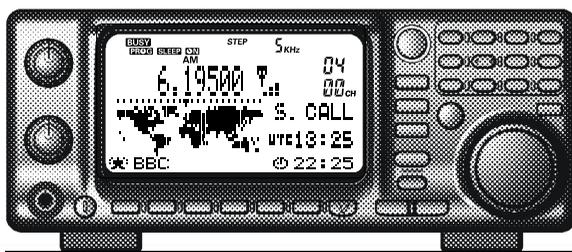


 **YAESU**

VR-5000

**ALL MODE
100kHz~2600MHz
COMMUNICATIONS RECEIVER**

OPERATING MANUAL



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Introduction

The **VR-5000** is a communications receiver providing general coverage reception from 100 kHz to 2600 MHz on the CW, SSB (LSB and USB), AM, and FM (Wide and Narrow bandwidths) modes (this coverage includes the AM and FM broadcast bands, HF Short-wave Bands up to 16 MHz, VHF and UHF TV bands, the VHF AM aircraft band, and a wide range of commercial and public safety frequencies!).

Installation of the **VR-5000** for everyday operation is may be accomplished in minutes. However, care should be taken in the installation process, so as to ensure maximum performance and safety. The procedures described below will ensure that you get the most out of your new **VR-5000** receiver.

INITIAL INSPECTION

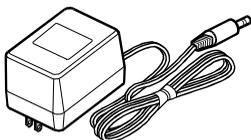
After carefully removing the **VR-5000** from its packing carton, inspect it for any signs of physical damage. Rotate the knobs and push the switches, checking each for normal freedom of action. If damage is suspected, write down your observations in detail, and notify the shipping company (if the set was shipped to you) or your dealer (if you purchased the set in-person) immediately. Save the packing carton for possible use later.

SUPPLIED ACCESSORIES

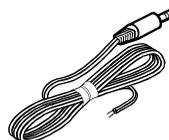
AC Adapter **PA-28B (120 V)/C (230-240 V)/U (230 V)**

DC Cable

Operating Manual



AC Adapter • PA-28 • h

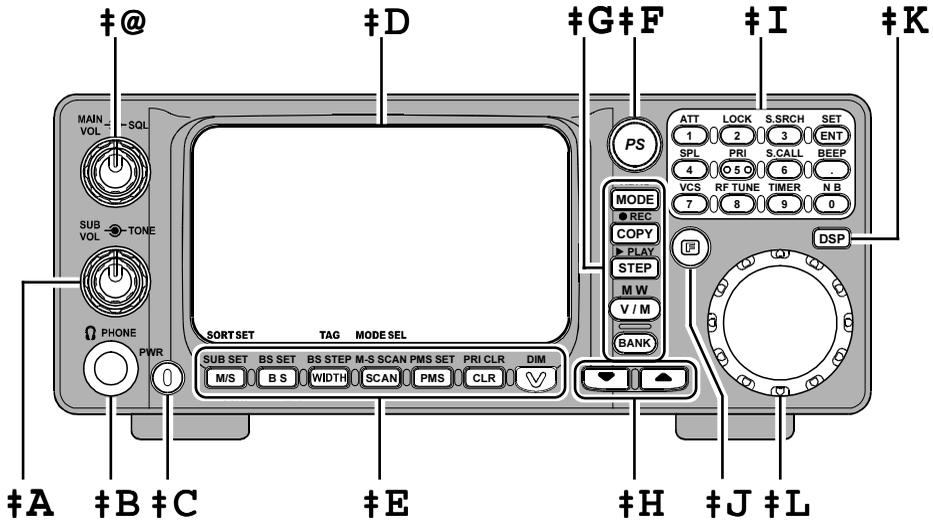


DC Cable

AVAILABLE OPTIONS

Voice Synthesizer Unit **DSP-1**
Voice Synthesizer Unit **FVS-1A**
Digital Voice Memory Unit **DVS-4**

Front Panel Controls & Switches



① MAIN VOL/SQL Knob

MAIN VOL Knob

The inner **MAIN VOL** knob adjusts the audio volume of the MAIN receiver in the speaker or headphones.

SQL Knob

The outer **SQL** knob sets the signal level threshold at which MAIN receiver audio is muted (and the “**BUSY**” icon in the LCD turns off), in all modes. This is normally kept fully counter-clockwise, except when scanning and during FM operation.

② SUB VOL/TONE Knob

SUB VOL Knob

The inner **SUB VOL** knob adjusts the audio volume of the SUB receiver in the speaker or headphones.

TONE Knob

The outer **TONE** knob adjusts receiver audio characteristics.

③ PHONES Jack

This 3-pin (“stereo”) miniature jack is used for connection to your headphones. When a plug is inserted into this jack, the internal (or external) speaker will be cut off. This jack’s impedance is optimized for use with 16Ω to 32Ω headphone types.

Front Panel Controls & Switches

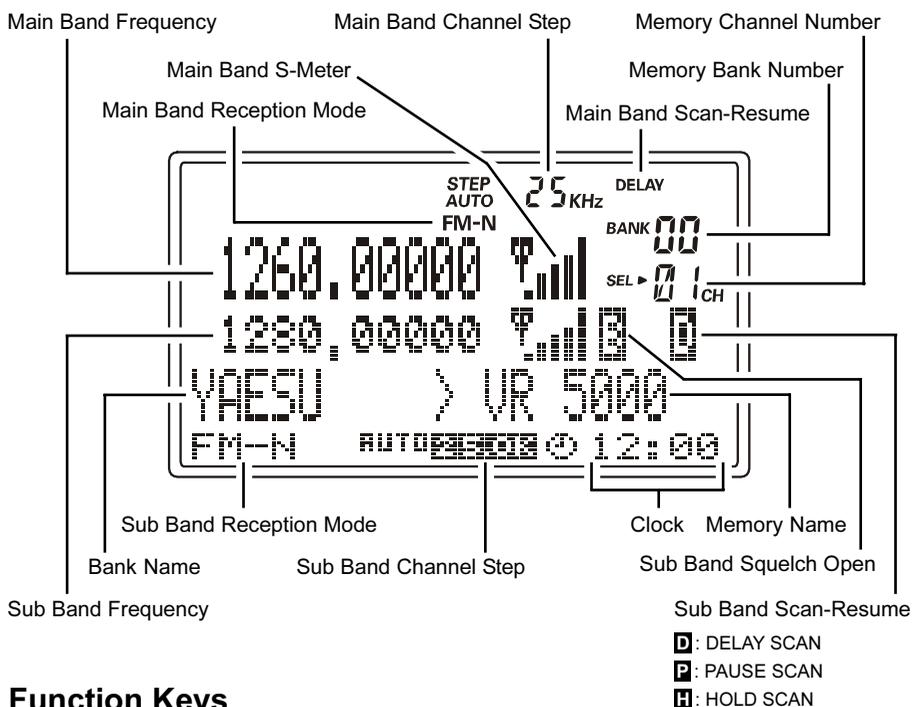
④ PWR Knob

This is the main on/off switch for the **VR-5000**. Press and hold this switch for one second to toggle the receiver's power on and off.

⑤ LCD (Liquid Crystal Display)

The upper half of the display consists of a dot-matrix display for frequency readout, plus various icons representing enabled receiver features.

The lower half contains a dot-matrix display for **Band Scope** viewing, menu programming, and alpha numeric name display, etc.



⑥ Function Keys

[M/S(SUB SET)] Key

Press this key momentarily to toggle the operating VFO between the MAIN VFO and SUB VFO.

Press this key, *after [F] key is pressed*, to toggle the VFO link feature on and off.

[BS(BS SET)] Key

Press this key momentarily to toggle the **Band Scope** feature on and off.

Press this key *twice*, *after the [F] key is pressed* (when the **Band Scope** is activated) to activate the SUB VFO cursor, which enables SUB VFO tuning.

Front Panel Controls & Switches

[WIDTH(BS STEP)] Key

Press this key momentarily to select the **Band Scope** sweep width.

Press this key *after [F] key is pressed* (when the **Band Scope** is activated) to select the **Band Scope** sweeping step size.

[SCAN(M-S SCAN)] Key

Press this key momentarily to activate the scanning function.

Press this key *after [F] key is pressed* to activate the “M-S Scanning” feature.

M-S Scan: The scanner hops back and forth between the MAIN VFO frequency and SUB VFO frequency.

[PMS(PMS SET)] Key

Press this key momentarily to activate the Programmable Memory Scan feature.

Press this key *after [F] key is pressed* to enable PMS memory (band edge) programming.

PMS Scan: The scanner sweeps a user-defined subband of frequencies (e.g. 450-480 MHz).

[CLR(PRI CLR)] Key

Press this key momentarily to clear (cancel) the function you currently are programming.

Press this key *after [F] key is pressed* to disable Priority Channel operation.

[V(DIM)] Key

Press this key momentarily to enable adjustment of the display brightness.

Press this key *after [F] key is pressed* to activate the optional **FVS-1A** Voice Synthesizer Unit which provides announcement of the operating frequency (with resolution to the displayed 100 Hz digit) for operators with vision impairments.

⑦ PS Key

Press this key momentarily to recall one of up to five **PS** (PreSet) memories for operation.

Press and hold this key for one second to store the operating parameters into consecutive **PS** memories.

⑧ Command Keys

[MODE(ADRS)] Key

Press this key momentarily to select the operating (receiving) mode. Repeated pressing of this key will scroll you through the available receiving mode choices.

Press this key *after [F] key is pressed* to select the recording field (memory register) for the voice recorder (requires the optional **DVS-4** Digital Voice Recorder unit).

[COPY(REC)] Key

Press this key momentarily to copy the SUB VFO data into the MAIN VFO.

Press this key *after [F] key is pressed* to start the voice recorder.

Front Panel Controls & Switches

[STEP(PLAY)] Key

Press this key momentarily to select the synthesizer steps to be used during VFO operation.

Press this key *after [F] key is pressed* to initiate playback on the voice recorder.

[V/M(MW)] Key

Press this key momentarily to change the frequency control method between the VFO and the Memory systems.

Press this key *after [F] key is pressed* to initiate the memory storage process.

[BANK] Key

Press this key momentarily to select the desired memory bank.

⑨ ▼(◀)/▲(▶) Keys

In the VFO mode, pressing either of these keys momentarily steps (according to the **DIAL** knob's step setting) the operating frequency down or up, respectively. Pressing either of these keys *after [F] key is pressed* causes a frequency hop of 10 MHz down or up.

In the Memory mode, pressing either of these keys momentarily steps the Memory Channel down or up respectively.

While the **Band Scope** is engaged, pressing either of these keys moves the Channel Marker.

⑩ Keypad

This keypad is used for direct frequency entry during VFO operation.

Secondary functions (activated by first pressing the [F] key) allow control of the **VR-5000**'s various control functions.

⑪ [F] Key

This key is used to activate the "Alternate" command functions of the panel keys.

If this key is pressed before one of the panel keys is pressed, the "Alternate" functions of the key will be enabled.

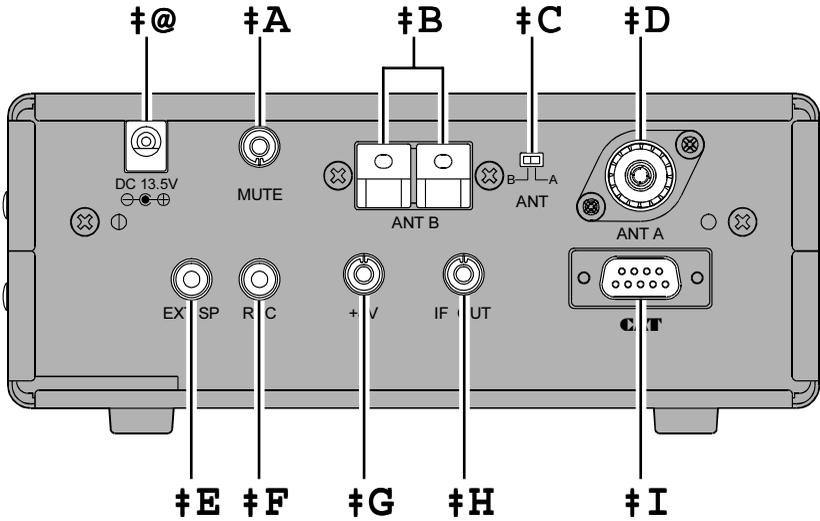
⑫ DSP Key

Press this key momentarily to activate the optional **DSP-1** Digital Signal Processing Unit.

⑬ DIAL Knob

This is the main tuning dial for the **VR-5000**. It is used for most tuning, memory selection, and function setting tasks on the **VR-5000**.

Rear Panel Connections



① DC 13.5V Jack

This is the DC power supply connection for the **VR-5000**. Connect the Supplied **PA-28** AC adapter to this jack.

② MUTE Jack

If using the **VR-5000** with a transceiver, shorting this jack during transmit will mute receiver output and attenuate the RF signal input. Check the information provided with your particular transceiver for details regarding proper connection.

③ ANT B Terminal

Use these spring-loaded terminal connectors to connect a high-impedance antenna.

④ ANT Switch

This switch selects antennas connected to the **ANT A** jack or **ANT B** terminal.

⑤ ANT A Jack

Connect the 50 Ω coaxial feed line from your low-impedance antenna here, using a type-M (PL-259) connector.

Rear Panel Connections

⑥ EXT SP Jack

This 2-contact mini phone jack provides receiver audio for an external loudspeaker with an impedance of $4 \sim 16 \Omega$. Inserting a plug in this jack disables the loudspeaker.

⑦ REC Jack

This jack provides a constant level (8 mV @ 1 k Ω) audio output, which is *unaffected* by the **VOL** and **TONE** controls. This audio can be used for tape-recording purposes, and for connection to data demodulator/decoder equipment.

⑧ +8V Jack

This output jack provides 8V DC at up to 100 mA for providing DC voltage to low power accessories. The center contact is positive.

⑨ IF OUT Jack

This output jack provides low-level 10.7 MHz IF output.

⑩ CAT Jack

This 9-pin serial DB-9 jack allows external computer control of the **VR-5000**. Connect a serial cable here and to the RS-232C “COM” port on your personal computer.

Installation

PHYSICAL LOCATION OF THE RECEIVER

The **VR-5000** should be located in a place that allows unobstructed ventilation around the cabinet. Although the **VR-5000** does not produce significant amounts of heat, as with any electronic device a well-ventilated location will ensure that heat does not build up inside the cabinet.

Do not place the **VR-5000** on top of another heat-generating device, and keep its top cover free of books, papers, and other objects which might impede ventilation.

If you utilize a computer in your monitoring location, we recommend that the **VR-5000**, its feedline, and its power cord all be kept as far away from the computer as possible, as the computer, its monitor, and/or other peripherals may radiate energy which can interfere with reception. Experimentation with several different locations may be necessary, in order to find the most interference-free location.

POWER CONNECTIONS

Base Station Operation

PA-28 AC Power Adapter Installation

Your **VR-5000** is supplied with an AC Power Adapter, model PA-28, which provides the 13.5 Volts (DC) required by the **VR-5000**. We do not recommend any other type of power adapter for use with this product.

To install the PA-28, first connect the small, round DC output connector on the cable of the PA-28 to the **DC 13.5V** jack on the rear panel of the **VR-5000**. Then plug the PA-28 into the AC wall outlet.

When disconnecting the PA-28, it is recommended that you first turn the **VR-5000** off, then unplug the PA-28 from the wall outlet, then unplug the round DC output connector.

When making power connections, always grasp the DC output connector, or the body of the PA-28, so as to minimize strain on the power cable. Never disconnect the PA-28 by pulling on either end of the cable, as this may lead to early mechanical failure of the PA-28.

DC Power Supply Connections

A well-regulated 13.5 Volt DC Power Supply may also be used with the **VR-5000**, providing it is capable of supplying 1 Ampere of current continuously. A DC cable is supplied with your **VR-5000** for connection to a power supply.

When making power connections to a power supply, be absolutely certain to observe the correct polarity, as serious damage can occur if the connections are reversed.

Connect the wire containing the *White Stripe* to the *Positive (+)* DC output terminal, and connect the *All-Black* wire to the *Negative (-)* DC output terminal. Double-check your hookup before plugging the DC output connector into the **VR-5000**.

We recommend that, when using an external DC power supply, you turn the power supply on, then turn on the **VR-5000**; when shutting down, turn the **VR-5000** off first, then turn off the power supply.

If the input voltage becomes too low (due to power supply failure or a problem in the DC cable), the **VR-5000**'s display will indicate "ERROR LOW VOLTAGE" If this should happen, check the output voltage from your power supply; if it is OK, then look for a problem in the DC cable.

Important Notice

Be absolutely certain to observe correct power supply polarity. Our Limited Warranty does not cover damage caused by improper power supply voltage or polarity.

ANTENNA CONSIDERATIONS

Antenna performance is critical to successful reception using the **VR-5000**. Extra time and care in installing your antenna(s) will reap great benefits for your monitoring station.

Best performance will always be obtained by the use of an outdoor antenna system, installed as high and in the clear as reasonably possible. Indoor antenna installations generally suffer from high levels of interference from computers and other electronic devices, as well as noise generated by fluorescent lights and home appliances.

Because of the wide frequency range of the **VR-5000**, no single antenna can be expected to provide optimized performance on all available frequencies. Therefore, separate discussions will address antenna principles for three general categories of antenna frequency range.

Important Safety Note

Never install an antenna where it (or its supporting mast) could possibly come in contact with utility power lines, even in a catastrophic wind storm. Such power lines carry thousands of volts of energy, and you can be killed instantly if the antenna connected to this product should come in contact with power lines, even for an instant.

The utilization of the services of a professional antenna-installation company is highly recommended, if you have any doubts about your ability to install your antenna system safely.

Installation

Antennas for Low- and Medium-Frequency Reception (below 2 MHz)

Good all-around reception will be obtained using a single *long* random length wire, connected to the (red) **Hi-Z** terminal on the rear panel. The wire should be supported as high above ground as possible by insulators at the end at possibly mid-span, depending on the length of the wire. The longer the wire, the stronger will be the signals received.

Insulated wire is generally preferred, as it is less susceptible to corrosion. The wire should be clear of nearby metallic objects to the greatest extent possible.

A good earth ground connection, as shown in the illustration, can be essential to good performance of a random length antenna. It may be connected to the Black terminal just to the left of the Red antenna terminal.

Antennas for Short-wave (HF)

Optimum performance on frequencies between 2 and 30 MHz will generally be obtained through use of a resonant antenna with an impedance near 50 Ohms at the frequency of interest. Broadband or multiband “Dipole” antennas, such as the Yaesu model YA-30, are available from your dealer.

If a particular frequency in the HF range is of interest to you, a half-wavelength Dipole antenna may easily be constructed from readily-available materials. A dipole consists of a length of wire, cut according to the formulas below; the wire is broken in the middle, and insulators are installed at each end and in the middle. A 50- or 75-Ohm coaxial cable is then connected in the middle, with the center conductor of the coaxial cable going to one side of the center insulator and the shield of the coaxial cable connecting to the other side of the insulator.

Length (meters) = $142.5 \div \text{Frequency (MHz)}$, or

Length (feet) = $468 \div \text{Frequency (MHz)}$

Better “balance” in the antenna’s reception pattern will be obtained if you make a coil of coaxial cable, ten turns of about 10” (25 cm) in diameter, just below the center insulator of the Dipole antenna. Tape the turns together securely to hold them in place.

The Dipole will work well near its design frequency. However, if you are interested in reception on several frequency bands separated by a number of MHz (for example, the 7 MHz band and the 15 MHz band), you may wish to cut wires for each band of interest, and solder the center ends of these different-length wires together on each side of the center insulator. The outer ends may then be fanned out so that they are separated by a few feet.

Install a type “M” (“PL-259”) coaxial connector at the station-end of the coaxial cable, and connect the coaxial cable to the coaxial jack (“**Antenna A**”) on the rear panel of the **VR-5000**.

Antennas for VHF and UHF Reception

Any antenna used for reception above 30 MHz will be fed with coaxial cable, so it must be connected to the **Antenna A** jack.

The wide frequency coverage of the **VR-5000** means that a wide-band vertical antenna (such as the “Discone” type) will be required for reasonable performance on the VHF and UHF bands. Optimized narrow-band vertical antennas will provide better performance on a specific frequency range, at the expense of poorer performance on other frequencies.

While vertical orientation of the antenna will be compatible with the configuration of the majority of base and mobile stations being heard, horizontally-oriented antennas are often used by amateur radio stations using the USB and CW modes in the 50 MHz, 70 MHz (U.K.), 144 MHz, and 432 MHz bands.

Whichever antenna(s) you use, it is important to use the best quality (lowest loss) coaxial cable possible, as cable loss in a long length of coaxial cable can be very high if small-diameter cable is used. This will reduce the strength of the incoming signals, making reception of weaker signals difficult or impossible.

Your local dealer will be in the best position to recommend an antenna type, as well as installation tips, for successful monitoring in your area.

Antenna Switching

Antenna switching between the coaxial **Antenna-A** and long-wire **Antenna-B** jacks (on the rear panel of the receiver) is accomplished using the **ANT A/B** slide switch, located between the two antenna jacks on the rear panel of the **VR-5000**. An antenna may be connected to each jack; there is no need to remove an antenna when the alternate jack is being used.

If multiple antennas are to be used in conjunction with the coaxial **Antenna A** jack, consult your dealer regarding the procurement of a coaxial antenna switch suitable for the frequency range of interest.

Important Note Regarding Antenna Safety!

Disconnect all antennas connected to the VR-5000 if you receive information that a lightning storm is approaching your area. Extremely high voltages can be fed into your station through an antenna system, and a receiver struck by lightning will be permanently damaged or destroyed.

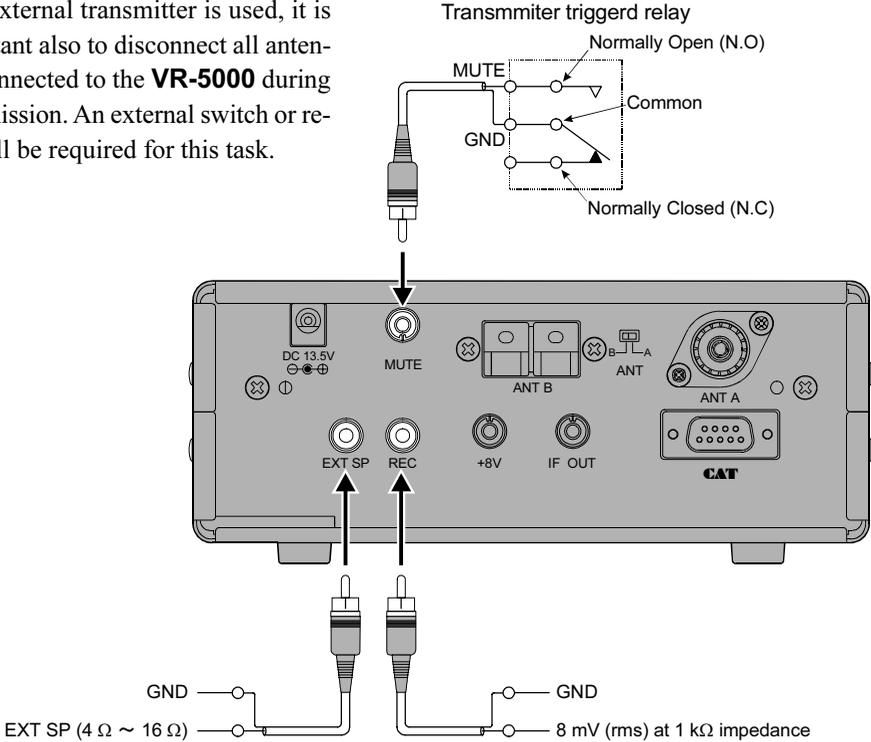
Do not, however, attempt to disconnect your antenna(s) if a lightning storm is in progress in your immediate area. You could be killed instantly if you are handling the antenna or its feedline at the moment lightning strikes!

Installation

MUTE Terminal Connections

The **MUTE** jack on the rear panel allows the receiver to be silenced during transmission, should the **VR-5000** be utilized with an external transmitter (not available from Yaesu). Typically, such a transmitter will have an internal relay, the contacts of which will close to ground during transmission; connection of a cable connected to this type of switching system will cause the audio output from the **VR-5000** to be cut off (when the center conductor is shorted to ground).

If an external transmitter is used, it is important also to disconnect all antennas connected to the **VR-5000** during transmission. An external switch or relay will be required for this task.



REC Jack Connections

The rear panel's **REC** jack provides constant-level "Line Out" audio output, suitable for connection to a tape recorder, modem, or computer sound card for recording or data-decoding purposes. The front panel Volume control does not affect the output level at this jack, which is 8 mV (rms) at 1 kΩ impedance.

EXT SP Jack Connections

An external loudspeaker may be connected to the rear panel's **EXT SP** jack. The external loudspeaker should have an impedance between 4Ω and 16Ω. Do not connect earphones to this jack, as the output level is high enough to yield the potential for hearing damage.

+8V Jack Connections

The **+8V** jack may be used for powering of small accessories. The output current, however, is limited to 100 mA or less, so check the current requirements for your accessory before connecting it to this jack.

Exercise particular care with any cables connected to this jack. If the far end of the cable should become shorted to ground (perhaps by accidental contact with a metal surface), the internal fuse for this jack will “blow” instantly.

IF OUT Jack Connections

A portion of the 10.7 MHz Intermediate Frequency (IF) stage signal is available via this jack. This may be used for observing signal characteristics, or a separate receiver may be connected here to monitor FM broadcast sub-carrier signals, etc.

Basic Operation

INTRODUCTION

The **VR-5000** utilizes a “VFO” (Variable Frequency Oscillator) tuning system for frequency selection. Two VFOs are provided, termed the “MAIN” and “SUB” VFOs in this manual. The VFOs utilize tuning “steps” which vary between operating modes, and which may be set by the owner according to your location and operating preferences. Fundamentally, however, a VFO may simply be thought of as a tuning dial for the receiver.

Details regarding setup and operation of the **VR-5000** are found in the pages to follow.

TURNING THE POWER ON/OFF

Press and hold the orange **PWR** switch for one second to turn the radio on and off. The one-second delay minimizes the chance that the radio will accidentally be turned on or off by bumping the **PWR** switch.

ADJUSTING THE VOLUME AND SQUELCH

1. Rotate the **MAIN VOL** knob to adjust the audio volume of the MAIN VFO. Rotate the **SUB VOL** knob to adjust the audio volume of the SUB VFO. Clockwise rotation of these **VOL** knobs increases the volume level. Both **VOL** knobs can be rotated to adjust the relative balance of receiver audio between the two VFOs during dual reception.
 2. The **VR-5000** squelch system allows you to mute the receiver’s audio output when no signals are being received. To set the squelch, turn the **SQL** knob fully counter-clockwise, then turn it *clockwise* just past the point where the background noise is silenced. Do not rotate the **SQL** knob much beyond this threshold point; if you do, the receiver will not respond to weak signals.
 3. Rotate the **TONE** knob to adjust the receiver’s audio characteristics. Clockwise rotation of the **TONE** knob emphasizes the high-frequency component. The **TONE** knob affects both the MAIN and SUB VFO audio.
-

FREQUENCY NAVIGATION

Tuning DIAL

Rotating the **DIAL** knob allows tuning in the pre-programmed steps established for the current receiving band. Clockwise rotation of the **DIAL** knob causes the **VR-5000** to be tuned toward a *higher* frequency, while counter-clockwise rotation will *lower* the receiving frequency.

If you press the **[F]** key momentarily, then rotate the **DIAL** knob, frequency steps of 1 MHz will be selected. This feature is extremely useful for making rapid frequency excursions over the wide tuning range of the **VR-5000**.

UP(▲)/DOWN(▼) Tuning

Pressing the [▼(◀)/▲(▶)] keys allows tuning in the pre-programmed steps established for the current receiving band. Pressing the [▲(▶)] key causes the **VR-5000** to be tuned toward a *higher* frequency, while pressing the [▼(◀)] key will *lower* the receiving frequency.

If you press the [F] key momentarily, then press the [▼(◀)/▲(▶)] keys, frequency steps of 10 MHz will be selected. The larger 10 MHz hops are extremely useful for making rapid frequency excursions over the wide tuning range of the **VR-5000**.

Direct Keypad Frequency Entry

The desired receiving frequency may be entered directly from the keypad.

The receiving mode (FM, SSB, AM, etc.) will automatically be set once the new frequency is entered via the keypad, based on the operating frequency you have chosen.

To enter a frequency from the keypad:

1. Enter the “MHz” portion of the frequency on which you wish to receive.
2. Enter the decimal point after the “MHz” portion by pressing the [• (BEEP)] key.
3. Enter five more digits to complete the frequency.
4. If there are “zeros” at the end of the frequency, you may press the [ENT(SET)] key after the final non-zero digit.

Examples:

To enter 146.16250 MHz, press [1] → [4] → [6] → [•] → [1] → [6] → [2] → [5] → [0]

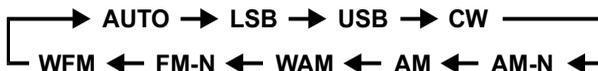
To enter 950 kHz, press [•] → [9] → [5] → [0] → [0] → [0]

To enter 445.40000 MHz, press [4] → [4] → [5] → [•] → [4] → [ENT]

MODE SELECTION

The **VR-5000** automatically selects a default receiving mode according to the frequency band on which you are receiving. However, many bands (especially HF Short-wave) may use a variety of transmission modes in a particular frequency segment.

If you want a change the receiving mode, press the [MODE(ADRS)] key. The receiving modes available are:



Basic Operation

CHANNEL STEP SELECTION

Operation of the **VR-5000** initially is set up in the “AUTO” mode (mentioned in the previous section), whereby the reception mode (such as AM or FM) is automatically set according to the frequency in use; at the same time, the channel steps typically used in that frequency segment are also programmed automatically.

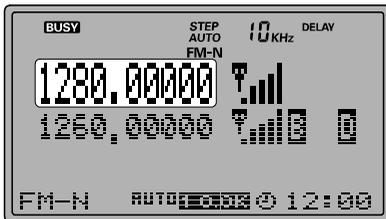
However, some frequency segments involve several different services which may use different channel steps. So you may wish to modify the channel steps; to do this, you must first exit the “AUTO” mode, then select the desired steps. The procedure is:

1. Note the operating mode in which you are operating via the “AUTO” mode (for example, FM-N).
2. Press the **[MODE(ADRS)]** key as many times as required to shift to the operating mode which had been selected by the “AUTO” mode.
3. Press the **[STEP(PLAY)]** key as many times as required to shift to the desired channel step selection (for example, 5 kHz).

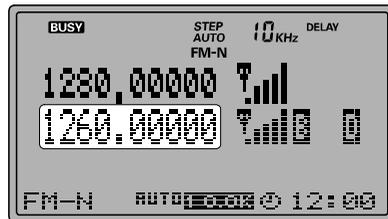
DUAL RECEIVE

The **VR-5000** provides two VFOs (MAIN VFO and SUB VFO), which operate in a Dual Receive configuration (simultaneous reception using both VFOs). The SUB VFO frequency must be set within ± 20 MHz of the MAIN VFO frequency (for example, if the MAIN VFO is set to 1280.000 MHz, the SUB VFO can be set to 1260.000 ~ 1300.000 MHz). Also, the SUB VFO may be set only AM or FM-N modes.

The MAIN VFO is the upper displayed frequency, while the SUB VFO is the lower displayed frequency. The relative size of the frequency displays indicates which VFO you currently are tuning on (the *larger* display size indicates the “active” VFO). Independent Volume controls are provided for each VFO; just turn the Volume down if you do not wish to listen to communications on a particular channel.



MAIN VFO



SUB VFO

Here are some of the features available during Dual Receive operation:

- Press the **[M/S(SUB SET)]** key momentarily to toggle the operating VFO between the **MAIN** VFO and **SUB** VFO.
- When tuning on the MAIN VFO, the SUB VFO frequency will track the MAIN VFO (VFO Tracking feature).
To disable the VFO Tracking feature, press the **[M/S(SUB SET)]** key *after the [F] key is pressed*. Repeat the same procedure to re-enable the VFO Tracking feature again.
- To disable the SUB VFO, and erase its contents, press the **[CLR(PRI CLR)]** key *after the [F] key is pressed*. Pressing the **[M/S(SUB SET)]** key will re-activate the SUB VFO. When the SUB VFO re-appears, it will have been reset to the MAIN VFO's frequency.
- Press the **[COPY(REC)]** key to copy the SUB VFO's frequency data to the MAIN VFO.

SETTING THE CLOCK

1. Press the **[F]** key momentarily, then press the **[ENT]** key.
2. Rotate the **DIAL** knob to set the cursor to the "MISC" menu, then press the **[ENT]** key.
3. Rotate the **DIAL** knob to set the cursor to the "CLOCK" menu option, then press the **[ENT]** key.
4. Enter the present time via the keypad.

Example 1: Set to 9:38, Press **[0] ► [9] ► [3] ► [8]**.

Example 2: Set to 13:20, Press **[1] ► [3] ► [2] ► [0]**.

5. Rotate the **DIAL** knob to set the cursor to the "END" menu option, then press the **[ENT(SET)]** key.
6. Confirm that the cursor is on the "WRITE" menu option, then press the **[ENT]** key.
7. Press the **[F]** key momentarily, then press the **[4(SPL)]** key.
8. Rotate the **DIAL** knob to set the cursor to the "UTC set" menu option, then press the **[ENT(SET)]** key. The World Clock and its accompanying World Atlas will appear.
9. Rotate the **DIAL** knob to select the desired area.
10. Press the **[F]** key momentarily, then press the **[9(TIMER)]** key.
11. Press the **[CLR(PRI CLR)]** key then press the **[ENT(SET)]** key.
12. Setup of the clock is now complete.

Basic Operation

RECEIVING SHORT-WAVE BROADCAST STATIONS

A special bank of prominent Short-wave Broadcast stations has been pre-programmed at the factory, for quick tuning. Each station selection will have been programmed with four of its most-often used frequencies, representing both night-time frequencies (generally below 10 MHz) and day-time frequencies (generally above 10 MHz).

Of course, you are not “required” to listen just to these stations; many other stations will be found in the frequencies adjacent to those stored in the special Short-wave Broadcast Memory Bank. However, the pre-programmed stations will provide a “quick start” to your Short-wave listening enjoyment!

To utilize the pre-programmed Short-wave Broadcast Memory Bank:

1. Press the [F] key momentarily, then press the [6(S.CALL)] key to recall the special Short-Wave Broadcast Station Memory Bank.
2. Press the [▼(◀)/▲(▶)] keys to select the desired Broadcast Station.
3. Rotate the **DIAL** knob to select the Broadcast Station’s frequency from among the pre-programmed choices. At different times of the day, different frequencies will be optimum for each station.
4. To exit from the special Short-wave Broadcast Station Memory Bank, press the [CLR(PRI CLR)] key.

Basic Operation

You can change the frequencies of stations in the above frequency list, if desired.

Here is the procedure:

1. Tune the radio to the *new* frequency of the Broadcast Station on the list.
2. Press the [F] key momentarily, then press the [4(SPL)] key.
3. Rotate the **DIAL** knob to set the cursor to the “STATION FREQ. WRITE” menu, then press the [ENT(SET)] key.
4. Press the [▼(◀)/▲(▶)] keys to select the Broadcast Station whose frequency is to be changed.
5. Rotate the **DIAL** knob to select the frequency (on that station’s list) to be changed, then press the [ENT] key.
6. Confirm that the cursor is on the “WRITE” menu, then press the [ENT] key to update the list reflect the new frequency.

Short-wave Broadcast Station List

Bank	Display	Station's Name	Frequency (MHz)
00	VOA	Voice Of America	6.030/6.160/9.760/11.930
01	R-CANADA	Radio Canada International	5.995/7.235/9.735/11.705
02	R-PORTUG	Radio Portugal	9.780/11.960/15.555/21.655
03	SPAIN	Radio Exterior de España	7.270/9.520/11.920/15.585
04	BBC	British Broadcasting Corporation	6.195/9.410/12.095/15.310
05	R-FRANCE	Radio France International	6.045/9.790/11.670/15.525
06	BELGIUM	Radio Vlaanderen International	5.985/9.925/11.780/13.740
07	R-NEDERL	Radio Nederland	5.955/6.020/9.895/11.655
08	R-LUXEMB	Radio Luxembourg	6.090
09	D-WELLE	Deutsche Welle	3.955/6.075/9.545/9.735
10	SWISS-R	Swiss Radio International	3.985/6.165/9.885/15.220
11	R-NORWAY	Radio Norway International	7.485/9.590/9.985/13.800
12	ITARY	Italian Radio International (RAI)	6.060/7.175/9.515/17.710
13	R-DENMAR	Radio Denmark	9.590/9.985/13.800/15.735
14	R-SWEDEN	Radio Sweden	6.065/9.490/13.625/17.505
15	R-FINLAN	Radio Finland	6.120/9.630/9.795/11.755
16	ISRAEL	Israel Broadcasting Authority	9.435/11.585/15.615/17.545
17	RUSSIA	Voice of Russia	5.920/5.940/7.205/12.030
18	INDIA	All India Radio (AIR)	6.045/9.595/11.620/15.020
19	CHINA-R	China Radio International (CRI)	5.250/7.190/9.855/11.685
20	R-KOREA	Radio Korea	5.795/7.275/9.570/13.670
21	R-JAPAN	Radio Japan	6.155/7.200/9.750/11.850
22	R-AUSTRALIA	Radio Australia	5.995/9.580/9.660/12.080

Memory Operation

The **VR-5000** provides a wide variety of memory system resources. These include:

- 2000 main memory channels, which may be separated into as many as 100 memory groups.
- 50 sets of band-edge memories (also known as “Programmable Memory Scan” channels).
- Five PS (Pre Set) memory channels, providing one-touch storage and recall of prime receiving frequencies.

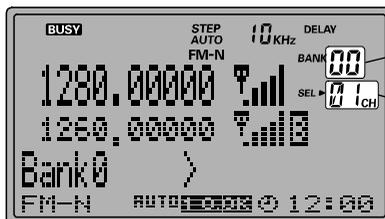
MAIN MEMORY SYSTEM

Memory Storage

1. Select the desired frequency, while receiving on the MAIN VFO. Be sure to set up any special features (described later), if you wish to store them.
2. Press the [**F**] key momentarily, then press the [**V/M(MW)**] key to enable the memory storage process.
3. To designate the channel for storage into a particular memory group, proceed to the next step; otherwise press the [**COPY(REC)**] key *twice* to save the entry and exit to the VFO mode. If you are not designating the channel into a memory group, storage of this frequency is now complete.
4. If designating the channel for storage into a memory group, confirm that the cursor is on the “Channel” menu, then press the [**ENT**] key.
5. Press the [**▼(◀)/▲(▶)**] keys to select the desired memory group to be stored, then press the [**ENT**] key. Pressing the [**▼(◀)**] key once will select an all-new memory group, if this is what you want to do.
6. Rotate the **DIAL** knob one click to the right to set the cursor to the “Channel” menu, then press the [**COPY**] key.
7. Confirm that the cursor has switched to the “WRITE” menu selection, then press the [**ENT**] key to save the entry and exit to the VFO mode.

Memory Recall

1. While operating in the VFO mode, press the [**V/M(MW)**] key to switch to the “memory” mode.
2. Press the [**▲(▶)/▼(◀)**] keys to select the desired memory group, or press the desired memory group number from the keypad (include any leading zeroes: press [**0**] **||||** [**2**] for memory group 2).
3. Now rotate the **DIAL** knob to select the desired memory channel within the selected memory group.
4. To return to the VFO mode, press the [**V/M(MW)**] key again.



Memory Operation

You can also configure the **VR-5000** for recall of all memory channels (ignoring the memory groups). To do this:

- (1) Press the [**F**] key momentarily, then press the [**ENT(SET)**] key.
- (2) Rotate the **DIAL** knob to set the cursor to the “MR” menu, then press the [**ENT**] key.
- (3) Confirm that the cursor is on the “MR BANK” menu selection, then press the [**•(BEEP)**] key to change its setting to “All Mem.”
- (4) Rotate the **DIAL** knob to set the cursor to the “END” menu selection, then press the [**ENT**] key.
- (5) Confirm that the cursor is on the “WRITE” menu, then press the [**ENT**] key to save the entry and exit. You can now select any of the programmed memory channels by just rotating the **DIAL** knob.



If you set the “MR BANK” menu selection to the “In BANK” option in step (3), the receiver will return to memory selection within memory groups, using the [**▼(◀)/▲(▶)**] keys for memory group selection and the **DIAL** knob for memory channel selection.

Memory Operation

ENHANCED MEMORY CHANNEL OPERATION

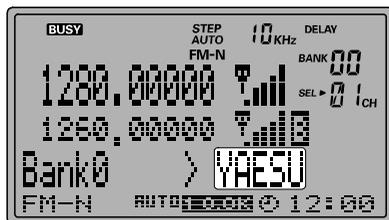
Memory Offset Tuning

Once you have recalled a particular memory channel, you may easily tune off that channel, as through you were in the “VFO” mode.

1. With the **VR-5000** in the memory mode, select the desired memory channel.
2. Press the **[BS(BS SET)MT]** key momentarily.
3. Rotate the **DIAL** knob or press the **[▼(◀)/▲(▶)]** keys, as desired, to tune to a new frequency.
4. If you wish to return to the *original* memory frequency, press the **[V/M(MW)]** key momentarily.
5. Press the **[COPY(REC)]** key to return to the VFO on the new frequency set during Memory Tuning.

Naming Memories

You may wish to append an alpha-numeric “Tag” (label) to a memory or memories, to aid in recollection of the channel frequency’s identity (such as a Short-wave Broadcast station’s name, etc.).



1. Recall the memory channel on which you wish to append a label.
2. Press the **[F]** key momentarily, then press the **[V/M(MW)]** key.
3. Rotate the **DIAL** knob to set the cursor to the “CH TAG” menu, then press the **[ENT(SET)]** key to enable programming of the name tag into the memory.
4. Press the keypad to select the first digit of the desired label, according to the key entry rule described below. When you have made your selection, rotate the **DIAL** knob clockwise one click to move to the next character.
5. Repeat the previous step to program the remaining letters, numbers, or symbols of the desired label. A total of 74 characters may be used in the creation of label.
6. When you have completed the label, press the **[ENT(SET)]** key.
7. Rotate the **DIAL** knob to set the cursor to the “END” menu selection, then press the **[ENT(SET)]** key.
8. Confirm that the cursor is on the “WRITE” menu option, then press the **[ENT]** key.
9. The naming of the memory is now complete.

Alpha-Numeric Keypad Sequence

- Press the [1(ATT)] key repeatedly to toggle between the two available characters:
“1” ⇨ “Space” ⇨ “1”
- Press the [2(LOCK)] key repeatedly to toggle among the seven available characters:
“2” ⇨ “A” ⇨ “B” ⇨ “C” ⇨ “a” ⇨ “b” ⇨ “c” ⇨ “2” ⇨ “A”
- Press the [3(S.SCH)] key repeatedly to toggle among the seven available characters:
“3” ⇨ “D” ⇨ “E” ⇨ “F” ⇨ “d” ⇨ “e” ⇨ “f” ⇨ “3” ⇨ “D”
- Press the [4(SPL)] key repeatedly to toggle among the seven available characters:
“4” ⇨ “G” ⇨ “H” ⇨ “I” ⇨ “g” ⇨ “h” ⇨ “i” ⇨ “4” ⇨ “G”
- Press the [5(PRI)] key repeatedly to toggle among the seven available characters:
“5” ⇨ “J” ⇨ “K” ⇨ “L” ⇨ “j” ⇨ “k” ⇨ “l” ⇨ “5” ⇨ “K”
- Press the [6(S.CALL)] key repeatedly to toggle among the seven available characters:
“6” ⇨ “M” ⇨ “N” ⇨ “O” ⇨ “m” ⇨ “n” ⇨ “o” ⇨ “6” ⇨ “M”
- Press the [7(VCS)] key repeatedly to toggle among the seven available characters:
“7” ⇨ “P” ⇨ “Q” ⇨ “R” ⇨ “p” ⇨ “q” ⇨ “r” ⇨ “7” ⇨ “P”
- Press the [8(RF TUNE)] key repeatedly to toggle among the seven available characters:
“8” ⇨ “S” ⇨ “T” ⇨ “U” ⇨ “s” ⇨ “t” ⇨ “u” ⇨ “8” ⇨ “S”
- Press the [9(TIMER)] key repeatedly to toggle among the seven available characters:
“9” ⇨ “V” ⇨ “W” ⇨ “X” ⇨ “v” ⇨ “w” ⇨ “x” ⇨ “9” ⇨ “V”
- Press the [0(NB)] key repeatedly to toggle among the five available characters:
“0” ⇨ “Y” ⇨ “Z” ⇨ “y” ⇨ “z” ⇨ “0” ⇨ “Y”
- Press the [DSP] key repeatedly to toggle among the 11 available symbols:
“!” ⇨ “ ” ⇨ “\$” ⇨ “%” ⇨ “&” ⇨ “ ’ ” ⇨
⇨ “ (” ⇨ “) ” ⇨ “ * ” ⇨ “ + ” ⇨ “ : ” ⇨ “ ! ” ...
- Press the [BS] key to delete the character before the cursor.
- Press the [▼(◀)] key to move the cursor to the left.
- Press the [▲(▶)] key to move the cursor to the right.
- Press the [CLR(PRI CLR)] key to cancel the creation of the label.
- Press the [CLR(PRI CLR)] key, *after the [F] key is pressed*, to cancel the all characters.

Memory Operation

Naming Memory Groups

1. Press the **[V/M(MW)]** key, if needed, to enter the memory mode.
2. Recall the memory group to which you wish to append a label, then press the **[BANK]** key.
3. Confirm that the cursor is on the “BANK TAG” menu, then press the **[ENT(SET)]** key.
4. Program the alpha-numeric “label” which you wish to recall using the **DIAL** knob and keypad, as described previously.
5. When you have completed the creation of the label, press the **[ENT(SET)]** key.
6. Rotate the **DIAL** knob to set the cursor to the “END” menu selection, then press the **[ENT(SET)]** key.
7. Confirm that the cursor is on the “WRITE” menu option, then press the **[ENT(SET)]** key.
8. The memory group naming process is now complete.

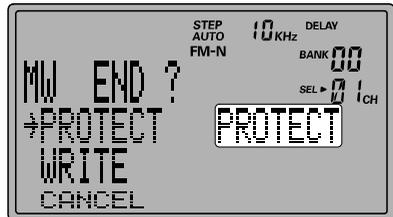


Protecting Memories (Inhibits the Editing of Memorized Channels)

You may wish to “Protect” a certain Memory Channel’s data, to prevent accidental data change. With Protection activated, you will not be able to edit or replace that channel’s data.

To Protect a channel’s data:

1. Recall the Memory Channel to be protected.
2. Press the **[F]** key momentarily, then press the **[V/M(MW)]** key.
3. Rotate the **DIAL** knob to set the cursor to the “END” menu selection, then press the **[ENT(SET)]** key.
4. Rotate the **DIAL** knob to set the cursor to the “PROTECT” menu, then press the **[• (BEEP)]** key to change its setting to “PROTECT.”
5. Rotate the **DIAL** knob to set the cursor to the “WRITE” menu option, then press the **[ENT(SET)]** key to protect the channel’s data.



If you set the “PROTECT” menu to “FREE” in step 4, the memory protection feature will be disabled.

Masking Memories

You may wish to “Mask” a certain Memory Channel’s data, when you no longer have a reason to recall that channel.

To Mask a channel’s data:

1. Recall the Memory Channel to be masked.
2. Press the **[F]** key momentarily, then press the **[V/M(MW)]** key.
3. Rotate the **DIAL** knob to set the cursor to the “Channel” menu, then press the **[ENT(SET)]** key.
4. Press the **[F]** key momentarily, then press the **[CLR(PRI CLR)]** key.
5. Confirm that the cursor is on the “DELETE” menu selection, then press the **[ENT(SET)]** key.
6. Press the **[CLR(PRI CLR)]** key.
7. Confirm that the cursor is on the “CANCEL” menu option, then press the **[ENT(SET)]** key to mask the channel’s data.



To unmask a channel’s data:

1. Press the **[F]** key momentarily, then press the **[V/M(MW)]** key.
2. Rotate the **DIAL** knob to set the cursor to “Channel” menu, then press the **[ENT(SET)]** key.
3. Select the masked memory using the **[▼(◀)/▲(▶)]** keys and **DIAL** knob. The masked memory appears with a “■” icon in the lower left corner of the LCD.
4. Press the **[F]** key momentarily, then press the **[CLR(PRI CLR)]** key.
5. Rotate the **DIAL** knob to set the cursor to the “OLD READ” menu selection, then press the **[ENT(SET)]** key.
6. Rotate the **DIAL** knob to set the cursor to the “END” menu, then press the **[ENT(SET)]** key.
7. Confirm that the cursor is on the “WRITE” menu option, then press the **[ENT(SET)]** key to unmask the channel.



Memory Operation

Alpha-Numeric Memory Recall

You can use the **VR-5000**'s powerful microprocessor system to search for Memory Channels according to their alpha-numeric label. In the example below, we shall set up the **VR-5000** to find all channels programmed with "POLICE" as an alpha-numeric label (e.g. POLICE 1, POLICE 2, etc.).

1. Press the **[V/M(MW)]** key, if needed, to enter the memory mode.
2. Press the **[WIDTH(BS STEP)]** key to enable setup of Alpha-Numeric Memory Recall.
3. Program the alpha-numeric "label" which you wish to recall, using the **DIAL** knob and keypad, as described previously. In this case, program "POLICE" as the label.
Note: do *not* press **[ENT(SET)]** after completing entry of the desired "label" in this instance.
4. Press the **[M/S(SUB SET)SORT]** key, which will recall the first memory channel beginning with "POLICE." The channel found will appear at the bottom left-hand portion of the display.
5. Press the **[M/S(SUB SET)SORT]** key; you will observe that only channels beginning with "POLICE" are appearing on the display.
6. When you find the desired memory channel, press the **[ENT(SET)]** key to recall that channel.

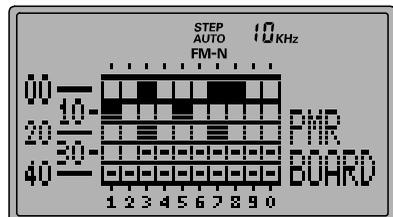
Important Note: You can recall Memory Channels alpha-numerically using just one or two letters of a label within above steps. In the above example, if you programmed "PO" instead of "POLICE," you could then recall channels such as "PONTIAC," "PORTER," "PORTLAND," and "POLAND" in addition to "POLICE." But if you set "POR," only "PORTER" and "PORTLAND" would be recalled.

PROGRAMMABLE MEMORY RECALL

The **VR-5000** can be set up to monitor the activity on as many as 50 memory channels simultaneously. For example, repeater system owners may wish to observe channel loading on the various repeaters in the system, and the **VR-5000** can assist in this effort. A graphical representation of channel occupancy will be created, called the "PMR Board."

When you install the memory channels you wish to observe into the PMR Board, the **VR-5000** will monitor the activity on these channels simultaneously via a rapid search function.

Then an "indicator" will appear on the board, as described below, letting you know that activity was noted on that channel.



Memory Operation

To install a Memory Channel into the PMR Board:

1. Recall the memory channel which you wish to be monitoring for activity.
2. Press the **[F]** key momentarily, then press the **[3(S.SCH)]** key.
3. The next-available PMR Board channel slot will be displayed, with an arrow alongside it. Press the **[• (BEEP)]** key to store the current channel.
4. Rotate the **DIAL** knob to set the cursor to the “END” menu selection, then press the **[ENT(SET)]** key.
5. Confirm that the cursor is on the “WRITE” menu selection, then press the **[ENT(SET)]** key to install the memory channel into the PMR Board.
6. Repeat steps 1 ~ 5 to install any other desired memory channels (up to 50 channels) into the PMR Board.

To monitor the PMR Board:

Before commencing operation in this mode, be sure that the **SQL** control is set up so as to quiet the background noise.

1. Press the **[F]** key momentarily, then press the **[4(SPL)]** key.
2. Rotate the **DIAL** knob to set the cursor to the “PMR Board” menu selection, then press the **[ENT(SET)]** key.
3. The PMR Board will now be displayed as a matrix of channel squares. The “White” squares indicate vacant channels, and Black squares indicate occupied channels.
4. Press the **[CLR(PRI CLR)]** key, followed by the **[ENT(SET)]** key, to return to the Memory mode.

To delete a memory channel from the PMR Board:

1. Recall the Memory Channel mode.
2. Press the **[F]** key momentarily, then press the **[3(S.SCH)]** key.
3. Rotate the **DIAL** knob to set the cursor to the memory channel which you wish to delete from the PMR Board, then press the **[• (BEEP)]** key.
4. Rotate the **DIAL** knob to select the cursor to the “END” menu, then press the **[ENT(SET)]** key.
5. Confirm that the cursor is on the “WRITE” menu, then press the **[ENT(SET)]** key to delete the memory channel from the PMR Board and return to the Memory mode.

Memory Operation

MEMORY CHANNEL SORT

The **VR-5000** can also sort the memory channels according to “Alpha-Numeric Name Tag,” “Frequency,” “Receive mode,” or “Channel Number.” When this is done, the memory channel numbers will be re-arranged to reflect the new lineup of the memorized channels.

Sorting by Alpha-Numeric Name Tag:

1. Recall the Memory mode.
2. Press the [**M/S(SUB SET)**] key, then rotate the **DIAL** knob to set the cursor to the “TAG NAME” menu.
3. Press the [**• (BEEP)**] key to set the sorting mode to “A → Z” or “Z → A.”
 - A → Z: Arranges the memory channels from A to Z (first letter of name).
 - Z → A: Arranges the memory channels from Z to A (first letter of name).
4. Press the [**ENT(SET)**] key to initiate the sort.

Sorting for the Receiving Frequency:

1. Recall the Memory mode.
2. Press the [**M/S(SUB SET)**] key, then rotate the **DIAL** knob to set the cursor to the “FREQUENCY” menu.
3. Press the [**• (BEEP)**] key to select the sorting mode to “A → Z” or “Z → A.”
 - A → Z: Arranges the memory channels from the lowest frequency to the highest frequency.
 - Z → A: Arranges the memory channels from the highest frequency to the lowest frequency.
4. Press the [**ENT(SET)**] key to initiate the sort.

Sorting for the Receiving Mode:

In this configuration, the channels are sorted according to the way the receiving modes appear on the display; “A → Z” corresponds to “Left to Right” on the display, while “Z → A” corresponds to “Right to Left” on the display.

1. Recall the Memory mode.
2. Press the [**M/S(SUB SET)**] key, then rotate the **DIAL** knob to set the cursor to the “Rx MODE” menu.
3. Press the [**• (BEEP)**] key to set the sorting mode to “A → Z” or “Z → A.”
 - A → Z: Sorts the memory channels as following order:
AUTO ➡ LSB ➡ USB ➡ CW ➡ AM-N ➡ AM ➡ WAM ➡ FM-N ➡ WFM
 - Z → A: Sorts the memory channels as following order:
WFM ➡ FM-N ➡ WAM ➡ AM ➡ AM-N ➡ CW ➡ USB ➡ LSB ➡ AUTO
4. Press the [**ENT(SET)**] key to initiate the sort.

Memory Operation

Sorting for the Channel Number (deletes the vacant memories automatically):

1. Recall the Memory mode.
2. Press the **[M/S(SUB SET)]** key, then rotate the **DIAL** knob to set the cursor to the "CHANNEL" menu.
3. Press the **[• (BEEP)]** key to set the sorting mode to "A -> Z" or "Z -> A."
A -> Z: Sorts the memory channels in ascending channel number order (any vacant memory channels are deleted automatically).
Z -> A: Sort the memory channels in descending channel number order (any vacant memory channels are deleted automatically).
4. Press the **[ENT(SET)]** key to initiate the sort.

(*Note:* The "ascending" or "descending" channel number order in this mode refers to the order in which the channels originally were stored.)

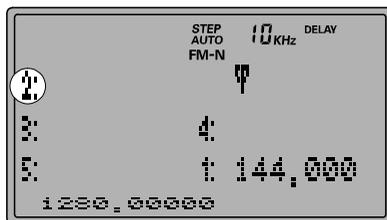
Note: When you initiate Channel Number Sorting, the **VR-5000** can not recall Masked memory channels.

PS (PRESET) MEMORY CHANNELS

Five convenient PS memories are provided in the **VR-5000**, allowing quick recall of top-priority operating frequencies. Use this memory feature for your most-often-used frequencies.

PS Memory Channel Storage

1. In the VFO mode, tune the **VR-5000** to the desired frequency.
2. Press and hold the **[PS]** key for one second.
3. Press the **[PS]** key momentarily (repeatedly, if necessary) to select the PS channel into which you wish to store the current frequency data.
4. Press and hold the **[PS]** key for one second to enable the programming of a name tag to the PS memory. To attach an alpha/numeric name to the PS memory, proceed to the programming of the name tag as described previously; otherwise press the **[ENT(SET)]** key.
5. Press the **[ENT(SET)]** key again to finish the PS Memory Channel storage.



PS Memory Channel Recall

1. Press the **[PS]** key to recall the currently active PS Memory Channel.
2. Press the **[PS]** key repeatedly to cycle through the PS Memory Channels.
3. Rotate the **DIAL** knob to exit the PS Memory Channel bank and return to the VFO or Memory mode.

Scanning

The **VR-5000** allows you to scan just memory channels, the entire operating band, or a portion of that band. It will halt on signals encountered, so you can listen to the station(s) on that frequency, if you like.

Scanning operation is basically the same in each of the above modes. There are customized settings for each scanning mode, however, that you need to set up according to your operating preferences. Before you begin, take a moment to select the way in which you would like the scanner to (A) *stop* scanning when it halts on a signal and (B) *resume* scanning after it halts on a signal.

Setting the Scan-Stop Technique

During Memory Channel Scanning, three options for the Scan-Stop mode are available:

NORMAL: In this mode, the scanner will stop on a signal it encounters (default).

S-METER: In this mode, the scanner will stop on a signal exceeding a prescribed S-meter level (at which the squelch opens).

VOICE: In this mode, the scanner will stop on a signal which contains a voice signal.

Here is the procedure for setting up the Scan-Stop mode:

S-METER Scanning

1. Press the [F] key momentarily, then press the [V/M(MW)] key.
2. Rotate the **DIAL** knob to set the cursor to the “Channel” menu option, then press the [ENT(SET)] key.
3. Using the [▼(◀)/▲(▶)] keys or the keypad, select the memory bank on which you wish to perform S-METER scanning, then press the [BANK] key. Each bank must be set separately.
4. Rotate the **DIAL** knob to set the cursor to the “S-LvlScan” menu option, then press the [• (BEEP)] key to enable setup of S-METER level scanning.
5. Press the [ENT(SET)] key, then rotate the **DIAL** knob to set the desired scan-stop (squelch opening) threshold to the desired signal strength “65” ~ “255,” then press the [ENT(SET)] key. The 65 ~ 255 scale is arbitrary, and you may need to experiment to find the level which is optimum for your operating needs.
6. Rotate the **DIAL** knob to set the cursor to the “END” menu option, then press the [ENT(SET)] key.
7. Confirm that the cursor is on the “WRITE” menu option, then press the [ENT(SET)] key to save the new setting and exit to normal operation.



VOICE Scanning

1. Press the [F] key momentarily, then press the [V/M(MW)] key.
2. Rotate the **DIAL** knob to set the cursor to the “Channel” menu option, then press the [ENT(SET)] key.
3. Using the [▼(◀)/▲(▶)] keys or the keypad, select the memory bank on which you wish to perform VOICE scanning, then press the [BANK] key.
4. Rotate the **DIAL** knob to set the cursor to the “VCS” menu option, then press the [• (BEEP)] key to enable VOICE scanning.
5. Rotate the **DIAL** knob to set the cursor to the “END” menu option, then press the [ENT(SET)] key.
6. Confirm that the cursor is on the “WRITE” menu option, then press the [ENT(SET)] key to save the new setting and exit to normal operation.



Setting the Scan-Resume Technique

Three options for the Scan-Resume technique are available. These options may be set *independently* for Memory Scan, VFO Scan, and PMS (Band-Segment) Scan operation.

DELAY: In this mode, the scanner will halt on a signal it encounters, and will hold until the signal disappears. After the squelch closes when the received station quits transmitting, scanning resumes automatically. The scanning-restart delay time (default interval: 2 seconds) is set by the “M-P.DELAY” menu selection.

PAUSE: In this mode, the scanner will halt on a signal it encounters. After a programmed time interval (set by the “M-PAUSE” menu selection), the scanner will resume, whether or not the signal has disappeared.

HOLD: In this mode, the scanner will halt on a signal it encounters. It will not restart automatically; you must manually re-initiate scanning if you wish to resume. However, the “M-HOLD” menu selection provides a “restart” window within which, if the incoming signal disappears, the scanner will resume; this allows scanning to proceed if the squelch is opened by a brief incoming signal burst.

Here is the procedure for setting up the Scan-Resume mode for Memory scanning:

1. Press the [V/M(MW)] key, if necessary, to enter the “MR” (Memory Recall) mode.
2. Use the [▼(◀)/▲(▶)] keys to select the desired memory bank.
3. Press the [BANK] key, then rotate the dial to select the “ScanStop” menu option.
4. Press the [• (BEEP)] key, repeatedly if necessary, to select “DELAY,” “PAUSE,” or “HOLD,” as desired.
5. Rotate the **DIAL** knob to select “END,” then press the [ENT(SET)] key.
6. The display should now indicate “WRITE;” press the [ENT(SET)] key again to save the new setting and exit to normal operation .

Scanning

Here is the procedure for setting up the Scan-Resume mode for VFO scanning:

1. Press the [F] key momentarily, then press the [ENT(SET)] key.
2. Confirm that the cursor is on the “VFO” menu option, then press the [ENT(SET)] key.
3. If you are setting the Scan-Resume mode for the MAIN VFO, rotate the dial to put the cursor on the “MainScan” menu option.
4. Press the [• (BEEP)] key to select the desired Scan-Resume mode: “DELAY,” “PAUSE,” or “HOLD.”
5. Rotate the **DIAL** knob to set the cursor to the “END” menu option, then press the [ENT(SET)] key.
6. Confirm that the cursor is on the “WRITE” menu option, then press the [ENT(SET)] key to save a new setting and exit.

Here is the procedure for setting up the Scan-Resume mode for PMS scanning:

1. Press the [PMS(PMS SET)] key to enter the “PMS” mode (described below).
2. Press the [SCAN(M-S SCAN)] key to halt PMS scanning, if engaged.
3. Press the [F] key momentarily, then press the [PMS(PMS SET)] key.
4. Rotate the **DIAL** knob to select the “MISC” menu option, then press [ENT(SET)].
5. Rotate the **DIAL** knob to select the “ScanStop” menu option.
6. Press the [• (BEEP)] key, repeatedly if necessary, to select “DELAY,” “PAUSE,” or “HOLD,” as desired.
7. Rotate the **DIAL** knob to select “END,” then press [ENT(SET)].
8. The display should now indicate “WRITE;” press the [ENT(SET)] key again to save the new setting and exit to normal operation.

MEMORY SCANNING

1. Press the [V/M(MW)] key, if needed, to enter the “MR” (Memory Recall) mode.
2. Press the [▼(◀)/▲(▶)] keys to select the memory bank on which you wish to do memory channel scanning.
3. Press the [SCAN(M-S SCAN)] key to initiate memory channel scanning in an upward direction (in the current memory bank).
4. If the scanner encounters a signal strong enough to open the squelch, the scanner will halt and pause on that channel. Scanning will resume according to the protocol you selected in the previous discussion.
5. To reverse the direction of the scan (i.e. toward a *lower* memory channel, instead of a higher memory channel), turn the **DIAL** knob one click in the counter-clock direction (or press the [▼(◀)] key momentarily) *while the VR-5000 is scanning*. To revert to scanning toward a *higher* memory channel once more, rotate the **DIAL** knob one click clockwise (or press the [▲(▶)] key momentarily).
6. Press the [SCAN(M-S SCAN)] key to disable memory channel scanning.

If you wish to have the memory channel scanner sweep *all* memories (in all memory banks):

- (1) Press the [F] key momentarily, then press the [ENT(SET)] key.
- (2) Rotate the **DIAL** knob to set the cursor to the “MR” menu option, then press the [ENT(SET)] key.
- (3) Confirm that the cursor is on the “MR BANK” menu option, then press the [• (BEEP)] key to change its setting to “All Mem.”
- (4) Rotate the **DIAL** knob to set the cursor to the “END” menu option, then press the [ENT] key.
- (5) Confirm that the cursor is on the “WRITE” menu option, then press the [ENT] key to save the entry and exit.
- (6) Press the [SCAN(M-S SCAN)] key to initiate memory channel scanning in an upward direction on the all memories (in all memory banks).



If you set the “MR BANK” menu option to “In BANK” in step (3), it will return the memory channel scanner to sweeping within the current memory bank only.

Memory Channel Skip

As mentioned previously, some continuous-carrier stations like a Broadcast station will seriously impede scanner operation if you are using the “PAUSE” Scan-resume mode, as the incoming signal will not pause long enough for the receiver to resume scanning. Such channels may be “skipped” during scanning, if you like.

1. Recall the Memory Channel to be skipped during scanning.
2. Press the [CLR(PRI CLR)] key. The “SKIP” icon will appear in place of the “SEL” icon (just to the left of the channel number on the display).
3. To cancel the memory channel skip programming for a particular channel, repeat the above steps so that the “SEL” icon appears in place of the “SKIP” icon.

VFO SCANNING

1. Press the [V/M(MW)] key to recall the VFO mode, if needed.
2. Press the [SCAN(M-S SCAN)] key to initiate scanning in an upward direction.
3. If the scanner encounters a signal strong enough to open the squelch, the scanner will halt and pause on that frequency. Scanning will resume according to the protocol you selected in the previous discussion.
4. To reverse the direction of the scan (i.e. toward a *lower* frequency, instead of a higher frequency), turn the **DIAL** knob one click in the counter-clock direction or press the [▼(◀)] key momentarily (while the **VR-5000** is scanning). To revert to scanning toward a higher frequency once more, rotate the **DIAL** knob one click clockwise (or press the [▲(▶)] key momentarily).
5. Press the [V/M(MW)] key to disable the scanner.

Scanning

PROGRAMMABLE (BAND LIMIT) MEMORY SCAN (PMS)

This feature a more refined and useful form of VFO scanning, allows you to establish sub-band limits for scanning. This allows you to monitor only a portion of the wide frequency range of the **VR-5000**, instead of sweeping the entire spectrum from 100 kHz to 2.6 GHz.

Programmable Memory Scan utilizes a pair of special memories to establish the upper and lower scanning limits. Here is the procedure for setting up limited band scanning:

Programming

1. Press the **[F]** key momentarily, then press the **[PMS(PMS SET)]** key to enable the storage of the frequency pair into a PMS memory.
2. The cursor will be pointing at the “PMS CH” menu option; press the **[ENT(SET)]** key.
3. If you want to program the frequency pair into the currently-selected PMS register (shown on the right edge of the display), proceed to the next step; if you wish to choose a different PMS register, press **[ENT(SET)]**, then use the **[▼(◀)/▲(▶)]** keys to select a different memory register number. Then press **[ENT(SET)]** to move on to the next step.
4. Rotate the **DIAL** knob to set the cursor to the “PMS TAG” menu option.
5. Press the **[ENT(SET)]** key to enable the programming of the name tag to the PMS memory. To attach an alpha/numeric name tag to the PMS memory, program the alpha-numeric “label” using the **DIAL** knob and keypad, as described previously; if you don’t want to label this frequency pair register, press the **[ENT(SET)]** key again.
6. When you have complete the creation of the label, press the **[ENT(SET)]** key.
7. Now it’s time to set up the band limits. Rotate the **DIAL** knob to set the cursor to the “START F” menu option, then press the **[ENT(SET)]** key.
8. Set the VFO frequency to the Lower sub-band limit, then press the **[ENT(SET)]** key.
9. Confirm that the cursor is on the “END F” menu, then press the **[ENT]** key.
10. Select the VFO frequency to the Upper sub-band limit, then press the **[ENT(SET)]** key.
11. Rotate the **DIAL** knob to set the cursor to the “END” menu option, then press the **[ENT(SET)]** key.
12. Confirm that the cursor is on the “WRITE” menu option, press the **[ENT(SET)]** key.
13. The PMS memory programming process is now completed.

Note: 50 PMS memories are available. You therefore can set upper and lower operation limits on a number of bands, if you like.

Operation (Current PMS Register)

1. Press the **[PMS(PMS SET)]** key to initiate PMS scanning in an upward direction.
2. If the scanner encounters a signal strong enough to open the squelch, the scanner will halt and pause on that frequency. Scanning will resume according to the protocol you selected in the previous discussion.

3. To change to a different PMS frequency pair, press the numerical keys on the keypad corresponding to the PMS register you wish to use. For example, if you are on PMS register “00” and wish to use PMS register “03,” press [0] \blacktriangleright [3] while PMS scanning is engaged. Scanning will begin on the new register without further action.
4. To reverse the direction of the scan (i.e. toward a *lower* frequency, instead of a higher frequency), turn the **DIAL** knob one click in the counter-clock direction or press the [▼(◀)] key momentarily while the **VR-5000** is scanning. To revert to scanning toward a higher frequency once more, rotate the **DIAL** knob one click clockwise or press the [▲(▶)] key momentarily.
5. Press the [V/M(MW)] key to disable the PMS scanner, and return to VFO mode.

Adjusting the PMS Scanner (Including PMS Register Change)

1. Press the [F] key momentarily, then press the [PMS(PMS SET)] key.
2. To change the PMS register on which you wish to scan, first confirm that the cursor is pointing to “PMS CH,” then press the [ENT(SET)] key.
3. Rotate the **DIAL** knob to select the new PMS register; now press the [ENT(SET)] key.
4. If you only wish to change the PMS register, skip to step 7.
5. Rotate the **DIAL** knob to set the cursor to the “MISC” menu option, then press the [ENT(SET)] key.
6. Rotate the **DIAL** knob to set the cursor to the desired menu from the following list; remember that these settings will only be applied during PMS operation.

ScanStop: Selects the Scan Resume mode among “HOLD,” “DELAY,” and “PAUSE,” as described previously. Press the [• (BEEP)] key to change selections.

- (1) In the “HOLD” mode, when a signal is received the scanner will hold for 2 second, then the scanner will stop.
- (2) In the “DELAY” mode, when a signal is received the scanner will hold until the signal disappears, then the scanner will resume after 2 seconds.
- (3) In the “PAUSE” mode, when a signal is received the scanner will hold for 2 second, then scanner will resume after 2 seconds.

S-LvlScan: The scanner will halt and pause on the frequency when there is a signal strong enough to stops on.

VCS: Enables/disables the VCS (Voice Channel Scan) feature via pressing the [• (BEEP)] key. When enable the VCS feature is enabled, the scanner will only halt and pause on the frequency that is having the voice signal.

ATT: Enable/disable the RF signal Attenuator via pressing the [• (BEEP)] key.

DSP: Turns the Digital Signal Processing system On or Off.

7. When you have made your selection(s), rotate the **DIAL** knob to select the “END” menu option, then press the [ENT(SET)] key.
8. Confirm that the cursor is now pointing to the “WRITE” menu option, and press the [ENT(SET)] key.

Scanning

M-S SCAN

This feature allows you to sub-band limits scanning between the MAIN VFO frequency and SUB VFO frequency.

1. Press the [**V/M(MW)**] key to recall the VFO mode, if necessary.
2. Press the [**F**] key momentarily, then press the [**SCAN(M-S SCAN)**] key to initiate scanning in an upward direction between the MAIN VFO frequency and SUB VFO frequency.
3. If the scanner encounters a signal strong enough to open the squelch, the scanner will halt and pause on that frequency.
4. To reverse the direction of the scan (i.e. toward a *lower* frequency, instead of a higher frequency), turn the **DIAL** knob one click in the counter-clock direction or press the [**▼(◀)**] key momentarily while the **VR-5000** is scanning. To revert to scanning toward a higher frequency once more, rotate the **DIAL** knob one click clockwise or press the [**▲(▶)**] key momentarily.
5. Press the [**SCAN(M-S SCAN)**] key to disable the M-S Scan, and return to the VFO mode.

Setting the dwell timers for the Scanner

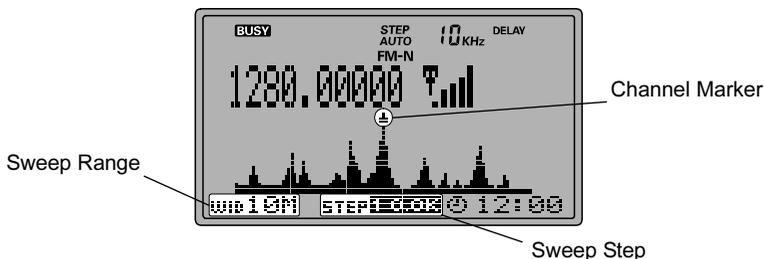
You can customized the dwell timers for the Scanner.

1. Press the [**F**] key momentarily, then press the [**ENT(SET)**] key.
2. Rotate the **DIAL** knob to select the cursor to the “SCAN TM” menu, then press the [**ENT(SET)**] key.
3. Rotate the **DIAL** knob to select the desired timer (menu) to be you wish changing.
 - M-DELAY: Determine the scan resume duration when signal is disappeared.
 - M-PAUSE: Determine the scanning pause time on activity before resuming.
 - M-P.DELAY: Determine the scan resume duration when the signal is disappeared while the M-PAUSE timer is activated.
 - M-HOLD: Determine the scanning pause time when signal is received. If the scanner stops until this time, the scanner turns to off.
 - M-H.DELAY: Determine the scan resume duration when the signal is disappeared while the M-HOLD timer is activated.
4. Rotate the **DIAL** knob to change the value for the timer, then press the [**ENT(SET)**] key.
5. Rotate the **DIAL** knob to select the cursor to the “END” menu, then press the [**ENT(SET)**] key.
6. Confirm that the cursor is on the “WRITE” menu, then press the [**ENT(SET)**] key to save the new setting and exit to the normal operation.

Band Scope Operation

The Band Scope allows viewing of operating activity on channels above or below the current operating channel in the VFO mode.

The display will indicate the relative signal strengths of signals on channels immediately adjacent to the current operating frequency. A convenient “Channel marker” can be used to zero in on one of the stations displayed; when you turn off the Band Scope, the **VR-5000** will be set to the frequency set by the Channel Marker.



To activate the Band Scope

1. Set the radio to the VFO mode by pressing the **[V/M(MW)]** key, if necessary.
2. Press the **[BS(BS SET)]** key momentarily to activate the Band Scope.
3. When the Band Scope is activated, press the **[M/S(SUB SET)]** key; you cannot move the Channel Marker.

This allows the Channel Marker to be moved anywhere within the programmed sweep range. When the Channel Marker is set to a frequency that may be of interest, press the **[COPY(REC)]** key; the frequency will change to that set by the Channel Marker.

4. When the Band Scope is activated, you can change the Sweep steps, which may be adjusted using the front panel keys.

To do this, press the **[F]** key momentarily, then press the **[WIDTH(BS STEP)]** key to select the sweep step from the following selections:

MODE	Steps
LSB/USB/CW	1.0 kHz (fixed)
AM-N/AM	1.0/5.0/9.0/10.0/20.0/25.0/50.0 kHz
WAM	1.0/5.0/9.0/10.0/20.0/25.0/50.0/100.0 kHz
FM-N	5.0/6.25/10.0/12.5/20.0/25.0/50.0/100 kHz
WFM	10.0/50.0/100/500 kHz

5. The Sweep range is can be changed, as well. To do this, press the **[WIDTH(BS STEP)]** key to select the sweep step as follows:

MODE	Sweep range
LSB/USB/CW	100/300/500 kHz
AM-N/AM	0.1/0.2/0.3/0.5/1.0/2.0/2.5/5.0/10.0 MHz
WAM/FM-N	0.5/1.0/2.0/2.5/5.0/10.0 MHz
WFM	1.0/2.0/5.0/10.0 MHz

Smart Search Operation

The Smart Search feature allows you to load frequencies automatically according to where activity is encountered by your radio. Smart Search will sweep the band of frequencies within the current “PMS” frequency pair (described previously), making a note of where activity is encountered and automatically loading those frequencies into a special Smart Search memory bank. The sweep will not pause on any of these busy channels, however; the frequency will automatically be stored without interrupting the scan.

To determine the Memory Bank for the Smart Search feature:

1. Press the [**F**] key momentarily, then press the [**ENT(SET)**] key.
2. Rotate the **DIAL** knob to set the cursor to the “PMS” menu option, then press the [**ENT(SET)**] key.
3. Confirm that the cursor is on the “S.SCH Bank” menu option, then press the [**ENT(SET)**] key.
4. Rotate the **DIAL** knob to select the Memory Bank which you wish to use the Memory Bank for the Smart Search, then press the [**ENT(SET)**] key.
5. Press the [**• (BEEP)**] key to select the between “STOP” or “FIFO.” If you select “STOP,” Smart Search will sweep the selected Memory Bank once, and then stop the scan (whether or not all the Smart Search memories are filled). If you select “FIFO,” Smart Search will repeatedly sweep until all Smart Search memories are full.
6. Rotate the **DIAL** knob to set the cursor to the “END” menu option, then press the [**ENT(SET)**] key.
7. Confirm that the cursor is on the “WRITE” menu option, then press the [**ENT(SET)**] key.

To initiate the Smart Search sweep:

1. Recall the PMS memory channel which memorized band limit for the Smart Search.
2. Press the [**F**] key momentarily, then press the [**3(S.SCH)**] key to initiate the Smart Search.
3. When Smart Search is engaged, press the [**SCAN(M-S SCAN)**] key momentarily to stop the Smart Search.
4. Press the [**V/M(MW)**] key momentarily to disable the Smart Search operation and return to the normal operation.

To recall the Smart Search Memories:

1. Recall the Memory mode.
2. Using the [**▼(◀)/▲(▶)**] key or keypad, select the Memory Bank for the Smart Search.
3. Rotate the **DIAL** knob to select Smart Search Memory.

Priority Operation

The priority feature, which is somewhat similar to Dual Watch, allow you to monitor a memory channel while checking a “Priority Memory” channel every five seconds for activity. If the Priority Memory channel becomes active with a signal strong enough to open the Squelch, the radio will halt on that frequency and will hold there in accordance with the setting of the “RESUME” mode described previously.

To setup the Priority Monitoring feature:

1. If you are operating on just one Memory Bank, select the Memory Bank within which the desired “Priority Channel” is to be found.
2. Press the [F] key momentarily, then press the [V/M(MW)] key.
3. Rotate the **DIAL** knob to set the cursor to the “Channel” menu, then press the [ENT(SET)] key.
4. Rotate the **DIAL** knob to select the channel you wish to designate as the “Priority” channel. The channel frequency will appear at the botto of the left side of the display.
5. Press the [F] key momentarily, then press the [5(PRI)] key. A “PRI▶” icon will appear to the left of the memory channel number on the LCD. Now press the [ENT(SET)] key.
6. Rotate the **DIAL** knob to set the cursor to the “END” menu option, then press the [ENT(SET)] key.
7. Confirm that the cursor is on the “WRITE” menu option, then press the [ENT(SET)] key.

To initiate Priority Channel operation:

Press the [F] key momentarily, then press the [5(PRI)] key to initiate Priority Channel operation. Every five seconds, the Priority Channel will be checked for activity; if activity is found on the Priority Channel, the **VR-5000** will automatically switch to that channel. If no activity is encountered on the Priority Channel, you can operate on other memory channels (and even scan, if desired), and the **VR-5000** will continue to poll the Priority Channel, looking for activity.

To disable Priority Channel operation, again press the [F] key momentarily, then press the [5(PRI)] key .

The polling time for the Priority Channel may be changed, if you like. To do this:

1. Press the [F] key momentarily, then press the [ENT(SET)] key.
2. Rotate the **DIAL** knob to set the cursor to the “MISC” menu option, then press the [ENT(SET)] key.
3. Rotate the **DIAL** knob to set the cursor to the “PRI WATCH” menu option, then press the [ENT(SET)] key.
4. Rotate the **DIAL** knob to select the polling time; the available selections are “1 sec,” “2 sec,” “5 sec,” and “10 sec.” When you have made your selection, press the [ENT(SET)] key.
5. Rotate the **DIAL** knob to set the cursor to the “END” menu option, then press the [ENT(SET)] key.
6. Confirm that the cursor is on the “WRITE” menu option, then press the [ENT(SET)] key.

World Clock

The **VR-5000** provides a World Clock with time references to 66 different areas of the world, for quick time zone recognition.

1. Press the **[F]** key momentarily, then press the **[4(SPL)]** key.
2. Confirm that the cursor is on the “WORLD TIME” menu, then press the **[ENT(SET)]** key. The World Clock and its accompanying World Atlas will appear.
3. Rotate the **DIAL** knob to select the desired area.
4. Press the **[F]** key momentarily, then press the **[9(TIMER)]** key.
5. Press the **[• (BEEP)]** key if you need to advance the clock one hour to account for “Summer Time.” Press the **[• (BEEP)]** key again to restore Standard Time.
6. To disable the World Clock, press the **[CLR(PRI CLR)]** key then press the **[ENT(SET)]** key.



Registered Area Name

Display	Area Name	Display	Area Name	Display	Area Name
HONOLULU	Honolulu	DAKAR	Dakar	KABUL	Kabul
TAHITI	Tahiti	LONDON	London	KARACHI	Karachi
ANCHORAG	Anchorage	MADRID	Madrid	MALDIVES	Maldives
VANCOUVR	Vancouver	BARCELON	Barcelona	NEW DELH	New Delhi
SAN FRAN	San Francisco	PARIS	Paris	CALCUTTA	Calcutta
LOS ANGL	Los Angels	BRUSSELS	Brussels	KATMANDU	kathmandu
CALGARY	Calgary	AMSTERDM	Amsterdam	DHAKA	Dhaka
DENVER	Denver	ZURICH	Zurich	YANGON	Yangon
MEX CITY	Mexico	ROME	Rome	BANGKOK	Bangkok
DALLAS	Dallas	BERLIN	Berlin	JAKARTA	Jakarta
CHICAGO	Chicago	VIENNA	Vienna	SINGAPOR	Singapore
MIAMI	Miami	STOCKHLM	Stockholm	HONGKONG	Hongkong
TORONTO	Tronto	ATHENS	Athens	PERTH	Perth
PANAMA	Panama	HELSINKI	Helsinki	BEIJING	Beijing
LIMA	Lima	CAIRO	Cairo	TAIPEI	Taipei
MONTREAL	Montreal	JERUSALM	Jerusalem	SEOUL	Seoul
NEW YORK	New York	NAIROBI	Nairobi	TOKYO	Tokyo
SANTIAGO	Santiago	MOSCOW	Moscow	ADELAIDE	Adelaide
CARACAS	Caracas	JEDDAH	Jeddah	SYDNEY	Sydney
B. AIRES	Buenos Aires	RIYADH	Riyadh	NOUMEA	Noumea
SAO PAUL	Sao Paulo	TEHRAN	Teheran	WELLNGTN	Wellington
CANARY I	Canary Islands	DUBAI	Dubai	FIJI	Fiji

You can change the area name to be desired name (i.e. “LOS ANGL” change to “Cerritos”). To do this:

1. Recall the area which you wish change the area name, as described previously.
2. Press the **[ENT(SET)]** key to enable the programming of the area name.
3. Program the area name (max 8 characters) using the **DIAL** knob and keypad, as described previously then press the **[ENT(SET)]** key. In this case “Cerritos.”
4. Confirm that the cursor is on the “WRITE” menu, then press the **[ENT(SET)]** key.

Timer Operation

ON/OFF TIMER

The Program timer can be utilized to set the **VR-5000** to user-programmed frequencies automatically at preset times. This is particularly convenient if you want to be sure not to miss programs of particular interest.

Programming:

1. Set the Main VFO to the desired receiving frequency (the frequency to which you want the **VR-5000** to switch automatically).
2. Press the **[F]** key momentarily, then press the **[9(TIMER)]** key.
3. Rotate the **DIAL** knob to set the cursor to the “TM PROG.” Menu option, then press the **[ENT(SET)]** key.
4. Press **[ENT(SET)]** key again to enable the programming of the Program Timer’s clock settings.
5. Rotate the **DIAL** knob to adjust the time you want the radio to switch to the programmed frequency, then press the **[ENT(SET)]** key.
6. Rotate the **DIAL** knob to adjust the time you want the radio to revert to the original frequency, then press the **[ENT(SET)]** key.
7. If you wish to attach an alpha/numeric name to the On/Off timer, program the alpha-numeric “label” using the **DIAL** knob and keypad, as described previously; otherwise press the **[COPY(REC)]** key.
8. Rotate the **DIAL** knob to set the cursor to the “WRITE” menu, then press the **[ENT(SET)]** key.
9. Confirm that the cursor is on the “WRITE” menu option, then press the **[ENT(SET)]** key.

Operation:

1. Press the **[F]** key momentarily, then press the **[9(TIMER)]** key.
2. Rotate the **DIAL** knob to set the cursor to the “TM PROG.” Menu, then press the **[• (BEEP)]** key to select “ON,” which enables the On/Off timer.
3. Rotate the **DIAL** knob to set the cursor to the “END” Menu option, then press the **[ENT(SET)]** key.

To disable the On/Off timer, set the “TM PROG.” Menu option to “OFF” in step 2 by pressing the **[• (BEEP)]** key .

When the On/OFF Timer is activated, the “**PROG**” icon will appear above the MAIN frequency display in the LCD.

Deletion of Program Timer Settings:

1. Press the **[F]** key momentarily, then press the **[9(TIMER)]** key.
2. Rotate the **DIAL** knob to set the cursor to the “TM PROG.” Menu, then press the **[ENT(SET)]** key.
3. Rotate the **DIAL** knob to set the cursor to the program to want to delete.
4. Press the **[• (BEEP)]** key, then press the **[COPY(REC)]** key.

Timer Operation

5. Confirm that the cursor is on the “WRITE” menu option, then press the [ENT(SET)] key.

Notes:

- *The program timer requires that both times be on the same day. Therefore, it is not possible to program a “Start Time” of 23:30 and an “End Time” of 00:30.*
- *It is possible to set up to 48 program times. However, the times for the programs must not overlap (the radio cannot switch away during a timer operation to a second program).*

SLEEP TIMER

The Sleep Timer can be automatically turn off the radio. This is convenient if you want to doze off listening to the radio.

1. Press the [F] key momentarily then press the [9(TIMER)] key.
2. Rotate the **DIAL** knob to select the cursor to the “SLEEP” Menu, then press the [ENT(SET)] key to enable the programming of the Sleep Timer.
3. Rotate the **DIAL** knob to select the desired sleep time among “30 min,” “60 min,” “90 min,” “120 min,” and “OFF,” then press the [ENT(SET)] key.
4. Rotate the **DIAL** knob to select the cursor to the “END” menu, then press the [ENT(SET)] key.
5. Confirm that the cursor is on the “WRITE” menu, then press the [ENT(SET)] key.

When activate the Sleep Timer, appear the “SLEEP” icon above the MAIN frequency display in the LCD.

ALARM TIMER

The Alarm Timer can be automatically turn on the radio. This is convenient if you wake up to your favorite station (or beep sound) every morning.

1. Press the [F] key momentarily then press the [9(TIMER)] key.
2. Rotate the **DIAL** knob to select the cursor to the “ALARM” Menu, then press the [ENT(SET)] key to enable the programming of the Alarm Timer.
3. Press the key to select the Alarm sound between the “RADIO” or “BEEP,” then press the [ENT(SET)] key.
4. Enter the time you want the radio turn on using the keypad, as described previously, then press the [ENT(SET)] key.
5. Rotate the **DIAL** knob to select the cursor to the “END” menu, then press the [ENT(SET)] key.
6. Confirm that the cursor is on the “WRITE” menu, then press the [ENT(SET)] key.

When activate the Alarm Timer, appear the “” icon above the MAIN frequency display in the LCD.

DSP Operation

Digital Signal Processing is a highly-effective filtering technology which can dramatically improve reception. The optional DSP Unit (**DSP-1**) brings to the **VR-5000** the following four features:

- DSP NOTCH Filter
- DSP Bandpass Filter
- DSP CW Peaking Filter
- DSP Noise Reducer
- CW-PITCH

DSP NOTCH FILTER

Unwanted beat notes within the receiver's IF filter passband can be effectively removed by utilization of the DSP NOTCH Filter.

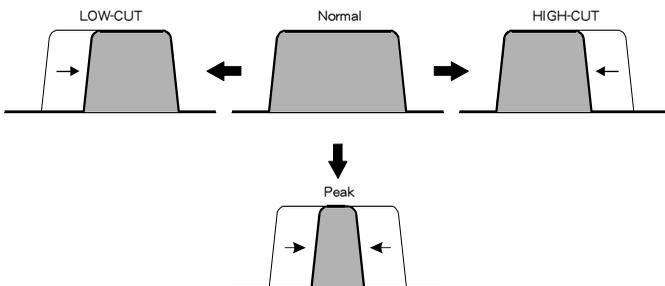
To activate the DSP NOTCH Filter:

1. Press the **[F]** key momentarily, then press the **[DSP]** key.
2. Rotate the **DIAL** knob to set the cursor to the "NOTCH" menu option, then press the **[• (BEEP)]** key to change its setting to "ON."
3. Rotate the **DIAL** knob to set the cursor to the "END" menu option, then press the **[ENT(SET)]** key.
4. Confirm that the cursor is on the "UPDATE" menu option, then press the **[ENT(SET)]** key to exit the setup process.
5. Press the **[DSP]** key to activate the DSP system.

To disable the DSP NOTCH Filter, set the "NOTCH" menu item to "OFF" in step 2.

DSP BANDPASS FILTER

In the SSB, AM, and FM modes, the DSP Bandpass Filter may be used to enhance the receiver's selectivity. Interference from adjacent-frequency stations, high-pitched noise, and low-frequency "rumble" components are among the types of problems which may be minimized using the DSP Bandpass Filter.



The bandwidth of the DSP Bandpass Filter is critical to its successful utilization, and it may be modified per the procedure below.

1. Press the **[F]** key momentarily, then press the **[DSP]** key.
2. Rotate the **DIAL** knob to set the cursor to the “LOW-CUT” menu option, then press the **[• (BEEP)]** key; this enables adjustment of the cutoff frequencies of the DSP Bandpass Filter.
3. Press the **[ENT(SET)]** key, then rotate the **DIAL** knob to adjust the low-frequency cutoff of the DSP Bandpass Filter as desired (100 ~ 1600 Hz). A setting of 300 or 400 Hz is a good starting point for most voice work. Press the **[ENT(SET)]** key when you have made your selection.
4. Confirm that the cursor is set to the “HIGH-CUT” menu option, then press the **[ENT(SET)]** key.
5. Rotate the **DIAL** knob to adjust the low frequency-cutoff as desired (1500 ~ 3000 Hz). A setting of 2100 ~ 2700 Hz is a good starting point. Press the **[ENT(SET)]** key when you have made your selection.
6. Rotate the **DIAL** knob to set the cursor to the “END” menu option, then press the **[ENT(SET)]** key.
7. Confirm that the cursor is on the “UPDATE” menu option, then press the **[ENT(SET)]** key to exit the setup process.
8. Press the **[DSP]** key to activate the DSP system.

To disable the DSP Bandpass Filter, set the “LOW-CUT” menu item to “OFF” in step 2.

DSP CW PEAKING FILTER

In the CW mode, you can activate a narrow-bandwidth peaking filter, which may be ideal for use under very crowded conditions.

To activate the DSP CW Peaking Filter as follow:

1. Be sure that the radio is set to the CW mode; the CW Peaking Filter will not function in the USB or LSB mode.
2. Press the **[F]** key momentarily, then press the **[DSP]** key.
3. Confirm that the cursor is on the “CW-BW” menu option, then press the **[• (BEEP)]** key.
4. Press the **[ENT(SET)]** key, then rotate the **DIAL** knob to select the desired bandwidth. The available values are 25 Hz, 100 Hz, 200 Hz, and 400 Hz.
5. Press the **[ENT(SET)]** key, then rotate the **DIAL** knob to select the “END” menu option, then press the **[ENT(SET)]** key.
6. Confirm that the cursor is on the “UPDATE” menu, then press the **[ENT(SET)]** key to exit the setup procedure.
7. Press the **[DSP]** key to activate the DSP system.

To disable the DSP CW Peaking Filter, set the “CW-BW” menu option to “OFF” in step 4.

DSP Operation

DSP NOISE REDUCTION

The DSP Noise Reduction feature can be effective against a wide variety of noise types; it is not limited to the “impulse” type (such as ignition noise).

To activate the DSP Noise Reduction system:

1. It is helpful to set up the receiver on a frequency with a station present, so you can hear the effects of any changes you make. Press the [DSP] key to engage the DSP.
2. Press the [F] key momentarily, then press the [DSP] key.
3. Rotate the **DIAL** knob to set the cursor to the “NR” menu option, then press the [• (BEEP)] key.
4. Press the [ENT(SET)] key, then rotate the **DIAL** knob to find the point where best signal-to-noise ratio is obtained under the current noise conditions.
5. Press the [ENT(SET)] key, then rotate the **DIAL** knob to set the cursor to the “END” menu option, then press the [ENT(SET)] key.
6. Confirm that the cursor is on the “UPDATE” menu option, then press the [ENT(SET)] key to exit the setup process.

To disable the DSP Noise Reduction feature, set the “NR” menu option to “OFF” in step 3.

CW-PITCH

In the CW mode, you can change the CW Pitch as desired. This feature adjusts the center frequency of the DSP CW Peaking Filter, to match the CW tone you prefer to listen to.

To change the CW Pitch:

1. Press the [F] key momentarily, then press the [DSP] key.
2. Rotate the **DIAL** knob to set the cursor to the “CW-PITCH” menu option, then press the [• (BEEP)] key.
3. Press the [ENT(SET)] key, then rotate the **DIAL** knob to choose the desired CW Pitch. The available values are 400 Hz ~ 1100 Hz (in 50 Hz steps).
4. Press the [ENT(SET)] key, then rotate the **DIAL** knob to set the cursor to the “END” menu option, then press the [ENT(SET)] key.
5. Confirm that the cursor is on the “UPDATE” menu option, then press the [ENT(SET)] key to exit the setup process.

Note: If you set the “CW-PITCH” menu item to “OFF” in step 2, it will automatically disable the CW Bandpass Filter. This is a “short-cut” to speed your progress through the Menu system.

Miscellaneous Features

ATT (RF ATTENUATOR)

For situations where extremely high signal levels are present, the receiver's input **ATT**enuator may be activated, to reduce the sensitivity and total gain of the receiver system.

1. To activate the Attenuator, press the **[F]** key momentarily, then press the **[1(ATT)]** key. The “**ATT**” icon will appear on the display. You should also hear a decrease in the incoming signal strength (and background noise) with the Attenuator engaged.
2. To switch the Attenuator off, press the **[F]** key momentarily, then press the **[1(ATT)]** key; the “**ATT**” icon will disappear from the display.

NB (NOISE BLANKER)

For reduction of impulse noise, such as that produced by automotive ignition systems, the noise blanker feature may prove helpful. The Noise Blanker is available in the SSB, CW, AM and FM-N modes.

1. To activate the Noise Blanker, press the **[F]** key momentarily, then press the **[0(NB)]** key. The “**NB**” icon will appear on the display. You should observe a reduction in the ignition noise.
2. To switch the Noise Blanker off, press the **[F]** key momentarily, then press the **[0(NB)]** key; the “**NB**” icon will disappear from the display.

RF TUNE

This feature allows you to shift the RF passband to maximize the receiver's sensitivity and reduce interference from out-of-band stations.

1. Press the **[F]** key momentarily, then press the **[8(RF TUNE)]** key to activate the RF TUNE feature.
2. Rotate the **DIAL** knob to the position where the desired signal strength is maximized, or where the interference is eliminated, then press the **[ENT(SET)]** key
3. To disable the RF TUNE feature, again press the **[F]** key momentarily, then press the **[8(RF TUNE)]** key.

KEYPAD BEEPER

If the keypad's beeper creates an inconvenience (particularly when operating late at night!), it may easily be disabled.

1. To disable the keypad beeper, press the **[F]** key momentarily, then press the **[•(BEEP)]** key.
2. If you wish to re-enable the keypad beeper, press the **[F]** key momentarily, then press the **[•(BEEP)]** key.

Miscellaneous Features

LOCKING FRONT PANEL CONTROLS

In order to prevent accidental frequency change, the **VR-5000**'s front panel Controls may be locked out.

1. To lock out the Front Panel Controls, press the **[F]** key momentarily, then press the **[2(LOCK)]** key. The “KEY” icon will appear on the display.
2. To cancel locking, press the **[F]** key momentarily, then press the **[2(LOCK)]** key; the “KEY” icon will disappear from the display.

You can change the lockout combinations. This feature allows you to customize the controls that will be locked out.

1. Press the **[F]** key momentarily, then press the **[ENT(SET)]** key.
2. Rotate the **DIAL** knob to set the cursor to the “MISC” menu option, then press the **[ENT(SET)]** key.
3. Rotate the **DIAL** knob to set the cursor to the “KEY LOCK” menu option, then press the **[ENT(SET)]** key.
4. Press the **[• (BEEP)]** key to select the desired lockout combination: “Key&Dial,” “Key,” or “Dial.”
5. To attach a “Password” to the Locking feature, enter a four-digit password (0000 ~ 9999) via the keypad, and then press the **[ENT(SET)]** key, otherwise just press the **[ENT(SET)]** key.
6. Confirm that the cursor is on the “WRITE” menu option, then press the **[ENT(SET)]** key to save the new setting and exit to normal operation.

To cancel the “Password:”

1. Press the **[F]** key momentarily, then press the **[ENT(SET)]** key.
2. Rotate the **DIAL** knob to set the cursor to the “MISC” menu option, then press the **[ENT(SET)]** key.
3. Rotate the **DIAL** knob to set the cursor to the “KEY LOCK” menu option, then press the **[ENT(SET)]** key.
4. Enter the four digit password which you programmed via the keypad, then press the **[ENT(SET)]** key.
5. Press the following key sequence:
[ENT(SET)] \Rightarrow **[F]** \Rightarrow **[CLR(PRI CLR)]** \Rightarrow **[ENT(SET)]**
6. Confirm that the cursor is on the “WRITE” menu option, then press the **[ENT(SET)]** key to cancel the “Password” and exit to normal operation.

Miscellaneous Features

DISPLAY CONTRAST

The display contrast may be adjusted, as well.

1. Press the **[F]** key momentarily, then press the **[ENT(SET)]** key.
2. Rotate the **DIAL** knob to set the cursor to the “MISC” menu option, then press the **[ENT(SET)]** key.
3. Rotate the **DIAL** knob to select the cursor to the “LCD CONT” menu, then press the **[ENT(SET)]** key.
4. Rotate the **DIAL** knob to adjust the contrast level “0 (low contrast) ~ 15 (high contrast)” to a comfortable setting.
5. Rotate the **DIAL** knob to set the cursor to the “END” menu option, then press the **[ENT(SET)]** key.
6. Confirm that the cursor is on the “WRITE” menu option, press the **[ENT]** key to save the new setting and exit to normal operation.

DISPLAY DIMMER

The LCD’s illumination level may be adjusted by the front panel keys.

1. Press the **[V(DIM)]** key momentarily to enable adjustment of the LCD illumination level.
2. Rotate the **DIAL** knob to adjust the illumination level “0 (dim) ~ 7 (bright).” As you make the adjustment, you will be able to see the effects of your changes.
3. When you have completed the adjustment, press the **[ENT(SET)]** key to save the new setting and exit to normal operation.

SELECTING THE **[F]** KEY “HANG•ETIME

By default, when you press the **[F]** key momentarily, the “**[F]** icon (indicating “Alternate” function mode) will remain active for 5 seconds. The default 5-second “Alternate” command time can be changed to a shorter or longer duration, if desired.

1. Press the **[F]** key momentarily, then press the **[ENT(SET)]** key.
2. Rotate the **DIAL** knob to set the cursor to the “MISC” menu option, then press the **[ENT(SET)]** key.
3. Rotate the **DIAL** knob to set the cursor to the “FUNC TM” menu option, then press the **[ENT(SET)]** key.
4. Rotate the **DIAL** knob to select the desired duration time (1/2/3/5/10 seconds, and “Toggle”).
5. Rotate the **DIAL** knob to set the cursor to the “END” menu option, then press the **[ENT(SET)]** key.
6. Confirm that the cursor is on the “WRITE” menu option, then press the **[ENT(SET)]** key to save the new setting and exit to normal operation.

Miscellaneous Features

VOICE SYNTHESIZER OPERATION

The optional Voice Synthesizer Unit (**FVS-1**) enables an audible announcement of the current (Main Band) operating frequency.

1. Press the **[F]** key momentarily, then press the **[V(DIM)]** key to activate the Voice Synthesizer Unit. The **[V(DIM)]** key is the switch directly below the bottom right-hand corner of the display.
2. When you press the **[V(DIM)]** key again (or change the Main Band frequency), the Voice Synthesizer will announce the current (Main Band) operating frequency.
3. To disable the Voice Synthesizer frequency announcements, press the **[F]** key momentarily, then press the **[V(DIM)]** key.
4. The audio monitoring level is controlled by the “**SUB VOL**” control, so advance the setting of this knob if you do not hear the frequency announcements when the **[V(DIM)]** key is pressed.

DIGITAL VOICE RECORDER

The optional Digital Voice Recorder Unit (**DVS-4**) enables the recording of received signals for playback later in the loudspeaker or headphones. Under difficult conditions, this may allow you to identify weak stations by repeatedly listening to the audio stream. You may also wish to record “snippets” for later transfer to a tape recorder as a record of stations heard.

Recording

1. Press the **[F]** key momentarily, then press the **[MODE(ADRS)]** key.
2. Select the recording memory channel (“DVR ch1” or “DVR ch2”) by pressing the **[MODE(ADRS)]** key.
3. Press the **[F]** key momentarily, then press the **[COPY(REC)]** key to start the recorder.
4. When you hear something you want to play back, press the **[F]** key momentarily, then press the **[COPY(REC)]** key again. This will stop the recording process, preserving the last 8 seconds of incoming audio.

Notes:

- It is possible to record for a maximum of 16 seconds in the primary recording channel, “DVR ch1.” If the recording time on this channel is 8 seconds or less, it is then possible to record for a maximum of 8 seconds in the secondary recording channel, “DVR ch2.”
- If you record for more than 8 seconds in channel “DVR ch1,” the contents of recording channel “DVR ch2” will be erased.
- If you manually choose record in channel “DVR ch2,” the last 8 seconds of the contents of channel “DVR ch1” will disappear.

Monitor

1. Press the **[F]** key momentarily, then press the **[MODE(ADRS)]** key.

Miscellaneous Features

2. Select the monitoring memory channel (“DVR ch1” or “DVR ch2”) by pressing the [**MODE(ADRS)**] key.
3. Press the [**F**] key momentarily, then press the [**STEP(PLAY)**] key to start the monitor.

Notes:

- If you select the “DVR ch1” channel for playback, it will play back audio for 16 seconds (irrespective of the actual recording time).
- If you select the “DVR ch2” channel for playback, it will play back audio for 8 seconds (irrespective of the actual recording time).

FIELD STRENGTH METER

The **VR-5000** can provide display of the relative receiving signal strength on the LCD, compared to some user-defined “baseline” field strength.

1. Press the [**F**] key momentarily, then press the [**4(SPL)**] key.
2. Rotate the **DIAL** knob to set the cursor to the “BASE FIELD STRENGTH” menu option, then press the [**ENT(SET)**] key.
3. You will now observe the display of the current signal strength (“CURRENT” row) and its peak level (“REFERENCE” row). The first time this is done, these levels will be the same (although the “CURRENT” level will appear to have a very slightly lower value, due to the “damping” in the metering).
4. If you are resetting the reference level, press the [**0(NB)**] key to equalize the peak level to the current signal strength.
5. To cancel the Field Strength Meter displays the [**ENT(SET)**] key momentarily; this will save the peak level and let you exit to the menu mode.
6. Confirm that the cursor is on the “CANCEL” menu selection, then press the [**ENT(SET)**] key to exit to normal operation.



If you want to display the current signal level (for example, on a different channel), compared to the reference level, use the following process:

1. Press the [**F**] key momentarily, then press the [**4(SPL)**] key.
2. Rotate the **DIAL** knob to set the cursor to the “CURRENT FIELD STR.” menu option, then press the [**ENT(SET)**] key.
3. The current signal strength (“CURRENT” row) and the memorized peak level (“REFERENCE” row) will be displayed.
4. To cancel the Field Strength Meter display, press the [**ENT(SET)**] key momentarily, to save the peak level and exit to menu mode.
5. Confirm that the cursor is on the “CANCEL” menu, then press the [**ENT(SET)**] key to exit to the normal operation.

Miscellaneous Features

AUDIO WAVE METER

The **VR-5000** can be set up to display the relative received audio wave-form on the LCD.

1. Press the **[F]** key momentarily, then press the **[4(SPL)]** key.
2. Rotate the **DIAL** knob to set the cursor to the “AUDIO WAVE” menu option, then press the **[ENT(SET)]** key.
3. Display the current signal audio wave-form.
4. Press the **[▼(◀)/▲(▶)]** keys to select the sampling rate between 50 ms ~ 200 ms (in 10 ms increments).
5. To cancel the Audio Wave Meter display, press the **[ENT(SET)]** key momentarily.
6. Confirm that the cursor is on the “CANCEL” menu option, then press the **[ENT(SET)]** key to exit to normal operation.



RADIO CONTROL (R/C) CHANNEL MONITORING

The **VR-5000** can be configured for monitoring activity on all typical Radio Control channels simultaneously. A graphical representation of channel occupancy will be created, called the “PMR Board.” The **VR-5000** will monitor the activity on these channels simultaneously via a rapid search function.

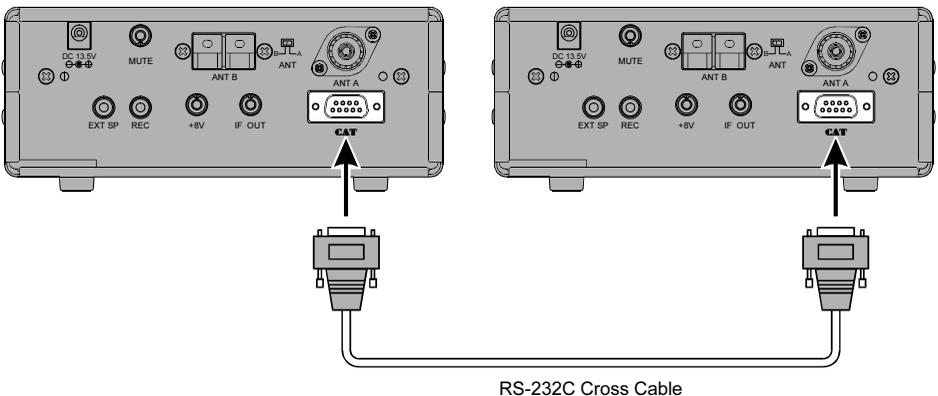
An “indicator” or indicators will appear on the board, as described below, letting you know that activity was noted on that channel.

Before commencing operation in this mode, be sure that the **SQL** control is set up so as to quiet the background noise.

1. Press the **[F]** key momentarily, then press the **[4(SPL)]** key.
2. Rotate the **DIAL** knob to set the cursor to the R/C channel set appropriate for your local area, then press the **[ENT(SET)]** key.
3. Rotate the **DIAL** knob to set the cursor to the R/C band (for your geographical area) which you wish to monitor, then press the **[ENT(SET)]** key.
4. The activity on the R/C Board will now be displayed as a matrix of channel squares. The “White” squares indicate vacant channels, and Black squares indicate occupied channels.
5. Press the **[CLR(PRI CLR)]** key, followed by the **[ENT(SET)]** key, to return to normal operation.

The **VR-5000** includes a convenient “Clone” feature, which allows the memory and configuration data from one receiver to be transferred to another **VR-5000**. Here is the procedure for Cloning one radio’s data to another:

1. Set both radio’s baud rate to the same rate, such as “57,600 bps,” per the following steps:
 - (1) Press the **[F]** key momentarily, then press the **[ENT(SET)]** key.
 - (2) Rotate the **DIAL** knob to set the cursor to the “CAT RATE” menu option, then press the **[ENT(SET)]** key.
 - (3) Rotate the **DIAL** knob to set the cursor to the desired rate (4800/9600/57600 bps), then press the **[ENT(SET)]** key.
 - (4) Confirm that the cursor is on the “END” menu option, then press the **[ENT(SET)]** key.
 - (5) Confirm that the cursor is on the “WRITE” menu option, then press the **[ENT(SET)]** key.
2. Turn both radios off.
3. Connect the a (D-SUB 9-pin) RS-232C cross cable (not supplied) between the **CAT** jacks on the rear panels of the two radios.
4. Turn the *Destination* radio on (“CLONE SLAVE” will appear on the LCD), then turn the *Source* radio on (“CLONE MASTER” will appear on the LCD).
5. Press the **[COPY(REC)]** key on the *Source* radio; “WRITE” will appear on the Source radio, and the data transfer will commence.
6. If the data transfer is successful, “COMPLETE” will appear on both radios. Turn both radios off and disconnect the RS-232C cross cable. You can then turn the radios back on, and begin normal operation.

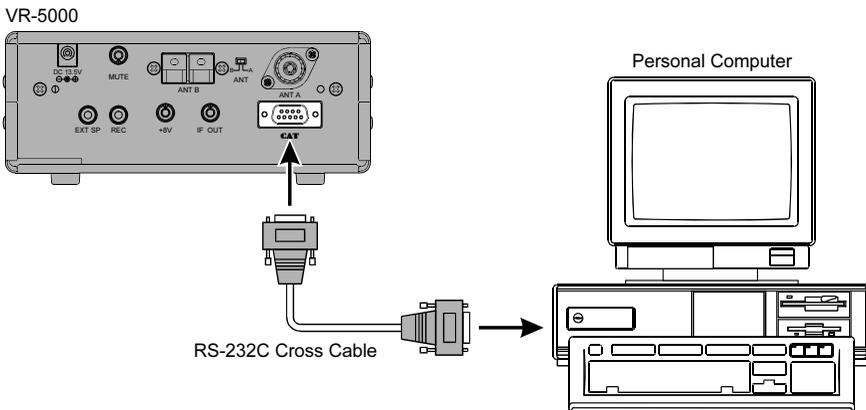


CAT Operation

The **CAT** (Computer Aided Transceiver) System in the **VR-5000** provides control of MAIN VFO frequency and Receiving mode using an external personal computer. This allows multiple control operations to be fully automated as single mouse clicks or key-stroke operations on the computer keyboard.

The **VR-5000** has a built-in level converter, allowing direct connection from the rear-panel **CAT** jack to the serial port of your computer without the need of any external boxes. You will need a serial cable for connection to the RS-232C (serial or COM port) connector on your computer. Purchase a standard serial cable (not the so-called “null modem” type), ensuring it has the correct gender and number of pins (some serial COM port connectors use a 9-pin rather than 25-pin configuration). If your computer uses a custom connector, you may have to construct the cable. In this case, refer to the technical documentation supplied with your computer for correct data connection.

VERTEX STANDARD does not produce **CAT** System operating software due to the wide variety of personal computers and operating systems in use today. However, the information provided in this chapter explains the serial data structure and opcodes used by the **CAT** system. This information, along with the short programming examples, is intended to help you start writing programs on your own. As you become more familiar with **CAT** operation, you can customize programs later on for your operating needs and discover the true operating potential of this system.

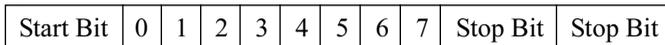


CAT Data Protocol

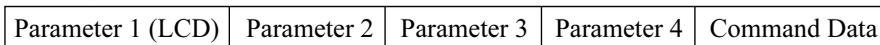
Serial data is passed via the **CAT** jack on the rear panel of the radio at 4800, 9600, or 57600 bits/sec. All commands sent from the computer to the receiver consist of five-byte blocks, with up to 200 ms between each byte. The last byte sent in each block is the instruction opcode, while the first four bytes of each block are arguments: either parameters for that instruction, or dummy values (required to pad the block out to five bytes):

Each byte sent consists of one start bit, 8 data bits, no parity bit and two stop bits:

CAT Data Byte Format



CAT 5-Byte Command Structure



There are three instruction opcodes for the **VR-5000**, listed in the table below. Most of these duplicate menu programming settings or options, or else emulate front panel button functions. Notice that several instructions require no specific parameters. However, every Command Block sent to the radio must always consist of five bytes.

The **CAT** control program you are writing must construct the 5-byte block, by selecting the appropriate instruction opcode, organizing the parameters, if any, and providing unused (dummy) argument bytes for padding the block to its required 5-byte length (the dummy bytes can contain any value). The resulting five bytes are then sent, opcode last, from the computer to the **VR-5000** CPU via the serial port and **CAT** jack on the radio rear panel.

Opcode Command Data

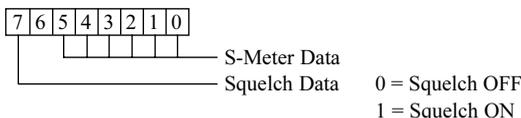
Command Tittel	Parameters				Opcode	Comments
CAT ON/OFF	×	×	×	×	P1	P1= 00: ON, P1 = 80: OFF
Set Frequency	F1	F2	F3	F4	P1	P1= 01: MAIN VFO P1= 31: SUB VFO Note 1
Receiving Mode	M1	M2	×	×	P1	P1= 07: MAIN VFO P1= 37: SUB VFO Note 2
Receiver Status	×	×	×	×	E7	S-Meter, Squelch, etc. Note 3

Note 1: F1 ~ F4 = Frequency Digits (HEX),
Example: 439.70 MHz = 02, 9E, ED, D0
F1, F2, F3, F4

Note 2: Receiving Mode/Channel Step Parameter Codes

M1				M2							
00	LSB	44	WAM	21	20 Hz	43	5 kHz	05	100 kHz	34	25 kHz
01	USB	48	WFM	02	100 Hz	53	6.25 kHz	45	500 kHz	44	50 kHz
02	CW	84	AM-N	42	500 Hz	63	9 kHz	14	12.5 kHz	–	–
04	AM	88	FM-N	03	1 kHz	04	10 kHz	24	20 kHz	–	–

Note 3: Receiver Status



Reset

MICROPROCESSOR RESETTING

1. Turn the Radio OFF.
2. Press and hold the [**CLR(PRI CLR)**] key while turning the Radio ON.
3. Press the [**ENT(SET)**] key to reset the all setting to their factory defaults (press the [**CLR(PRI CLR)**] key to cancel the Reset procedure).

Installation of the Optional Accessories

VOICE SYNTHESIZER UNIT (DSP-1)

1. Remove the four screws affixing the bottom cover, then remove the bottom cover (see Figure 1).
2. Locate the empty 11-pin jack, and connect the **DSP-1** here (see Figure 2).
3. Mount the **DSP-1** to the main chassis using the supplied four screws.
4. Replace the bottom cover and its four screws.

DIGITAL VOICE MEMORY UNIT (DVS-4)

1. Remove the four screws affixing the bottom cover, then remove the bottom cover (see Figure 1).
2. Locate the empty 8-pin jack, and connect the **DVS-4** here (see Figure 2).
3. Replace the bottom cover and its four screws.

VOICE SYNTHESIZER UNIT (FVS-1A)

1. Remove the four screws affixing the bottom cover, then remove the bottom cover (see Figure 1).
2. Locate the empty 10-pin jack, and connect the **FVS-1A** here (see Figure 2).
3. Set **J**apanese/**E**nglish switch on the **FVS-1A** to the **EN**.
4. Replace the bottom cover and its four screw.

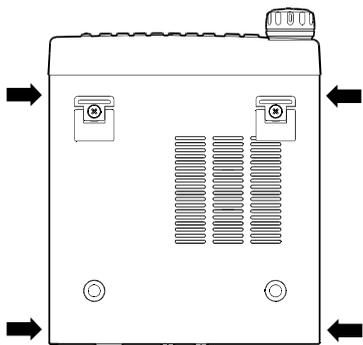


Figure 1

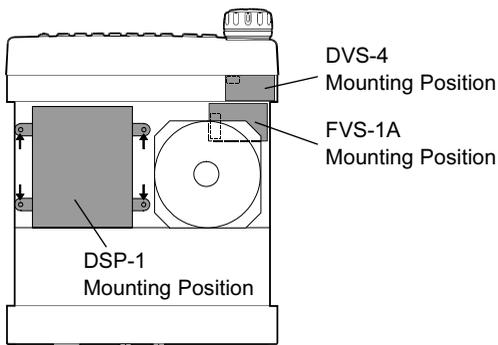


Figure 2

“AUTO” Mode Preset Operating Parameters

Frequency Range (MHz)	MODE	STEP (kHz)	Frequency Range (MHz)	MODE	STEP (kHz)
0.10000 ~ 0.52000	AM	1	142.00000 ~ 144.00000	FM-N	12.5
0.52000 ~ 1.71000	AM	10	144.00000 ~ 144.10000	CW	0.1
1.71000 ~ 3.50000	AM	5	144.10000 ~ 144.30000	USB	0.1
3.50000 ~ 4.00000	LSB	0.1	144.30000 ~ 148.00000	FM-N	5
4.00000 ~ 7.00000	AM	5	148.00000 ~ 156.00000	FN-N	12.5
7.00000 ~ 7.30000	LSB	0.1	156.00000 ~ 157.45000	FM-N	25
7.30000 ~ 10.10000	AM	5	157.45000 ~ 160.60000	FM-N	12.5
10.10000 ~ 10.15000	CW	0.1	160.60000 ~ 160.97500	FM-N	25
10.15000 ~ 14.00000	AM	5	160.97500 ~ 161.50000	FM-N	12.5
14.00000 ~ 14.35000	USB	0.1	161.50000 ~ 162.90000	FM-N	25
14.35000 ~ 18.00000	AM	5	162.90000 ~ 174.00000	FM-N	12.5
18.00000 ~ 18.20000	USB	0.1	174.00000 ~ 216.00000	WFM	50
18.20000 ~ 21.00000	AM	5	216.00000 ~ 225.00000	FM-N	5
21.00000 ~ 21.45000	USB	0.1	225.00000 ~ 262.00000	AM	100
21.45000 ~ 24.80000	AM	5	262.00000 ~ 270.00000	FM-N	12.5
24.80000 ~ 25.00000	USB	0.1	270.00000 ~ 271.00000	AM	100
25.00000 ~ 28.00000	AM	5	271.00000 ~ 275.00000	FM-N	12.5
28.00000 ~ 29.70000	USB	0.1	275.00000 ~ 336.00000	AM	100
29.70000 ~ 50.00000	FM-N	5	336.00000 ~ 420.00000	FM-N	12.5
50.00000 ~ 50.10000	CW	0.1	420.00000 ~ 450.00000	FM-N	25
50.10000 ~ 50.50000	USB	0.1	450.00000 ~ 470.00000	FM-N	12.5
50.50000 ~ 54.00000	FM-N	5	470.00000 ~ 770.00000	WFM	50
54.00000 ~ 108.00000	WFM	50	770.00000 ~ 1300.00000	FM-N	25
108.00000 ~ 142.00000	AM	25	1300.00000 ~ 2599.99998	FM-N	12.5

Specifications

Frequency Range:	0.1 ~ 2599.99998 MHz (Cellular Blocked)
Receiving Mode:	CW/LSB/USB/AM/AM-N/WAM/FM-N/WFM
Antenna Impedance:	50 Ω unbalanced, 450 Ω unbalanced
Channel Step:	Main Band LSB/USB/CW : 20 Hz/100 Hz/500 Hz/1 kHz/5 kHz AM-N/AM/WAM : 1/5/9/10/20/25/50/100/500 kHz FM-N : 5/6.25/10/12.5/20/25/50/100/500 kHz WFM : 10/50/100/500 kHz Sub Band AM : 1/5/9/10/20/25/50/100/500 kHz FM-N : 5/6.25/10/12.5/20/25/50/100/500 kHz
Memory Channel:	Regular Memories: 2000 Channels PS "Preset" Memories: 5 Channel
Operating Temp.:	-10 $^{\circ}$ C ~ + 50 $^{\circ}$ C
Sensitivity:	0.2 ~ 0.49998 MHz SSB/CW 4.8 μ V (10 dB S/N) AM 10.8 μ V (10 dB S/N) 0.5 ~ 1.79998 MHz SSB/CW 1.0 μ V (10 dB S/N) AM 4.0 μ V (10 dB S/N) 1.8 ~ 3.99998 MHz SSB/CW 0.6 μ V (10 dB S/N) AM 2.5 μ V (10 dB S/N) 4.0 ~ 29.99998 MHz SSB/CW 0.3 μ V (10 dB S/N) AM 1.1 μ V (10 dB S/N) 28.0 ~ 29.99998 MHz FM-N 0.35 μ V (12 dB SINAD) 30.0 ~ 1999.99998 MHz SSB/CW 0.3 μ V (10 dB S/N) AM 1.2 μ V (10 dB S/N) FM-N 0.45 μ V (12 dB SINAD) WFM 1.5 μ V (12 dB SINAD) 2000.0 ~ 2599.99998 MHz SSB/CW 0.5 μ V (10 dB S/N) AM 1.8 μ V (10 dB S/N) FM-N 0.8 μ V (12 dB SINAD)
Conducted Spurious Emission:	Less than -54 dBm
Supply Voltage:	DC 13.5V \pm 15 %
Current Consumption:	0.7 A (@ audio output 1W)
Audio Output:	At least 1 W @ 8 Ω
Audio Output Impedance:	8 Ω
Case Size:	180 x 70 x 203 mm (W x H x D) w/o knob
Weight:	Approx. 1.9 kg

Specifications are subject to change without notice.

Note

“This scanner receiver is not a digital scanner and it is incapable of being converted or modified to a digital scanner receiver by the user.”

This equipment has been tested and found to comply with the limits for a Class A Digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference in which case the User will be required to correct the interference at his own expense.

1. Changes or modifications to this device not expressly approved by VERTEX STANDARD could void the user's authorization to operate this device.
2. This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions; (1) this device may not cause harmful interference, and (2) this device must accept any interference including interference that may cause undesired operation.
3. The scanning receiver in this equipment is incapable of tuning, or readily being altered, by the User to operate within the frequency bands allocated to the Domestic public Cellular Telecommunications Service in Part 22.

This device complies with RSS-210 of Industry Canada. Operation is subject to the following two conditions: (1) this device may not cause interference; and (2) this device must accept any interference, including interference that may cause undesirable operation of this device.



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