

Yaesu VR-5000

Yaesu's wide spectrum multimode VR-5000 receiver is in the same price class as the AOR AR8600 reviewed in February and April *MT*. Both radios are built in Japan and tune frequencies from VLF to over 2400 MHz. Both models receive AM, FM, SSB, and CW signals and support three AM bandwidths. The AR8600 provides three FM bandwidth selections versus two for the VR-5000.

Like the AR8600, the VR-5000 is powered by 12 - 14 VDC or from the AC mains using the provided wall wart power supply. A telescoping antenna is included, but no mobile mounting bracket is supplied or mentioned in the user manual.

Extra cost options include a digital signal processor (DSP-1), voice recorder (DVS-4), and a speech board (FVS-1A). We tested VR-5000 serial number 0L040004, but have none of the options to evaluate.

The VR-5000 operating manual leaves out so much information, we had to learn how to use the radio by experimentation. For example, there's no explanation of the screen icons so we had to guess at their meanings. The Yaesu customer service representative we contacted was aware of the deficiency and expects an updated manual to be forthcoming.

❖ VFOs, Memory, Scanning, and Searching

The VR5000 has two VFO-controlled receiver sections which provide dual receive capability. It can receive AM or FM signals on two different frequencies simultaneously, as long as they are within 20 MHz of each other. The AR8600's tuning step may be selected from factory presets between 50 Hz and

999.95 kHz, including the new European air band channelization of 8.33 kHz. The VR-5000 provides several step size choices, but they are restricted depending on mode. It lacks an 8.33 kHz step and provides no way to program a custom step size.

Our VR-5000, like the AR8600, often stops a few kHz away from a signal's center frequency during VFO and limit searches. Frequencies may be skipped, but the VR-5000 manual doesn't discuss this. There are 50 pairs of search limits available. They can be linked together and the attenuator, rescan parameters, steps, and mode settings can differ for each one. We have trouble programming the search limits without overwriting them with the VFO frequency but don't know if this is due to a firmware bug or mistakes in the operating manual.



A silent Auto Store (Smart Search) facility searches between limits and stores active frequencies into a special memory bank.

The VR-5000's memory capacity is enormous. Its 2000 memory channels are divided into 100 banks, designated 00, 01, 02 etc. Each bank holds 20 channels and cannot be expanded.

An alphanumeric label can be programmed for each memory channel, memory bank, and search bank. Banks can be scanned individually or in combination. Band switching relays make a clickety-

clack noise while scanning a mixture of frequencies in different bands, reminiscent of the ICOM IC-R8500. We found the VR-5000's band switching boundaries at 622, 1240, and 1850 MHz.

❖ Physical

The VR-5000 is well built in a metal cabinet with sculpted plastic front panel. The tuning knob has a detent action and is easier to use than the AR8600's smaller knob. The black on white LCD display is brightly lit, and you can adjust the LCD contrast to suit, though the white background is harsh on the eyes. The small keys are close together and are not backlit.

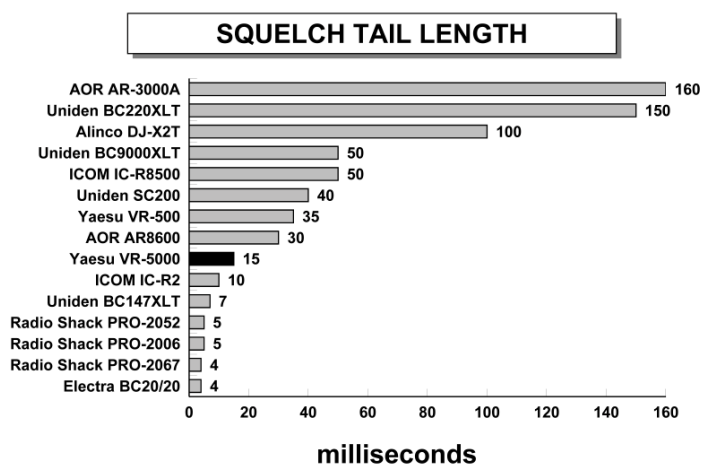
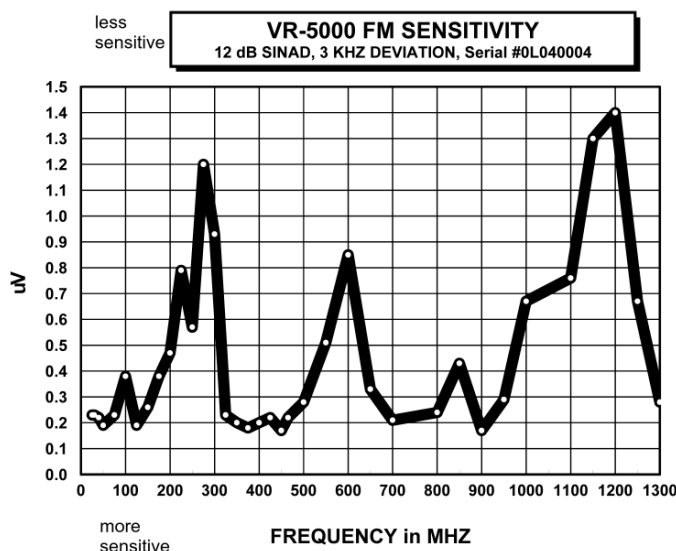
The rear panel holds two antenna connectors and a tiny slide switch to choose between them. One jack is a 50 Ohm SO-239 and the other is a pair of spring loaded terminals intended for a high impedance antenna. Most VHF/UHF receivers use a BNC or N connector instead of an SO-239.

The VR-5000 is fitted with a standard DB9 connector intended for cloning or connecting a computer to control frequency and mode. The operating manual documents the computer commands, a refreshing change from the undocumented VR-500 interface.

A 10.7 MHz IF output jack provides a 250 kHz (@10 dB) wide view, as verified by connecting an HP spectrum analyzer. Jacks for external speaker, low-level audio output, and mute control also adorn the rear panel.

❖ Performance

Our VR-5000 performs better below 30 MHz than the AR8600 we reviewed. That said, both radios experience intermod from AM broadcast sta-



Notes:
One sample of each model tested.
Produced by a 155 MHz, 1uV unmodulated signal.
Squelch control set beyond threshold in NFM mode.

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tions. The VR-5000's AGC decay time is too fast for normal sounding SSB reception, permitting background noise to be heard in between syllables.

Video signals from television channel 38 (615.25 MHz) enter our VR-5000's 1st IF, causing loud buzzing sounds when tuning frequencies at 5 MHz multiples above 300 MHz. The obnoxious noise is almost 500 kHz wide, so we hear it in the ranges of 300 - 300.5, 305 - 305.5, 310 - 310.5 MHz, to well above 900 MHz.

The VR-5000 employs a variable 1st IF of 610 - 615 MHz, which coincides with frequencies used by UHF television channels 37 and 38. Our VR-5000's IF rejection measures only 12 dB at 460 MHz and 6 dB at 860 MHz. The channel 38 transmitter is located on a building 36 miles away. If you live in an area served by television channels 37 or 38 and experience the same problem, try add-

ing a single channel wave trap between the VR-5000 and the antenna.

Other VHF/UHF reception glitches include intermod from a 162.4 NOAA weather transmitter in the VHF-high band and 930 MHz range. The nearest cellular phone base station is one mile away and a few cellular phone signals break through the 903 - 908 MHz range. Strong FM broadcast stations appear 13.65 MHz above their assigned frequencies and this interferes with our aircraft monitoring.

We measured a scan rate of 13 channels/sec for the VR-5000 and AR8600. Our VR-5000 searches at about 15 steps/sec. Measurements show the VR-5000 20 dB attenuator to be consistent across a wide range of frequencies and this is unusual for a consumer grade receiver.

While it cannot compare with the quick sweep of an authentic spectrum analyzer, the VR-5000's

bandscope is the best we've seen. It's fast, easy to use, and the audio is not muted during operation. You can tune the main receiver VFO while observing neighboring signals on the band scope.

❖ **Wrap-up**

Our VR-5000's performance is commensurate with its price. Pundits who predicted that the VR-5000 would be as good a performer as the ICOM IC-R8500 for less money were only half-right. The ICOM cost us dearly, but its intermod immunity and AGC action are head and shoulders above our VR-5000.

Our VR-5000 is fun to use except for the television channel 38 interference. This model is full of features and we find it easier to operate than the AR8600.

Measurements

Yaesu VR-5000 Receiver S/N 0L040004

Retail price \$900

Yaesu USA, 17210 Edwards Rd., Cerritos, CA 90703

Frequency coverage (MHz):

0.100 - 2600 with gaps
at 824 - 849 and 869 - 894

Modes:

USB, LSB, CW, NAM, AM, WAM, FM, WFM

Steps:

USB/LSB/CW: 20, 100, 500, 1000, 5000 Hz
NAM/AM/WAM: 1, 5, 9, 10, 20, 25, 50, 100, 500 kHz
NFM: 5, 6.25, 10, 12.5, 20, 25, 50, 100, 500 kHz

NFM modulation acceptance: 10 kHz

Attenuator:

19 dB @ 14 MHz
19 dB @ 40 MHz
19 dB @ 155 MHz
20 dB @ 460 MHz
17 dB @ 860 MHz

Intermediate Frequencies, main receiver (MHz):

1) 610 - 615
2) 45.75
3) 10.7
4) 0.455 (except WFM)

IF output jack:

10.7 MHz, 250 kHz bandwidth
at 10 dB down

IF rejection at 1st IF:

89 dB @ 40 MHz
40 dB @ 155 MHz
12 dB @ 460 MHz
6 dB @ 860 MHz

Audio output power, measured at speaker jack:
more than 1.1 W @ 10% distortion

Squelch tail near threshold (1 uV @ 155 MHz): 15 ms.

Practical memory scan speed: 13 channels/sec.

Search speed: 15 steps/sec.

Band switching relays at (MHz):

622, 1240, 1850

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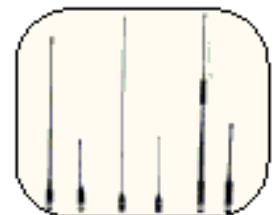
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