

# KENWOOD

2-m/70-cm FM DUAL BANDER

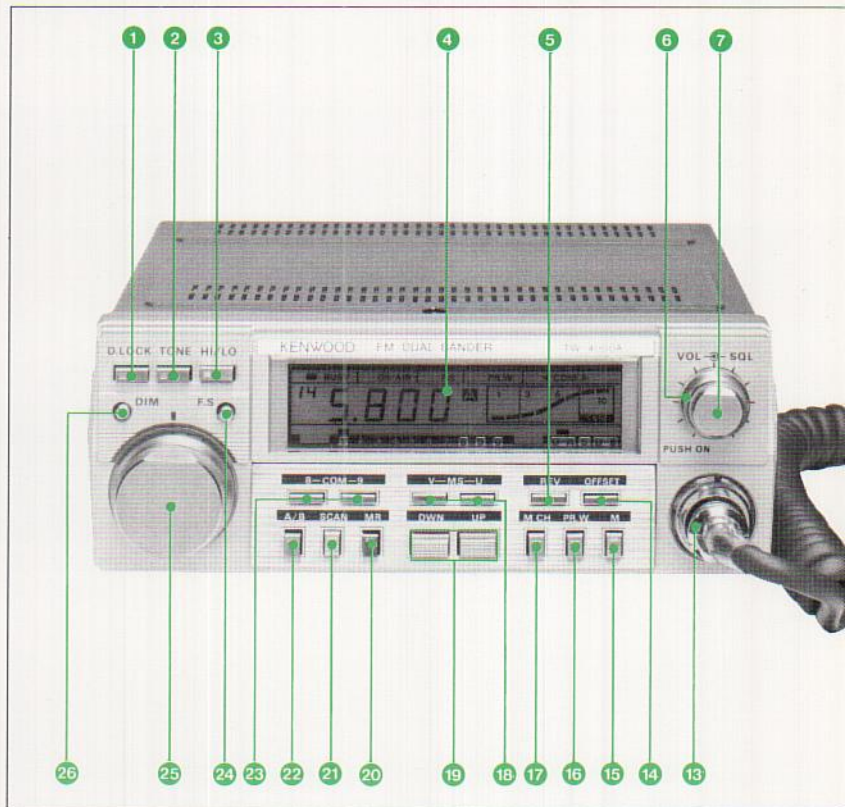
# TW-4000A





An "FM Dual-Bander", the KENWOOD TW-4000A provides new versatility in VHF and UHF operations, uniquely combining 2-m and 70-cm FM functions in a single compact package. Utilizing the latest KENWOOD technology, the TW-4000A design incorporates new operating features allowing for ease and flexibility of operation on the 2-m and 70-cm bands. Included in its more convenient operating features are a large, easy-to-read LCD display, a 10 channel memory with offset recall backed up by an internal lithium battery, plus dual digital VFO's, priority watch, common channels, programmable memory scan, band scan, and a full 25 watts output on each band.

In addition to the important operating features mentioned in the foregoing, an optional VS-1 voice synthesizer unit provides aural operating frequency and function indication utilizing synthesized voice. The TW-4000A with the optional VS-1 announces the operating frequency, and the function being used, a totally new concept in operations on the VHF-UHF bands.



## 2-m and 70-cm FM IN A COMPACT PACKAGE

The TW-4000A covers the 2-m band (144.000 ~ 145.995 MHz) plus the 70-cm FM band (430.000 ~ 439.995 MHz), all in a single compact package. Measuring only 60 H x 161 W x 217 D (mm), this new radio weighs in at only 2.0 kg.

## 25 WATTS RF POWER ON 2-m AND 70-cm BANDS

The use of new high reliability RF power modules permits operation at 25 watts output on either 2-m or 70-cm, with a resultant extension in operating range. A HI/LO power switch allows operation at the high 25 watts output, or at a more conservative 5 watts when the higher power is not needed.

## LARGE, EASY-TO-READ LCD DISPLAY

A green, multi-function back-lighted LCD display is provided for best visibility. It indicates frequency, memory channel, repeater offset, "S" or "RF" level, VFO A/B, scan, busy, and "ON AIR". A dimmer switch is provided.



## OPTIONAL "VOICE SYNTHESIZER UNIT"

In addition to the improved LCD display and the "beep" circuit that indicates operating function, an optional VS-1 "Voice Synthesizer" is available for easy installation inside the TW-4000A. The voice announces frequency, band, VFO A or B, repeater offset, memory channel number, and data that has already been stored in the selected memory channel. A front panel switch allows the operator to initiate an announcement of the current operating data.

## 10 MEMORIES WITH OFFSET RECALL AND LITHIUM BATTERY BACKUP

Each memory stores frequency, band, and repeater offset (2-m:  $\pm 600$  kHz or Simplex, 70-cm:  $-7.6$  MHz,  $-1.6$  MHz or Simplex, or  $\pm 1.6$  MHz or Simplex for England version). Memory 1 is for priority watch frequency. Memory 8 and 9 are for common channel use. Memory 0 can be used to store receive and transmit frequencies independently for odd repeater offsets, or for 2-m/70-cm cross-band operation.

## PROGRAMMABLE MEMORY SCAN

The programmable memory scan is very versatile, in that it can be programmed to scan all memory channels, or scan only 2-m or 70-cm channel. It can also be programmed to skip channels that the operator does not wish to monitor. Scanning stops on busy channels, and resumes approximately 1 second after the signal ceases. Scanning may be cancelled by momentarily pressing the "MR" key on

the front panel, or the "PTT" switch on the microphone. The scan direction may be reversed by pressing the "UP" or "DOWN" button on the microphone while scanning.

## BAND SCAN IN SELECTED 1 MHz SEGMENTS

Scans within the chosen 1 MHz band segment (examples 144.000 ~ 144.995 or 430.000 ~ 439.995 etc.), using the selected frequency step. Scanning stops on busy channels, and resumes approximately 1 second after the signal ceases. The scanning action may be cancelled by momentarily depressing the "PTT" switch on the microphone. The scanning direction may be reversed by pressing either the "UP" or "DOWN" button on the microphone.

## PRIORITY WATCH FUNCTION

In the Priority Watch mode, the unit switches back to memory channel 1 for 1 second out of every 10 seconds, to monitor the activity on the priority channel.

## COMMON CHANNEL SCAN

COM (Common) channels may be programmed in the same manner as other memory channels. During common channel scan, memory channels 8 and 9 are alternately scanned approximately every 5 seconds. Scanning is not interrupted by signals that may be present when the channels are scanned. This function allows the operator to monitor activity on both channels, such as the most used 2-m and 70-cm repeater channels. Either channel may be recalled instantly by pressing its respective common channel key.

## DUAL DIGITAL VFO'S

The two built-in VFO's tune independently, including band selection, allowing for easy frequency change from VFO "A" to VFO "B", or vice versa. Tuning steps of either 5-kHz or 25-kHz may be selected for 2-m/70-cm operations, using the "FS" (Frequency Step) switch. Holding the "UP" or "DOWN" key on the front panel depressed will cause the frequency to change in 1 MHz steps across the 2-m and 70-cm ranges. When tuning the VFO control,





## 1 D. LOCK SWITCH

When the switch is depressed, main dial frequency is locked electronically.

## 2 TONE SWITCH

Activates 1.750 Hz tone device for repeater use.

## 3 HIGH/LOW POWER SWITCH

Selects full or low output power.

## 4 INDICATOR SECTION

Operating frequency / off-set / S/RF Meter /Memory channel.

## 5 REVERSE KEY

Transposes receive and transmit frequencies, for receiving on the input and transmitting on the output of repeater.

## 6 SQUELCH CONTROL

## 7 VOLUME CONTROL/POWER SWITCH

## 8 V.RCL SWITCH

The optional voice synthesizer (VS-1) must be installed. When depressed, the mode of operation is announced.

## 9 BAND SWITCH

With the switch ON, depressing the UP/DOWN switch shifts the displayed frequency 1 MHz step up/down.

## 10 MR SWITCH

Used to recall memory with the switch ON, only the REV, OFFSET, PR.W and M keys on the keyboard are operable.

## 11 PTT SWITCH

Push to talk; also cancels scanning function.

## 12 UP/DOWN SWITCH

Controls three kinds of UP/DOWN functions.

- (1) frequency (when operation of VFO is scanning)
- (2) frequency 1 MHz step (when band switch is switched on)
- (3) memory channel

## 13 MIC CONNECTOR

## 14 OFFSET KEY

Used to set transmit frequency shifted from the display receive frequency when operating a repeater.

## 15 MEMORY

Used to store the frequency set by VFO into memory channels. (During CALL operating, MS scan or MR scan, this key operation is inhibited.)

## 16 PRIORITY WATCH

Used to monitor whether the priority channel (CH-1) is busy or not.

## 17 MEMORY CHANNEL

Used to select a memory channel. Depressing the key once selects the next higher memory channel.

## 18 MEMORY SCAN

Used to select a scan band (either 144 MHz or 430 MHz band) and initiate memory scan.

## 19 UP/DOWN KEY

Depressing the UP/DOWN key once shifts the displayed frequency 1 MHz up/down. Holding the key depressed continuously shifts the displayed frequency up or down.

## 20 MR (RECALL THE MEMORY CHANNEL)

Depressing the key recalls the specified memory channel.

## 21 SCAN

Used to initiate scan operation.

## 22 VFO A/B

Used to select VFO A or B.

## 23 COMMON CHANNEL SCAN

Depressing the COM-8/9 key recalls the content in CH-8/9 which is a common channel use.

## 24 FS SWITCH

Alternates VFO steps: 2-m/70-cm: 25 kHz/OFF, 5 kHz/ON

## 25 MAIN DIAL

Sets the receive/transmit frequency.

## 26 DIMMER

the frequency shifts continuously within the 2-m or 70-cm bandwidth.

## NEW MULTI-FUNCTION HAND MICROPHONE

MR and BAND switches as mode selection and V.RCL (voice recall) switch, in addition to frequency, band or memory scanning action depending on the selected mode, may be controlled using the buttons on the multi-function hand microphone supplied with the unit.

The "V.RCT" switch activates if the voice synthesizer unit, VS-1 is installed in the receiver.

## REPEATER REVERSE SWITCH

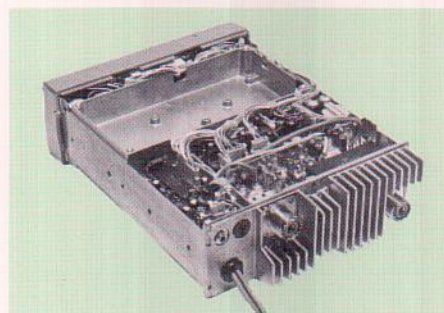
By pressing the "REV" switch, the transmit and receive frequencies are transposed. This function allows the user to switch the receiver instantly to the input of a repeater, and to transmit on the output. This is useful for checking signals on the input of a repeater (for quality, and for determining if the other station is in simplex range), for communicating with a station if the repeater fails or times out, and for determining if a repeater is "upside-down".

## FRONT PANEL ILLUMINATION

The VFO knob and other important controls on the front panel are illuminated for easy operation during night operations. The DIM switch dims both the panel lighting and the LCD display.

## HIGH PERFORMANCE RECEIVER AND TRANSMITTER

The use of GaAs FET's in the RF amplifiers on both 2-m and 70-cm, as well as the use of high performance MCF's in the 1st IF section, provides high receive sensitivity and excellent dynamic range. The high reliability RF power modules assure clean and dependable transmissions on either band, at the full 25 watt output power.



## RUGGED DIE-CAST CHASSIS

The use of advanced diecasting techniques in the fabrication of the combination chassis/heat sink, as well as in the RF shielding results in improved mechanical strength, plus higher immunity to RF interference.

## TONE SWITCH

The TONE switch activates 1750 Hz repeater access tone oscillator.

## MICROPHONE TEST FUNCTION

With the HI/LO power switch in the low power position, the RF bar meter reading varies with relative modulation, verifying output from the microphone.

## "BEEPER" CIRCUIT, WITH AUDIO AMPLIFICATION

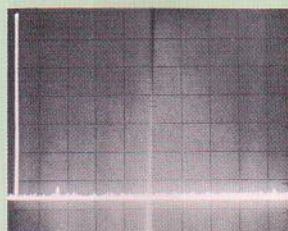
The execution of the various key operations is confirmed by the sounding of a "beeper" tone. The audio output level of this tone can be adjusted internally, using a variable resistor, to a comfortable level, with the front panel volume control set at your usual operating position.

## EASY-TO-INSTALL, ADJUSTABLE-ANGLE MOBILE MOUNT

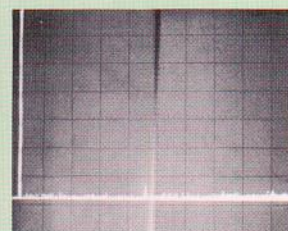
## OTHER FEATURES:

- Separate antenna connectors for 2-m and 70-cm.
- Auxiliary terminals for tone pad input, 70-cm band and standby information.

## ADJACENT SPURIOUS RADIATION



146.000 MHz ST 0.1 sec.  
BW 300 kHz VF 10 kHz  
SW 100 MHz



445.000 MHz ST 0.5 sec.  
BW 100 kHz VF 10 kHz  
SW 100 MHz



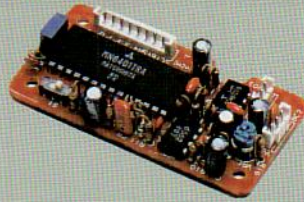
## OPTIONAL ACCESSORIES

### PS-430 DC POWER SUPPLY



Supplies regulated 13.8 VDC at 20A intermittent with built-in cooling fan and protection circuits for maximum reliability.

### VS-1 VOICE SYNTHESIZER



The VS-1 may be easily installed inside the TW-4000A, and, using the radio audio system, announces the frequency, band, VFO A or B, repeater offset, or the memory channel number when the unit is turned "ON", when the frequency is selected or changed, during memory recall, or when scanning is stopped.

### SP-40 (4Ω) COMPACT MOBILE SPEAKER



Very small, high quality mobile speaker, which can be mounted virtually anywhere.

### MA-4000 DUAL BAND MOBILE ANTENNA WITH DUPLEXER



Covers the two bands 2-m and 70-cm.

### SW-100A/B SWR/POWER METER



Compact and lightweight SWR/POWER/VOLT meters cover 1.8 ~ 150 MHz (SW-100A), 140 ~ 450 MHz (SW-100B) in range of 150W full scale for mobile use. (Optional couplers for HF ~ VHF/VHF ~ UHF are also available)

### SW-200A/B SWR/POWER METER



Selectable Peak-reading/RMS, SWR/POWER meters cover 1.8 ~ 150 MHz (SW-200A), 140 ~ 450 MHz (SW-200B) in ranges of 0 ~ 20W, 0 ~ 200W for base station use. (Optional couplers for HF ~ VHF/VHF ~ UHF are also available)

### PG-3A NOISE FILTER (for Mobile use) Max. current 15A (continuous)



Noise Filter for mobile use.

## TW-4000A SPECIFICATIONS

### [GENERAL]

Frequency Range:

VHF	UHF
144 ~ 146 MHz	430 ~ 440 MHz

Mode:  
Power Requirement:  
Power Consumption:

FM (F3E)  
13.8 VDC ± 15% (Negative grounding)  
Transmit (max.) = 7.5A (13.8 VDC)  
Receive (no signal) = 0.6A (13.8 VDC)  
Back-up current = (Battery) Less than 2μA

Operating Temperature:  
Antenna Impedance:  
Microphone Impedance:  
External Speaker Impedance:  
Dimensions:  
Weight:

-20°C to +50°C  
50Ω (VHF and UHF)  
500Ω  
8Ω  
60H x 161W x 217D mm  
2.0 kg

### [TRANSMITTER]

Final Output Power:  
Modulation:  
Maximum Frequency Deviation:  
Spurious Radiation:  
Modulation Distortion:

HI 25W, LO 5W  
Variable Reactance Direct Shift  
± 5 kHz  
HI/LO less than -60 dB  
Less than 3%

### [RECEIVER]

Circuitry:  
Intermediate Frequency:

Sensitivity:  
Selectivity:

Spurious Response:  
Squelch Sensitivity:  
Audio Output Power:

Double Conversion Superheterodyne  
1st IF = 30.865 MHz  
2nd IF = 455 kHz  
SINAD 12 dB less than 0.17μV  
More than 14 kHz (-6 dB)  
less than 30 kHz (-60 dB)  
Better than 70 dB (except IF/2)  
Less than 0.1μV  
More than 2.0W (at 8Ω load, 10% distortion)

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



# FM "Dual-Bander"

**NEW**



2 m & 70 cm in single compact package, LCD, 25 W, optional voice synthesizer.

## TW-4000A

**KENWOOD's TW-4000A FM "Dual-Bander" provides new versatility in VHF and UHF operations, uniquely combining 2 m and 70 cm FM functions in a single compact package.**

### TW-4000A FEATURES:

- **2 m and 70 cm FM in a Compact Package**  
Covers the 2 m band (142.000-148.995 MHz), including certain MARS and CAP frequencies, plus the 70 cm FM band (440.000-449.995 MHz), all in a single compact package. Only 6-3/8 (161)W x 2-3/8 (60)H x 8-9/16 (217)D inches (mm), and 4.4 lbs. (2.0 kg).
- **Large, Easy-to-Read LCD Display**  
A green, multi-function back-lighted LCD display for better visibility. Indicates frequency, memory channel, repeater offset, "S" or "RF" level, VFO A/B, scan, busy, and "ON AIR!" Dimmer switch.
- **25 Watts RF Power on 2 m/70 cm.**  
Hi/Lo power switch.
- **Optional "Voice Synthesizer Unit"**  
Installs inside the TW-4000A. Voice announces frequency, band, VFO A or B, repeater offset, and memory channel number.
- **Front Panel Illumination**

- **10 Memories with Offset Recall and Lithium Battery Backup**  
Stores frequency, band, and repeater offset. Memory 0 stores receive and transmit frequencies independently for odd repeater offsets, or cross-band operation.
- **Programmable Memory Scan**  
Programmable to scan all memories, or only 2 m or 70 cm memories. Also may be programmed to skip channels.
- **Band Scan in Selected 1-MHz Segments**  
Scans within the chosen 1-MHz segment (i.e., 144.000-144.995 or 440.000-440.995, etc.). The scanning direction may be reversed by pressing either the "UP" or "DOWN" buttons on the microphone.
- **Priority Watch Function**  
Unit switches to memory 1 for 1 second each 10 seconds, to monitor the activity on the priority channel.
- **Common Channel Scan**  
Memory 8 and 9 are alternately scanned every 5 seconds. Either channel may be recalled instantly.
- **Dual Digital VFO's**  
Selectable 5-kHz or 10-kHz for 2 m, and 5-kHz or 25-kHz for 70 cm. Depress "UP" or "DOWN" key on the front panel for band change in 1-MHz steps.
- **16-Key Autopatch UP/DOWN Microphone (Supplied)**
- **Repeater Reverse Switch**

- **High Performance Receiver/Transmitter**  
GaAs FET RF amplifiers on both 2 m and 70 cm, high performance MCF's in the 1st IF section, provide high receive sensitivity and excellent dynamic range. The high reliability RF power modules assure clean and dependable transmissions on either band.
- **Rugged Die-cast Chassis**
- **Optional Two-Frequency CTCSS Encoder**  
Easily mounted inside the radio, allows DIP switch programming of two different tone frequencies, for 2 m and 70 cm.
- **"BEEPER" sounds through speaker.**
- **Easy-to-Install mobile mount**
- **TW-4000A accessories:**
- **VS-1 Voice Synthesizer**
- **TU-4C Two-Frequency Programmable CTCSS Encoder**
- **KPS-7A Fixed station power supply**
- **SP-40 Compact mobile speaker**

Subject to FCC approval

More information on the TW-4000A and TS-780 is available from all authorized dealers of Trio-Kenwood Communications, 1111 West Walnut Street, Compton, California 90220.

# KENWOOD

...pacesetter in amateur radio

## All mode "Dual-Bander"

### TS-780

2 m & 70 cm all mode, dual digital VFO's, 10 memories, scan, IF shift...

### TS-780 FEATURES:

- USB, LSB, CW, FM all mode, covering the 2 m band (144.000-148.000 MHz) and the middle 70 cm band (430.000-440.000 MHz). UP/DOWN band switch.
- Dual digital VFO's with normal/tight drag switch. VFO steps in 20-Hz, 200-Hz, 5-kHz, or 12.5-kHz, plus "FM CH" channel-
- ized tuning. Split (cross) frequency operation possible. F. LOCK switch provided.
- 10 memories include band and frequency data, backed up by internal batteries (not supplied). Battery life exceeds one year. Memories 9 and 10 for priority instant recall.
- Band scan, with selectable 0.5, 1, 3, 5, and 10-MHz scan bandwidth.
- Memory scan selectable for all memories, or 2 m or 70 cm only.
- IF shift circuit rejects adjacent interference.
- High sensitivity and wide dynamic range • 7-digit

fluorescent tube digital display  
• 10 watt RF output • 2 m  $\pm$ 600-kHz TX offset switch with reverse switch • Tone switch for optional TU-4C two frequency tone

encoder unit • VOX and semi break-in CW built-in • FM center-tune meter • Noise blanker for SSB, CW.

Subject to FCC approval





