MT REVIEW

AOR AR-ALPHA
Wide Coverage Receiver

By Bob Grove W8JHD

The introduction of a new super receiver into the radio communications marketplace is always marked by hope and anticipation: such is the case of AOR's brand-new entry, the AR-Alpha. We received an advance model of this receiver for review in *MT*.

The Alpha is an impressive piece of engineering, both cosmetically and technically, with an impressive array of manual and automatic features. With a continuous tuning range of 10 kHz through 3500 MHz (3.5 GHz), custom step sizes, five VFOs, scan and search capability, and 2000 alphanumeric memory channels, this instrument brings a lot to the table. The consumer model for U.S. distribution has cellular frequencies blocked to comply with FCC regulations.

Weighing in at a substantial 17 lbs. and measuring 16-1/2"W x 5-1/8"H x 10-1/8"D, the Alpha is clearly not targeted at the mobile-mount audience. It is, however, equipped with threaded side holes for mounting to 19" rack-panel brackets for serious installations.

The Alpha is a triple-conversion receiver with considerable demodulation capability (see specifications sidebar). It even allows continuous digital voice recording of up to 53 minutes.

The multifunction, 6" TFT display allows full-color television reception in North American and European formats; in addition, composite video output is available from the rear panel.

The crisp, bright LCD also functions as a full-color spectrum display unit (SDU) with Fast-Fourier Transform (FFT) capability and waterfall (activity over time) display of signals over a selectable span of from 250 kHz minimum to 1000 MHz maximum. Simultaneous audio recovery is allowed up to 20 MHz span, but not while displaying the wider span of from 20-1000 MHz width.

Depending on the types of signals and span chosen, the user may select the best resolution bandwidth (RBW) from 1, 4, 32, 64 or 128 kHz.

When not used for graphic presentation, the LCD also doubles as a function display for associated keys.

The Alpha is capable of both CTCSS (52 tones) and DCS (106 codes) squelch activation, and provides convenient DTMF tone decoding when hearing touch-pad signals.

An auto-notch feature assists in rejecting tone interference such as shortwave heterodynes and annoying paging tones.

A speech inversion descrambling function is included only on the government version; while this mode is the least secure of voice privacy measures, it is still widely used among many law enforcement agencies still operating more traditional analog systems.

While the receiver does not have trunk tracking capability, it does provide APCO P-25 digital voice decoding, the fastest growing digital voice technology to be encountered on public safety frequencies in the VHF/UHF spectrum.

Computer control from third-party software can activate the receiver through its rear panel jacks, an RS232C DB9 and a USB 2.0.

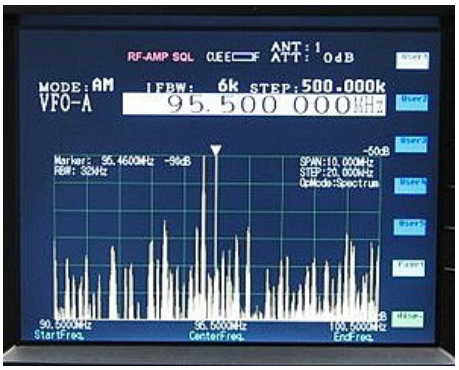
Our Test

The Alpha requires a substantial ramp-up period to get used to it. The accompanying, 130-page manual must be studied in detail for the user to feel comfortable with the receiver's operation; it is not intuitive. Many later pages of directions depend upon your already knowing what's on the earlier pages.

The manual is well written, with hundreds of pertinent illustrations; even so, it is under constant revision due to the complexity of the receiver's operational parameters.

Once understood, the multi-functional capability of this instrument makes it a powerful receiving station for the most populated portion of the radio spectrum, including the emerging 2.4-2.5 GHz wireless digital communications.

The large, finger-indent tuning knob makes accurate slewing a pleasure, and various functions of the receiver can be user-adjusted for the listener's preferences.



The rear panel abounds with input and output ports – two antenna connectors (SO-239 and N), a 10 MHz external oscillator reference input, an external speaker jack, a mute jack, right and left stereo line outputs,

SPECIFICATIONS

FREQUENCY RANGE: 10 kHz-3500 MHz (3.5 GHz) (cellular blocked on U.S. consumer version)
FREQUENCY STABILITY: Better than +/-0.1 ppm over entire frequency range, after 5 minutes warmup
MODES: WFM, FM stereo, narrow FM, AM, sharp AM, USB, LSB, CW, ISB, sideband diversity, real-zero SSB, analog I/Q (for DRM reception utilizing third-party software), APCO P-25, and video (NTSC, PAL, SECAM) displayed on the full-color LCD.
SENSITIVITY (TYPICAL):
AM (10 dB S/N, 6 kHz BW): 5 uV 0.1-25 MHz, 2.3 uV 25-1030 MHz, 1.3 uV 1030-3300 MHz
NFM (12 dB SINAD, 15 kHz BW): 2.5 uV 25-480 MHz, 0.8 uV 480-1030 MHz, 1.5 uV 1030-3300 MHz
WFM (12 dB SINAD, 200 kHz BW): 1.3 uV 25-1700 MHz, 1.5 uV 1700-3300 MHz
SELECTIVITY BW (-3 dB/-90 dB down):
SSB 3kHz/3.6 kHz
CW 500 Hz/700 Hz
AM 6 kHz/15 kHz
NFM 15 kHz/25 kHz
SELECTABLE IF BANDWIDTHS: 0.2, 0.5, 1, 3, 6, 15, 30, 100, 200, 300 kHz, with shift capability
SPURIOUS SENSITIVITY: 60 dB or more
DYNAMIC RANGE: 90 dB or more
THIRD-ORDER INTERCEPT POINT: Better than +2 dBm over entire frequency range
POWER REQUIREMENT: 13.8 VDC @ 2.2 A nom. (AC adaptor included)
ANTENNA JACKS: SO239 and N (selectable)
MEASUREMENTS: 16-1/2"W x 5-1/8"H x 10-1/8"D
WEIGHT: 17 lbs.

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an I/Q out, DB-9 and modular digital control connectors, and a multipurpose port which provides two 12 VDC @ 50 mA lines for antenna switching, and an AGC control line.

Shortwave listeners will find listening to the HF spectrum a special pleasure; the variety of selectable bandwidths, ease of tuning and brick-wall filtering seem to slice signals out of the spectrum. Audio quality from the internal speaker is very good as well.

❖ A Few Observations

Sensitivity comparisons submitted by AOR (see accompanying table) varied with frequency range. On the AM broadcast and HF shortwave frequencies, the new Alpha averaged several decibels better than AOR's standard of comparison, the well-established AR5000+3. Of course, large antennas used in that part of the spectrum deliver so much signal that a few dBs difference aren't noticeable.

At VHF and UHF, measured sensitivity, for all purposes, is identical. Above 1 GHz, however, the old AR-5000+3 was clearly the winner. It must be pointed out, however, that there will be unit-to-unit production differences among receivers.

While the spectrum display function is very versatile and accurate, like most other LCD displays with pixel-by-pixel address, rapid events like pulse transmissions are not captured and displayed. Similarly, the rapid envelope-shape changes from modulation are more strobe-like than smooth. The wider the span, the more apparent this becomes.

CRT displays still reign supreme in sweep response time. Nonetheless, the spectrum display function is very useful for the vast majority of tasks in which signal presence is more than a brief spike, and when the modulation-envelope details are not critical.

❖ The Bottom Line

All in all, the new AOR Alpha is a truly remarkable receiving instrument. It is currently available from AOR dealers including Grove Enterprises (1-800-438-8155) and other *MT* advertisers. Street price for the unblocked, government version knocks around $3,000 off the list price of $13,000. Call for pricing on the consumer version, not yet type-accepted by the FCC at press time.

SENSITIVITY COMPARISON BETWEEN AR-ALPHA AND AR-5000+3

Relative Sensitivity in dB

MHz	AR5000A	AR-ALPHA
0.1	-110.0	-98.1
0.9	-112.0	-120.0
1.9	-105.0	-115.1
9.9	-115.9	-120.0
24.5	-115.0	-118.0
25.5	-116.3	-117.4
50.5	-116.5	-119.0
80.5	-115.0	-119.0
120.5	-119.4	-119.0
158.5	-119.0	-119.0
200.5	-120.0	-117.8
300.5	-119.6	-118.1
400.5	-118.9	-117.3
500.5	-118.0	-120.0
700.5	-118.2	-120.0
800.5	-119.2	-119.5
900.5	-118.7	-119.7
1000.5	-118.0	-118.7
1200.5	-121.9	-117.9
1400.5	-121.4	-117.0
1600.5	-122.4	-116.8
1800.5	-119.8	-116.7
2000.5	-122.0	-115.3
2200.5	-122.3	-111.0
2400.5	-120.0	-111.0
2500.5	-121.2	-109.0
2800.5	-119.0	-109.0
2999.5		-105.1

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