

Function Mode	DS:OFF		DS:ON	
	Step	No. of display digits	Step	No. of display digits
FM 1	25 kHz	4 digits	25 kHz	4 digits
FM 2	100 Hz	5 digits	12.5 kHz	5 digits
USB CW LSB	100 Hz	5 digits	10 kHz The 0.0-9.9kHz range is repeatedly searched in 100Hz steps.	5 digits

When the DS switch is ON in SSB/CW mode, the frequency is searched, that is, the digits for "kHz" and "100Hz" are set to "00" and the 0.0 to 9.9kHz frequency range is swept repeatedly at a speed of 60mS per step.

If a signal is present during search swept, tone will be heard, allowing you to check the signal in SSB mode. It is thus possible to locate stations quickly.

NOTE:

If the transmitters are keyed in this Mode, a momentary tone will sound to remind you that the transceiver is in search mode.

3.4 MEMORY SWITCH

Using this switch, commonly used frequencies (repeaters, etc.) can be stored in the memory. Frequencies set by the VFO are stored in channels 1 through 5 by using the M switch. Stored frequencies can be called-up by placing the MR switch ON.

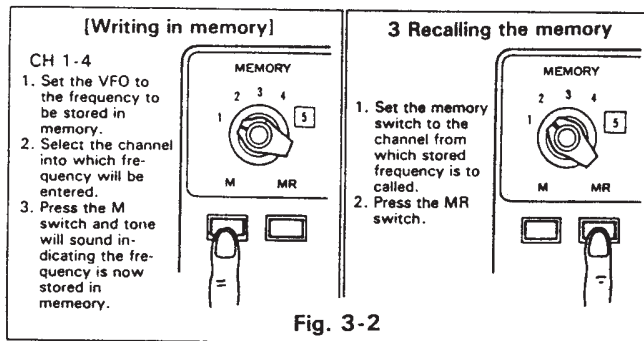


Fig. 3-2

Two different frequencies (transmit and receive) can be stored in channel 5, so the transceiver will operate on any repeater split. The receiver frequency is stored in memory just as for channels 1-4. To store the transmit frequency in memory, set the transmit frequency in the receiver mode and then press the M switch in the transmit mode. (See Fig. 3-3)

NOTE:

1. When a memory is vacant, the memory frequency is 144.0000MHz.
2. The memory frequency called-up by the MR switch is displayed in 5 digits, regardless of mode.

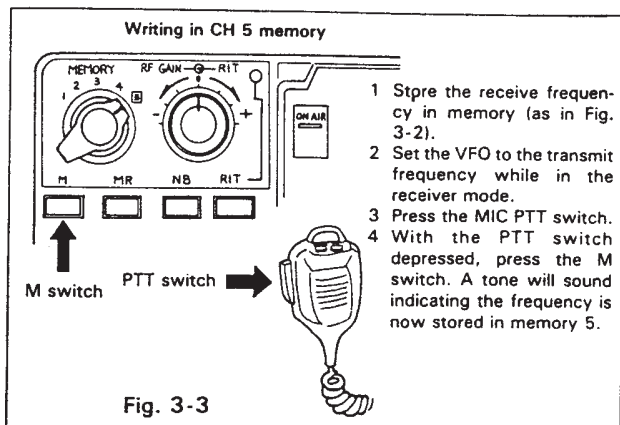


Fig. 3-3

3. To clear a frequency stored in memory, simply store a new frequency in that memory.
4. If you desire to retain the memories, back-up power should be supplied to the micro-computer
 - (1) A power cord should be connected directly to the battery terminal.
 - (2) A back-up supply *(Part No. W09-0005-05) should be used.

* This is the same charger with the supplied accessory of the TR-2300.

In either case, back-up current of about 2.5mA is required.

5. If power is disconnected, the back-up function is retained for only 1-1.5 sec. If instantaneous voltage drop at engine starting continues for more than 2 sec, the micro computer will be reset and the memory cleared.
6. If you wish to retain the memories even when changing the installation between the car and the fixed station, utilize a back-up cord as shown in Fig. 3-4.

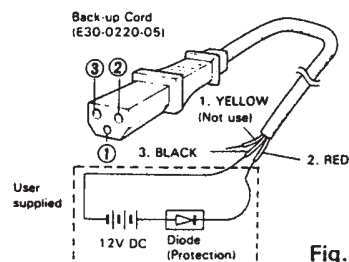


Fig. 3-4

3.5 SCAN OPERATION

TR-9000 scan operation is classified into auto scan (signal stops at a certain point and scan restarts when signal is absent) and free scan.

• Auto scan

Auto scan is available only in the FM mode.

1. Set the squelch control to the threshold point (noise disappears at no-signal time and BUSY lamp goes off).
2. Next, press the SCAN button to start scan operation.
3. When a signal is present, scanning stops. When the signal drops scan restarts automatically.

4. If you desire to hold the frequency at which the scan stops, press the HOLD button or press the microphone PTT switch ON momentarily. Scan will be released and the transceiver will return to normal operation.
5. Scan speed is about 120mS for each channel. When the scan button is continuously depressed, scan speed is doubled.
6. In the auto scan operation, it may be better to use FM1 mode (25kHz step) in crowded FM areas.
7. Effective auto scan operation cannot be obtained with 100Hz step FM (FM2, DS OFF).

- **Free scan**

1. In SSB or CW mode, press the SCAN button and the transceiver will operate in a free scan mode. Auto scan is not possible in SSB/CW mode.
2. When the SCAN button is pressed with DS ON (search operation), your SSB frequency is scanned automatically.
3. For free scan operation in FM mode, set the squelch control to the F.S. position and press the SCAN button. Scanning will not stop when a signal is present.
4. To stop the scan, press the HOLD button or the microphone PTT switch, as for auto scan. The transceiver will return to normal operation.

- **Scan Operation Precautions**

1. During scan operation, including temporary scan stop, the frequency can not be changed by the VFO or the microphone UP/DWN switches. To change frequency, it is first necessary to release the scan by pressing the HOLD button or MIC PTT switch.
2. If the MR switch is pressed during scan operation, the memory frequency is output. When this switch is released, scanning will not resume.

3.6 TX OFFSET SWITCH

The TX OFFSET switch, used for selecting simplex or repeater operation, has three positions.

If the transmitter frequency is shifted beyond the high or low frequency limits, the transceiver will operate in simplex mode, and a warning tone will sound during transmit.

- ⊕: The transmitter frequency is 600 kHz higher than the receiver frequency.
(Generally, this position might not be used.)
- S: The TR-9000 operates in the usual simplex mode. That is, receive and transmit frequencies are the same.
- ⊖: The transmitter frequency is 600 kHz lower than the receiver frequency.

NOTE:

OFFSET is available for all modes.

3.7 SQUELCH

The squelch circuit operates only in the FM mode.

To eliminate the noise at no-signal condition turn the squelch slowly clockwise until the noise disappears and the BUSY lamp goes off (threshold point).

Adjust the VFO to an empty frequency. The BUSY lamp will light and the speaker will operate when a signal is received. The squelch control is also used for auto scan operation control.

If the signal is weak or fades during mobile operation, readjust the squelch for the clearest reception.

3.8 RIT AND RIT SWITCH

"RIT" is an abbreviation for "receiver incremental tuning".

The RIT feature enables you to shift receive frequency approximately ± 1 kHz. By adjusting the RIT control in the "+" direction, the receive frequency will be higher than the transmit frequency (and vice versa).

When the RIT control is set to the center "0" position, the frequency is the same as that at RIT OFF, and the frequency indicated on the digital display remains unchanged.

If the receive frequency is incorrect, it can be adjusted by turning the RIT switch ON (the RIT lamp will light). Since the receive frequency can be varied without changing the transmit frequency, there is a difference between the transmit and receive frequencies. Therefore, the RIT switch should be turned OFF when the QSO is finished.

Note that the RIT circuit is available in SSB or CW mode and does not operate in FM1 or FM2 modes.

3.9 NB (NOISE BLANKER)

The noise blanker is used to reduce ignition type impulse noise generated from a car, and allows reception of weak CW or SSB signals. The noise blanker will not operate in the FM modes.

3.10 RF GAIN AND S METER

The RF GAIN control, which is used to control receiver, gain has a range of more than 60dB in SSB or CW mode. Since the RF GAIN function is interlocked with the AGC, it is used to control strong signals. Receiver gain is maximum at full clockwise position, and is reduced by adjusting the control counterclockwise.

In SSB mode, receiver noise can be reduced by using the RF GAIN control. Adjust as necessary, according to signal conditions. Normally, it should be set for maximum gain.

In FM mode, the RF GAIN has a range of about 20dB. It is not interlocked with the S meter.

- FM mode The lower 0-10 division linear scale of the S meter is used. Full scale occurs at 15 μ V.
- SSB/CW mode The upper scale of the S meter is used.
The meter reads S-9 at 5 μ V input and full scale at 1mV.

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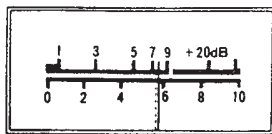


Fig. 3-5 S Meter

3.11 TRANSMITTER PRECAUTIONS

1. The TR-9000 antenna impedance is 50 ohms. Be sure to connect an antenna of 50 ohm impedance.
2. Check the transmit frequency before operating to insure that you do not interfere with other stations.
3. By pressing the microphone PTT switch, The TR-9000 is set in transmit mode; the ON AIR lamp will light and the meter indicate transmit power. Hold the microphone about 5cm from your mouth and speak.
4. In SSB mode, microphone gain has been adjusted for optimum ALC for normal tone of voice. If you speak too loud, the signal will distort, reducing intelligibility.
5. In CW mode:
 - (1) If a key is not connected, CW is transmitted when the PTT switch is pressed.
 - (2) With a key connected, operate the key with the PTT switch depressed (or the BO-9, optional accessory) STBY SW to send).

The SIDE TONE circuit will provide a tone about 800 Hz from the speaker.

3.12 CW OPERATION

For CW operation, make connections as shown in Fig. 3-6.

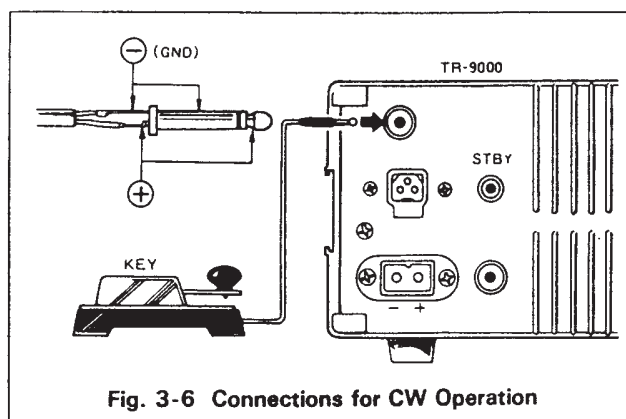


Fig. 3-6 Connections for CW Operation

• Preparation

1. Connect the supplied plug to the key.
2. Standby switch:
 - (1) The microphone PTT switch can be used.
 - (2) Connect the supplied standby plug to the STBY terminal at the rear. Your standby switch should have a contact rating of more than 100mA.
 - (3) By connecting the optional BO-9 system base, the standby switch on the BO-9 can be used.

Use any of these 3 methods for CW operation.

NOTE:

1. CW receive mode is USB. The AGC time constant is automatically switched to "fast" in CW mode, and to "slow" in USB mode.
2. The built-in SIDE TONE circuit allows you to monitor your station's CW signal.
3. When the key is closed, the SIDE TONE circuit provides a tone of about 800Hz even in receive mode. Use this tone as a reference for receiver tuning.

NOTE:

The relationship between the displayed frequency (operating frequency) and HETERODYNE frequency in each mode is shown in the following Table. The operating frequency is set to the displayed frequency by shifting the HET frequency.

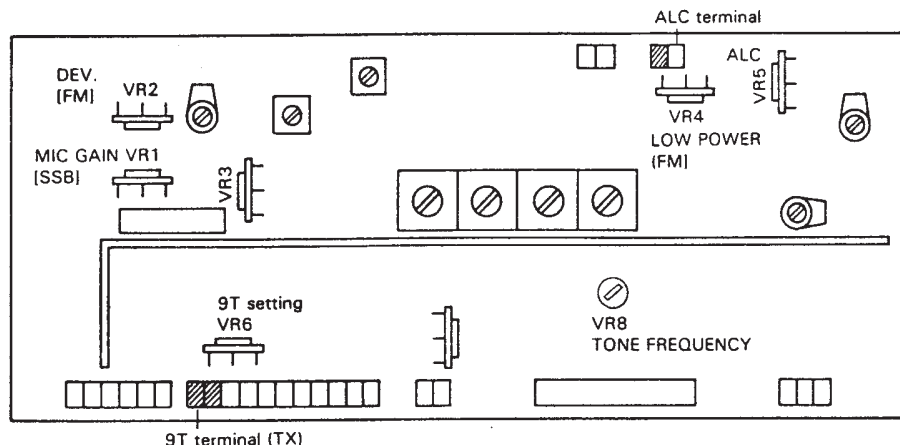
1. The digital VFO frequency shift is based on USB mode.
2. In LSB mode, there is a frequency difference of about 400–600Hz for every 10kHz as compared with USB mode. This is a product of the frequency shift and is not an indication that the transceiver is defective. Consequently, the jumps when the digits shift up from 9.9 to 10.0kHz.

Table 3–3

MODE	f Displayed (operating) frequency	HET frequency
FM 1	144.00 ~ 145.975MHz	133.305 ~ 135.280MHz
FM 2	144.0000 ~ 145.9999MHz	133.3050 ~ 135.3049MHz
USB/CW	144.0000 ~ 145.9999MHz	133.3065 ~ 135.3064MHz
LSB	144.0000 ~ 145.9999MHz	133.3035 ~ 135.3034MHz

3.13 TX unit

All adjustable trimmers, coils and potentiometers of the TR-9000 are aligned and preset at the factory, and should not be touched unnecessarily.



SECTION 4. ADDITIONAL INFORMATION

4.1 GENERAL INFORMATION

Your TR-9000 has been factory aligned and tested to specification before shipment. Under normal circumstances, the transceiver will operate in accordance with these operating instructions.

If your transceiver fails to work, contact the authorized dealer from which you purchased it for quick, reliable repair. All adjustable trimmers and coils in your transceiver were preset at the factory and should only be readjusted by a qualified technician with proper test equipment.

Attempting service or alignment without factory authorization can void the transceiver's warranty.

4.2 HOW THE TX FINAL TRANSISTORS ARE PROTECTED

Final transistor protection is provided by sampling the reflected power. As the reflected power is increased (higher SWR) transmitter drive is reduced, thus decreasing input to the final transistors. This in turn reduces collector loss, protecting the final transistors.

4.3 BATTERY PRECAUTION:

When charging your vehicle battery, or when jump-starting a dead battery ALWAYS disconnect the power lead from the back of the transceiver.

4.4 ORDERING SPARE PARTS

When ordering replacement or spare parts for your equipment, be sure to specify the following:

- Model and serial number of your transceiver. Schematic number of the part. Printed circuit board number on which the part is located. Part number and name, if known, and Quantity desired.

NOTE:

A full service manual is available as a separate publication.

4.5 SERVICE

Should it ever become necessary to return the equipment for repair, pack in its original boxes and packing, and include a full description of the problems involved. Also include your telephone number. You need not return accessory items unless directly related to the service problem. Tag all returned items with your call for easy I.D. Please mention the model and serial number of your radio in any correspondence, whether phone or written. For future reference, record this information in the space provided on the back cover of this manual.

NOTE:

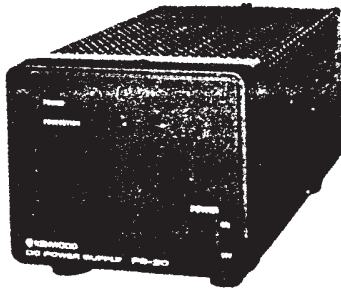
When claiming warranty service, please include a photocopy of the bill of sale, or other proof of purchase showing the date of sale.

SECTION 5. OPTIONAL ACCESSORIES

The following accessories are available for more sophisticated operation of the TR-9000:

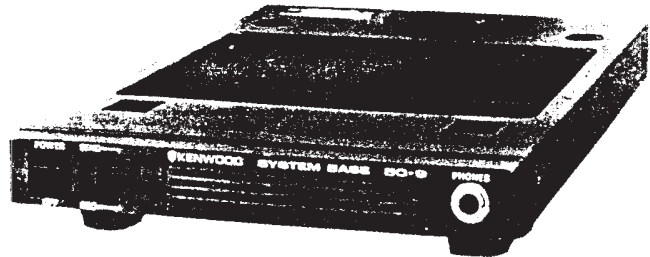
1. FIXED STATION DC POWER SUPPLY PS-20

The PS-20 DC power supply perfectly matches the TR-9000's design. It incorporates a circuit for protecting the transceiver against shorted output and overload.



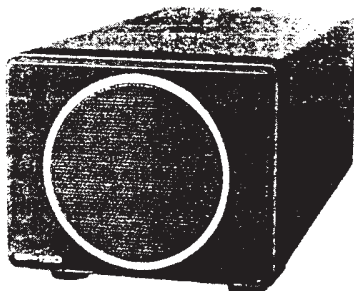
3. SYSTEM BASE BO-9

Specifically designed for the TR-9000, it incorporates back-up power supply, headphone jack, standby switch and AC power switch for integrated fixed station operation with PS-20 or PS-120.



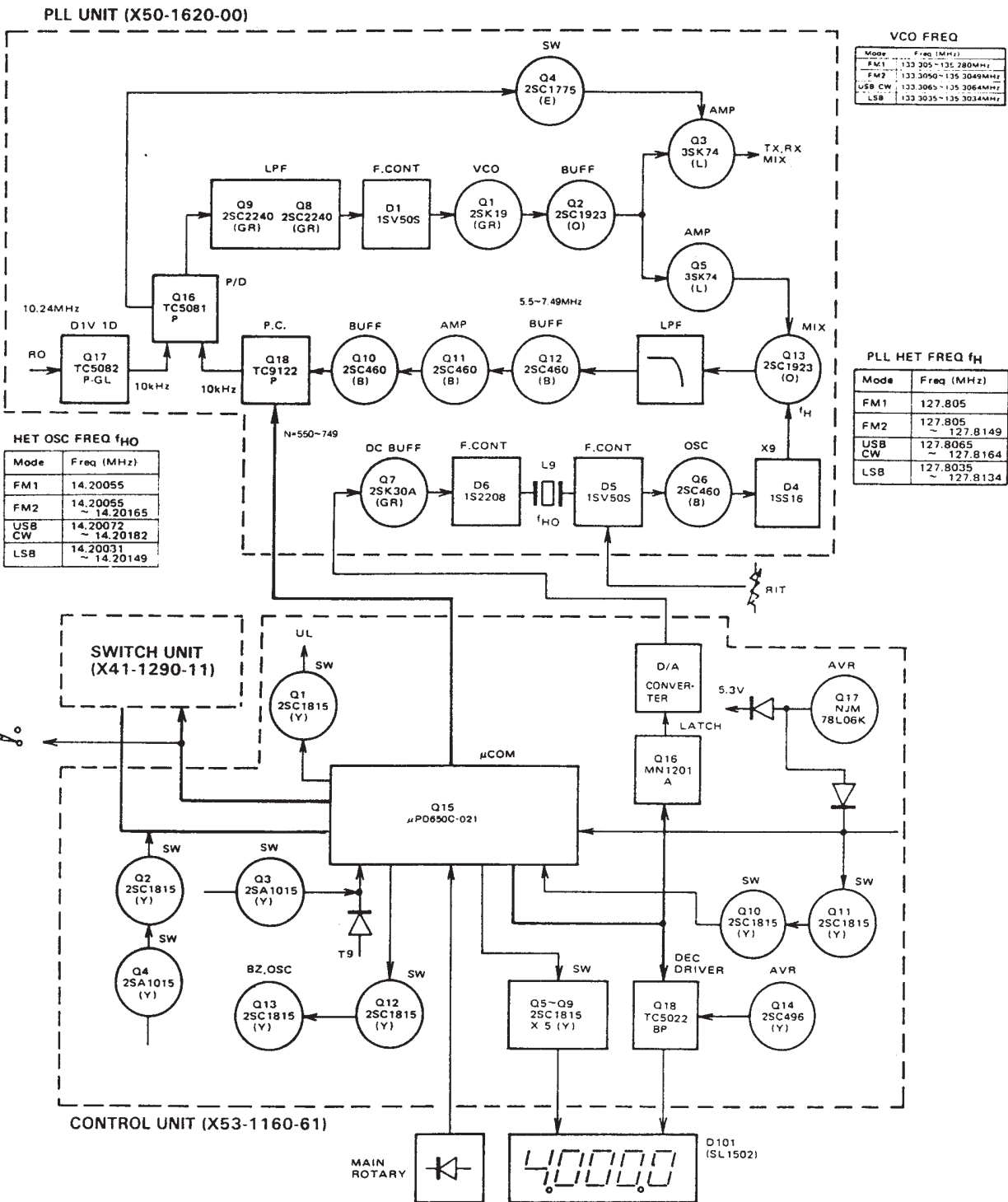
2. EXTERNAL SPEAKER SP-120

Designed for fixed station operation. Styling and tone quality match the TR-9000 perfectly.



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BLOCK DIAGRAM



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