KENWOOD

2 METER ALL-MODE TRANSCEIVER

TR-9000

KENWOOD

The TR-9000 is a lightweight and compact 2-meter FM/USB/LSB/CW transceiver with advanced and convenient functions and many accessories at an affordable price.

The transceiver is designed for FM, SSB, and CW modes, utilizing a microcomputer which permits frequency selection in 100-Hz, 5-kHz, and 10-kHz steps by means of two digital VFOs. The microcomputer also permits memory, scanning, searching, and other features.

FM/USB/LSB/CW..... ALL POPULAR MODES, YET COMPACT AND LIGHTWEIGHT

The transceiver has built-in FM/USB/LSB/CW modes, yet it's still compact and lightweight. The FM mode is available in two frequency-selection positions (FM 1 and FM 2) for most convenient mobile operation. In the SSB and CW modes the most suitable frequency step and digital display resolution may be selected, for optimum versatility in mobile, fixed-station, and portable field operation. Furthermore, the LSB mode provides a reversed-sideband signal for OSCAR operation.

FM 1 position provides 10-kHz steps for fast tuning

Regardless of the ON/OFF position of the D. STEP (digital step) switch, the frequency change is 10 kHz per step when the MODE switch is in the FM 1 position, and the frequency display becomes three digits (no unnecessary digits). After fast frequency dial-up in the FM 1 position, the MODE switch may be tuned to the desired mode of operation.

FM 2 position provides 5-kHz and 100-Hz steps

When the D. STEP switch is on and the MODE switch is in the FM 2 position, the main knob selects in 5-kHz steps and the frequency display becomes four digits, for most convenient FM tuning.

When the D. STEP switch is off, the frequency changes in 100-Hz steps and the frequency display becomes five digits, allowing selection of nonstandard frequencies (or off-frequency stations).

USB, LSB and CW positions

In the USB, LSB, and CW modes, the D. STEP switch becomes the SEARCH switch. When this switch is on searching is initiated between 0 and 9.9 kHz in 100-Hz steps. At the same time, the main knob selects in 10-kHz steps. Combining the main knob's frequency steps with the SEARCH function is an easy way to find SSB or CW activity on 2 meters. When the D. STEP switch is off, the frequency step becomes 100 Hz. The frequency display is five digits regardless of the ON/OFF position of the D. STEP/SEARCH switch.

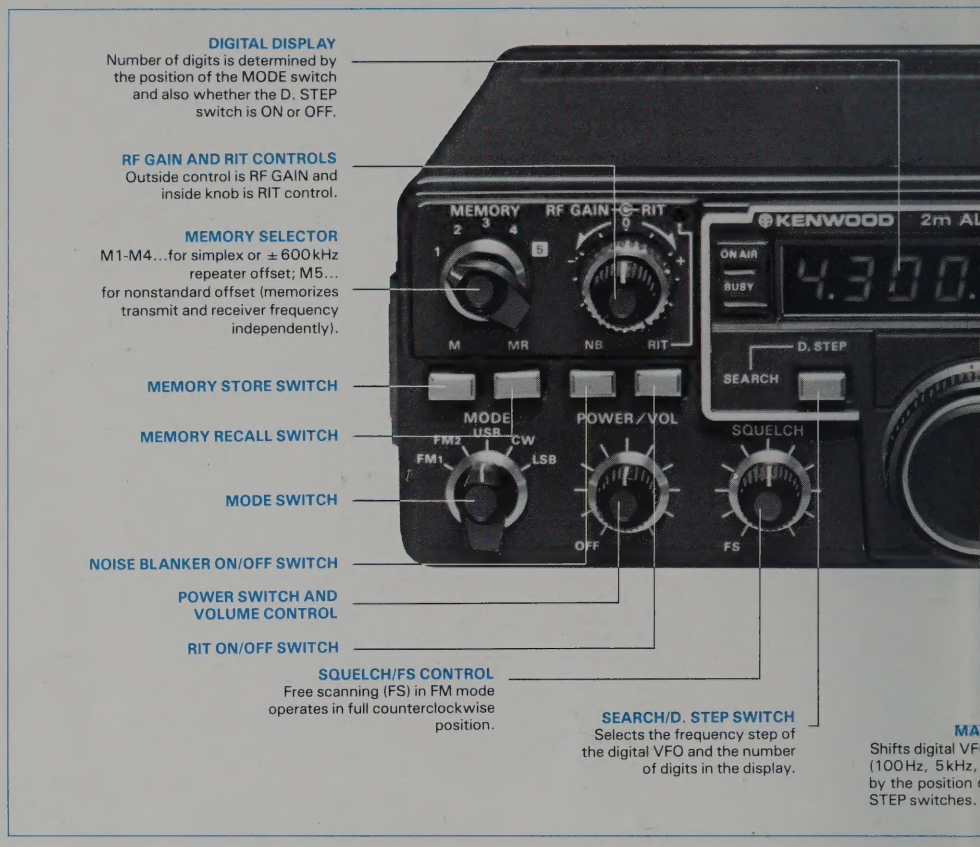
MICROCOMPUTER CONTROL CIRCUITS

Extended frequency range of 143.9000-148.9999 MHz

The TR-9000 will operate on all 2-meter Amateur frequencies as well as MARS and CAP frequencies (simplex and any repeater split), between 143.9000 and 148.9999 MHz.

Digital dual VFOs

The built-in dual VFO system is useful for selecting frequencies in convenient steps (100-Hz, 5-kHz, and 10-kHz), with fast change from the high end (FM) to the low end (SSB/CW) of the band.



This VFO system uses a high-quality rotary-step photosensor switch for frequency selection. When the radio is turned off and then on again, VFO A resets to 146.00 MHz, and VFO B to 144.00 MHz. Both VFOs cover the entire range from 143.9000 MHz to 148.9999 MHz.

Five memories built-in

Five memory channels are provided in the TR-9000, for quickly switching to specific frequencies. When the MEMORY switch is rotated to the desired channel (1 through 5), the displayed frequency can be memorized by pressing the "M" button. The frequency can be recalled later by rotating the MEMORY switch to the appropriate channel and pressing the "MR" button.

Memory channels 1-4 are used for simplex or repeater (with ±600-kHz offset) operation. Memory channel 5 can be used for operation on repeaters with nonstandard splits, because the transmit and receive frequencies are memorized independently!

Automatic busy stop scan and free scan

The built-in busy stop scan of the entire band automatically locks onto a signal. Scanning resumes when the signal disappears. Automatic busy scan function only in the FM 1 and FM 2 modes. Free scanning (no automatic lock) is available in the USB/LSB/CW position, over 4-MHz in the 144-MHz band.

Scanning stops when the "HOLD" button is pressed or the PTT switch is pushed. Free scanning is activated in the FM mode by turning the squelch control counterclockwise to "FS" and pressing the SCAN button. Frequencies change in the free-scanning mode in steps determined by the positions of the MODE and D. STEP switches. When the SCAN button is pressed continuously, scanning speed increases.

New hand microphone with UP-DOWN switch

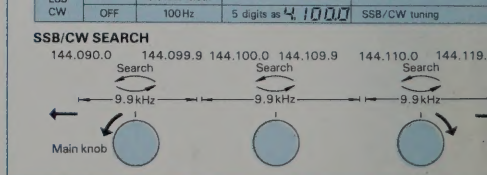
The UP/DOWN buttons on the microphone enable convenient frequency changes up or down, in steps determined by the positions of the MODE and D. STEP switches. A "beep" is heard with each step.

If the UP or DOWN switch is pressed continuously, the frequency changes gradually, and a continuous tone is heard until the switch is released.

FREQUENCY STEPS AND DISPLAY

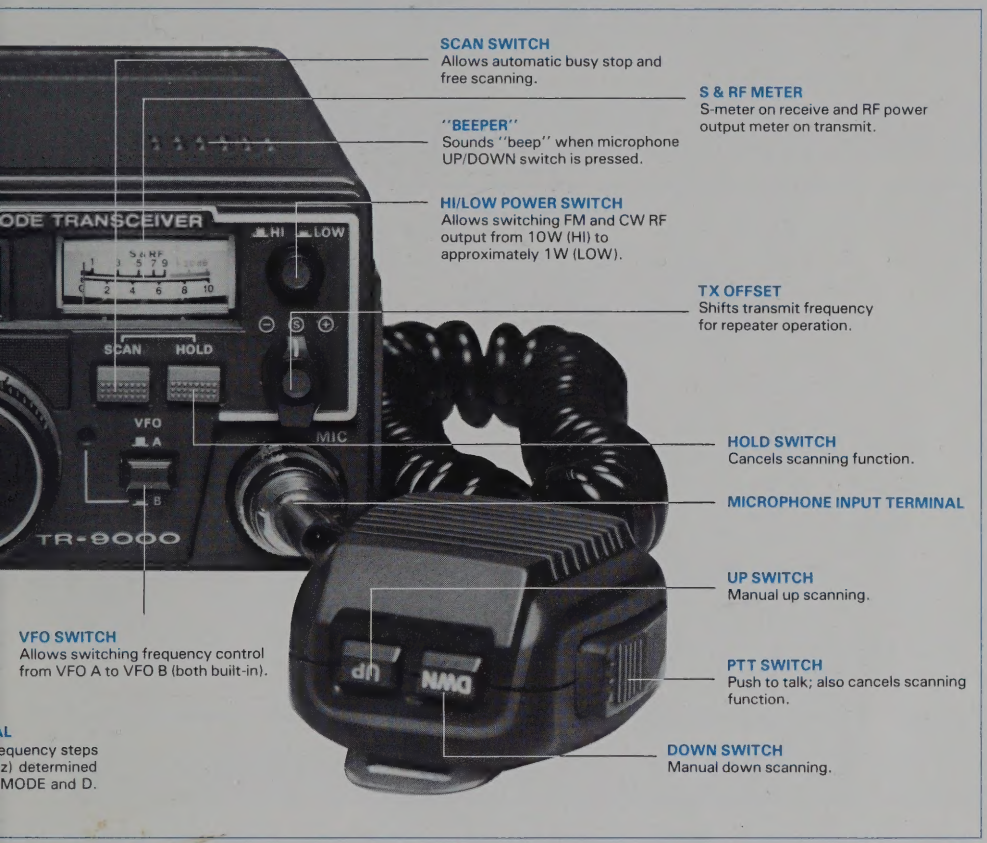
MODE switch	D.STEP switch	Tuning steps	Display digits	Application
FM1	ON or OFF	10 kHz	3 digits as 5.0 1	FM tuning and fast dial-up all modes
FM2	ON	5 kHz	4 digits as 5.025	Most FM tuning
	OFF	100 Hz	5 digits as 5.025.0	Tuning off-channel frequen
USB LSB CW	ON	Searches each 9.9 kHz width	5 digits as 4.100.0	Finding SSB/CW activity
	OFF	100 Hz	5 digits as 4.100.0	SSB/CW tuning

SSB/CW SEARCH



TX OFFSET

A front-panel switch offsets the transmit frequency of the TR-9000 up or down 600kHz for standard repeater operation. This offset circuit uses advanced digital technology for generating a highly stable offset frequency without spurious emission. A nonstandard offset may be provided by using memory 5, which memorizes receive and transmit frequencies independently.



EXCELLENT PERFORMANCE AND CONVENIENT FUNCTIONS

Linear power module for SSB operation

The TR-9000's final power amplifier is an M 57713 power module, designed for stable output with high-quality transmitted audio in both SSB and FM modes.

High receiving stability and excellent two-signal characteristics

A high-quality crystal oscillator enhances receiving stability and improves dial linearity. Intermodulation and desensing characteristics are quite good, due to the use of a low-noise dual-gate 3SK76 MOSFET and two newly developed monolithic crystal filters.

RF gain control

The RF gain can be controlled in the SSB and FM modes. This is a threshold-type control in SSB operation, permitting accurate S-meter readings at all times.

RIT circuit

A RIT (Receiver Incremental Tuning) control allows the receiver to be tuned slightly off frequency in the SSB/CW mode.

Built-in high-quality noise blanker

The built-in high-quality noise blanker is effective in suppressing pulse-type noise (such as ignition noise) in the SSB/CW mode. This noise blanker is very useful for mobile operation.

HI/LOW power switch

In the FM/CW mode the RF output power may be switched from 10 watts to 1 watt. In the SSB mode, however, the RF output is always 10 watts, regardless of the position of the HI/LOW switch.

Built-in side-tone circuit

A side-tone circuit in the TR-9000 enables monitoring of keying during CW operation.

AGC time constant automatically selected

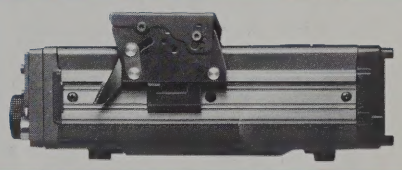
The amplified-type AGC circuit enhances SSB/CW reception. The AGC time constant is automatically selected with the MODE switch.

Indicators and accessory terminals

The TR-9000 provides various LED indicators such as VFO A/B, RIT, ON AIR, and BUSY. It also provides a number of accessory terminals such as KEY, BACK UP, TONE INPUT, STBY, EXT SP, etc., for mobile and fixed-station flexibility.

New adjustable-angle mount for mobile installation

The mounting angle may be adjusted easily for mobile installation. The mobile mounting bracket includes quick-release levers for easy removal.



ACCESSORIES FOR FIXED-STATION OPERATION

Fixed-station operation with the TR-9000 is accomplished with a combination of accessories, including the BO-9 System Base, the PS-20 external power supply, and the SP-120 external speaker.

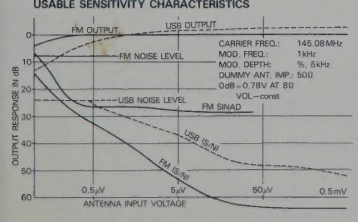
BO-9 system base function

The BO-9 includes a power supply for memory backup in the transceiver, a SEND/RECEIVE switch for CW operation, a headphone jack, and a power ON/OFF switch with AC outlet for the PS-20 power supply.

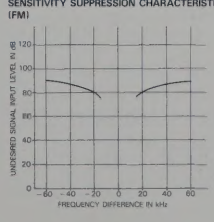
Spare legs for sloping appearance

Spare legs can be attached to the BO-9 to provide a convenient sloping angle for an attractive fixed-station appearance with the PS-20 and the SP-120.

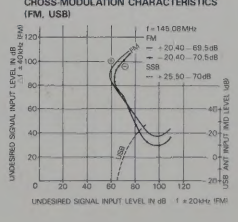
USABLE SENSITIVITY CHARACTERISTICS



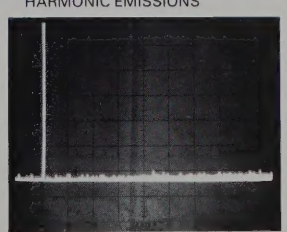
SENSITIVITY SUPPRESSION CHARACTERISTICS (FM)



CROSS-MODULATION CHARACTERISTICS (FM, USB)



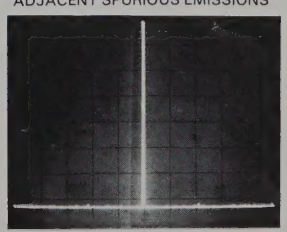
HARMONIC EMISSIONS



f:145.00MHz PO:12W ATT30dB SW/100MHz BW 100kHz VF 10kHz ST

1 sec

ADJACENT SPURIOUS EMISSIONS



f:144.00MHz(FM) PO:12W ATT20dB SW 5MHz BW 10kHz VF 10kHz ST

1 sec

OPTIONAL ACCESSORIES

SP-120 (EXTERNAL SPEAKER)

A good looking compact speaker matching the TR-9000 styling and designed for home station use.
A low distortion speaker unit provides clear reproduction of the TR-9000 high quality audio.

BO-9 (SYSTEM BASE)

The BO-9 provides a power supply for the memory back-up in the transceiver, manual standby switch for CW operation, headphone jack and switched AC outlet for the PS-20.

PS-20 (DC POWER SUPPLY)

Supplies regulated 13.8V DC at 4A continuous, 4.5A intermittent load with complete ease and safty due to the use of generous heat sinks and an automatic reset electronic overload trip.
Power Requirements: 120/220V AC, 50/60Hz

BC-1 (BATTERY CHARGER)

The BC-1 is an external battery charger for memory back-up, when used for fixed station.

TR-9000 SPECIFICATIONS

GENERAL

Semiconductors:	ICs.....12 FETs.....16 Transistors.....87 Diodes.....141
Frequency Range:	144.000.0 to 147.999.9MHz
Frequency Synthesizer:	Digital Control, Phase Locked VCO.
Mode:	SSB (A3j), FM (F3), CW (A1).
Frequency Stability:	Within ±500Hz during the first hour after 1 minute of warm up, and within 50Hz any 30 minutes thereafter at 25°C (constant).
Power Requirement:	13.8V DC ±15%.
Grounding:	Negative
Operating temperature:	−20°C to +60°C.
Current Drain:	0.4A in receive mode with no input signal 2.9A in HI Transmit Mode (Approx.) 1.3A in LOW Transmit Mode (Approx.) Less Than 2.5mA for memory back-up
Dimension:	170 (6-11/16)W × 68 (2-11/16)H × 234 (9-3/16)Dmm (inch) (projections not included)
Weight:	2.5kg (5.5lbs.)

TRANSMITTER SECTION

RF output Power (at 13.8V DC, 50Ω load):	HI (SSB, FM, CW) 10W LOW (FM, CW) 1W approx.
Modulation:	FM Variable Reactance direct Shift SSB Balanced Modulation
Frequency Tolerance:	SSB, CW Less than $\pm 10 \times 10^{-6}$ FM Less than $\pm 20 \times 10^{-6}$
Spurious Radiation:	HI Less than −60dB LOW Less than −50dB
Carrier Suppression:	Better than 40dB
Unwanted Side Band Suppression:	Better than 40dB
Maximum Frequency Deviation (FM):	±5kHz
Microphone:	Dynamic Microphone with PTT Switch, 500Ω

RECEIVER SECTION

Circuitry:	FM Double Conversion Superheterodyne SSB, CW Single Conversion Superheterodyne
Intermediate Frequency:	1st IF 10.695MHz 2nd IF (FM) 455kHz
Receiver Sensitivity:	FM Better than 0.5μV for 30dB S/N (Better than 0.2μV for 12dB SINAD) SSB, CW 0.2μV for 10dB S/N
Receiver Selectivity:	FM More than 12kHz (−6dB) Less than 25kHz (−60dB) SSB, CW More than 2.2kHz (−6dB) Less than 4.8kHz (−60dB)
Spurious Interference:	Better than 70dB
Squelch Sensitivity:	0.16μV (threshold)
Auto Scan Stop Level:	Less than 0.2μV (threshold)
Audio Output:	More than 2.0 Watts across 8 ohm load (10% dist.)

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

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