a. When Q409 is turned on (TX mode with RIT off), the RIT control is made inactive; when Q411 is turned on, the RIT control is made active. The RIT control varies receiver's tuning frequency only, while keeping the frequency readout constant.

## 6. MIXER (Q103)

The signal output of the VCO is passed through a buffer amplifier, consisting of Q113 and Q120, to the mixer (Q103). This mixes the VCO signal for the band A of 133.3000 to 135.2999 MHz and the band B of 135.300 to 137.2999 MHz with the local oscillator signal for the band A of 130.1800 to 130.1899 MHz and the Band B of 130.1800 to 130.1899 MHz, respectively, to produce a signal of 3.12 to 5.11 MHz.

## 7. PRESCALER

The prescaler is essentially a frequency divider using J-K flip-flops, which outputs a half the frequency of the input signal.

## 8. OUTPUT AMPLIFIER AND UNLOCK SWITCH CIRCUIT

The VCO output is amplified by Q113, Q120 and Q121, and is coupled to output switch Q122 and Q123, where it is subject to transmit/receive mode switching before coupled to the transmitter or receiver section.

If the PLL circuit is unlocked, the DC output voltage (unlock output integrated by a C/R integrator) drops. This causes the unlock transistor switch, Q124, to turn off. As a result, output amplifier Q120 and Q121 are made inactive to block the PLL output. This results in prevention of unnecessary emission upon PLL unlocking.

## CONTROL SECTION

- Microprocessor (QL01)
- Expander (QL02)
- Keyboard
- Rotary switch
- Control switches

### 1. The control section provides the following control outputs:

- (1) PLL programmable counter control code output:  
An 8-bit binary code to determine the dividing ratio (N) of the PLL programmable counter is output at pins 15 ~ 22 of QL02.
- (2) D/A converter input code:  
Two digit 4 bit code (8 bits in all) of D/A converter data is output at pins 15 ~ 22 of QL02.
- (3) LCD drive output:  
LCD driver Q801 accepts driving input from pins 01, 02, 03, 07 and R11 of QL01.





## • Other Features

### (1) Noise Blanker (NB)

The noise blanker is activated by closing matrix R4-K8. It is alternately activated each time the NB switch is depressed. The NB circuit is bypassed in the FM mode. If operation mode is switched from SSB into FM when the NB feature is activated, it is inactivated and is left inactive when the SSB mode is restored.

### (2) Scan operation

When a signal is received during channel scanning in the FM mode, a potential is applied to pin 12 of analog switch QL04. This closes matrix R2-L8 to stop frequency scan.

When the signal is removed from the input, matrix R2-L8 is opened, and the microprocessor restarts channel scanning approximately 1.5 sec. later (BUSY operation). In the SSB mode, channel scanning is continued regardless of signal presence at the input.

### (3) Switching between 5/25 kHz stepping intervals:

Switching between 5 and 25 kHz stepping intervals is controlled by SL01.

Closing matrix R2-L4 selects 5 kHz stepping interval.

Closing matrix R2-L4 selects 25 kHz stepping interval.

### (4) HALT feature

The HALT feature is provided to reduce power dissipation from the microprocessor during memory back-up. When HIGH level is applied to the HALT terminal (pin 34), the microprocessor halts its operation to reduce current drain to approx. 40  $\mu$ A.

The HALT feature is used for the following cases:

- The microprocessor monitors the SW+B at its L1 input (pin 36). When the POWER switch is set to OFF and the input at L1 goes LOW, the back-up feature is activated. At the time, the microprocessor drops all its outputs (R0-R13, 00-07) to LOW and stops internal operation.
- When the SW+B is set LOW, the HALT SW (QL05) is turned on. With a delay determined by time constant CL12, a HIGH level potential is applied to the HALT terminal to halt microprocessor operation.
- When the POWER switch is set to ON and the SW+B is set to HIGH, QL05 is turned off and, at the same time, pins 8 and 9 of QL04 are closed. This instantly discharges

the potential across CL12.

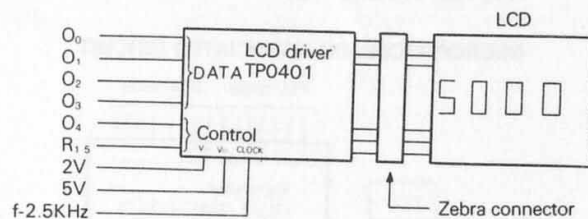
- The potential at the HALT terminal goes low, and the SW+B is applied to L1. This restarts microprocessor operation.

### (5) Control section in the TX mode

Input L2 (pin 37) of the microprocessor monitors the TX B. When the TX mode is effected and input L2 is set HIGH, the microprocessor holds all its outputs (R0-R13, 00-07) to DC level to ineffectuate all control IC inputs.

## 3. Display section

The display section consists of an LCD display and LCD driver. It accepts 4 data lines (O2, O3, O6, O7) and 2 control lines (O1, R11) from the microprocessor. V, Vss, and driving clock are also supplied to the driver. The driver provides the LCD display with a dynamic driving signal of 1/3 duty cycle. The dynamic display driving requires a clock.

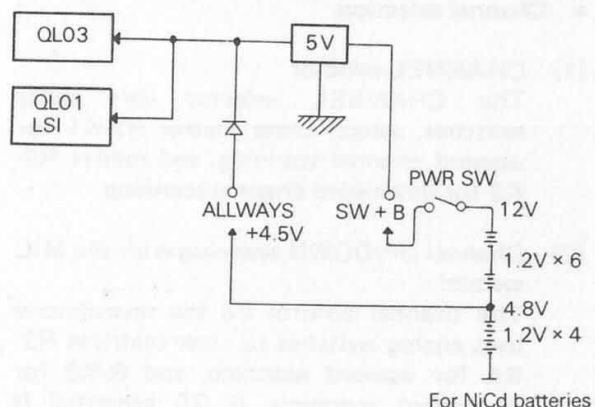


## 4. Other controller peripheral circuitry

### (1) Back-Up Circuit

When the POWER switch is set at ON, the power is supplied from a 3-pin regulator (QS09). When the POWER switch is set at OFF, the internal memory is backed up by the built-in battery power.

No back-up is provided if the battery is not installed.





## (2) RESET circuit

When a HIGH level signal is applied to the INT terminal (pin 35) of the microprocessor via the RESET switch contact, the entire microprocessor content including its memory is cleared.

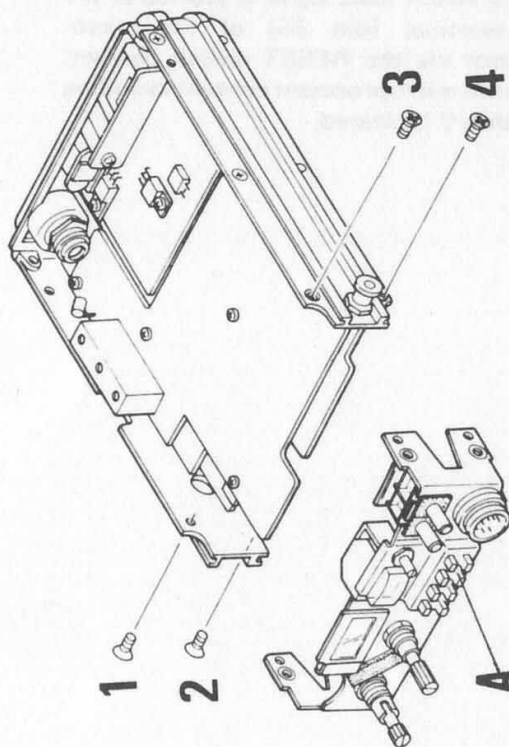
## DISASSEMBLY

### 2 FRONT BRACKET

Remove the four screws 1 through 4 holding the front bracket A for separation from the chassis.

#### NOTE:

In separation, be careful not to damage any lead wire.



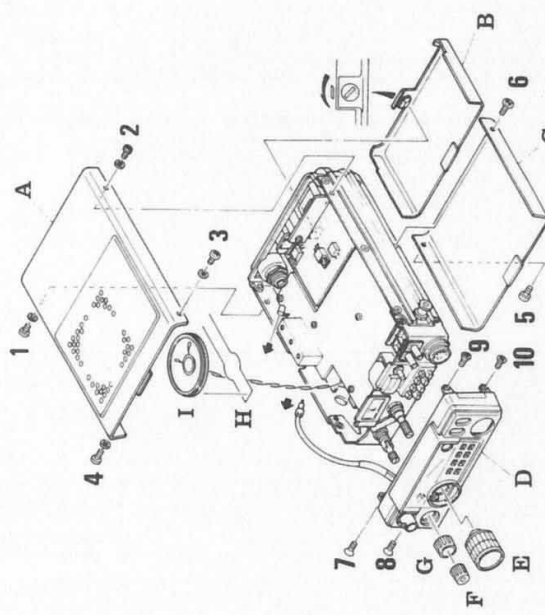
### 1. DISASSEMBLING THE CASE OF THE UNIT

- 1) To remove the upper panel A, remove the four screws 1 through 4 holding it.
- 2) Remove the battery compartment B. This allows you to look the component parts of the C58.

#### NOTE:

In disassembling, care should be taken in the speaker (1) lead wires and other wires.

- 3) To remove the front panel D, pull the knobs E, F, and G backward for removal. Also, remove the four screws 7 through 10 holding the panel.
- 4) To replace, reverse Steps 1 through 3.



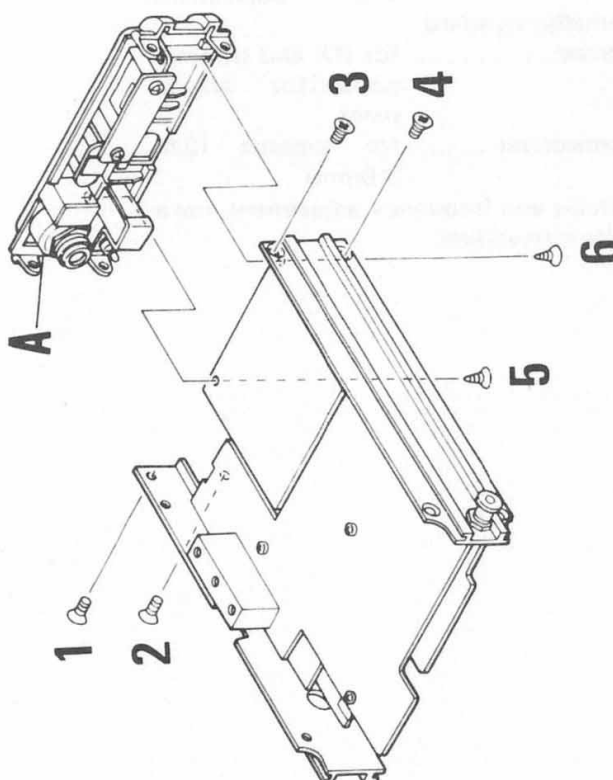


## 3. REAR PANEL

To remove the rear panel A, remove the six screws 1 through 6 holding it.

### NOTE:

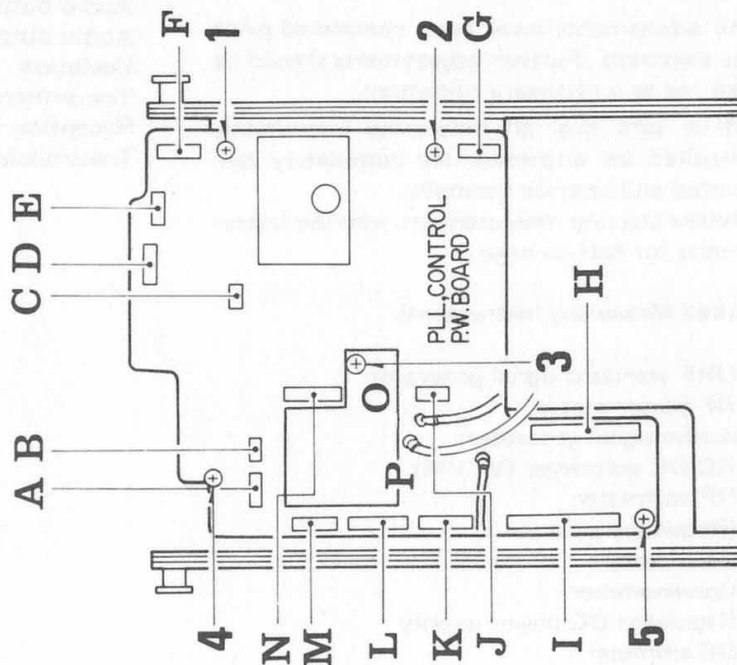
In separation, be careful not to damage any lead wire.



## 4. REMOVING PC BOARD ASSEMBLIES

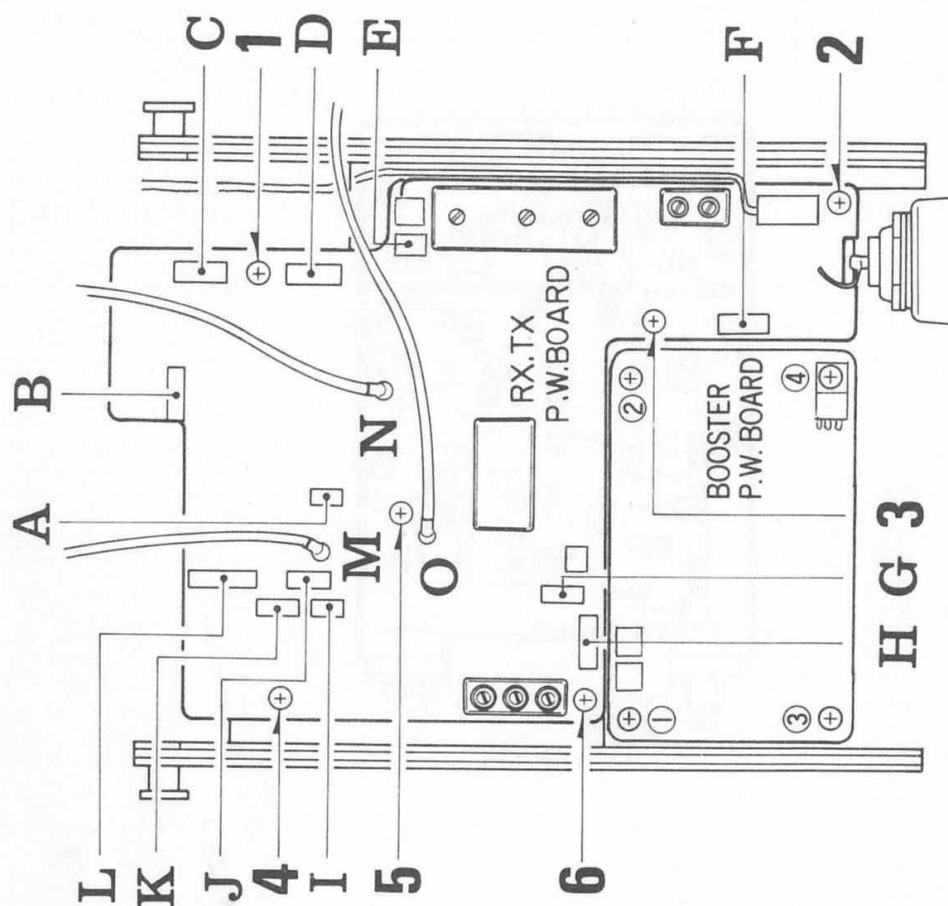
### PLL, CONTROL BOARD

- 1) Disconnect the two coaxial cables P and O from the PLL control PW board.
- 2) Also, disconnect the thirteen connectors A through N.
- 3) Remove the five screws 1 through 5 holding the PW board for removal.
- 4) To reassemble, reverse Steps 1 through 4.

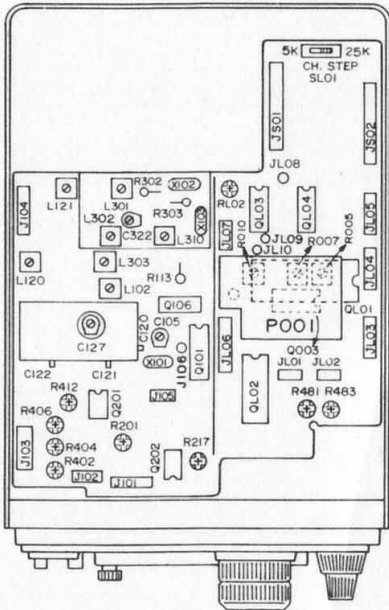
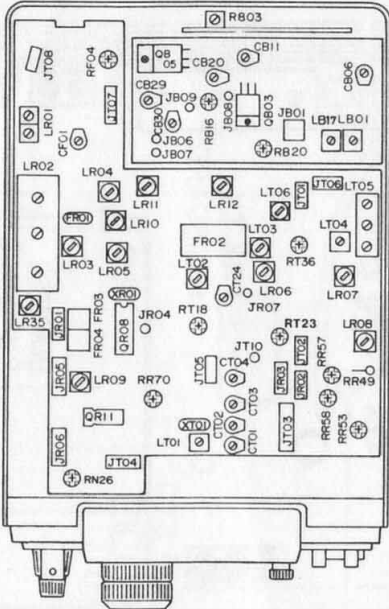


## RX, TX BOARD

- 1) Disconnect the three coaxial cables M through O from the RX & TX PW board.
- 2) Also, disconnect the twelve connectors A through L.
- 3) Remove the six screws 1 through 6 holding the PW board for removal.
- 4) To reassemble, reverse Steps ① through ④.







## ALIGNMENT PROCEDURE

### CONDITIONS

- \* All adjustments have been completed prior to shipment. Further adjustments should be limited to a necessary minimum.
- \* Make sure that all measuring instruments required for alignment are completely calibrated and operate normally.
- \* Before starting measurement, idle the instruments for half-an-hour.

### Standard condition

|                              |             |
|------------------------------|-------------|
| Supply voltage .....         | 13.8 V      |
| Audio output .....           | 0.5 W       |
| Audio output loading .....   | 8Ω          |
| Deviation .....              | ±3 kHz      |
| Transmitter load .....       | 50Ω         |
| Reception frequency .....    | 145.900 MHz |
| Transmission frequency ..... | 146.000 MHz |

### Required Measuring Instruments

1. UHF standard signal generator
2. RF power meter
3. Audio signal generator
4. AC/DC voltmeter (VTVM)
5. RF voltmeter
6. Frequency counter
7. Oscilloscope
8. Galvanometer
9. Regulated DC power supply
10. DC ammeter
11. (Spectrum analyzer)
12. (Digital voltmeter)

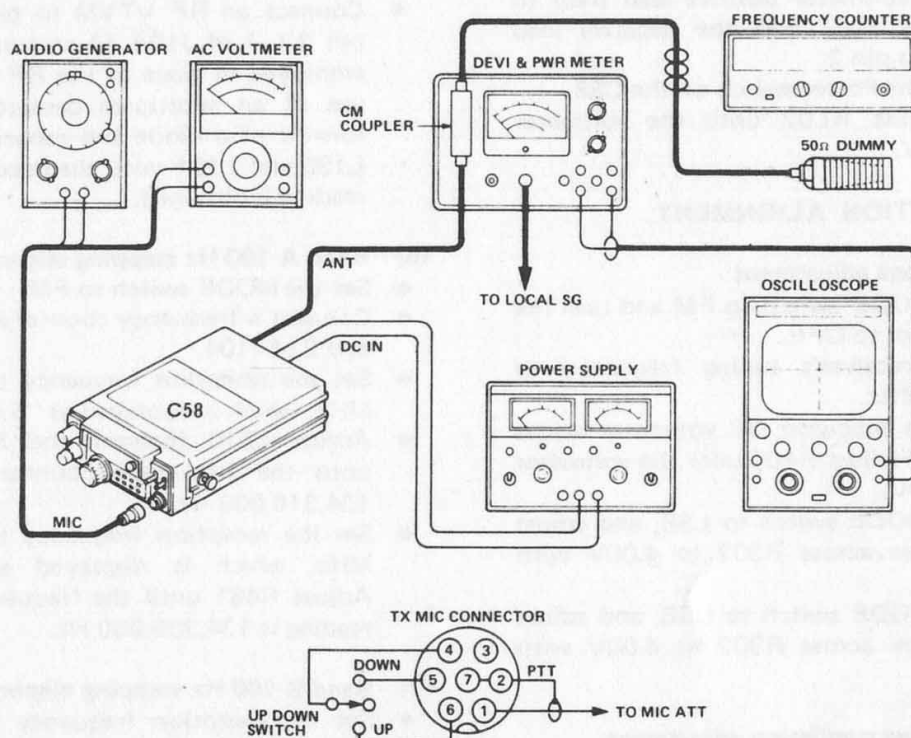
### Required Alignment Tools

1. Philips screwdriver . . . for casing and boards
2. Standard screwdriver. . for trimmer resistor and IF adjustment
3. Non-metallic standard screwdriver . . . . . for RF and trimmer capacitor adjustment
4. Box screwdriver . . . . for support (2.6, 3.0mm)

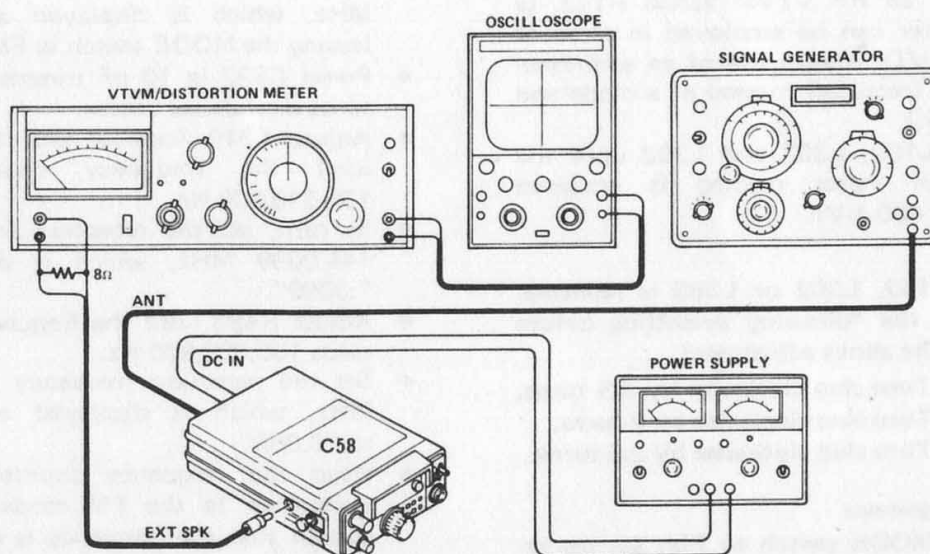
For RF circuit and frequency adjustment, use a non-metallic screwdriver.



## TX ADJUSTMENT SET-UP



## RX ADJUSTMENT SET-UP



## 1. LCD Supply Voltage Adjustment

- First, set RL02 to a mechanical center.
- Connect a digital voltmeter or high precision DC voltmeter positive lead (red) to pin 1 on JL07 and the negative lead (brown) to pin 2.
- Turn on the Power switch on the C58.
- Now, adjust RL02 until the voltmeter reads 3.0V.

## 2. PLL SECTION ALIGNMENT

### (1) Shift voltage adjustment

- Set the MODE switch to FM and turn the RIT control to OFF.
- Set the receiver's tuning frequency to 145.000 MHz.
- Connect a precision DC voltmeter across R302, and adjust R406 until the voltmeter reads 4.00V.
- Set the MODE switch to LSB, and adjust the voltage across R302 to 4.00V with R404.
- Set the MODE switch to USB, and adjust the voltage across R302 to 4.00V with R402.

### (2) Comparative oscillation adjustment

- Set the MODE switch to FM and set the reception frequency to 145.000 MHz.
- Connect a frequency counter to J106.
- Adjust C105 until the frequency counter reading is 5.120 MHz.

### (3) Programmable counter input adjustment

- Set the MODE switch to FM. Set the reception frequency to 146.000 MHz.
- Connect an RF VTVM across R113. (a multimeter can be employed in place of the RF VTVM with use of an additional detector (rectifier) formed of a diode and capacitor.)  
Adjust L102, L302 and L303 until the maximum meter reading is obtained (approx. 400 mV).

#### NOTE:

When L102, L302 or L303 is replaced, perform the following presetting before making the above adjustment.

L102: Turn slug clockwise by 3.5 turns.

L302: Turn slug clockwise by 2 turns.

L303: Turn slug clockwise by 2.5 turns.

### (4) VCO Alignment

- Set the MODE switch to FM. Set the reception frequency to 145.000 MHz.
- Connect a precision DC voltmeter across C120. C120 (a capacitor placed through the shielding plate covered over the VCO board). Adjust C107 until the voltmeter reads 1.50V.

### (5) Output alignment

- Set the MODE switch to FM, and the reception frequency to 146.000 MHz.
- Connect an RF VTVM to pin 1 (+) and pin 2 (–) of J104. (A multimeter can be employed in place of the RF VTVM with use of an additional detector (rectifier) formed of a diode and capacitor.) Adjust L120 and L121 until the maximum meter reading is obtained.

### (6) Band A 100 Hz stepping alignment

- Set the MODE switch to FM.
- Connect a frequency counter across pins 1 and 2 of J104.
- Set the reception frequency to 145.0100 MHz, which is displayed as "5.01".
- Adjust L310 (coarse) and R406 (fine) until the frequency counter reading is 134,310,000 Hz.
- Set the reception frequency to 145.0099 MHz, which is displayed as ":0099". Adjust R481 until the frequency counter reading is 134,309,900 Hz.

### (7) Band B 100 Hz stepping alignment

- Set the reception frequency to 145.005 MHz, which is displayed as ":0050" or "5.005".
- Set the MODE switch to FM.
- Read the frequency counter connected to J104. For example, it may be 134,305,020 Hz, not always 134,305,000 Hz. If it deviates more than 500 Hz, misalignment or defective VXO circuit part can be suspected.
- Set the reception frequency to 146.010 MHz, which is displayed as "6.010", leaving the MODE switch in FM.
- Preset C322 (a 10 pF trimmer capacitor) to its mechanical center.
- Adjust L310 (coarse) and C322 (fine) until the frequency counter reads 135,310,000 Hz.
- In turn, set the reception frequency to 146.0099 MHz, which is displayed as ".0099".
- Adjust R483 until the frequency counter reads 135,309,900 Hz.
- Set the reception frequency to 146.005 MHz, which is displayed as ":6.005" or "6.005".
- Read the frequency counter with the transceiver in the FM mode and make certain that the frequency is within  $\pm 500$  Hz.

### (8) Output frequency adjustment

- In turn, set the reception frequency to 145.000 MHz. Also, turn the MODE switch to LSB.



- Precisely adjust R404 until the frequency counter reads 1.5 kHz lower than the frequency in the FM mode.
- In turn, set the MODE switch to USB.
- Similarly adjust R402 until the frequency counter reads 1.5 kHz higher than the frequency in the FM mode.
- Set the reception frequency to 146.000 MHz and make certain that the frequency in the LSB mode is 1.5 kHz lower than the one in the FM mode and that in the USB is 1.5 kHz higher.

## NOTE:

The frequency difference may not always be  $\pm 1.5$  kHz, because  $\pm 1.5$  kHz shift adjustment is made in the band A.

## (9) RIT Alignment

- Leave the frequency counter connected to J104.
- Turn the RIT control to position "0". Set up the transceiver for the transmission mode, and read the frequency counter readout.
- Set up the transceiver for the reception mode, and adjust R412 until a frequency reading identical to that in the transmission mode is obtained.
- Turn the RIT control over its full rotation span to check that a frequency variation of more than 1 kHz is obtained.

## TRANSMITTER SECTION ALIGNMENT

### (1) Subcarrier frequency alignment

Connect a standard 3.5 mm plug as shown below to the rear KEY jack on the transceiver.

- Solder one end of a capacitor (5~20 pF) to RR49 (470 $\Omega$ ), and connect a frequency counter to RR49 via this capacitor.

## NOTE:

To prevent measurement error use as small a capacitor as possible;

- Set the mode switch to FM and CT01 to its mechanical center. Set up the unit for the transmission mode. Adjust LT01 until the frequency counter reading is 10.700 MHz.
- Set the MODE switch to LSB, and adjust CT02 until the frequency counter reading is 10.7015 MHz.
- In turn, set the MODE switch to USB. Adjust CT03 until the frequency counter reading is 10.6993 MHz.
- With the MODE switch USB. Adjust CT04 until the frequency counter reading is 10.6985 MHz.
- Check the above adjustment steps again.
- Disconnect the plug from the rear KEY jack.

### (2) Younger adjustment

- Set the MODE switch to FM and transmission frequency to 146.000 MHz.
- Connect an RF VTVM across pins 1 (+) and 2 (-) of JT06, and insert the plug used in the preceding step into the rear KEY jack.
- Connect a DC voltmeter across the sources of QT08 and QT09, and set up the unit for transmission mode. Adjust RT36 until the voltmeter reading is  $\pm 0V$ .

## NOTE:

This adjustment is required only after part replacement. Never try otherwise.

- Adjust LT02, LT03, LR06, LT04 and LT05 until the maximum reading is obtained in the RF VTVM. Repeat this adjustment step a few times.
- Disconnect the plug from the KEY jack.

## NOTE:

After adjusting LT03 and LR06, be sure to adjust the receiver sensitivity.

## (3) Linear amplifier adjustment

- Set the MODE switch either to USB. or LSB.
- Disconnect the lead which connects between JB09 and LB12.
- Connect an ammeter between JB09 and LB12.
- Set up the unit for transmission mode (non modulation), and adjust RB16 until the ammeter reading is 30 mA.

### NOTE:

**This adjustment is required only after part replacement.**

- After completing adjustment, restore the original connection between JB09 and LB12.
- Set CB06, CB11, CB19, CB29, CB30 and CF01 to their mechanical centers. Also, turn RB20 fully counterclockwise. Further, turn the output slug of LT05 down (the slug is located near JT06).
- Set the transmission frequency to 146.000 MHz.
- Set up the unit for transmission mode.
- Adjust LT06, LR06, two input slugs of LT05, LB17, LB01, CB06, CB11, CB19, CB29, CB30 and CF01 in the order in which they are written until the maximum transmission power is obtained. Repeat this adjustment a few times.

### NOTE:

**Observe the adjustment order.**

- In turn, set the transmission frequency to 147.000 MHz, and adjust the three slugs of LT05 from input to output until the highest transmission power is obtained. Repeat this a few times.
- Make certain that the transmission power level at the extreme low frequency of 144.000 MHz is approximate to the one at the extreme high frequency of 147.995 MHz. If the level difference is not allowable, adjust CB17 and LB01 for good level balance.
- Adjust RB20 until the transmission power is 1.3 W.

## (4) Deviation/SSB Transmission power alignment

- Set the MODE switch to FM.
  - Apply an audio frequency signal of 1 kHz, 30mV across terminals pin 1 (HOT) and pin 7 (GND) of the MIC jack.
  - Set up the unit for transmission mode, and adjust R217 until  $\pm 5$  kHz of deviation is obtained.

- Reduce the audio signal level by 20 dB to 3 mV (1 kHz), and adjust R201 until deviation of  $\pm 3.5$  kHz is obtained.
- In turn, proceed with tone burst adjustment as follows. Depress the CALL key, and adjust R010 until the tone deviation is 3.5 kHz.
- Adjust R007 until the tone frequency is 1,750 Hz.

### b. Set the MODE switch to USB.

- Couple an audio signal of 1 kHz, 5 mV across the MIC input.
- Set up the unit for transmission mode, and adjust RT23 until 1.0W of transmission power is obtained.

### NOTE:

**SSB transmission power adjustment should be done after completing FM deviation adjustment.**

## (5) SSB Carrier suppression alignment

- Set the MODE switch to LSB, and set up the unit for transmission mode (non-modulation).
- Set CT24 to its mechanical center.
- While viewing a spectrum analyzer, adjust RF output to minimum with RT18. Then adjust CT24 until the minimum RF output is obtained.
- Repeat the adjustment by RT18 and CT24 a few times.
- If carrier suppression ratio is still 40 dB smaller than 1.3 W, repeat the above adjustment steps again.
- In turn, set the MODE switch to USB and similarly proceed with adjustment (Carrier suppression must be greater than 40 dB for both LSB and USB.)

### NOTE:

**In adjustment, full attention should be taken as the carrier suppression may change critically.**

## RECEIVER SECTION ALIGNMENT

### (6) RF output power and battery check meter alignment

- Set the MODE switch to FM, and set up the C58 for the transmission mode.
- Make certain that the transmission RF output power is 1.3 W.
- Now, adjust RF04 until the meter pointer deflects to the +20 dB mark.

### NOTE:

- If the meter pointer deflection is too small to adjust RF04, then bring LF0 and LF07 closer. If too large, on the contrary, bring them away.



2. The meter is misaligned with it adjusted as the S meter in the reception mode. The adjustment for the meter as the RF output power meter must be completed after it has been adjusted as the S meter in the reception mode.
3. Moving LF03 and LF07 or opening the TX & RX PW board could cause misalignment of the meter. In such a case, readjustment must be made.

- In turn, set the LIGHT/BAT CHECK switch to the BAT CHECK position.
- Set the voltage regulator output to 9.6 V.
- Adjust R803 until the meter pointer is at the boundary of the red and green zones.

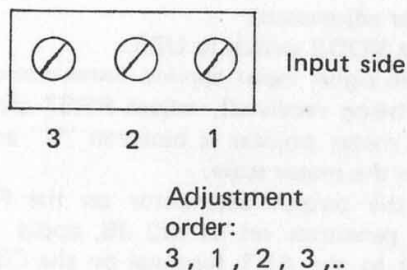
## (1) SSB sensitivity adjustment

- Set the slubs of the antenna coil LR02 as follows.
  - a. Turn the screw of the 1st stage 1/2 turn counterclockwise.
  - b. Also, turn the screw of the 3rd stage 5 turns counterclockwise.

### NOTE:

1. This adjustment is required only after part replacement.
2. Each slub does not move up and down. Its correct setting cannot be found if turned with no care.

- Turn RN26 (semi-fixed, CW tone and buzzer output control) fully clockwise.
- Set the MODE switch to USB.
- Set the reception frequency to 144.00 MHz.
- Turn the output side slub of LR01 to lower down.
- Set up the C58 so as to receive a 144.00 MHz nonmodulated wave from the RF signal generator.
- Adjust the RIT control so that a 1 kHz signal output can be obtained. Make certain the frequency in a Lissajous waveform way.
- Set RR53 to its mechanical center.
- Adjust LR01, LR03, LR04, LR05, LR06, LR07 and LR08 in this order a few times each until a highest audio signal level is obtained. Whenever adjusting each control, adjust RF signal generator output level until the audio signal-to-noise ratio is around 10 dB. (Care should be taken not to saturate the audio signal output.)
- In turn, set the reception frequency to 146.00 MHz and adjust the LR02 slubs in the order shown below until a highest audio signal level is obtained. Repeat this adjustment a few times.



In adjustment, also, adjustment should be made for the audio signal-to-noise ratio and saturation.

- In turn, set the RF signal generator output level to 80 dB.
- Adjust the VOL control until 1V audio signal output is obtained. The 1V level should be 0 dB as reference.
- Also, adjust the attenuator until the audio signal output is -3 dB.
- Turn the VOL control fully clockwise (maximum audio signal output).
- Now, adjust RR53 until the audio signal output is 1.5W, or 3.46V across 8Ω load.

## (2) FM Sensitivity adjustment

- Set the MODE switch to FM, and the RIT control to OFF.
- Set up the signal generator output for 1 kHz modulation with  $\pm 3.5$  kHz deviation. (at 145.900 MHz)
- Adjust LR09 until the maximum audible output is obtained from the speaker (with 60 dB input).
- Turn the VOL control on the C58 fully clockwise, and adjust RR70 until the audio output across the speaker terminals is 1.5W (3.5V across 8Ω load).

## (3) Noise blanker alignment

- After completing sensitivity adjustment, set the NB switch to ON.
- Set the MODE switch to USB, and apply no signal input from the RF signal generator.
- Connect a voltmeter across the QN06 base and RN15, and adjust LN01, LN02 and LN03 until the maximum signal amplitude is obtained on the oscilloscope.

## (4) S Meter adjustment

- Set the MODE switch to USB.
- With no signal input applied (inter-station noise being received), adjust RR57 until the S meter pointer is between "S" and "1" on the meter scale.
- With the output attenuator on the RF signal generator set at +20 dB, apply its output to the ANT terminal on the C58. Adjust RR58 until the S meter pointer indicates "9" on the meter scale.
- Repeat the above adjustment and make certain that the meter indicates "1" for no input signal and "9" for 20 dB input signal.

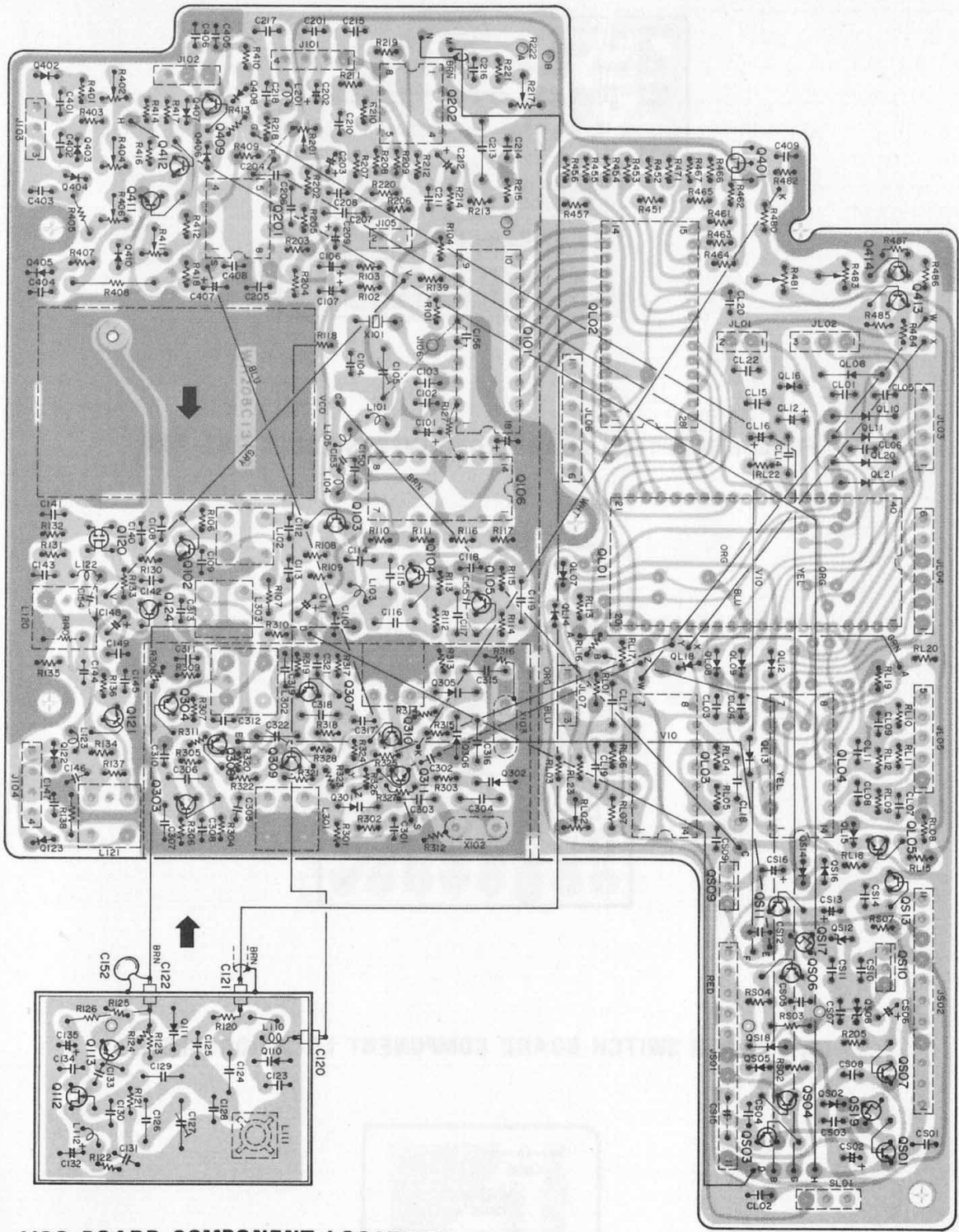
### NOTE:

After adjusting the S meter, ensure to adjust the RF output power meter as well.



COMPONENT LOCATIONS

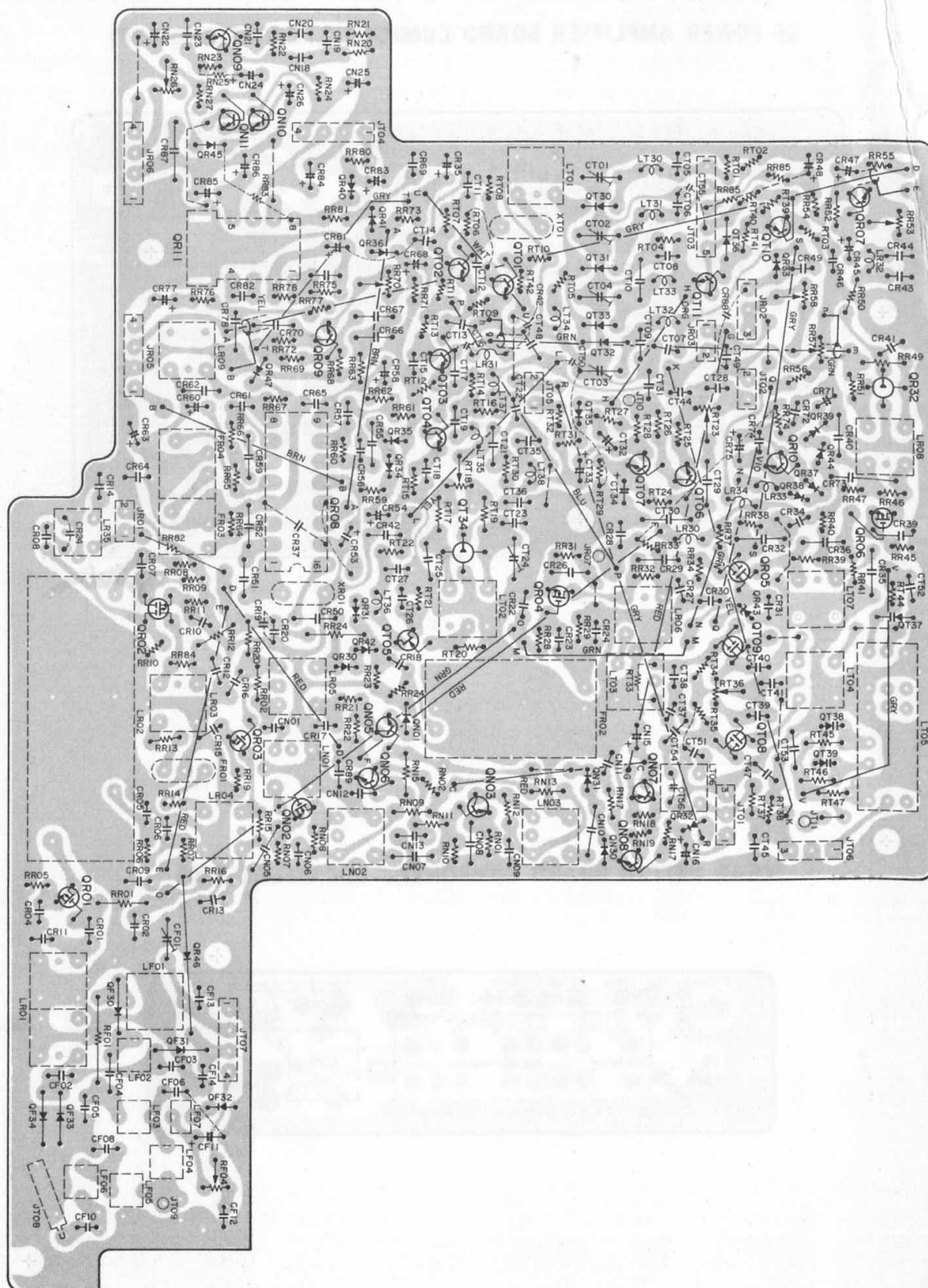
PLL BOARD COMPONENT LOCATIONS-P101



VCO BOARD COMPONENT LOCATIONS-P120

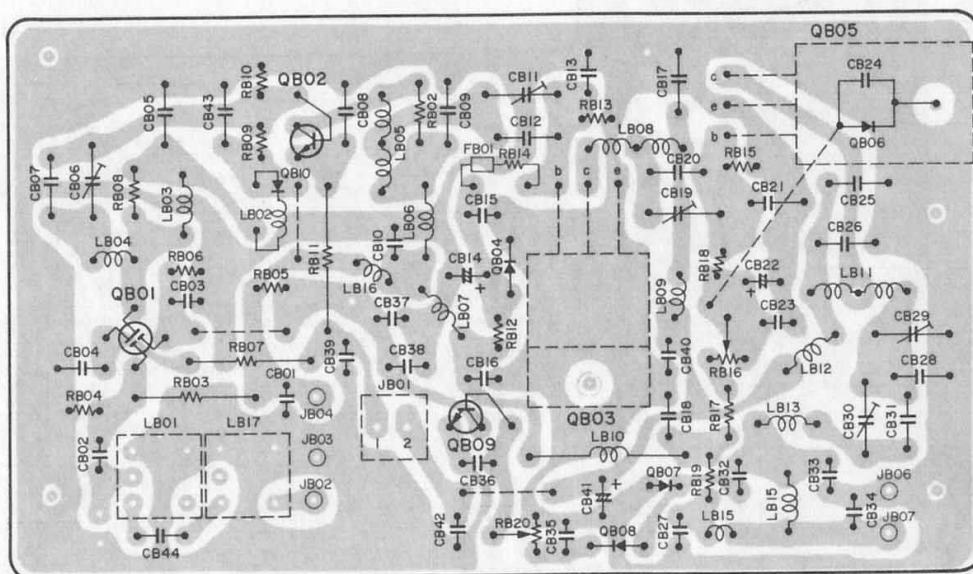


## RX AND TX BOARD COMPONENT LOCATIONS-PR01

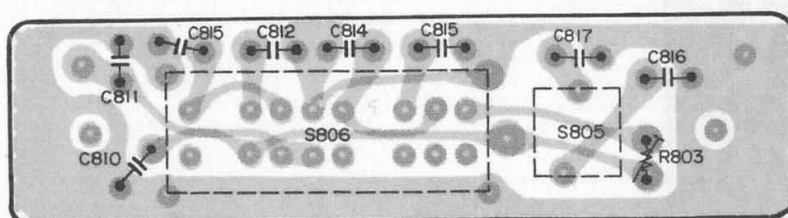




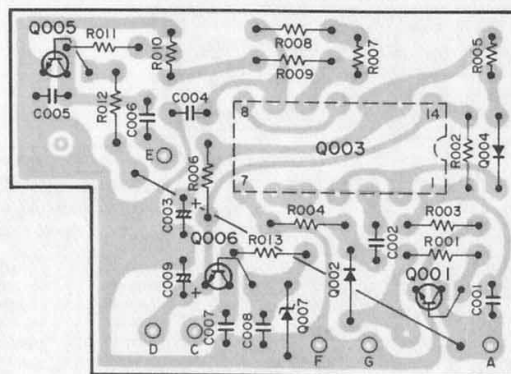
## RF POWER AMPLIFIER BOARD COMPONENT LOCATIONS-PB01



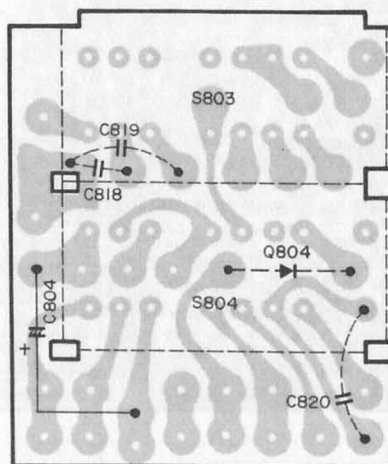
## REAR SWITCH BOARD COMPONENT LOCATIONS-P803



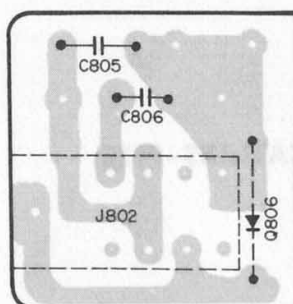
## TONE BURST BOARD COMPONENT LOCATIONS-P001



## FUNCTION SWITCH BOARD COMPONENTS LOCATIONS-P801

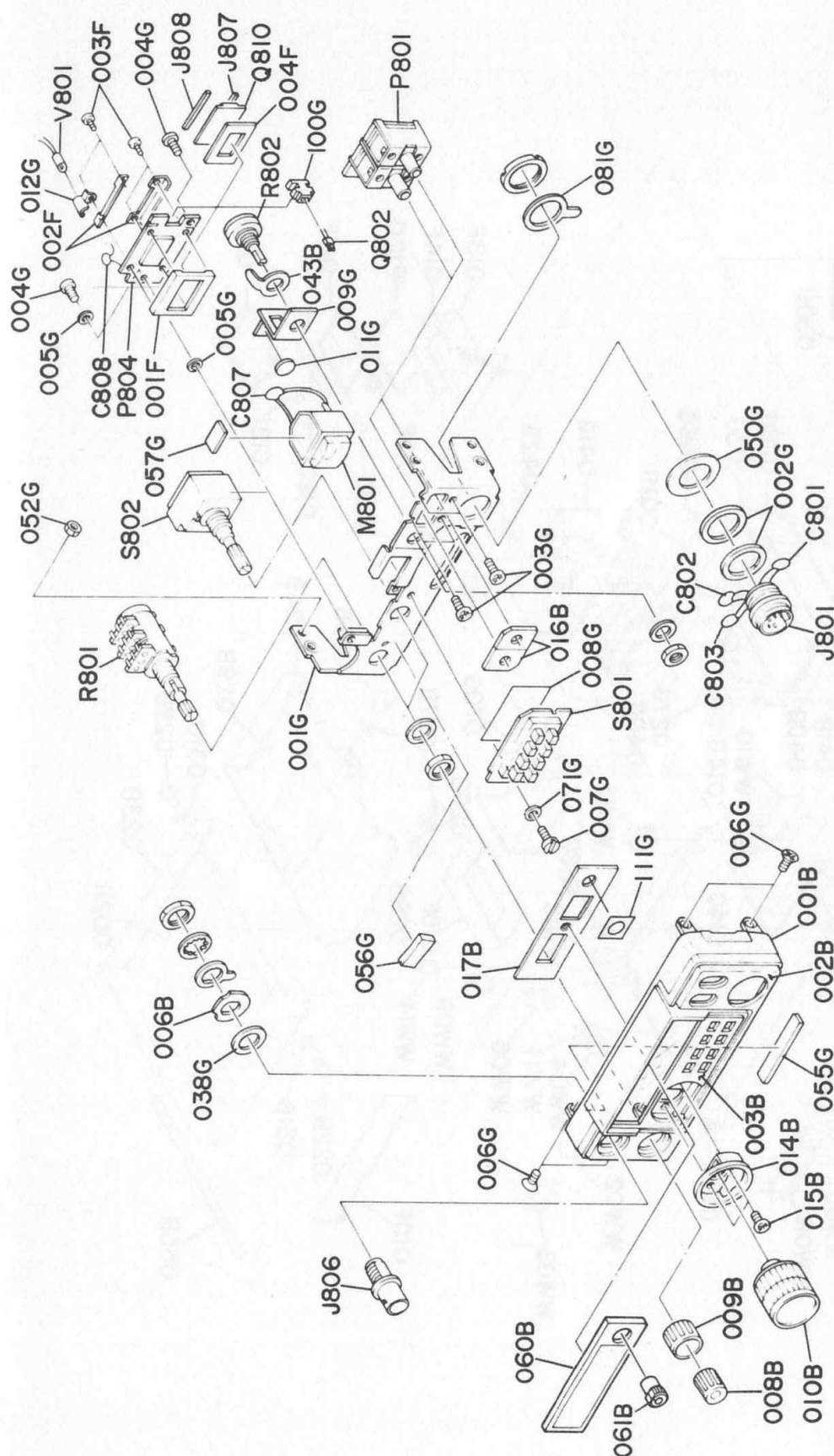


## EXT. POWER SWITCH BOARD COMPONENT LOCATIONS-P802





## EXPLODED VIEWS AND PARTS LIST

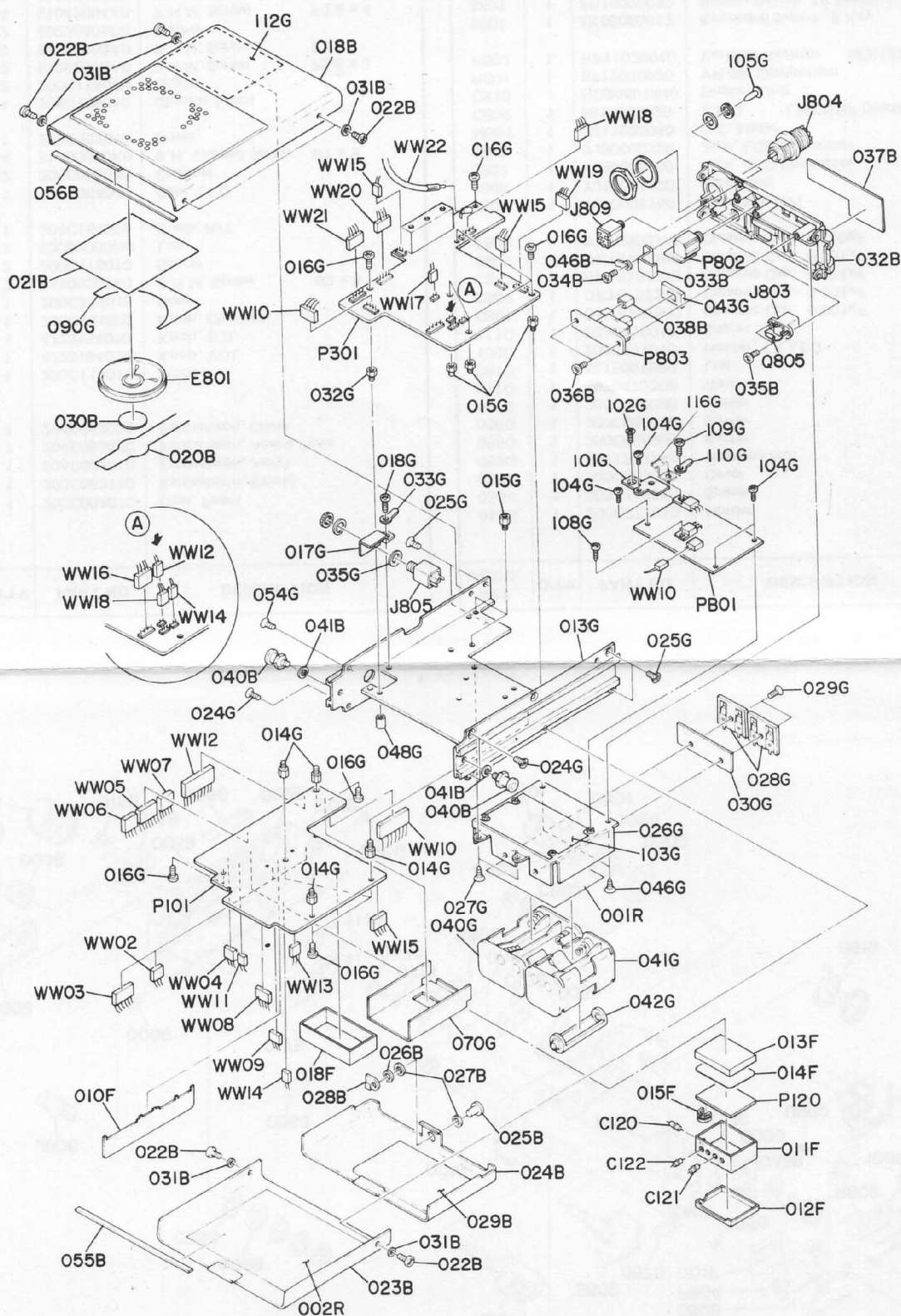


[P01-99] ESCUTCHEON RERATED

| REF. DESIG. | Q'TY | PART NO.   | DESCRIPTION             | REF. DESIG. | Q'TY | PART NO.   | DESCRIPTION                          |
|-------------|------|------------|-------------------------|-------------|------|------------|--------------------------------------|
| 001B        | 1    | 200C064010 | Case, Front             | 012G        | 1    | 200C271010 | Holder                               |
| 002B        | 1    | 203C063120 | Escutcheon, Mould       | 038G        | 1    | 203C118010 | Spacer                               |
| 003B        | 1    | 204C063010 | Escutcheon, Acryl       | 050G        | 1    | 200C053020 | Cover                                |
| 017B        | 1    | 204C063020 | Escutcheon, Alumi Plate | 052G        | 1    | 53112603A0 | Hexagon Nut                          |
| 060B        | 1    | 204C063030 | Escutcheon, Cover       | 055G        | 1    | 200C056060 | Buffer                               |
|             |      |            |                         | 056G        | 1    | 200C056070 | Buffer                               |
|             |      |            |                         | 057G        | 1    | 200C056080 | Buffer                               |
|             |      |            |                         | 071G        | 1    | 59264702G9 | Washer                               |
| 006B        | 1    | 203C114010 | Stopper                 | 081G        | 1    | 62150019E0 | Lug                                  |
| 008B        | 1    | 4723154020 | Knob, VOL               | 100G        | 1    | 204C271010 | Holder, TX LED                       |
| 009B        | 1    | 4723154030 | Knob, SQL               | 111G        | 1    | 204C118010 | Spacer                               |
| 010B        | 1    | 200C154500 | Knob, Channel           | C801        | 1    | DK16102300 | Ceramic Cap. 0.001 $\mu$ F $\pm$ 10% |
| 014B        | 1    | 200C353010 | Ring                    | C802        | 1    | DK16102300 | Ceramic Cap. 0.001 $\mu$ F $\pm$ 10% |
| 015B        | 2    | 51100205E0 | B.H.M. Screw            | C803        | 1    | DK16102300 | Ceramic Cap. 0.001 $\mu$ F $\pm$ 10% |
| 016B        | 2    | 200C118010 | Spacer                  | C807        | 1    | DK16102300 | Ceramic Cap. 0.001 $\mu$ F $\pm$ 10% |
| 043B        | 1    | 62062060W0 | Lug                     | C808        | 1    | DD15300370 | Ceramic Cap. 30pF $\pm$ 5%           |
| 061B        | 1    | 204C154010 | Knob, RIT               | J801        | 1    | YJ10001250 | Jack, Mic (7P)                       |
|             |      |            |                         | J806        | 1    | YJ10001620 | Jack, Ant.                           |
| 001F        | 1    | 200C064060 | Case, LCD               | J807        | 1    | YJ90000280 | Jack, LCD Connector                  |
| 002F        | 2    | 200C005040 | Clamper                 | J808        | 1    | YJ90000280 | Jack, LCD Connector                  |
| 003F        | 4    | 51400019K0 | B.H. Tapped Screw       | M801        | 1    | IM11020040 | D.C. Meter                           |
| 004F        | 1    | 200C053030 | Cover                   | Q802        | 1    | HI10025020 | L.E.D. LN222RP (Red)                 |
| 001G        | 1    | 204C105010 | Chassis, Front          | Q810        | 1    | HQ20401440 | Display Unit                         |
| 002G        | 2    | 200C118050 | Spacer                  | R801        | 1    | BP12030030 | VR-SW Component                      |
| 003G        | 2    | 51062603A0 | P.H.M. Screw            | R802        | 1    | RB11020010 | Variable Resistor 1K $\Omega$ (B)    |
| 004G        | 2    | 51060203A0 | P.H.M. Screw            |             |      |            |                                      |
| 005G        | 2    | 59020403G0 | Washer                  | S801        | 1    | SK08080012 | Keyboard Switch, 8 Key               |
| 006G        | 4    | 51042604A0 | F.H.M. Screw            | S802        | 1    | SR18020010 | Rotary Switch, 18 Position           |
| 007G        | 1    | 200C005030 | Clamper                 | V801        | 1    | IN10140080 | Lamp, 40mA 14V                       |
| 008G        | 1    | 4723120050 | Insulator               |             |      |            |                                      |
| 009G        | 1    | 204C005010 | Clamper                 | K801        | 1    | KZ03001440 | LCD Kit                              |
| 011G        | 1    | 200C056030 | Buffer                  | P804        | 1    | YF200C0030 | P.W. Board LCD                       |



## [M01-99] VARIOUS BOARDS AND COMMON PARTS



| REF. DESIG. | Q'TY | PART NO.   | DESCRIPTION                |
|-------------|------|------------|----------------------------|
| 010F        | 1    | 203C109050 | Shield                     |
| 011F        | 1    | 203C109040 | Shield, VCO Frame          |
| 012F        | 1    | 203C109060 | Shield                     |
| 013F        | 1    | 4723109240 | Shield                     |
| 014F        | 1    | 4723120020 | Insulator                  |
| 015F        | 1    | 1143259010 | Bushing                    |
| 018F        | 1    | 205C109050 | Shield                     |
| 013G        | 1    | 200C105210 | Chassis, H                 |
| 014G        | 4    | 200C101010 | Support                    |
| 015G        | 4    | 200C101020 | Support                    |
| 016G        | 10   | 51442605A0 | B.H.M. Screw B2.6 x 5      |
| 017G        | 1    | 204C160010 | Bracket                    |
| 018G        | 1    | 51280305B0 | B.H. Tapped Screw B3 x 5   |
| 024G        | 3    | 51042604A0 | F.H.M. Screw F2.6 x 4      |
| 025G        | 4    | 51042604A0 | F.H.M. Screw F2.6 x 4      |
| 026G        | 1    | 200C064210 | Case, Battery Tray         |
| 027G        | 2    | 51342605P0 | F.H. Tapped Screw F2.6 x 5 |
| 019G        | 1    | 51102604A0 | B. H. M Screw B2.6 x 4     |
| 028G        | 2    | 200C123110 | Contact                    |
| 029G        | 2    | 51342605P0 | F.H. Tapped Screw F2.6 x 5 |
| 030G        | 1    | 200C120040 | Insulator                  |
| 032G        | 1    | 204C101020 | Support                    |
| 033G        | 1    | 62030039W0 | Lug                        |
| 035G        | 1    | 200C118030 | Spacer                     |
| 040G        | 1    | 200C064040 | Case, Battery (6 Pieces)   |
| 041G        | 1    | 200C064050 | Case, Battery (4 Pieces)   |
| 042G        | 1    | 200C121010 | Link, Dummy                |
| 043G        | 1    | 200C118020 | Spacer                     |
| 120G        | 1    | 208C101010 | Support                    |
| 121G        | 1    | 208C056010 | Buffer                     |
| 122G        | 1    | 208C118010 | Spacer                     |
| 117G        | 1    | 200C101040 | Support                    |

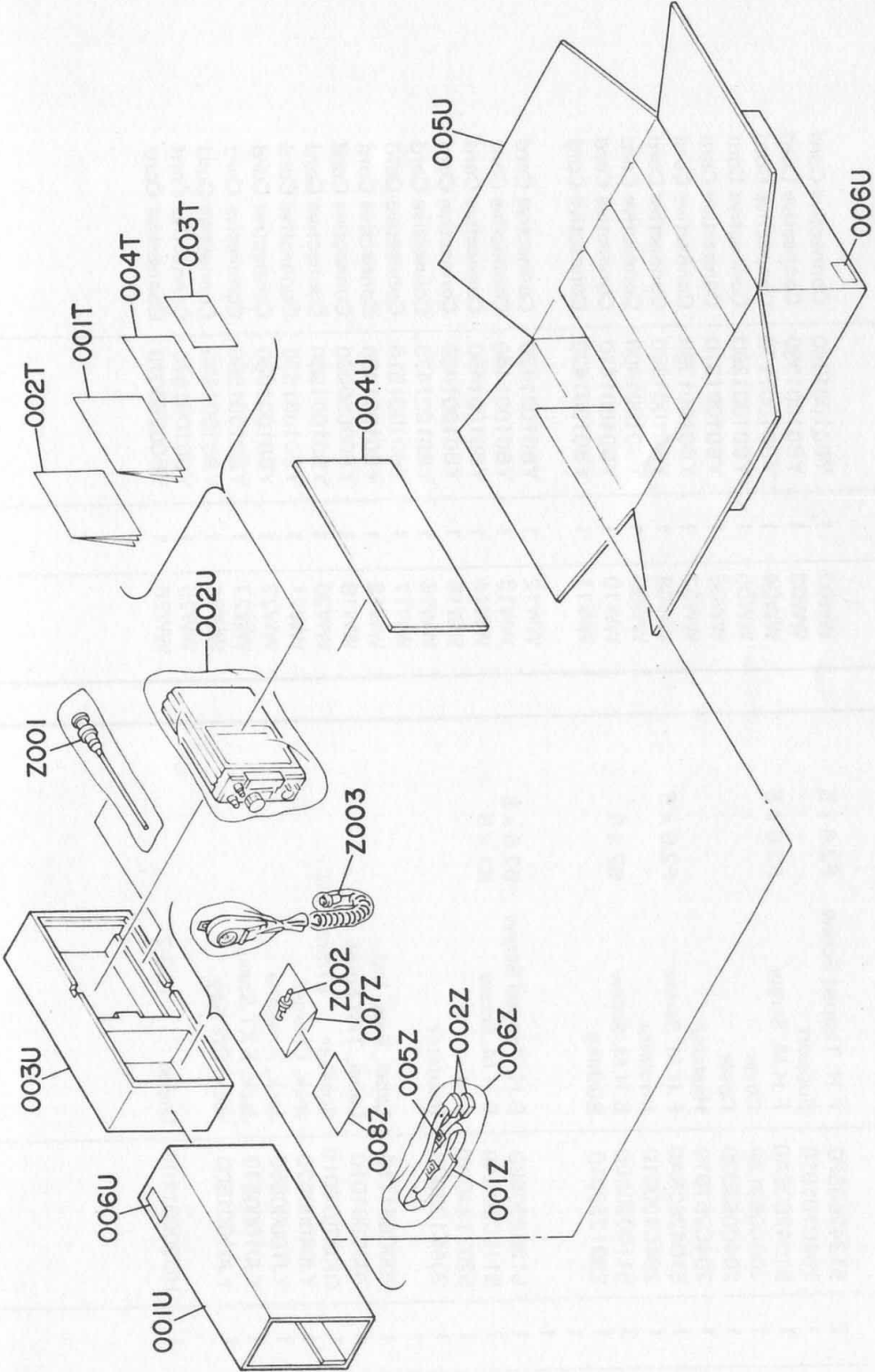
| REF. DESIG. | Q'TY | PART NO.   | DESCRIPTION                |
|-------------|------|------------|----------------------------|
| 024B        | 1    | 200C257030 | Lid, Battery Case          |
| 025B        | 1    | 200C102030 | Lock, Coin                 |
| 026B        | 1    | 200C055010 | Collar                     |
| 027B        | 2    | 59069505G9 | Washer                     |
| 028B        | 1    | 200C102040 | Lock                       |
| 016B        | 2    | 200C118010 | Spacer                     |
| 018B        | 1    | 204C257010 | Lid, Upper Case            |
| 020B        | 1    | 204C115010 | Spring                     |
| 021B        | 1    | 204C053010 | Cover                      |
| 022B        | 6    | 51282606U0 | B.H. Tapped Screw B2.6 x 6 |
| 023B        | 1    | 200C257020 | Lid, Bottom Case           |
| 029B        | 1    | 200C056020 | Buffer                     |
| 030B        | 1    | 200C120060 | Insulator                  |
| 031B        | 6    | 54012600A0 | Flat Washer, S.            |
| 032B        | 1    | 200C064220 | Case, Rear                 |
| 033B        | 1    | 200C005020 | Clamper                    |
| 034B        | 1    | 51102604E0 | B.H.M. Screw B2.6 x 4      |
| 035B        | 2    | 51100204E0 | B.H.M. Screw B2 x 4        |
| 036B        | 2    | 51102604E0 | B.H.M. Screw B2.6 x 4      |
| 037B        | 1    | 200C265220 | Indicator                  |
| 038B        | 1    | 200C270010 | Button, Reset              |
| 040B        | 2    | 200C155010 | Hanger                     |
| 041B        | 2    | 54040402B0 | Spring Washer              |
| 046B        | 1    | 62261240W0 | Lug                        |
| 055B        | 1    | 200C118040 | Spacer                     |
| 056B        | 1    | 200C118040 | Spacer                     |



| REF. DESIG. | Q'TY | PART NO.   | DESCRIPTION     |
|-------------|------|------------|-----------------|
| WW02        | 1    | YB01001340 | Connective Cord |
| WW03        | 1    | YB01001350 | Connective Cord |
| WW04        | 1    | YB01001170 | Connective Cord |
| WW05        | 1    | YB01001360 | Connective Cord |
| WW06        | 1    | YB01001370 | Connective Cord |
| WW07        | 1    | YB01001380 | Connective Cord |
| WW08        | 1    | YB01001390 | Connective Cord |
| WW09        | 1    | YB01001400 | Connective Cord |
| WW10        | 1    | YB01001410 | Connective Cord |
| WW11        | 1    | YB01001430 | Connective Cord |
| WW12        | 1    | YB01001420 | Connective Cord |
| WW13        | 1    | YB01001440 | Connective Cord |
| WW14        | 1    | YB01001450 | Connective Cord |
| WW15        | 1    | YB01001460 | Connective Cord |
| WW16        | 1    | YB01001470 | Connective Cord |
| WW17        | 1    | YB01001510 | Connective Cord |
| WW18        | 1    | YB01001480 | Connective Cord |
| WW19        | 1    | YB00050080 | Connective Cord |
| WW20        | 1    | YB01001500 | Connective Cord |
| WW21        | 1    | YB01001520 | Connective Cord |
| WW22        | 1    | YB01001080 | Connective Cord |
| WW23        | 1    | YB01001550 | Connective Cord |
| WW24        | 1    | YB01001560 | Connective Cord |
| WW25        | 1    | YB01001570 | Connective Cord |
| WW26        | 1    | YB00280070 | Connective Cord |

| REF. DESIG. | Q'TY | PART NO.   | DESCRIPTION       |
|-------------|------|------------|-------------------|
| 046G        | 2    | 51342605P0 | F.H. Tapped Screw |
| 048G        | 1    | 204C101010 | Support           |
| 054G        | 1    | 51042606A0 | F.H.M. Screw      |
| 070G        | 1    | 200C053130 | Cover             |
| 090G        | 1    | 204C053020 | Cover             |
| 101G        | 1    | 204C267010 | Heatsink          |
| 102G        | 1    | 51042605A0 | F.H.M. Screw      |
| 103G        | 1    | 204C120010 | Insulator         |
| 104G        | 3    | 51100205E0 | B.H.M. Screw      |
| 105G        | 1    | 2991259010 | Bushing           |
|             | 1    |            |                   |
| 108G        | 1    | 51282605B0 | B.H. Tapped Screw |
| 109G        | 1    | 51100305A9 | B.H.M. Screw      |
| 110G        | 1    | 62031340W0 | Lug               |
| 112G        | 1    | 204C120020 | Insulator         |
|             | 1    |            |                   |
| 001R        | 1    | 200C861110 | Label, Batt. Ind. |
| 002R        | 1    | 208C861010 | Label, Test Point |
| E801        | 1    | QK00578010 | Speaker           |
| J803        | 1    | YJ04000620 | Jack, Charger     |
| J804        | 1    | YJ10000550 | Jack, Antenna     |
| J805        | 1    | YJ01000570 | Jack, EXT Speaker |
| J809        | 1    | YJ01001500 | Jack, CW Key      |
|             |      |            |                   |
| Q805        | 1    | HD20001100 | Diode             |
|             |      |            | 10D-2             |

PACKAGING





| REF. DESIG. | Q'TY | PART NO.   | DESCRIPTION      |
|-------------|------|------------|------------------|
| 001Z        | 1    | 4223156010 | Strap            |
| 002Z        | 2    | 200C155500 | Hanger, (K)      |
| 005Z        | 1    | 200C155020 | Hanger, Mic      |
| 006Z        | 1    | 9011020010 | Polyethylene Bag |
| 007Z        | 1    | 9010510010 | Polyethylene Bag |
| 008Z        | 1    | 208C851010 | Instructions     |
| Z001        | 1    | YR99020060 | Whip Antenna     |
| Z002        | 1    | YP01000310 | Plug, Non Short  |
| Z003        | 1    | MP11000690 | Microphone       |

| REF. DESIG. | Q'TY | PART NO.   | DESCRIPTION      |
|-------------|------|------------|------------------|
| 001T        | 1    | 208C851010 | Instructions     |
| 002T        | 1    | 208C856010 | Circuit Diagram  |
| 001U        | 1    | 204C804020 | Packing Case     |
| 002U        | 1    | 9012035010 | Polyethylene Bag |
| 003U        | 1    | 200C809010 | Cushion          |
| 004U        | 1    | 200C803010 | Partitioner      |
| 005U        | 1    | 204C805020 | Master Carton    |
| 006U        | 3    | 9523019020 | Serial No. Card  |

## ELECTRICAL PARTS LIST

| REF. DESIG. | Q'TY | PART NO.   | DESCRIPTION          |
|-------------|------|------------|----------------------|
| CS10        | 1    | DK18103030 | Ceramic 0.01μF       |
| CS11        | 1    | DK16102300 | Ceramic 0.001μF ±10% |
| CS12        | 1    | DK18103030 | Ceramic 0.01μF       |
| CS13        | 1    | EA10602530 | Elect 10μF 25V       |
| CS14        | 1    | DK16102300 | Ceramic 0.001μF ±10% |
| CS15        | 1    | DK18103030 | Ceramic 0.001μF      |
| CS16        | 1    | EA47502530 | Elect 4.7μF 25V      |
| C101        | 1    | EV10601060 | Elect 10μF 10V       |
| C102        | 1    | DK16102300 | Ceramic 0.001μF ±10% |
| C103        | 1    | DD15330300 | Ceramic 33pF ±5%     |
| C104        | 1    | DD15200300 | Ceramic 20pF ±5%     |
| C105        | 1    | CT12000090 | Trimming 20pF        |
| C106        | 1    | EV33501060 | Elect 3.3μF 10V      |
| C107        | 1    | EV10403560 | Elect 0.1μF 35V      |
| C108        | 1    | DD10020300 | Ceramic 2pF ±0.25pF  |
| C109        | 1    | DK16102300 | Ceramic 0.001μF ±10% |
| C110        | 1    | DK16102300 | Ceramic 0.001μF ±10% |
| C111        | 1    | EA47601030 | Elect 47μF 10V       |
| C112        | 1    | DD10050300 | Ceramic 5pF ±0.25pF  |
| C113        | 1    | DD10050300 | Ceramic 5pF ±0.25pF  |
| C114        | 1    | DD15270300 | Ceramic 27pF ±5%     |
| C115        | 1    | DD15270300 | Ceramic 27pF ±5%     |
| C116        | 1    | DD15101350 | Ceramic 100pF ±5%    |
| C117        | 1    | DD15101350 | Ceramic 100pF ±5%    |
| C118        | 1    | DK18103030 | Ceramic 0.01μF ±5%   |
| C119        | 1    | DK18203030 | Ceramic 0.02μF ±5%   |
| C140        | 1    | DD15150300 | Ceramic 15pF ±5%     |
| C141        | 1    | DK16102300 | Ceramic 0.001μF ±10% |
| C142        | 1    | DK16102300 | Ceramic 0.001μF ±10% |
| C143        | 1    | DK18103030 | Ceramic 0.01μF ±10%  |
| C144        | 1    | DK16102300 | Ceramic 0.001μF ±10% |
| C145        | 1    | DK16602300 | Ceramic 0.001μF ±10% |
| C146        | 1    | DK18103030 | Ceramic 0.01μF       |

| REF. DESIG. | Q'TY | PART NO.   | DESCRIPTION                               |
|-------------|------|------------|---|
| P101        | 1    | WH208C1310 | P101-PLL CIRCUIT BOARD<br>P.W. Board, PLL |
| CL01        | 1    | DD15220370 | Ceramic 22pF ±5%                          |
| CL02        | 1    | DD15220370 | Ceramic 22pF ±5%                          |
| CL03        | 1    | DD15220370 | Ceramic 22pF ±5%                          |
| CL04        | 1    | DD15220370 | Ceramic 22pF ±5%                          |
| CL05        | 1    | DD15220370 | Ceramic 22pF ±5%                          |
| CL06        | 1    | DD15220370 | Ceramic 22pF ±5%                          |
| CL07        | 1    | DK16102300 | Ceramic 0.001μF ±10%                      |
| CL08        | 1    | DK16102300 | Ceramic 0.001μF ±10%                      |
| CL09        | 1    | DK16102300 | Ceramic 0.001μF ±10%                      |
| CL11        | 1    | DK16102300 | Ceramic 0.001μF ±10%                      |
| CL12        | 1    | EV22403560 | Elect 0.2μF 35V                           |
| CL13        | 1    | EV10502560 | Elect 1μF 25V                             |
| CL14        | 1    | DD15470300 | Ceramic 47pF ±5%                          |
| CL15        | 1    | DK18103030 | Ceramic 0.01μF                            |
| CL16        | 1    | EJ10601610 | Elect 10μF 16V                            |
| CL17        | 1    | DS17822010 | Semicon 8200pF ±20%                       |
| CL18        | 1    | DS17153010 | Semicon 0.015μF ±20%                      |
| CL19        | 1    | DS17153010 | Semicon 0.015μF ±20%                      |
| CL20        | 1    | DK18103030 | Ceramic 0.01μF                            |
| CL22        | 1    | DK18223320 | Ceramic 0.022μF                           |
| CS01        | 1    | DK18103030 | Ceramic 0.01μF 16V                        |
| CS02        | 1    | EA10601630 | Elect 10μF ±10%                           |
| CS03        | 1    | DK16102300 | Ceramic 0.001μF                           |
| CS04        | 1    | DK18103030 | Ceramic 0.01μF                            |
| CS05        | 1    | DK18103030 | Ceramic 0.01μF                            |
| CS06        | 1    | EJ10505010 | Elect 1μF 50V                             |
| CS07        | 1    | DK16102300 | Ceramic 0.001μF ±10%                      |
| CS08        | 1    | DK18103030 | Ceramic 0.01μF                            |
| CS09        | 1    | DK18103030 | Ceramic 0.01μF                            |



| REF. DESIG. | Q'TY | PART NO.   | DESCRIPTION   |
|-------------|------|------------|---|
| C306        | 1    | DD15101050 | Ceramic 100pF ±5%   |
| C307        | 1    | DD15101050 | Ceramic 100pF ±5%   |
| C308        | 1    | DK18103030 | Ceramic 0.01μF ±5%  |
| C310        | 1    | DD15220300 | Ceramic 22pF ±5%  |
| C311        | 1    | DK18103030 | Ceramic 0.01μF  |
| C312        | 1    | DK18103030 | Ceramic 0.01μF  |
| C313        | 1    | DD10010300 | Ceramic 1pF ±0.25pF                                       |
| C315        | 1    | DD15470360 | Ceramic 47pF ±5%  |
| C316        | 1    | DD15470360 | Ceramic 47pF ±5%  |
| C317        | 1    | DK16102300 | Ceramic 0.001μF ±10%                                      |
| C318        | 1    | DD15101050 | Ceramic 100pF ±5%   |
| C319        | 1    | DD15101050 | Ceramic 100pF ±5%   |
| C320        | 1    | DD15220300 | Ceramic 22pF ±5%  |
| C321        | 1    | DK18103030 | Ceramic 0.01μF  |
| C322        | 1    | CT11000020 | Trimming 10pF   |
| C401        | 1    | DK16102300 | Ceramic 0.001μF ±10%                                      |
| C402        | 1    | DK16102300 | Ceramic 0.001μF ±10%                                      |
| C403        | 1    | DK16102300 | Ceramic 0.001μF ±10%                                      |
| C404        | 1    | DK16102300 | Ceramic 0.001μF ±10%                                      |
| C405        | 1    | DK18103030 | Ceramic 0.01μF  |
| C406        | 1    | DK18103030 | Ceramic 0.01μF  |
| C407        | 1    | EV22403560 | Elect 0.22μF 35V  |
| C408        | 1    | DK16102300 | Ceramic 0.001μF ±10%                                      |
| C409        | 1    | DK18103030 | Ceramic 0.01μF  |
| RL01        | 1    | GD05272140 | P101-RESISTORS<br>(All Resistors are ±5% and ¼W)<br>2.7KΩ |
| RL02        | 1    | RA01020330 | 10KΩ(B) Trimming  |
| RL03        | 1    | GD05152140 | 1.5KΩ   |
| RL04        | 1    | GD05822140 | 8.2KΩ   |
| RL05        | 1    | GD05103140 | 10KΩ  |

| REF. DESIG. | Q'TY | PART NO.   | DESCRIPTION          |
|-------------|------|------------|----------------------|
| C147        | 1    | DK18102300 | Ceramic 0.001μF ±10% |
| C148        | 1    | EJ10601610 | Elect 10μF 16V       |
| C149        | 1    | DK16102300 | Ceramic 0.001μF ±10% |
| C150        | 1    | DK18103030 | Ceramic 0.01μF       |
| C151        | 1    | EJ10601610 | Elect 10μF 16V       |
| C152        | 1    | DK18103030 | Ceramic 0.01μF       |
| C153        | 1    | DK18103030 | Ceramic 0.01μF       |
| C154        | 1    | DS17223010 | Ceramic 0.022μF      |
| C155        | 1    | DD15470300 | Ceramic 47pF         |
| C156        | 1    | DK16101300 | Ceramic 100pF ±10%   |
| C201        | 1    | DK16102300 | Ceramic 0.001μF ±10% |
| C202        | 1    | EJ22505010 | Elect 2.2μF 50V      |
| C203        | 1    | EV10403560 | Elect 0.1μF 35V      |
| C204        | 1    | DD15300370 | Ceramic 30pF ±5%     |
| C205        | 1    | DK18103030 | Ceramic 0.01μF       |
| C206        | 1    | DD15151370 | Ceramic 15pF ±5%     |
| C207        | 1    | DS17473010 | Semicon 0.047μF ±20% |
| C208        | 1    | DK16471300 | Ceramic 470pF ±10%   |
| C209        | 1    | EJ22505010 | Elect 2.2μF 50V      |
| C210        | 1    | DK16471300 | Ceramic 470pF ±10%   |
| C211        | 1    | DS17103010 | Semicon 0.01μF ±20%  |
| C212        | 1    | EV22403560 | Elect 0.22μF 35V     |
| C213        | 1    | DF17823300 | Film 0.082μF ±20%    |
| C214        | 1    | DK16391300 | Ceramic 390pF ±10%   |
| C215        | 1    | DK18103030 | Ceramic 0.01μF       |
| C216        | 1    | DS17472010 | Semicon 4700pF ±20%  |
| C217        | 1    | DK16102300 | Ceramic 0.001μF ±10% |
| C218        | 1    | DK16102300 | Ceramic 0.001μF ±10% |
| C301        | 1    | DK18103030 | Ceramic 0.01μF       |
| C302        | 1    | DK18103030 | Ceramic 0.01μF       |
| C303        | 1    | DD15470360 | Ceramic 47pF ±5%     |
| C304        | 1    | DD15470360 | Ceramic 47pF ±5%     |
| C305        | 1    | DK16102300 | Ceramic 0.001μF ±10% |

| REF.<br>DESIG. | Q'TY | PART NO.   | DESCRIPTION     |
|----------------|------|------------|-----------------|
| R111           | 1    | GD05101140 | 100Ω            |
| R112           | 1    | GD05474140 | 470KΩ           |
| R113           | 1    | GD05332140 | 3.3KΩ           |
| R114           | 1    | GD05224140 | 220KΩ           |
| R115           | 1    | GD05392140 | 3.9KΩ           |
| R116           | 1    | GD05223140 | 22KΩ            |
| R117           | 1    | GD05822140 | 8.2KΩ           |
| R118           | 1    | RC00000140 | 0Ω              |
| R127           | 1    | GD05222180 | 2.2KΩ 1/8W      |
| R130           | 1    | GD05104140 | 100KΩ           |
| R131           | 1    | GD05223140 | 22KΩ            |
| R132           | 1    | GD05223140 | 22KΩ            |
| R133           | 1    | GD05221140 | 220Ω            |
| R134           | 1    | GD05333140 | 33KΩ            |
| R135           | 1    | GD05472140 | 4.7KΩ           |
| R136           | 1    | GD05221140 | 220Ω            |
| R137           | 1    | GD05222140 | 2.2KΩ           |
| R138           | 1    | GD05561140 | 560Ω            |
| R139           | 1    | GD05103140 | 10KΩ            |
| R140           | 1    | GD05101140 | 100Ω            |
| R201           | 1    | RA01020330 | 1KΩ(B) Trimming |
| R202           | 1    | GD05102140 | 1KΩ             |
| R203           | 1    | GD05472140 | 4.7KΩ           |
| R204           | 1    | GD05472140 | 4.7KΩ           |
| R205           | 1    | GD05334140 | 330KΩ           |
| R206           | 1    | GD05473140 | 47KΩ            |
| R207           | 1    | GD05472140 | 4.7KΩ           |
| R208           | 1    | GD05104140 | 100KΩ           |
| R209           | 1    | GD05223140 | 22KΩ            |
| R210           | 1    | GD05105140 | 1MΩ             |
| R211           | 1    | GD05123140 | 12KΩ            |
| R212           | 1    | GD05123140 | 12KΩ            |
| R213           | 1    | GD05822140 | 8.2KΩ           |

| REF.<br>DESIG. | Q'TY | PART NO.   | DESCRIPTION |
|----------------|------|------------|-------------|
| RL06           | 1    | GD05103140 | 10KΩ        |
| RL07           | 1    | GD05103140 | 10KΩ        |
| RL08           | 1    | GD05103140 | 10KΩ        |
| RL09           | 1    | GD05333140 | 33KΩ        |
| RL10           | 1    | GD05333140 | 33KΩ        |
| RL11           | 1    | GD05334140 | 330KΩ       |
| RL12           | 1    | GD05394140 | 390KΩ       |
| RL13           | 1    | GD05183140 | 18KΩ        |
| RL15           | 1    | GD05155140 | 1.5MΩ       |
| RL16           | 1    | GD05273140 | 27KΩ        |
| RL17           | 1    | GD05563140 | 56KΩ        |
| RL18           | 1    | GD05274140 | 270KΩ       |
| RL19           | 1    | GD05102140 | 1KΩ         |
| RL20           | 1    | GD05104140 | 100KΩ       |
| RL21           | 1    | GD05392140 | 3.9KΩ       |
| RL22           | 1    | GD05223140 | 22KΩ        |
| RL23           | 1    | GD05103140 | 10KΩ        |
| RS02           | 1    | GD05183140 | 18KΩ        |
| RS03           | 1    | GD05103140 | 10KΩ        |
| RS04           | 1    | GD05332140 | 3.3KΩ       |
| RS05           | 1    | GD05102140 | 1KΩ         |
| RS07           | 1    | GD05104140 | 100KΩ       |
| RS08           | 1    | GD05272140 | 2.7KΩ       |
| R101           | 1    | GD05822140 | 1.2KΩ -03   |
| R102           | 1    | GD05103140 | 10KΩ        |
| R103           | 1    | GD05681140 | 680Ω        |
| R104           | 1    | GD05222140 | 2.2KΩ       |
| R106           | 1    | GD05824140 | 820KΩ       |
| R107           | 1    | GD05182140 | 1.8KΩ       |
| R108           | 1    | GD05474140 | 470KΩ       |
| R109           | 1    | GD05222140 | 2.2KΩ       |
| R110           | 1    | GD05101140 | 100Ω        |



| REF. DESIG. | QTY | PART NO.   | DESCRIPTION                |
|-------------|-----|------------|----------------------------|
| R326        | 1   | GD05333180 | 33K $\Omega$ 1/8W          |
| R327        | 1   | GD05103180 | 10K $\Omega$ 1/8W          |
| R401        | 1   | GD05222140 | 2.2K $\Omega$              |
| R328        | 1   | GD05101180 | 100 $\Omega$ 1/8W          |
| R402        | 1   | RA04720120 | 4.7K $\Omega$ (B) Trimming |
| R403        | 1   | GD05222140 | 2.2K $\Omega$              |
| R404        | 1   | RA04720120 | 4.7K $\Omega$ (B) Trimming |
| R405        | 1   | GD05222140 | 2.2K $\Omega$              |
| R406        | 1   | RA04720120 | 4.7K $\Omega$ (B) Trimming |
| R407        | 1   | GD05103140 | 10K $\Omega$               |
| R408        | 1   | GD05104140 | 100K $\Omega$              |
| R409        | 1   | GD05682140 | 6.8K $\Omega$              |
| R410        | 1   | GD05103140 | 10K $\Omega$               |
| R411        | 1   | GD05682140 | 6.8K $\Omega$              |
| R412        | 1   | RA04720120 | 4.7K $\Omega$ (B) Trimming |
| R413        | 1   | GD05103140 | 10K $\Omega$               |
| R414        | 1   | GD05103140 | 10K $\Omega$               |
| R416        | 1   | GD05223140 | 22K $\Omega$               |
| R417        | 1   | GD05103140 | 10K $\Omega$               |
| R418        | 1   | GD05104140 | 100K $\Omega$              |
| R451        | 1   | GD05334140 | 330K $\Omega$              |
| R452        | 1   | GD05474140 | 470K $\Omega$              |
| R453        | 1   | GD05394140 | 390K $\Omega$              |
| R454        | 1   | GD05103140 | 10K $\Omega$               |
| R455        | 1   | GD05104140 | 100K $\Omega$              |
| R456        | 1   | GD05104140 | 100K $\Omega$              |
| R457        | 1   | GD05104140 | 100K $\Omega$              |
| R461        | 1   | GD05334140 | 330K $\Omega$              |
| R462        | 1   | GD05474140 | 470K $\Omega$              |
| R463        | 1   | GD05394140 | 390K $\Omega$              |
| R464        | 1   | GD05103140 | 10K $\Omega$               |

| REF. DESIG. | QTY | PART NO.   | DESCRIPTION               |
|-------------|-----|------------|---------------------------|
| R214        | 1   | GD05333140 | 33K $\Omega$              |
| R215        | 1   | GD05822140 | 8.2K $\Omega$             |
| R217        | 1   | RA01030490 | 10K $\Omega$ (B) Trimming |
| R218        | 1   | GD05102140 | 1K $\Omega$               |
| R219        | 1   | GD05472140 | 4.7K $\Omega$             |
| R220        | 1   | GD05472140 | 4.7K $\Omega$             |
| R221        | 1   | GD05473140 | 47K $\Omega$              |
| R301        | 1   | GD05473140 | 47K $\Omega$              |
| R302        | 1   | GD05473140 | 47K $\Omega$              |
| R303        | 1   | GD05473140 | 47K $\Omega$              |
| R304        | 1   | GD05562140 | 5.6K $\Omega$             |
| R305        | 1   | GD05562140 | 5.6K $\Omega$             |
| R306        | 1   | GD05331140 | 330 $\Omega$              |
| R307        | 1   | GD05223140 | 22K $\Omega$              |
| R308        | 1   | GD05472140 | 4.7K $\Omega$             |
| R309        | 1   | GD05102140 | 1K $\Omega$               |
| R310        | 1   | GD05102140 | 1K $\Omega$               |
| R311        | 1   | GD05101140 | 100 $\Omega$              |
| R312        | 1   | RC00000120 | 0 $\Omega$                |
| R313        | 1   | GD05473180 | 47K $\Omega$ 1/8W         |
| R314        | 1   | GD05473180 | 47K $\Omega$ 1/8W         |
| R315        | 1   | GD05473180 | 47K $\Omega$ 1/8W         |
| R316        | 1   | RC00000120 | 0 $\Omega$ 1/8W           |
| R317        | 1   | GD05562180 | 5.6K $\Omega$ 1/8W        |
| R318        | 1   | GD05562180 | 5.6K $\Omega$ 1/8W        |
| R319        | 1   | GD05331180 | 330 $\Omega$ 1/8W         |
| R320        | 1   | GD05102180 | 1K $\Omega$ 1/8W          |
| R321        | 1   | GD05102180 | 1K $\Omega$ 1/8W          |
| R322        | 1   | GD05222180 | 2.2K $\Omega$ 1/8W        |
| R323        | 1   | GD05222180 | 2.2K $\Omega$ 1/8W        |
| R324        | 1   | GD05333180 | 33K $\Omega$ 1/8W         |
| R325        | 1   | GD05103180 | 10K $\Omega$ 1/8W         |

| REF. DESIG.                | Q'TY | PART NO.   | DESCRIPTION               |
|----------------------------|------|------------|---------------------------|
| R465                       | 1    | GD05104140 | 100K $\Omega$             |
| R466                       | 1    | GD05104140 | 100K $\Omega$             |
| R467                       | 1    | GD05104140 | 100K $\Omega$             |
| R471                       | 1    | GD05474140 | 470K $\Omega$             |
| R480                       | 1    | GD05223140 | 22K $\Omega$              |
| R481                       | 1    | RA02230090 | 22K $\Omega$ (B) Trimming |
| R482                       | 1    | GD05223140 | 22K $\Omega$              |
| R483                       | 1    | RA02230090 | 22K $\Omega$ (B) Trimming |
| R484                       | 1    | GD05333180 | 33K $\Omega$              |
| R485                       | 1    | GD05103180 | 10K $\Omega$              |
| R486                       | 1    | GD05333180 | 33K $\Omega$              |
| R487                       | 1    | GD05103180 | 10K $\Omega$              |
| <b>P101-SEMICONDUCTORS</b> |      |            |                           |
| QL01                       | 1    | HC10018370 | IC MP5356                 |
| QL02                       | 1    | HC10010370 | IC TMS1024C               |
| QL03                       | 1    | HC10014170 | IC MC14011BCP             |
| QL04                       | 1    | HC10012170 | IC MC14016CP              |
| QL05                       | 1    | HT107331P0 | Transistor 2SA733(P)      |
| QL06                       | 1    | HD20011050 | Diode 1S1555              |
| QL07                       | 1    | HD20011050 | Diode 1S1555              |
| QL08                       | 1    | HD20011050 | Diode 1S1555              |
| QL09                       | 1    | HD20011050 | Diode 1S1555              |
| QL10                       | 1    | HD20011050 | Diode 1S1555              |
| QL11                       | 1    | HD20011050 | Diode 1S1555              |
| QL12                       | 1    | HD20011050 | Diode 1S1555              |
| QL13                       | 1    | HD20011050 | Diode 1S1555              |
| QL14                       | 1    | HD20011050 | Diode 1S1555              |
| QL15                       | 1    | HD20011050 | Diode 1S1555              |
| QL16                       | 1    | HD20011050 | Diode 1S1555              |
| QL18                       | 1    | HD20011050 | Diode 1S1555              |
| QL20                       | 1    | HD20011050 | Diode 1S1555              |
| QS01                       | 1    | HT313681B0 | Transistor 2SC1368(B)     |
| QS02                       | 1    | HD30060090 | Zener XZ094               |
| QS03                       | 1    | HT313681B0 | Transistor 2SC1368(B)     |
| QS04                       | 1    | HT309451Q0 | Transistor 2SC945(Q)      |
| QS05                       | 1    | HD20011050 | Diode 1S1555              |
| QS06                       | 1    | HT107381B0 | Transistor 2SA738(B)      |
| QS07                       | 1    | HT313681B0 | Transistor 2SC1368(B)     |
| QS08                       | 1    | HD30060090 | Zener XZ094               |
| QS09                       | 1    | HC10031060 | $\mu$ PC78L05             |
| QS10                       | 1    | HC10022060 | $\mu$ PC78L08             |
| QS11                       | 1    | HT312131B0 | Transistor 2SC1213(B)     |
| QS12                       | 1    | HD30078090 | Zener XZ076               |
| QS13                       | 1    | HT309451Q0 | Transistor 2SC945(Q)      |
| QS14                       | 1    | HD10005020 | Diode OA99                |
| QS16                       | 1    | HD10005020 | Diode OA-99               |
| QS17                       | 1    | HF200301B0 | F.E.T. 2SK30(O)           |
| QS18                       | 1    | HD20011050 | Diode 1S1555              |
| QS19                       | 1    | HF202461B0 | F.E.T. 2SK246(Y)          |
| Q101                       | 1    | HC10011170 | IC MC1415106P             |
| Q102                       | 1    | HT305351B0 | Transistor 2SC535(B)      |
| Q103                       | 1    | HT305351B0 | Transistor 2SC535(B)      |
| Q104                       | 1    | HT304601B0 | Transistor 2SC460(B)      |
| Q105                       | 1    | HT304601B0 | Transistor 2SC460(B)      |
| Q106                       | 1    | HC707300A0 | IC 74LS73                 |
| Q120                       | 1    | HF401011B0 | F.E.T. 3SK101(GR)         |
| Q121                       | 1    | HT323471O0 | Transistor 2SC2347        |
| Q122                       | 1    | HD20010060 | Diode 1SS53               |
| Q123                       | 1    | HD20010060 | Diode 1SS53               |
| Q124                       | 1    | HT309451Q0 | Transistor 2SC945(Q)      |
| Q201                       | 1    | HC10003090 | IC NJM4558D               |
| Q202                       | 1    | HC10003090 | IC NJM4558D               |
| Q301                       | 1    | HD40001060 | Varicap 1SV50             |
| Q302                       | 1    | HD40002060 | Varicap 1S2208            |
| Q303                       | 1    | HT304601B0 | Transistor 2SC460B        |
| Q304                       | 1    | HT323471O0 | Transistor 2SC2347        |



| REF. DESIG. | Q'TY | PART NO.   | DESCRIPTION                               |
|-------------|------|------------|---|
| Q305        | 1    | HD40001060 | Varicap 1SV50                             |
| Q306        | 1    | HD40001060 | Varicap 1SV50                             |
| Q307        | 1    | HT304601B0 | Transistor 2SC460B                        |
| Q308        | 1    | HT106082A0 | Transistor 2SA608                         |
| Q309        | 1    | HT106082A0 | Transistor 2SA608                         |
| Q310        | 1    | HT305360F0 | Transistor 2SC536F                        |
| Q311        | 1    | HT305360F0 | Transistor 2SC536F                        |
| Q401        | 1    | HF202461C0 | F.E.T. 2SK246(GR)                         |
| Q402        | 1    | HD20011050 | Diode 1S1555                              |
| Q403        | 1    | HD20011050 | Diode 1S1555                              |
| Q404        | 1    | HD20011050 | Diode 1S1555                              |
| Q405        | 1    | HD20011050 | Diode 1S1555                              |
| Q406        | 1    | HD20011050 | Diode 1S1555                              |
| Q407        | 1    | HD20011050 | Diode 1S1555                              |
| Q408        | 1    | HD20011050 | Diode 1S1555                              |
| Q409        | 1    | HT309451Q0 | Transistor 2SC945(Q)                      |
| Q410        | 1    | HD20011050 | Diode 1S1555                              |
| Q411        | 1    | HT309451Q0 | Transistor 2SC945(Q)                      |
| Q412        | 1    | HT309451Q0 | Transistor 2SC945(Q)                      |
| Q413        | 1    | HT305360F0 | Transistor 2SC536F                        |
| Q414        | 1    | HT305360F0 | Transistor 2SC536F                        |
| JL01        | 1    | YJ07000420 | Jack (2P)                                 |
| JL02        | 1    | YJ07000430 | Jack (3P)                                 |
| JL03        | 1    | YJ07000440 | Jack (4P)                                 |
| JL04        | 1    | YJ07000460 | Jack (6P)                                 |
| JL05        | 1    | YJ07000450 | Jack (5P)                                 |
| JL06        | 1    | YJ07000460 | Jack (6P)                                 |
| JL07        | 1    | YJ07000430 | Jack (3P)                                 |
| JL08        | 1    | YP10002210 | Plug (1P)                                 |
| JL09        | 1    | YP10002210 | Plug (1P)                                 |
| JL10        | 1    | YP10002210 | Plug (1P)                                 |
| JL01        | 1    | YJ07000510 | Jack (11P)                                |
| JL02        | 1    | YJ07000510 | Jack (11P)                                |
| JL03        | 1    | YJ07000440 | Jack (4P)                                 |
| JL04        | 1    | YJ07000430 | Jack (3P)                                 |
| JL05        | 1    | YJ07000430 | Jack (3P)                                 |
| JL06        | 1    | YJ07000440 | Jack (4P)                                 |
| JL07        | 1    | YJ07000420 | Jack (2P)                                 |
| JL08        | 1    | YP10002210 | Plug, Test Point                          |
| L101        | 1    | LC13940010 | Choke Coil, 390μH                         |
| L102        | 1    | LA70280090 | Ant. Coil                                 |
| L103        | 1    | LC11030020 | Choke Coil, 10μH                          |
| L104        | 1    | LC12720020 | Choke Coil, 2.7μH                         |
| L105        | 1    | LC11050040 | Choke Coil, 1mH                           |
| L120        | 1    | LA70280150 | Ant. Coil                                 |
| L121        | 1    | LA70280160 | Ant. Coil                                 |
| L122        | 1    | LC11030060 | Choke Coil, 10μH                          |
| L123        | 1    | LC11030060 | Choke Coil, 10μH                          |
| L201        | 1    | LC11220030 | Choke Coil, 1.2μH                         |
| L301        | 1    | LA70360010 | Ant. Coil                                 |
| L302        | 1    | LA70280090 | Ant. Coil                                 |
| L303        | 1    | LA70280090 | Ant. Coil                                 |
| L310        | 1    | LA70360010 | Ant. Coil                                 |
| SL01        | 1    | SS01020340 | Slide Switch                              |
| X101        | 1    | XY41024002 | Crystal 10.24MHz                          |
| X102        | 1    | XC111001X1 | Crystal 21.697500MHz                      |
| X103        | 1    | XC111003X1 | Crystal 22.0308MHz VXO                    |
| P120        | 1    | YF203C0010 | P120-VCO CIRCUIT BOARD<br>P.W. Board, VCO |

| REF. DESIG.   | Q'TY | PART NO.    | DESCRIPTION                                 |
|---|------|-------------|---|
| <b>P120-CAPACITORS</b>  |      |             |   |
| C120  | 1    | DC18202020  | Feedthru 2000pF                             |
| C121  | 1    | DC18202020  | Feedthru 2000pF                             |
| C122  | 1    | DC18202020  | Feedthru 2000pF                             |
| C123  | 1    | DD10050300  | Ceramic 5pF $\pm 0.25\text{pF}$             |
| C124  | 1    | DD15240300  | Ceramic 24pF $\pm 5\%$                      |
| C125  | 1    | DD10010300  | Ceramic 1pF $\pm 0.25\text{pF}$             |
| C126  | 1    | DD15200300  | Ceramic 20pF $\pm 5\%$                      |
| C127  | 1    | CT10600090  | Trimming 6pF                                |
| C128  | 1    | DD11060300  | Ceramic 6pF $\pm 0.5\text{pF}$              |
| C129  | 1    | DD15200300  | Ceramic 20pF $\pm 5\%$                      |
| C130  | 1    | DD111100300 | Ceramic 10pF $\pm 0.5\%$                    |
| C131  | 1    | DD111100300 | Ceramic 10pF $\pm 0.5\%$                    |
| C132  | 1    | EJ10601610  | Elect 10pF                                  |
| C133  | 1    | DD11070300  | Ceramic 7pF $\pm 0.5\%$                     |
| C134  | 1    | DK16102300  | Ceramic 0.001 $\mu\text{F}$ $\pm 10\%$      |
| C135  | 1    | EJ47601010  | Elect 47 $\mu\text{F}$ 10V                  |
| <b>P120-RESISTORS</b><br>(All Resistors are $\pm 5\%$ and $\frac{1}{4}\text{W}$ ) |      |             |   |
| R120  | 1    | GD05103140  | 10K $\Omega$                                |
| R121  | 1    | GD05104140  | 100K $\Omega$                               |
| R122  | 1    | GD05101140  | 100 $\Omega$                                |
| R123  | 1    | GD05473140  | 47K $\Omega$                                |
| R124  | 1    | GD05104140  | 100K $\Omega$                               |
| R125  | 1    | GD05102140  | 1K $\Omega$                                 |
| R126  | 1    | GD05101140  | 100 $\Omega$                                |
| <b>P120-SEMICONDUCTORS</b>  |      |             |   |
| Q110  | 1    | HD40001060  | Varicap 1SV50                               |
| Q111  | 1    | HD40001060  | Varicap 1SV50                               |
| Q112  | 1    | HF200191B0  | F.E.T. 2SK19(GR)                            |
| Q113  | 1    | HT319591A0  | Transistor 2SC1959(O)                       |
| <b>P120-COIL</b>  |      |             |   |
| L110  | 1    | LC11220030  | Choke Coil, 1.2 $\mu\text{H}$               |
| L111  | 1    | LA70350020  | Ant. Coil, 2.5T                             |
| L112  | 1    | LC12720080  | Choke Coil, 2.7 $\mu\text{H}$               |
| <b>P801-FUNCTION SWITCH CIRCUIT BOARD</b><br>P.W. Board, Function Switch          |      |             |   |
| P801  | 1    | WH208C2630  |   |
| C804  | 1    | EA47601030  | Elect Cap. 47 $\mu\text{F}$ 10V             |
| C818  | 1    | DD15220370  | Ceramic Cap. 22pF $\pm 5\%$                 |
| C819  | 1    | DD15220370  | Ceramic Cap. 22pF $\pm 5\%$                 |
| C820  | 1    | DK18103030  | Ceramic Cap. 0.01 $\mu\text{F}$             |
| C821  | 1    | DK10103030  | Ceramic Cap. 0.001 $\mu\text{F}$ -03        |
| Q804  | 1    | HD20011050  | Diode 1S1555                                |
| S803  | 1    | SS04030140  | Slide Switch, VFO                           |
| S804  | 1    | SS04030140  | Slide Switch, MODE                          |
| <b>P802-EXT POWER SWITCH CIRCUIT BOARD</b><br>P.W. Board, EXT Power Switch        |      |             |   |
| P802  | 1    | WH208C2640  |   |
| C805  | 1    | DK16102300  | Ceramic Cap. 0.001 $\mu\text{F}$ $\pm 10\%$ |
| C806  | 1    | DK16102300  | Ceramic Cap. 0.001 $\mu\text{F}$ $\pm 10\%$ |
| Q806  | 1    | HD20001100  | Diode 10D-2                                 |
| J802  | 1    | YJ01001390  | Jack, EXT Power                             |
| <b>P803-REAR SWITCH CIRCUIT BOARD</b><br>P.W. Board, Rear Switch                  |      |             |   |
| P803  | 1    | WH208C1320  |   |



| REF. DESIG. | Q'TY | PART NO.   | DESCRIPTION   |
|-------------|------|------------|---|
| C810        | 1    | DK16102300 | Ceramic Cap. 0.001 $\mu$ F $\pm$ 10%                      |
| C811        | 1    | DK16102300 | Ceramic Cap. 0.001 $\mu$ F $\pm$ 10%                      |
| C812        | 1    | DK16102300 | Ceramic Cap. 0.001 $\mu$ F $\pm$ 10%                      |
| C813        | 1    | DK16102300 | Ceramic Cap. 0.001 $\mu$ F $\pm$ 10%                      |
| C814        | 1    | DK16102300 | Ceramic Cap. 0.001 $\mu$ F $\pm$ 10%                      |
| C815        | 1    | DK16102300 | Ceramic Cap. 0.001 $\mu$ F $\pm$ 10%                      |
| C816        | 1    | DK16102300 | Ceramic Cap. 0.001 $\mu$ F $\pm$ 10%                      |
| CZ02        | 1    | EV22403560 | Elect. Cap. 0.22 $\mu$ F 35V                              |
| R803        | 1    | RA01040290 | Trimming Resistor 100k $\Omega$ (B)                       |
| S805        | 1    | SK02010010 | Keyboard Switch, Reset                                    |
| S806        | 1    | SS04030150 | Slide Switch  |
| P804        | 1    | YF200C0030 | <b>P804-LCD CIRCUIT BOARD</b><br>P.W. Board, LCD          |
| Q801        | 1    | HC10006370 | IC TP0401, LCD Driver                                     |
| Q810        | 1    | HQ20401440 | Display Unit  |
| J807        | 1    | YJ90000280 | Jack, Connector   |
| J808        | 1    | YJ90000280 | Jack, Connector   |
| PB01        | 1    | WH208C2620 | <b>PB01-BOOSTER CIRCUIT BOARD</b><br>P.W. Board, Booster  |
| CB01        | 1    | DK16102300 | <b>PB01-CAPACITORS</b><br>Ceramic 0.001 $\mu$ F $\pm$ 10% |
| CB02        | 1    | DD11100300 | Ceramic 10pF $\pm$ 0.5pF                                  |
| CB03        | 1    | DK16102300 | Ceramic 0.001 $\mu$ F $\pm$ 10%                           |
| CB04        | 1    | DK18103310 | Ceramic 0.01 $\mu$ F                                      |
| CB05        | 1    | DK18103310 | Ceramic 0.01 $\mu$ F                                      |
| CB06        | 1    | CT11000020 | Trimming 10pF   |
| CB07        | 1    | DD10050300 | Ceramic 5pF $\pm$ 0.25pF                                  |
| CB08        | 1    | DK18102030 | Ceramic 0.001 $\mu$ F                                     |
| CB09        | 1    | DK18103310 | Ceramic 0.01 $\mu$ F                                      |
| CB10        | 1    | DK18103310 | Ceramic 0.01 $\mu$ F                                      |
| CB11        | 1    | CT11000020 | Trimming 10pF   |
| CB12        | 1    | DD15220300 | Ceramic 22pF $\pm$ 5%                                     |
| CB13        | 1    | DD15300300 | Ceramic 30pF $\pm$ 5%                                     |
| CB14        | 1    | EA10601630 | Elect. 10 $\mu$ F 16V                                     |
| CB15        | 1    | DK16102300 | Ceramic 0.001 $\mu$ F $\pm$ 10%                           |
| CB16        | 1    | DK16102300 | Ceramic 0.001 $\mu$ F $\pm$ 10%                           |
| CB17        | 1    | DK18103310 | Ceramic 0.01 $\mu$ F                                      |
| CB18        | 1    | DK16102300 | Ceramic 0.001 $\mu$ F $\pm$ 10%                           |
| CB19        | 1    | CT11000020 | Trimming 10pF   |
| CB20        | 1    | DD15240300 | Ceramic 24pF $\pm$ 5%                                     |
| CB21        | 1    | DD15470300 | Ceramic 47pF $\pm$ 5%                                     |
| CB22        | 1    | EA10601630 | Elect. 10 $\mu$ F 16V                                     |
| CB23        | 1    | DK16102300 | Ceramic 0.001 $\mu$ F $\pm$ 10%                           |
| CB24        | 1    | DK16102300 | Ceramic 0.001 $\mu$ F $\pm$ 10%                           |
| CB25        | 1    | DK18102030 | Ceramic 0.001 $\mu$ F                                     |
| CB26        | 1    | DK18103310 | Ceramic 0.01 $\mu$ F                                      |
| CB27        | 1    | DK16102300 | Ceramic 0.001 $\mu$ F $\pm$ 10%                           |
| CB28        | 1    | DD15150300 | Ceramic 15pF $\pm$ 5%                                     |
| CB29        | 1    | CT11000020 | Trimming 10pF   |
| CB30        | 1    | CT11000020 | Trimming 10pF   |
| CB31        | 1    | DD11100300 | Ceramic 10pF $\pm$ 0.5pF                                  |
| CB32        | 1    | DD10010300 | Ceramic 1pF $\pm$ 0.25pF                                  |
| CB33        | 1    | DD15200300 | Ceramic 20pF $\pm$ 5%                                     |
| CB34        | 1    | DD15200300 | Ceramic 20pF $\pm$ 5%                                     |
| CB35        | 1    | DK16102300 | Ceramic 0.001 $\mu$ F $\pm$ 10%                           |
| CB36        | 1    | DK16102300 | Ceramic 0.001 $\mu$ F $\pm$ 10%                           |
| CB37        | 1    | DK16102300 | Ceramic 0.001 $\mu$ F $\pm$ 10%                           |

| REF. DESIG. | Q'TY | PART NO.   | DESCRIPTION  |
|-------------|------|------------|--|
| QB04        | 1    | HD20011050 | Diode 1S1555                                       |
| QB05        | 1    | HT31971100 | Transistor 2SC1971                                 |
| QB06        | 1    | HD20011050 | Diode 1S1555                                       |
| QB07        | 1    | HD10004020 | Diode OA91   |
| QB08        | 1    | HD10004020 | Diode OA91   |
| QB09        | 1    | HT309451Q0 | Transistor 2SC945(Q)                               |
| QB10        | 1    | HD20011050 | Diode 1S1555                                       |
| FB01        | 1    | FC90050010 | PB01-MISCELLANEOUS<br>Ferrite Core                 |
| FB02        | 1    | FC90050010 | Ferrite Core                                       |
| JB01        | 1    | YJ07000620 | Jack (2P)  |
| JB06        | 1    | YP10002210 | Plug   |
| JB07        | 1    | YP10002210 | Plug   |
| LB01        | 1    | LA70280170 | Ant. Coil  |
| LB02        | 1    | LC12010012 | Choke Coil, 8T                                     |
| LB03        | 1    | LC16000010 | Choke Coil, 5T                                     |
| LB04        | 1    | LC15000110 | Choke Coil, 2T                                     |
| LB05        | 1    | LM12030010 | Twist Coil, 12T                                    |
| LB06        | 1    | LC12010012 | Choke Coil, 8T                                     |
| LB07        | 1    | LC12010012 | Choke Coil, 8T                                     |
| LB08        | 1    | LM12030010 | Twist Coil, 12T                                    |
| LB09        | 1    | LC12010012 | Choke Coil, 8T                                     |
| LB10        | 1    | LC12010012 | Choke Coil, 8T                                     |
| LB11        | 1    | LM12030010 | Twist Coil, 12T                                    |
| LB12        | 1    | LC12010012 | Choke Coil, 8T                                     |
| LB13        | 1    | LC16000010 | Choke Coil, 5T                                     |
| LB14        | 1    | LC16000010 | Choke Coil, 5T                                     |
| LB15        | 1    | LC11030020 | Choke Coil, 10μH                                   |
| LB16        | 1    | LC12010012 | Choke Coil, 8T                                     |
| LB17        | 1    | LA70280170 | Ant. Coil  |
| CB38        | 1    | EA22601630 | Elect 22μF 16V                                     |
| CB39        | 1    | DK16102300 | Ceramic 0.001μF ±10%                               |
| CB40        | 1    | DK16102300 | Ceramic 0.001μF ±10%                               |
| CB41        | 1    | EA22602530 | Elect 22μF 25V                                     |
| CB42        | 1    | DK18103030 | Ceramic 0.01μF                                     |
| CB43        | 1    | DK18103310 | Ceramic 0.01μF                                     |
| CB44        | 1    | DD16005370 | Ceramic 0.5pF                                      |
| RB01        | 1    | GD05470140 | PB01-RESISTORS<br>(All Resistors are ±5% and 1/4W) |
| RB02        | 1    | GD05471140 | 47Ω  |
| RB03        | 1    | GD05104140 | 470Ω   |
| RB04        | 1    | GD05153140 | 100KΩ  |
| RB05        | 1    | GD05563140 | 15KΩ   |
| RB06        | 1    | GD05563140 | 56KΩ   |
| RB07        | 1    | GD05101140 | 56KΩ   |
| RB08        | 1    | GD05331140 | 100Ω   |
| RB09        | 1    | GD05102140 | 330Ω   |
| RB10        | 1    | GD05221140 | 1KΩ  |
| RB11        | 1    | GD05470140 | 220Ω   |
| RB12        | 1    | GD05681140 | 47Ω  |
| RB13        | 1    | GD05182140 | 680Ω   |
| RB14        | 1    | GD05100140 | 1.8KΩ  |
| RB15        | 1    | GD05221140 | 10Ω  |
| RB16        | 1    | RA01020330 | 220Ω   |
| RB17        | 1    | GD05221140 | 1KΩ(B) Trimming                                    |
| RB18        | 1    | GD05100140 | 220Ω   |
| RB19        | 1    | GD05391140 | 100Ω   |
| RB20        | 1    | RA04720120 | 390Ω   |
| QB01        | 1    | HF401011B0 | 4.7KΩ(B) Trimming                                  |
| QB02        | 1    | HT32053000 | PB01-SEMICONDUCTORS<br>F.E.T. 3SK101(GR)           |
| QB03        | 1    | HT31970100 | Transistor 2SC2053                                 |
|             |      |            | Transistor 2SC1970                                 |



| REF. DESIG. | QTY | PART NO.   | DESCRIPTION           |
|-------------|-----|------------|-----------------------|
| CN19        | 1   | DS17103010 | Semicon 0.01µF ±20%   |
| CN20        | 1   | DS17103010 | Semicon 0.01µF ±20%   |
| CN21        | 1   | DK16471300 | Ceramic 470pF ±10%    |
| CN22        | 1   | EJ47502510 | Elect 4.7µF 25V       |
| CN23        | 1   | DS17332010 | Semicon 0.0033µF ±20% |
| CN24        | 1   | EJ10505010 | Elect 1µF 50V         |
| CN25        | 1   | EA10701030 | Elect 100µF 10V       |
| CN26        | 1   | EA10602530 | Elect 10µF 25V        |
| CR01        | 1   | DD15200300 | Ceramic 20pF ±5%      |
| CR02        | 1   | DK16102300 | Ceramic 0.001µF ±10%  |
| CR03        | 1   | DK18103030 | Ceramic 0.01µF ±10%   |
| CR04        | 1   | DK16102300 | Ceramic 0.001µF ±10%  |
| CR05        | 1   | DK16102300 | Ceramic 0.001µF ±10%  |
| CR06        | 1   | DK16102300 | Ceramic 0.001µF ±10%  |
| CR07        | 1   | DD15200300 | Ceramic 20pF ±5%      |
| CR08        | 1   | DD10050300 | Ceramic 5pF ±0.25pF   |
| CR09        | 1   | DK16102300 | Ceramic 0.001µF ±10%  |
| CR10        | 1   | DK16102300 | Ceramic 0.001µF ±10%  |
| CR11        | 1   | DD10020300 | Ceramic 2pF ±0.25pF   |
| CR12        | 1   | DK18103030 | Ceramic 0.01µF ±10%   |
| CR13        | 1   | DK18103030 | Ceramic 0.01µF ±10%   |
| CR14        | 1   | DK16102300 | Ceramic 0.001µF ±10%  |
| CR15        | 1   | DS17103010 | Semicon 0.01µF ±20%   |
| CR16        | 1   | DK18103030 | Ceramic 0.01µF ±10%   |
| CR17        | 1   | DK16471300 | Ceramic 470pF ±10%    |
| CR18        | 1   | DK16102300 | Ceramic 0.001µF ±10%  |
| CR19        | 1   | DK18103030 | Ceramic 0.01µF ±10%   |
| CR20        | 1   | DK18103030 | Ceramic 0.01µF ±10%   |
| CR21        | 1   | DD15120300 | Ceramic 12pF ±5%      |
| CR22        | 1   | DK18103030 | Ceramic 0.01µF ±10%   |
| CR23        | 1   | DK16102300 | Ceramic 0.001µF ±10%  |
| CR24        | 1   | DD11080300 | Ceramic 8pF ±0.5pF    |

| REF. DESIG. | QTY | PART NO.   | DESCRIPTION                                      |
|-------------|-----|------------|--|
| PR01        | 1   | WH208C2610 | PR01-RX-TX<br>CIRCUIT BOARD<br>P.W. Board, RX-TX |
| CF01        | 1   | CT11100120 | PR01-CAPACITORS<br>Trimming 10pF                 |
| CF02        | 1   | DK16102300 | Ceramic 0.001µF ±10%                             |
| CF03        | 1   | DD15300300 | Ceramic 30pF ±5%                                 |
| CF04        | 1   | DD15101370 | Ceramic 100pF ±5%                                |
| CF05        | 1   | DD15330300 | Ceramic 33pF ±5%                                 |
| CF06        | 1   | DD15330300 | Ceramic 33pF ±5%                                 |
| CF07        | 1   | DD15220300 | Ceramic 22pF ±5%                                 |
| CF08        | 1   | DD15330300 | Ceramic 33pF ±5%                                 |
| CF10        | 1   | DK16102300 | Ceramic 0.001µF ±10%                             |
| CF11        | 1   | EA47502530 | Ceramic 4.7µF 25V                                |
| CF12        | 1   | DK18103030 | Ceramic 0.01µF ±10%                              |
| CF13        | 1   | DD15150300 | Ceramic 15pF ±5%                                 |
| CF14        | 1   | DK18103030 | Ceramic 0.01µF ±10%                              |
| CN01        | 1   | DD10010300 | Ceramic 1pF ±0.25pF                              |
| CN05        | 1   | DS17223010 | Semicon 0.022µF ±20%                             |
| CN06        | 1   | DK18103030 | Ceramic 0.01µF ±10%                              |
| CN07        | 1   | DD15101350 | Ceramic 100pF ±5%                                |
| CN08        | 1   | DS17223010 | Semicon 0.022µF ±20%                             |
| CN09        | 1   | DK18103030 | Ceramic 0.01µF ±10%                              |
| CN10        | 1   | DD15470300 | Ceramic 47pF ±5%                                 |
| CN11        | 1   | DK16102300 | Ceramic 0.001µF ±10%                             |
| CN12        | 1   | DK16102300 | Ceramic 0.001µF ±10%                             |
| CN13        | 1   | DK18103010 | Ceramic 0.01µF ±10%                              |
| CN15        | 1   | EA22601630 | Elect 22µF 16V                                   |
| CN16        | 1   | EV10601060 | Elect 10µF 10V                                   |
| CN18        | 1   | DS17103010 | Semicon 0.01µF ±20%                              |

| REF. DESIG. | Q'TY | PART NO.   | DESCRIPTION           |
|-------------|------|------------|-----------------------|
| CR60        | 1    | EV10502560 | Elect 1µF 25V         |
| CR61        | 1    | DD15120300 | Ceramic 12pF ±5%      |
| CR62        | 1    | DD15430330 | Ceramic 43pF ±5%      |
| CR63        | 1    | EA10701030 | Elect 100µF 10V       |
| CR64        | 1    | DK18103030 | Ceramic 0.01µF ±20%   |
| CR65        | 1    | DS17152010 | Semicon 0.0015µF ±20% |
| CR66        | 1    | DS17473010 | Semicon 0.047µF ±20%  |
| CR67        | 1    | DS17473010 | Semicon 0.047µF ±20%  |
| CR68        | 1    | EV10601060 | Elect 10µF 10V        |
| CR69        | 1    | DK18103030 | Ceramic 0.01µF ±20%   |
| CR70        | 1    | DS17223010 | Semicon 0.022µF ±20%  |
| CR71        | 1    | EQ47502530 | Elect 4.7µF 25V       |
| CR72        | 1    | DK18103030 | Ceramic 0.01µF ±5%    |
| CR73        | 1    | DD15150300 | Ceramic 15pF ±5%      |
| CR74        | 1    | DK18103030 | Ceramic 0.01µF ±20%   |
| CR75        | 1    | EJ10405010 | Elect. 0.1µF 50V      |
| CR77        | 1    | EV10403560 | Elect 0.1µF 35V       |
| CR78        | 1    | DS17472010 | Semicon 0.0047µF ±20% |
| CR79        | 1    | DK18103030 | Ceramic 0.01µF ±20%   |
| CR80        | 1    | EJ10601610 | Elect 10µF 16V        |
| CR81        | 1    | EA47601630 | Elect 47µF 16V        |
| CR82        | 1    | DK16101300 | Ceramic 100pF ±10%    |
| CR83        | 1    | EA47601030 | Elect 47µF 10V        |
| CR84        | 1    | EA10701630 | Elect 100µF 16V       |
| CR85        | 1    | EV33601060 | Elect 33µF 10V        |
| CR86        | 1    | EA10701030 | Elect 100µF 10V       |
| CR87        | 1    | DF16104010 | Film 0.1µF ±10%       |
| CR88        | 1    | DK18103030 | Ceramic 0.01µF ±10%   |
| CR89        | 1    | DK18103030 | Ceramic 0.01µF ±10%   |
| CT01        | 1    | CT12000090 | Trimming 20pF         |
| CT02        | 1    | CT12000090 | Trimming 20pF         |
| CT03        | 1    | CT12000090 | Trimming 20pF         |

| REF. DESIG. | Q'TY | PART NO.   | DESCRIPTION           |
|-------------|------|------------|-----------------------|
| CR26        | 1    | DS17333010 | Semicon 0.033µF ±20%  |
| CR27        | 1    | DK18103030 | Ceramic 0.01µF ±20%   |
| CR28        | 1    | DS17103010 | Semicon 0.01µF ±5%    |
| CR29        | 1    | DD15101370 | Ceramic 100pF ±5%     |
| CR30        | 1    | DK18103030 | Ceramic 0.01µF ±20%   |
| CR31        | 1    | DK18103030 | Ceramic 0.01µF ±20%   |
| CR32        | 1    | DS17223010 | Semicon 0.022µF ±20%  |
| CR33        | 1    | DS17223010 | Semicon 0.022µF ±20%  |
| CR34        | 1    | DK18103030 | Ceramic 0.01µF ±5%    |
| CR36        | 1    | DD15101370 | Ceramic 100pF ±20%    |
| CR37        | 1    | DK18103030 | Ceramic 0.01µF ±20%   |
| CR39        | 1    | DS17223010 | Semicon 0.022µF ±20%  |
| CR40        | 1    | DS17223010 | Semicon 0.022µF ±20%  |
| CR41        | 1    | DS17103010 | Semicon 0.01µF ±20%   |
| CR42        | 1    | DD15220300 | Ceramic 22pF ±5%      |
| CR43        | 1    | DK18103030 | Ceramic 0.01µF ±20%   |
| CR44        | 1    | DK18103030 | Ceramic 0.01µF ±20%   |
| CR45        | 1    | EV22403560 | Elect 0.22µF 35V      |
| CR46        | 1    | DK16101300 | Ceramic 100pF ±10%    |
| CR47        | 1    | DS17223010 | Semicon 0.022µF ±10%  |
| CR48        | 1    | EA47601630 | Elect 47µF 16V        |
| CR49        | 1    | DK16102300 | Ceramic 0.001µF ±10%  |
| CR50        | 1    | DD15151370 | Ceramic 150pF ±5%     |
| CR51        | 1    | DD15360300 | Ceramic 36pF ±5%      |
| CR52        | 1    | DD15560330 | Ceramic 56pF ±5%      |
| CR53        | 1    | EV10502560 | Elect 1µF 25V         |
| CR54        | 1    | EV10502560 | Elect 1µF 25V         |
| CR55        | 1    | DS17473010 | Semicon 0.047µF ±20%  |
| CR56        | 1    | DS17332010 | Semicon 0.0033µF ±20% |
| CR57        | 1    | DK16471300 | Ceramic 470pF ±10%    |
| CR58        | 1    | EV10502560 | Elect 1µF 25V         |
| CR59        | 1    | DS17223010 | Semicon 0.022µF ±20%  |



| REF. DESIG. | Q'TY | PART NO.   | DESCRIPTION          |
|-------------|------|------------|----------------------|
| CT04        | 1    | CT12000090 | Trimming 20pF        |
| CT05        | 1    | DK18103030 | Ceramic 0.01μF       |
| CT06        | 1    | DK18103030 | Ceramic 0.01μF       |
| CT07        | 1    | DK18103030 | Ceramic 0.01μF       |
| CT08        | 1    | DK18103030 | Ceramic 0.01μF       |
| CT09        | 1    | DD15200300 | Ceramic 10pF ±0.5pF  |
| CT10        | 1    | DD11100300 | Ceramic 20pF ±5%     |
| CT11        | 1    | DK18103030 | Ceramic 0.01μF       |
| CT12        | 1    | DD15510330 | Ceramic 51pF ±5%     |
| CT13        | 1    | DD15510330 | Ceramic 51pF ±5%     |
| CT14        | 1    | DK18103030 | Ceramic 0.01μF       |
| CT15        | 1    | DK18103030 | Ceramic 0.01μF       |
| CT16        | 1    | DD15470300 | Ceramic 47pF ±5%     |
| CT17        | 1    | DD15470300 | Ceramic 47pF ±5%     |
| CT18        | 1    | DK18103030 | Ceramic 0.01μF       |
| CT19        | 1    | DK16102300 | Ceramic 0.001μF ±10% |
| CT21        | 1    | DD15510330 | Ceramic 51pF ±5%     |
| CT22        | 1    | DK18103030 | Ceramic 0.01μF       |
| CT23        | 1    | DD15220300 | Ceramic 22pF ±5%     |
| CT24        | 1    | CT12000090 | Trimming 20pF        |
| CT25        | 1    | DD15330300 | Ceramic 33pF ±5%     |
| CT26        | 1    | DK18103030 | Ceramic 0.01μF       |
| CT27        | 1    | DK18103030 | Ceramic 0.01μF       |
| CT28        | 1    | DK16331300 | Ceramic 330pF ±10%   |
| CT29        | 1    | DS17473010 | Semicon 0.047μF ±20% |
| CT30        | 1    | DK16101300 | Ceramic 100pF ±10%   |
| CT31        | 1    | DS17103010 | Semicon 0.01μF ±20%  |
| CT32        | 1    | EV10502560 | Elect 1μF 25V        |
| CT33        | 1    | EV33501060 | Elect 3.3μF 10V      |
| CT34        | 1    | EJ47502510 | Elect 4.7μF 25V      |
| CT35        | 1    | DK18103030 | Ceramic 0.01μF       |
| CT36        | 1    | DK18103030 | Ceramic 0.01μF       |
| CT37        | 1    | DD15220300 | Ceramic 22pF ±5%     |

| REF. DESIG.   | Q'TY | PART NO.   | DESCRIPTION          |
|---|------|------------|----------------------|
| CT38  | 1    | DD15220300 | Ceramic 22pF ±5%     |
| CT39  | 1    | DK18103030 | Ceramic 0.01μF       |
| CT40  | 1    | DK18103030 | Ceramic 0.01μF       |
| CT41  | 1    | DK18103030 | Ceramic 0.01μF       |
| CT56  | 1    | DD10050300 | Ceramic 5pF ±20%     |
| CT42  | 1    | DS17223010 | Semicon 0.022μF      |
| CT55  | 1    | DK18103030 | Ceramic 0.01μF       |
| CT44  | 1    | DK18103030 | Ceramic 0.01μF       |
| CT45  | 1    | DK18103030 | Ceramic 0.01μF       |
| CT47  | 1    | DK18103030 | Ceramic 0.01μF       |
| CT48  | 1    | DS17103010 | Semicon 0.01μF ±20%  |
| CT49  | 1    | DS17223030 | 0.022μF              |
| CT50  | 1    | DS17223030 | 0.022μF              |
| CT51  | 1    | DK18102030 | Ceramic 0.001μF ±10% |
| CT52  | 1    | DK16102300 | Ceramic 0.001μF ±10% |
| CT53  | 1    | DK16102300 | Ceramic 0.001μF ±10% |
| CT54  | 1    | DD10050300 | Ceramic 5pF          |
| <b>PR01-RESISTORS</b><br>(All Resistors are ±5% and 1/8W) |      |            |                      |
| RF01  | 1    | GD05272140 | 2.7KΩ                |
| RF14  | 1    | RA04720120 | 4.7KΩ(B) Trimming    |
| RN01  | 1    | GD05221140 | 220Ω                 |
| RN02  | 1    | GD05223140 | 22KΩ                 |
| RN03  | 1    | GD05472180 | 4.7KΩ                |
| RN07  | 1    | GD05102140 | 1KΩ                  |
| RN08  | 1    | GD05822140 | 8.2KΩ                |
| RN09  | 1    | GD05331140 | 330Ω                 |
| RN10  | 1    | GD05223140 | 22KΩ                 |
| RN11  | 1    | GD05223140 | 22KΩ                 |
| RN12  | 1    | GD05103140 | 10KΩ                 |
| RN13  | 1    | GD05101140 | 100Ω                 |
| RN14  | 1    | GD05333140 | 33KΩ                 |

| REF. DESIG. | Q'TY | PART NO.   | DESCRIPTION       |
|-------------|------|------------|-------------------|
| RR26        | 1    | GD05681140 | 680Ω              |
| RR28        | 1    | GD05393140 | 39KΩ              |
| RR29        | 1    | GD05821140 | 820Ω              |
| RR31        | 1    | GD05101140 | 100Ω              |
| RR32        | 1    | GD05472140 | 4.7KΩ             |
| RR33        | 1    | GD05221140 | 220Ω              |
| RR34        | 1    | GD05562140 | 5.6KΩ             |
| RR37        | 1    | GD05222140 | 2.2KΩ             |
| RR38        | 1    | GD05221140 | 220Ω              |
| RR39        | 1    | GD05103140 | 10KΩ              |
| RR40        | 1    | GD05221140 | 220Ω              |
| RR41        | 1    | GD05103140 | 10KΩ              |
| RR42        | 1    | GD05471180 | 470Ω              |
| RR45        | 1    | GD05101140 | 100Ω              |
| RR46        | 1    | GD05172140 | 47KΩ              |
| RR47        | 1    | GD05221140 | 220Ω              |
| RR49        | 1    | GD05471140 | 470Ω              |
| RR50        | 1    | GD05821140 | 820Ω              |
| RR51        | 1    | GD05471140 | 470Ω              |
| RR52        | 1    | GD05105140 | 1MΩ               |
| RR53        | 1    | RA02220160 | 2.2KΩ(B) Trimming |
| RR54        | 1    | GD05222140 | 2.2KΩ             |
| RR55        | 1    | GD05332140 | 3.3KΩ             |
| RR56        | 1    | GD05332140 | 3.3KΩ             |
| RR57        | 1    | RA01020330 | 1KΩ(B) Trimming   |
| RR58        | 1    | RA04720120 | 4.7KΩ(B) Trimming |
| RR59        | 1    | GD05103140 | 10KΩ              |
| RR60        | 1    | GD05224140 | 220KΩ             |
| RR61        | 1    | GD05392140 | 3.9KΩ             |
| RR62        | 1    | GD05332140 | 3.3KΩ             |
| RR63        | 1    | GD05333140 | 33KΩ              |
| RR64        | 1    | GD05222140 | 2.2KΩ             |
| RR65        | 1    | GD05222140 | 2.2KΩ             |

| REF. DESIG. | Q'TY | PART NO.   | DESCRIPTION      |
|-------------|------|------------|------------------|
| RN15        | 1    | GD05273140 | 27KΩ             |
| RN17        | 1    | GD05223140 | 22KΩ             |
| RN18        | 1    | GD05103140 | 10KΩ             |
| RN19        | 1    | GD05332140 | 3.3KΩ            |
| RN20        | 1    | GD05822140 | 8.2KΩ            |
| RN21        | 1    | GD05822140 | 8.2KΩ            |
| RN22        | 1    | GD05474140 | 470KΩ            |
| RN23        | 1    | GD05222140 | 2.2KΩ            |
| RN24        | 1    | GD05822140 | 8.2KΩ            |
| RN25        | 1    | GD05472180 | 4.7KΩ            |
| RN26        | 1    | RA02230090 | 22KΩ(B) Trimming |
| RN27        | 1    | GD05472140 | 4.7KΩ            |
| RR01        | 1    | GD05104140 | 100KΩ            |
| RR02        | 1    | GD05223140 | 22KΩ             |
| RR05        | 1    | GD05470140 | 47Ω              |
| RR06        | 1    | GD05101140 | 100Ω             |
| RR07        | 1    | GD05101140 | 100Ω             |
| RR08        | 1    | GD05562140 | 5.6KΩ            |
| RR09        | 1    | GD05473140 | 47KΩ             |
| RR10        | 1    | GD05473140 | 47KΩ             |
| RR11        | 1    | GD05560140 | 56Ω              |
| RR12        | 1    | GD05101140 | 100Ω             |
| RR13        | 1    | GD05152140 | 1.5KΩ            |
| RR14        | 1    | GD05152140 | 1.5KΩ            |
| RR15        | 1    | GD05103180 | 10KΩ             |
| RR16        | 1    | GD05393140 | 39KΩ             |
| RR19        | 1    | GD05151140 | 150Ω             |
| RR20        | 1    | GD05101140 | 100Ω             |
| RR21        | 1    | GD05472140 | 4.7KΩ            |
| RR22        | 1    | GD05103140 | 10KΩ             |
| RR23        | 1    | GD05103140 | 10KΩ             |
| RR24        | 1    | GD05333140 | 33KΩ             |



| REF. DESIG. | Q'TY | PART NO.   | DESCRIPTION                |
|-------------|------|------------|----------------------------|
| RR66        | 1    | GD05473140 | 47K $\Omega$               |
| RR67        | 1    | GD05123140 | 12K $\Omega$               |
| RR68        | 1    | GD05273140 | 27K $\Omega$               |
| RR69        | 1    | GD05333140 | 33K $\Omega$               |
| RR70        | 1    | RA02220150 | 2.2K $\Omega$ (B) Trimming |
| RR71        | 1    | GD05822140 | 8.2K $\Omega$              |
| RR72        | 1    | GD05822140 | 8.2K $\Omega$              |
| RR73        | 1    | GD05103140 | 10K $\Omega$               |
| RR74        | 1    | GD05185140 | 1.8M $\Omega$              |
| RR75        | 1    | GD05393140 | 39K $\Omega$               |
| RR76        | 1    | GD05103140 | 10K $\Omega$               |
| RR77        | 1    | GD05103140 | 10K $\Omega$               |
| RR78        | 1    | GD05224140 | 220K $\Omega$              |
| RR79        | 1    | GD05104140 | 100K $\Omega$              |
| RR80        | 1    | GD05153140 | 15K $\Omega$               |
| RR81        | 1    | GD05151140 | 150 $\Omega$               |
| RR82        | 1    | GD05332140 | 3.3K $\Omega$              |
| RR83        | 1    | GD05104180 | 100K $\Omega$              |
| RR84        | 1    | GD05682180 | 6.8K $\Omega$              |
| RR85        | 1    | GD05102180 | 1K $\Omega$                |
| RR86        | 1    | RC00000120 | 0 $\Omega$                 |
| RT01        | 1    | GD05104140 | 100K $\Omega$              |
| RT02        | 1    | GD05104140 | 100K $\Omega$              |
| RT03        | 1    | GD05104140 | 100K $\Omega$              |
| RT04        | 1    | GD05104140 | 100K $\Omega$              |
| RT05        | 1    | GD05392140 | 3.9K $\Omega$              |
| RT06        | 1    | GD05333140 | 33K $\Omega$               |
| RT07        | 1    | GD05153140 | 15K $\Omega$               |
| RT08        | 1    | GD05473140 | 47K $\Omega$               |
| RT09        | 1    | GD05562140 | 5.6K $\Omega$              |
| RT10        | 1    | GD05183140 | 18K $\Omega$               |
| RT11        | 1    | GD05102140 | 1K $\Omega$                |
| RT12        | 1    | GD05472140 | 4.7K $\Omega$              |
| RT13        | 1    | GD05332140 | 3.3K $\Omega$              |
| RT14        | 1    | GD05154140 | 150K $\Omega$              |
| RT15        | 1    | GD05330140 | 33 $\Omega$                |
| RT16        | 1    | GD05331140 | 330 $\Omega$               |
| RT17        | 1    | GD05221140 | 220 $\Omega$               |
| RT18        | 1    | RA01010100 | 100 $\Omega$ (B) Trimming  |
| RT19        | 1    | GD05221140 | 220 $\Omega$               |
| RT20        | 1    | GD05103140 | 10K $\Omega$               |
| RT21        | 1    | GD05101140 | 100 $\Omega$               |
| RT22        | 1    | GD05221140 | 220 $\Omega$               |
| RT23        | 1    | RA04720120 | 4.7K $\Omega$ (B) Trimming |
| RT24        | 1    | GD05154140 | 150K $\Omega$              |
| RT25        | 1    | GD05152140 | 1.5K $\Omega$              |
| RT26        | 1    | GD05223140 | 22K $\Omega$               |
| RT27        | 1    | GD05681140 | 680 $\Omega$               |
| RT28        | 1    | GD05102140 | 1K $\Omega$                |
| RT29        | 1    | GD05331140 | 330 $\Omega$               |
| RT30        | 1    | GD05223140 | 22K $\Omega$               |
| RT48        | 1    | GD05104140 | 100K $\Omega$              |
| RT31        | 1    | GD05103140 | 10K $\Omega$               |
| RT32        | 1    | GD05333140 | 33K $\Omega$               |
| RT33        | 1    | GD05103180 | 10K $\Omega$               |
| RT34        | 1    | GD05103140 | 10K $\Omega$               |
| RT35        | 1    | GD05103140 | 10K $\Omega$               |
| RT36        | 1    | RA04710060 | 470 $\Omega$ (B) Trimming  |
| RT37        | 1    | GD05332140 | 3.3K $\Omega$              |
| RT38        | 1    | GD05101140 | 100 $\Omega$               |
| RT39        | 1    | GD05103140 | 10K $\Omega$               |
| RT40        | 1    | GD05103140 | 10K $\Omega$               |
| RT41        | 1    | GD05103140 | 10K $\Omega$               |
| RT42        | 1    | GD05563140 | 56K $\Omega$               |
| RT44        | 1    | GD05563140 | 56K $\Omega$               |
| RT45        | 1    | GD05563140 | 56K $\Omega$               |
| RT46        | 1    | GD05563140 | 56K $\Omega$               |
| RT47        | 1    | GD05103140 | 10K $\Omega$               |

| REF. DESIG. | Q'TY | PART NO.   | DESCRIPTION          |
|-------------|------|------------|----------------------|
| QF30        | 1    | HD20001200 | PR01-SEMICONDUCTORS  |
| QF31        | 1    | HD20001200 | Diode MI301          |
| QF32        | 1    | HD20005060 | Diode MI301          |
| QF33        | 1    | HD20011050 | Diode 1S16           |
| QF34        | 1    | HD20011050 | Diode 1S1555         |
| QF34        | 1    | HD20011050 | Diode 1S1555         |
| QN01        | 1    | HD10004020 | Diode OA91           |
| QN02        | 1    | HF202411B0 | F.E.T. 2SK241(Y)     |
| QN03        | 1    | HT304601B0 | Transistor 2SC640(B) |
| QN05        | 1    | HT309451Q0 | Transistor 2SC945(Q) |
| QN06        | 1    | HT309451Q0 | Transistor 2SC945(Q) |
| QN07        | 1    | HT107331Q0 | Transistor 2SA733(Q) |
| QN08        | 1    | HT309451Q0 | Transistor 2SC945(Q) |
| QN09        | 1    | HT309451Q0 | Transistor 2SC945(Q) |
| QN10        | 1    | HT309451Q0 | Transistor 2SC945(Q) |
| QN11        | 1    | HT107331Q0 | Transistor 2SA733(Q) |
| QN30        | 1    | HD10004020 | Diode OA91           |
| QN31        | 1    | HD10004020 | Diode OA91           |
| QN32        | 1    | HD20011050 | Diode 1S1555         |
| QR01        | 1    | HF202411B0 | F.E.T. 2SK241(Y)     |
| QR02        | 1    | HF401021B0 | F.E.T. 3SK102(GR)    |
| QR03        | 1    | HF202411B0 | F.E.T. 2SK241(Y)     |
| QR04        | 1    | HF202411B0 | F.E.T. 2SK241(Y)     |
| QR05        | 1    | HF202411B0 | F.E.T. 2SK241(Y)     |
| QR06        | 1    | HF401011B0 | F.E.T. 3SK101(GR)    |
| QR07        | 1    | HT309001E0 | Transistor 2SC900(E) |
| QR08        | 1    | HC10015170 | IC MC3357P           |
| QR09        | 1    | HT309001E0 | Transistor 2SC900(E) |
| QR10        | 1    | HT309451Q0 | Transistor 2SC945(Q) |
| QR11        | 1    | HC10037060 | IC $\mu$ PC575-C2    |
| QR30        | 1    | HD20011050 | Diode 1S1555         |
| REF. DESIG. | Q'TY | PART NO.   | DESCRIPTION          |
| QR31        | 1    | HD20011050 | Diode 1S1555         |
| QR32        | 1    | HD20013060 | Diode ND487R1-3R     |
| QR33        | 1    | HD10004020 | Diode OA91           |
| QR34        | 1    | HD10004020 | Diode OA91           |
| QR35        | 1    | HD10004020 | Diode OA91           |
| QR36        | 1    | HD20011050 | Diode 1S1555         |
| QR37        | 1    | HD20011050 | Diode 1S1555         |
| QR38        | 1    | HD20011050 | Diode 1S1555         |
| QR39        | 1    | HD10004020 | Diode OA91           |
| QR40        | 1    | HD20011050 | Diode 1S1555         |
| QR41        | 1    | HD20011050 | Diode 1S1555         |
| QR43        | 1    | HD30033090 | Zener WZ-052         |
| QR44        | 1    | HD20011050 | Diode 1S1555         |
| QR45        | 1    | HD20011050 | Diode 1S1555         |
| QR46        | 1    | HD10004020 | Diode OA91           |
| QR47        | 1    | HD20011050 | Diode 1S1555         |
| QT01        | 1    | HT309451Q0 | Transistor 2SC945(Q) |
| QT02        | 1    | HT304601B0 | Transistor 2SC460(B) |
| QT03        | 1    | HT304601B0 | Transistor 2SC460(B) |
| QT04        | 1    | HT304601B0 | Transistor 2SC460(B) |
| QT05        | 1    | HF200191B0 | F.E.T. 2SK19(GR)     |
| QT06        | 1    | HT309001E0 | Transistor 2SC900(E) |
| QT07        | 1    | HT309001E0 | Transistor 2SC900(E) |
| QT08        | 1    | HF401011C0 | F.E.T. 3SK101(BL)    |
| QT09        | 1    | HF401011C0 | F.E.T. 3SK101(BL)    |
| QT10        | 1    | HT107331Q0 | Transistor 2SA733(Q) |
| QT11        | 1    | HT309451Q0 | Transistor 2SC945(Q) |
| QT30        | 1    | HD20011050 | Diode 1S1555         |
| QT31        | 1    | HD20011050 | Diode 1S1555         |
| QT32        | 1    | HD20011050 | Diode 1S1555         |
| QT33        | 1    | HD20011050 | Diode 1S1555         |



| REF. DESIG. | QTY | PART NO.   | DESCRIPTION       |
|-------------|-----|------------|-------------------|
| LF06        | 1   | LL635004A0 | Coil, 4T          |
| LF07        | 1   | LL653004A3 | Coil, 3T          |
| LN01        | 1   | LI71016100 | I.F.T. Coil       |
| LN02        | 1   | LI71016100 | I.F.T. Coil       |
| LN03        | 1   | LI71016100 | I.F.T. Coil       |
| LR01        | 1   | LA70260040 | Ant. Coil         |
| LR02        | 1   | LA15040010 | Ant. Coil         |
| LR03        | 1   | LI71016100 | I.F.T. Coil       |
| LR04        | 1   | LI71016100 | I.F.T. Coil       |
| LR05        | 1   | LI71016120 | I.F.T. Coil       |
| LR06        | 1   | LI71016150 | I.F.T. Coil       |
| LR07        | 1   | LI71016150 | I.F.T. Coil       |
| LR08        | 1   | LI71016160 | I.F.T. Coil       |
| LR09        | 1   | LI71016090 | I.F.T. Coil       |
| LR30        | 1   | LC11050040 | Choke Coil, 1mH   |
| LR31        | 1   | LC11030060 | Choke Coil, 10μH  |
| LR32        | 1   | LC11040010 | Choke Coil, 100μH |
| LR33        | 1   | LC11030060 | Choke Coil, 10μH  |
| LR34        | 1   | LC11050040 | Choke Coil, 1mH   |
| LR35        | 1   | LA55016080 | Ant. Coil         |
| LT01        | 1   | LA70360020 | Ant. Coil         |
| LT02        | 1   | LI71016120 | I.F.T. Coil       |
| LT03        | 1   | LI71016120 | I.F.T. Coil       |
| LT04        | 1   | LA70280170 | Ant. Coil         |
| LT05        | 1   | LA70270030 | Ant. Coil         |
| LT06        | 1   | LA55016080 | Ant. Coil         |
| LT30        | 1   | LC13940010 | Choke Coil, 390μH |
| LT31        | 1   | LC13940010 | Choke Coil, 390μH |
| LT32        | 1   | LC13940010 | Choke Coil, 390μH |
| LT33        | 1   | LC13940010 | Choke Coil, 390μH |
| LT34        | 1   | LC13940010 | Choke Coil, 390μH |

| REF. DESIG. | QTY | PART NO.   | DESCRIPTION             |
|-------------|-----|------------|-------------------------|
| QT34        | 1   | HD20013060 | Diode ND487R1-3R        |
| QT35        | 1   | HD20011050 | Diode 1S1555            |
| QT36        | 1   | HD10004020 | Diode OA91              |
| QT37        | 1   | HD40010090 | Diode 1S2688C           |
| QT38        | 1   | HD40010090 | Diode 1S2688C           |
| QT39        | 1   | HD40010090 | Diode 1S2688C           |
| FR01        | 1   | XU410700M5 | PR01-MISCELLANEOUS      |
| FR02        | 1   | XV710700S3 | Crystal 10.7MHz(M)      |
| FR03        | 1   | FG455304F0 | Crystal 10.7MHz         |
| FR04        | 1   | FG455304F0 | Ceramic Filter CFU-455F |
|             |     |            | Ceramic Filter CFU-455F |
| JR01        | 1   | YJ07000420 | Jack (2P)               |
| JR02        | 1   | YJ07000430 | Jack (3P)               |
| JR03        | 1   | YJ07000420 | Jack (2P)               |
| JR04        | 1   | YP10002210 | Plug                    |
| JR05        | 1   | YJ07000440 | Jack (4P)               |
| JR06        | 1   | YJ07000440 | Jack (4P)               |
| JR07        | 1   | YP10002210 | Plug                    |
| JT01        | 1   | YJ07000430 | Jack (3P)               |
| JT02        | 1   | YJ07000420 | Jack (2P)               |
| JT03        | 1   | YJ07000450 | Jack (5P)               |
| JT04        | 1   | YJ07000440 | Jack (4P)               |
| JT05        | 1   | YJ07000420 | Jack (2P)               |
| JT06        | 1   | YJ07000440 | Jack (4P)               |
| JT07        | 1   | YJ07000440 | Jack (4P)               |
| JT08        | 1   | YJ07000360 | Jack                    |
| JT10        | 1   | YP10002210 | Plug                    |
| LF01        | 1   | LL050003A5 | Coil, 3T                |
| LF02        | 1   | LC11010080 | Choke Coil, 4T          |
| LF03        | 1   | LC18000160 | Choke Coil, 3T          |
| LF04        | 1   | LC18000160 | Choke Coil, 3T          |
| LF05        | 1   | LL635004A0 | Coil, 4T                |

| REF. DESIG. | Q'TY | PART NO.   | DESCRIPTION  |
|-------------|------|------------|--|
| R001        | 1    | GD05103180 | <b>P001-RESISTORS</b><br>10K $\Omega$ 1/8W<br>100K $\Omega$ 1/8W<br>1M $\Omega$ 1/8W<br>220K $\Omega$ 1/8W<br>Trimming 10K $\Omega$<br>820K $\Omega$ 1/8W<br>Trimming 47K $\Omega$<br>39K $\Omega$ 1/8W<br>6.8K $\Omega$ 1/8W<br>Trimming 10K $\Omega$ |
| R002        | 1    | GD05104180 |  |
| R003        | 1    | GD05105180 |  |
| R004        | 1    | GD05224180 |  |
| R005        | 1    | RA01030520 |  |
| R006        | 1    | GD05824180 |  |
| R007        | 1    | RA04730100 |  |
| R008        | 1    | GD05393180 |  |
| R009        | 1    | GD05682180 |  |
| R010        | 1    | RA01030530 |  |
| R011        | 1    | GD05683180 | No. 016-01, E01-81,5<br>68K $\Omega$ 1/8W<br>220K $\Omega$ 1/8W<br>10K $\Omega$ 1/8W   |
| R012        | 1    | GD05224180 |  |
| R013        | 1    | GD05103180 |  |

|          |                     |
|----------|---------------------|
| (W01-99) | Assembly and Wiring |
| (T01-99) | Adjustment          |
| (X01-00) | Correction          |

| REF. DESIG.  | Q'TY | PART NO.   | DESCRIPTION               |
|--|------|------------|---------------------------|
| LT35   | 1    | LC11030060 | Choke Coil, 10 $\mu$ H    |
| LT36   | 1    | LC11030060 | Choke Coil, 10 $\mu$ H    |
| LT37   | 1    | LC11050040 | Choke Coil, 1mH           |
| LT38   | 1    | LC11050040 | Choke Coil, 1mH           |
| XR01   | 1    | XA21024504 | Crystal 10.245MHz         |
| XT01   | 1    | XB111001G1 | Crystal 10.7MHz           |
| <b>P001-TONE BURST CIRCUIT BOARD</b><br>P.W. Board, Tone Burst |      |            |                           |
| P001   | 1    | YF208C0020 |                           |
| <b>P001-CAPACITORS</b>   |      |            |                           |
| C001   | 1    | DK26103020 | Ceramic 0.01 $\mu$ F 50V  |
| C002   | 1    | DK26104010 | Ceramic 0.1 $\mu$ F 50V   |
| C003   | 1    | EV33501660 | Elect 3.3 $\mu$ F 16V     |
| C004   | 1    | DK26333010 | Ceramic 0.033 $\mu$ F 50V |
| C005   | 1    | DK16471300 | Ceramic 470pF             |
| C006   | 1    | DK26473010 | Ceramic 0.047 $\mu$ F 50V |
| C007   | 1    | DK16102300 | Ceramic 0.001 $\mu$ F     |
| C008   | 1    | DK16102300 | Ceramic 0.001 $\mu$ F     |
| C009   | 1    | EV47501660 | Elect 4.7 $\mu$ F 16V     |
| <b>P001-SEMICONDUCTORS</b>                                     |      |            |                           |
| Q001   | 1    | HT305360F0 | Transistor 2SC536(F)      |
| Q002   | 1    | HD20011050 | Diode 1S1555              |
| Q003   | 1    | HC10019170 | IC MC14093BCP             |
| Q004   | 1    | HD20011050 | Diode 1S1555              |
| Q005   | 1    | HT305360F0 | Transistor 2SC536(F)      |
| Q006   | 1    | HT305360F0 | Transistor 2SC536(F)      |
| Q007   | 1    | HD30029090 | Diode WZ-090              |



## SPECIFICATIONS

### 1. General Specifications

|  |   |
|--|---|
| Frequency                              | 144.000 ~ 147.999 MHz (E)<br>144.000 ~ 145.999 MHz (W)  |
| Type of emission                       | FM (F <sub>3</sub> ), SSB (A <sub>3</sub> J), CW (A <sub>1</sub> )  |
| Frequency stability (room temperature) | ±300 Hz within 1 ~ 60 minutes after power on<br>50 Hz every 30 minutes  |
| Power supply                           | External: 13.8 VDC<br>Internal: 1. UN-3 Ni-Cad battery x 10<br>2. UM-3 dry cell x 9   |
| Operating supply voltage range         | 9.6 ~ 16 VDC  |
| Power consumption                      | FM reception standby: 90 mA<br>Non-signal SSB and CW: 90 mA<br>Transmission: 600 mA<br>(at 1 W into 50 Ω load)<br>Memory back up: 40 μA |
| Microphone input impedance             | 600 Ω   |
| Antenna impedance                      | 50 Ω  |
| AF output impedance                    | 8 Ω   |
| Grounding system                       | Negative  |
| Dimensions                             | 129 (W) x 52 (H) x 190.5 (D) mm   |
| Weight                                 | 1.25 kg (1.45 kg including batteries)   |

### 2. Reception Specifications

|                        |   |
|------------------------|---|
| Reception system       | FM: Double super heterodyne<br>SSB and CW: Single super heterodyne            |
| Intermediate frequency | FM: 1st IF 10.7 MHz<br>2nd IF 455 kHz<br>SSB and CW: 10.7 MHz                 |
| Sensitivity            | FM: -6 dB (20 dB QS)<br>-8 dB (12 dB SINAD)<br>SSB and CW: -10 dB (10 dB S/N) |
| Pass Bandwidth         | (-6 dB) FM ±6 kHz, SSB: CW 2.2 kHz  |
| Selectivity (60 dB)    | FM: 25 kHz<br>SSB and CW: 4.2 kHz   |
| Squelch sensitivity    | -14 dB  |
| AF output              | More than 1 W (into 8 ohms with 10% THD)                                      |
| Load impedance         | 8 Ω   |

### 3. Transmission Specifications

|                                 |  |
|---------------------------------|--|
| Power output                    | 1 W  |
| Modulation                      | FM: Reactance modulation<br>SSB: Balanced modulation |
| Maximum frequency tolerance     | ±10 x 10 <sup>-6</sup> (-10 ~ 50°C)                  |
| Spurious attenuation            | 60 dB  |
| Carrier suppression             | 40 dB  |
| Undesired side band suppression | 40 dB  |
| Maximum deviation               | ±5 kHz   |

These specifications are subject to change without notice in the event of improvements.



