

# 2m FM TRANSCEIVER



## INTRODUCTION

You are the owner of our latest product, the new TR-7950 (or TR-7930) transceiver. Please read this instruction manual carefully before placing your transceiver in service. The unit has been carefully engineered and manufactured to rigid quality standards, and should give you satisfactory and dependable operation for many years.

### AFTER UNPACKING

- Shipping container: Save the boxes and packing in case you want your unit needs to be transported for remote operation, maintenance, or service.
- The following explicit definitions apply in this manual:  
**Note:** If disregarded, inconvenience only, no risk of equipment damage or personal injury.  
**Caution:** Equipment damage may occur, but not personal injury.

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### ■ ACCESSORIES

Carefully unpack your TR-7950 (or TR-7930) and check that it is supplied with the following accessories:	
(1) Dynamic microphone (with U/D switch) (T91-0313-05)	1 piece
(2) Mounting Bracket	
Mounting parts:	
Hex wrench (W01-0401-04)	1 piece
Nuts (5 mm diameter) (N14-0510-04)	4 pieces
Hex-socket screw (N09-0008-04)	4 pieces
Flat washers (6 mm diameter) (N15-1060-46)	4 pieces
Spring washer (6 mm diameter) (N16-0060-46)	4 pieces
(3) Foot	
Rubber foot (small, rear) (J02-0069-05)	2 pieces
Rubber foot (large, front) (J02-0070-05)	2 pieces
Screw (N30-3006-41)	4 pieces
(4) DC power cord (with 2P plug and fuse) TR-7950(E30-1685-05)/TR7930(E30-1674-05)	1 piece
(5) Spare fuse TR-7950(10A) (F05-1031-05) TR-7930(8A) (F05-8021-05)	1 piece
(7) Miniature plug (for external speaker) (E12-0001-15)	1 piece
(9) Warranty card	1 copy
(10) Instruction manual	1 copy

## FEATURES

Outstanding features providing maximum ease of operation include a large backlit, easy-to-read (either in direct sunlight or in the dark) LCD display, 21 multi-function memories, automatic offset, programmable priority channel, memory and programmable band scans, built-in lithium battery memory back-up, built-in 16-key autopatch, and the choice of a hefty 45 watts output (TR-7950), or 25 watts output (TR-7930).

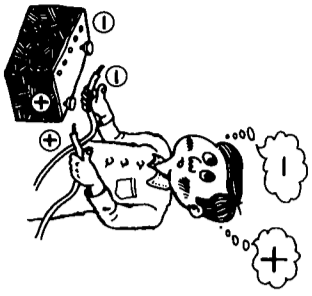
### TR-7950 FEATURES:

- **NEW, large, easy-to-read LCD digital display**  
Easy to read in direct sunlight or in the dark (backlit-ed). Displays transmit/receive frequencies, memory channel, repeater offset, (+, S, -), sub-tone number (F-0, 1, 2, 3), tone scan, and memory scan lock-out. Includes LED S/Rf bar meter, and LED indicators for REVERSE, CENTER TUNING, PRIORITY, and ON AIR.
- **21 NEW, multi-function memory channels**  
Stores frequency, repeater offset, and optional sub-tone channels. Memories 1 through 15 for simplex for  $\pm 600$  kHz offset. Memory pairs 16/17, and 18/19 are paired for non-standard repeater offset. Memories "A" and "B" set upper and lower scan limits, or for simplex or  $\pm 600$  kHz offset. In MEMORY mode, a circle of light appears around the memory selector knob. When the memory selector knob is rotated in either direction to channel 1, and audible "beep" will sound for visually impaired operators.
- **Choice of 45 or 25 watts output**  
The TR-7950 provides a hefty 45 watts output, while the TR-7930 features a more modest 25 watts. A HI/LOW power switch allows power reduction to approximately 5 watts (adjustable).
- **Long-life lithium battery memory back-up**  
Built-in lithium battery has an estimated 5 year life.
- **Automatic offset**  
The microprocessor is pre-programmed for simplex or  $\pm 600$  kHz offset, in accordance with the ARRL 2 meter band plan. "OS" key allows manual offset change.
- **Programmable priority alert**  
The PRIORITY channel may be programmed as any one of the 21 memories, with the ALERT switch "ON," a dual "beep" sounds when a signal is present on the PRIORITY channel. The OPER switch allows and instant move to the PRIORITY channel.
- **Programmable memory scan lock-out**  
"LO" key for programming the scan to skip selected memory channels, without erasing the memory.
- **The lower limit may be programmed into memory "A" and the upper limit into memory "B".**
- **Center stop during band-scan, with indicator**  
Stops on a channel center during band-scan, with center tuning indicator.
- **Scan resume selectable**  
Scan stops on busy channel. Selectable automatic time resume-scan (approx. 5 sec., adjustable), or carrier operated resume-scan. a scan delay after carrier-drop of approx. 1.5 seconds is built-in.
- **Scan control using up/down microphone**  
Momentarily pressing UP or DWN button on microphone tunes one step in the selected direction, on memory or on 5-kHz step tuning. Holding the button for about 2 seconds starts UP or DWN automatic scan action. Scan also starts using "SC" key on keyboard. Scan may be cancelled by momentarily pressing the PTT switch or by pressing both UP/DWN buttons simultaneously.
- **Programmable sub-tone channels**  
Optional TU-79 three frequency sub-tone unit provides keyboard selectable sub-tone channels, which may be stored in memory.
- **Built-in 16-key autopatch, with adjustable monitor**  
The keyboard functions as a 16-key autopatch during transmit. DTMF tones appear in the speaker output when a key is pressed during transmit.
- **Front panel keyboard control**  
Used for selecting frequent panel keyboard control. Used for selecting frequency offset, programming memories, controlling scan, and autopatch encode. Keyboard night lighting is provided.
- **Extended frequency coverage**  
covers 142,000-148,995 MHz, in 5-kHz steps.
- **Repeater reverse switch**  
Locking-type switch, with indicator.
- **"Beeper" amplified through speaker (level adjustable)**
- **Compact, lightweight design**
- **Easy-to-install adjustable-angle mobile mounting bracket**

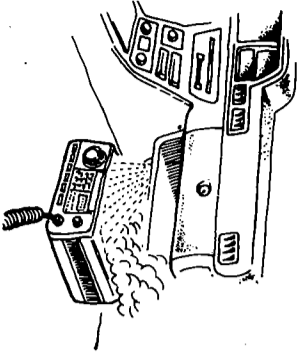
### Optional accessories:

- TU-79 three frequency diode programmable tone unit
- KPS-12 fixed-station power supply for TR-7950
- KPS-7A fixed-station power supply for TR-7930
- SP-40 compact mobile speaker.

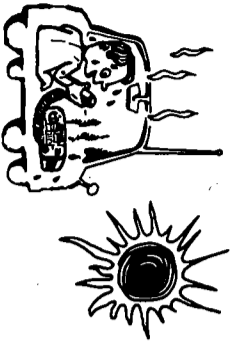
## BEFORE USE



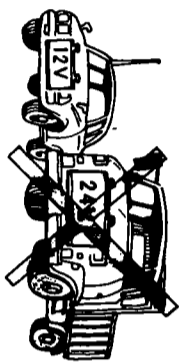
BEFORE connection, check polarity.



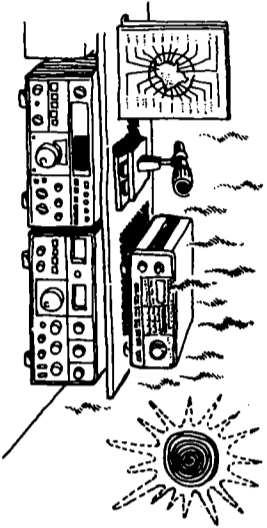
Do not install near heater outlet.



After parking in the sun, or if inside temperature is HOT, cool this unit BEFORE transmitting.



This unit is designed for 12V negative ground ONLY.



Keep equipment away from heat and out of direct sunlight.



Do not adjust coil, trimmers, or pots! These are factory adjustments.

## SPECIFICATIONS

[General]  
Semiconductors.....MPU 1  
ICs 19  
Transistors 43  
FETs 5  
Diodes 61

Frequency range.....144.0 to 148.0 MHz

Frequency synthesizer.....Digital control, phase locked VCO

Mode.....FM (F3)

Antenna impedance.....50 ohms

Power requirement.....13.8V DC  $\pm$  15%

Grounding.....Negative

Operating temperature.....-20°C to +50°C

Current drain.....0.5V in reverse mode with no input signal  
Max. 9.5A in HI transmit mode (TR-7950)

3.0A in LOW transmit mode (TR-7950)

Max. 6.5A in HI transmit mode (TR-7930)

2.5A in LOW transmit mode (TR-7930)

Dimension.....175 mm (6 - 7/8) wide

64 mm (2 - 1/2) high

220 mm (8 - 11/36") deep (TR-7950)

206 mm (8 - 1/16") deep (TR-7930)

(projections excluded)

Weight.....1.9 kg (4.18 lb) (TR-7950)

1.8 kg (3.96 lb) (TR-7930)

[Transmitter]  
RF output power (at 13.8V DC, 50 $\Omega$  load).....HI 45 Watts min. (TR-7950)

HI 25 Watts min. (TR-7930)

LOW 5 Watts approx. (not adjustable)

Modulation.....Phase sift

Frequency tolerance (-20°C ~ +50°C).....Less than  $\pm$  15  $\times$  10<sup>-6</sup>

Spurious radiation.....HI Less than -70 dB

LOW Less than -60 dB

Maximum frequency deviation (FM)..... $\pm$  5 kHz

Audio response.....Within +1/-3 dB of 6 dB/oct pre-emphasis characteristic from 300 to 3000 Hz.

Audio distortion.....3% max.

Microphone.....Dynamic microphone with PTT switch, 500 $\Omega$

[Receiver]  
Circuitry.....Double superheterodyne

Intermediate frequency.....1st 10.695 MHz

2nd 455 KHz

Receiver sensitivity.....Better than 12 dB for 0.25  $\mu$ V SINAD

Better than 50 dB for 1 mV S+N/N

Receiver selectivity.....More than 12 KHz (-6 dB)

More than 24 KHz (-60 dB)

Spurious response.....Less than 70 dB

Squelch sensitivity.....Better than 0.16  $\mu$ V (threshold)

Auto scan stop level.....Less than 0.2  $\mu$ V (threshold)

Audio output.....More than 2.0 watts across 8 ohms load (5% dist.)

Note: Circuit and ratings are subject to change without notice due to developments in technology.

# SECTION 1 INSTALLATION

## 1-1. Interconnection

Connect the antenna and power supply as shown in Fig. 1-1 for fixed station.

## 1-2. MOBILE Installation, [General]

### ● Installation location

Using the supplied mounting bracket, install the transceiver under the dashboard or on the side of the console in your car.

Refer to Fig. 1-2A and Fig. 1-2B on page 7.

If your car is equipped with and electronic fuel injector, the transceiver should be as far from the control equipment as possible.

### ● Antenna installation

Various types of antennas for 2 meter mobile operation are available. (See Fig. 1-2C)

### NOTE:

For gutter-mount installation, the antenna bracket must be grounded to the car body as shown in Fig. 1-2C. Affix the antenna securely, referring to the antenna instruction.

### ● Power supply

Connect the supplied power cable with fuse directly to the battery terminals. Connecting to the cigarette lighter socket can cause a poor connection, and excessive voltage drop.

### ● Ignition noise

The transceiver is designed to suppress ignition noise; however, if excessive noise is present, it may be necessary to use suppressor spark plugs (with resistors).

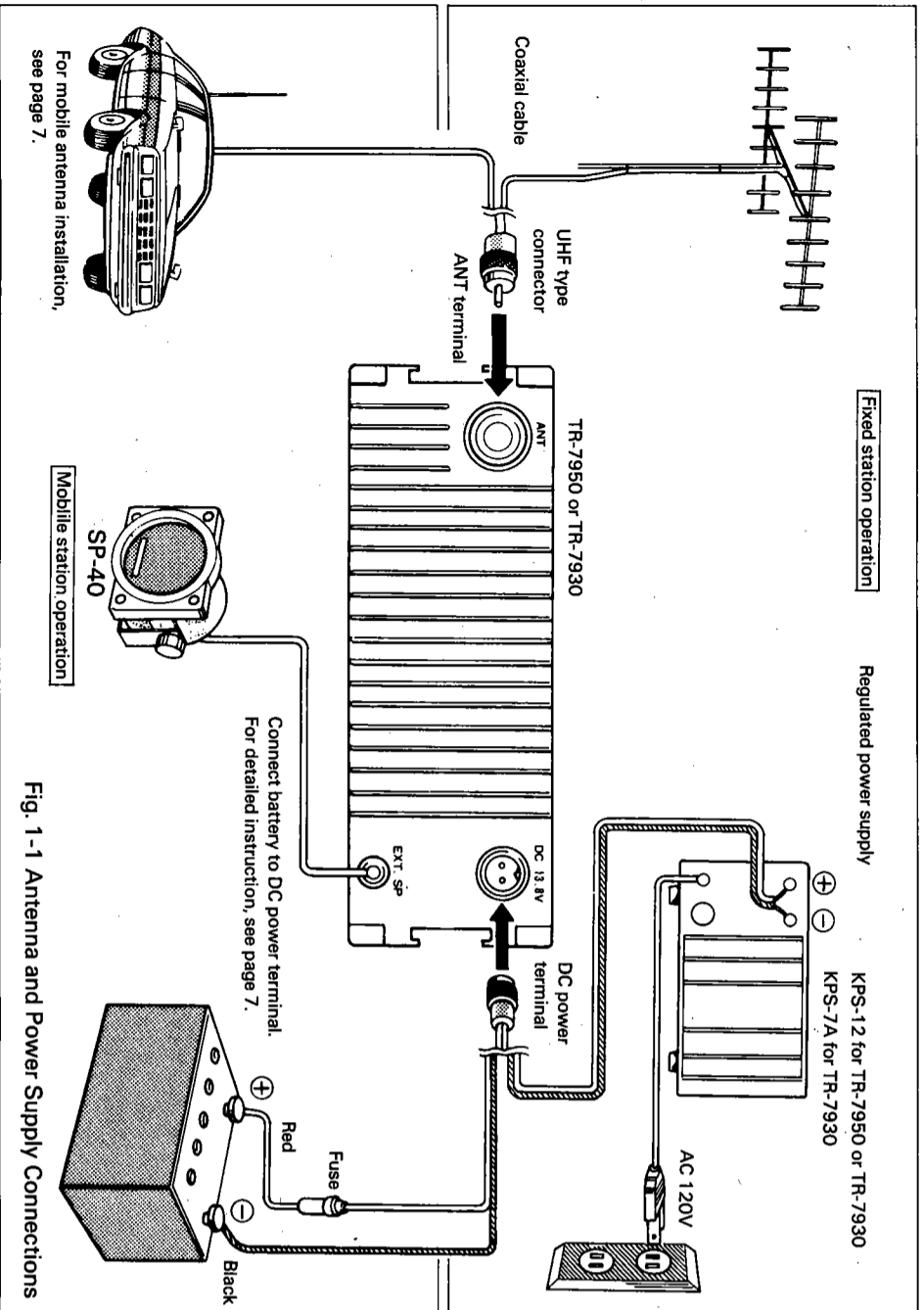


Fig. 1-1 Antenna and Power Supply Connections

## 1-3. FIXED STATION Installation, [General]

### ● Power supply (Fig. 1-3 on page 8)

For the TR-7950, the KPS-12 base power supply is recommended. For the TR-7930, either the KPS-12, or KPS-7A supply is recommended.

### ● Antenna (Fig. 1-3 on page 8)

Various types of fixed station antennas are commercially

available. Select an antenna according to your installation space and application.

Note that the VSWR of your antenna should be less than 1.5:1.

A high VSWR will cause the Transceiver's protective circuit to operate, reducing the transmitter output power.

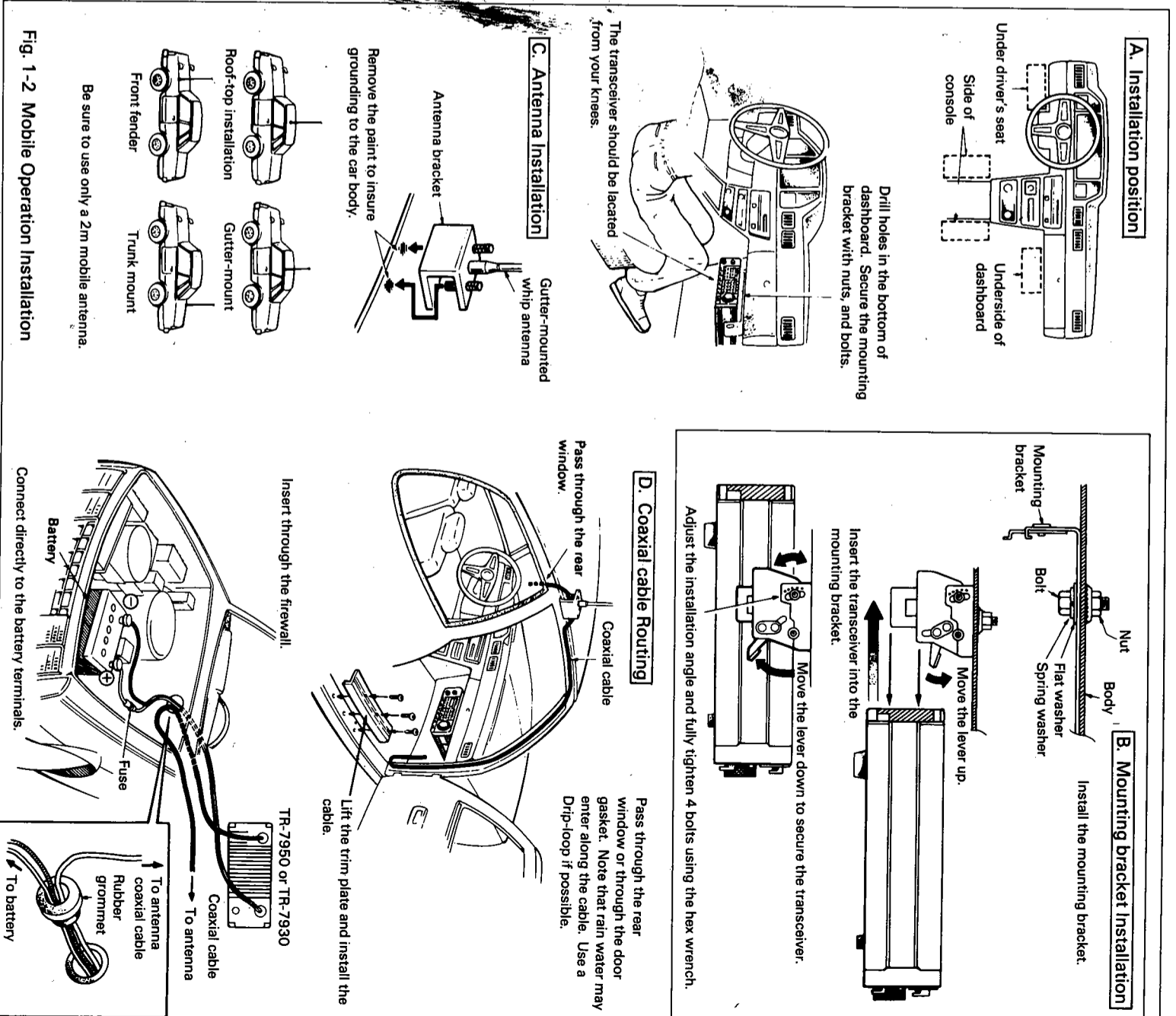
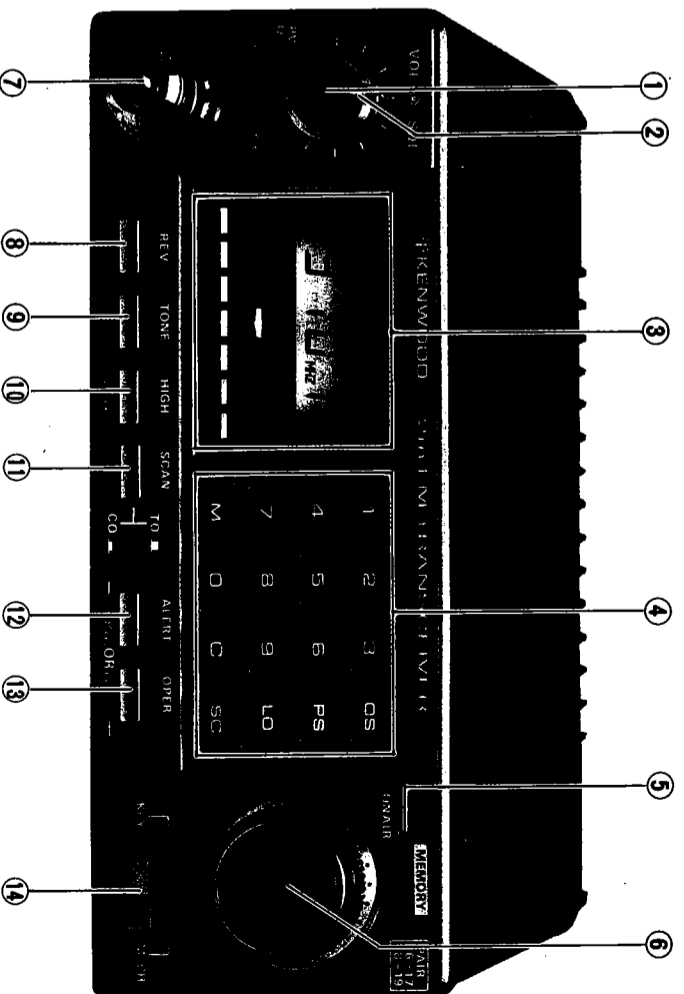


Fig. 1-2 Mobile Operation Installation

## SECTION 2. CONTROLS AND TERMINALS



### 2-1. Front Panel

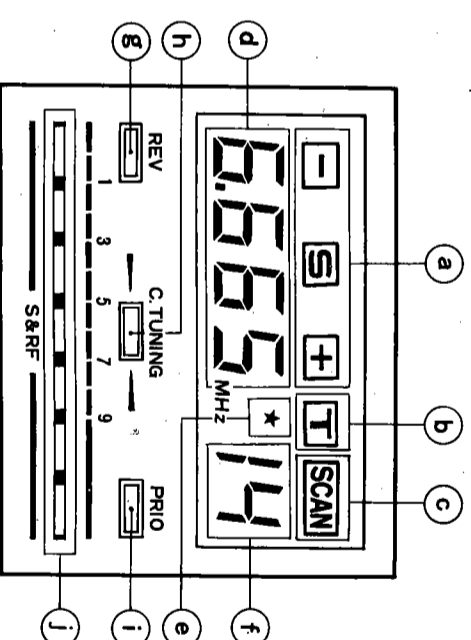
#### ① VOL/POWER

Power-ON-OFF switch and volume control are combined. Turning the control fully counterclockwise will turn the power OFF. Clockwise rotation will increase the volume.

#### ② SQUELCH

The squelch control is used to eliminate noise during no-signal time. Normally, this control is adjusted clockwise until the noise disappears and the Center Tuning indicator must be set to the threshold point.

#### ③ LCD and Indicator Group



a) TX shift indicators:

By pressing the **[S]** key on the keyboard, the **[ ]** indicator will light in sequence to show transmit frequency is switched down 600 KHz from the receive frequency.

By pressing the **[T]** key on the keyboard, the **[ ]** indicator will light in sequence to show the transmitter is operating in the simplex mode.

By pressing the **[+]** key on the keyboard, the **[ ]** indicator will light in sequence to show transmit frequency is switched up 600 KHz from the receive frequency.

b) **[ ]** indicator:

By pressing the TONE pushbutton the four digit frequency display changes to show which of three preset subaudible frequency channels is selected. **[ ]** does not display at FO (no tone), TU-79 option required.

c) **[ ]** indicator lights when scan operation is in progress.

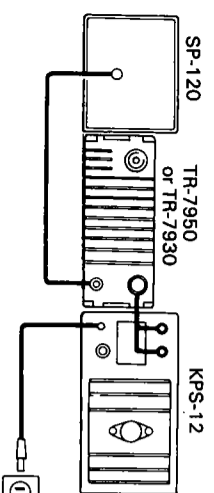
d) This section displays either frequency in four digit (146.520 MHz is displayed as 6.520 ), or one of four subtone conditions (F1 - 3, or O, no tone).

e) **[ ]** star mark: Memory channel scan lock-out designator.

If you desire to skip a busy memory channel during memory scan, press the **[ ]** key. The star designates scan-skip.

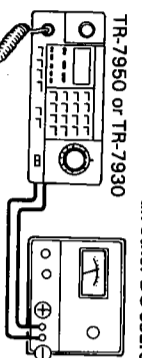
f) Memory channel display indicates A, B, and 1 ~ 19.

#### 1. KPS-12 connection



Regulated DC power supply

#### 2. Connection of an other DC source.

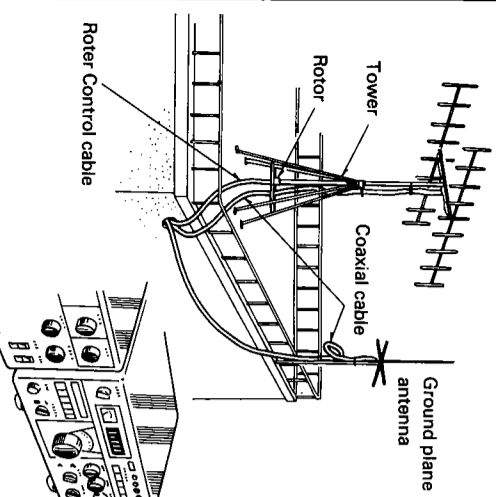


Standard voltage: 13.8V DC  
Current capacity: TR-7950: 10A  
TR-7930: 6A

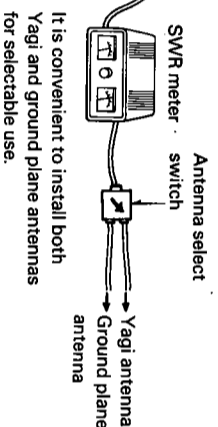
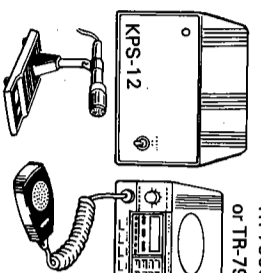
NOTE:  
Preferably, voltage should be adjusted to 13.8V DC. The regulated supply should be equipped with a built-in protection circuit for both overcurrent and overvoltage.

CAUTION:  
A battery charging power supply cannot be used.

#### Yagi antennas (ARRAY)



Transceiver performance depends largely on the type of antenna used. For fixed station operation there are ground plane antennas (omni-directional) and Yagi antennas (uni-directional). The Yagi antenna is suitable for long distance operation (DX) or communication with a specific party (having excellent directivity and antenna is generally used for local operation.



It is convenient to install both Yagi and ground plane antennas for selectable use.

Fig. 1-3 Fixed Station Operation Installation

### 1-4. MEMORY BACK-UP LITHIUM BATTERY

A lithium battery is contained in the transceiver to retain memory. Therefore, turning off the POWER switch, disconnecting the power cable, or a power failure will not clear the memory. The battery will last approximately five years. When the battery discharges and erroneous display may appear on the LCD. Lithium battery replacement should be performed by an authorized Kenwood service facility - either your Kenwood dealer, or the factory.

#### Note:

When the lithium battery is replaced, the microprocessor must be reset. Press the microswitch accessible through the opening on the bottom cover, as shown.

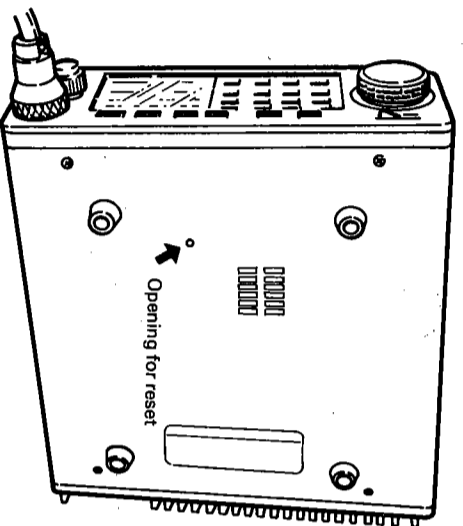


Fig. 1-4 Microprocessor reset

