



AR6000

9kHz - 6GHz

Super Wide-band Multi-mode Receiver

Photo of receiver with rack option HRE5001



www.aorja.com

Continuous coverage from 9kHz to 6GHz!



In recent years, frequency bands above 3 GHz are populated with new signal standards such as MLS, STL and FPU. These new signals in the so-called C-band and S-band offer services such as ISM, WiMAX, etc..., which cannot be received with conventional wideband receivers. Not only the frequency coverage, but also high sensitivity and high reception accuracy are required for optimum performance. All over the world, frequency bands over 2.5 GHz are used for new digital cellular services such as LTE-Advanced, TD-SCDMA, and WCDMA/HSPA.

This is where AOR's new AR6000 receiver replies to such new needs by offering world's first wide-band communication receiver with frequency coverage up to 6000MHz, based on revolutionary broadband reception and digital signal processing technology introduced with the AR-ALPHA, AR2300 and AR5001D receivers.

On all frequencies, AR6000 provides excellent reception characteristics and can be used for signal analysis and signal strength measurement. Typical commercial applications are wide-area radio monitoring, interference detection and investigation, field-strength measurements, frequency analysis, radio propagation research, close range detection of illegal eavesdropping devices such as wiretap bugs and hidden wireless cameras.

■ Main features

Super wide-band: AOR is the world's first commercial receiver manufacturer to introduce a receiver with continuous coverage from 9kHz to 6GHz, in 1Hz step increments (2Hz over 3.15GHz). Unlike spectrum analyzers, it offers outstanding sensitivity, selectivity and reception stability. Thanks to its small size (30 x 22 x 10 cm), light weight (5 kg) and 13.5V power requirements, it can be easily carried around and used outdoors. AR6000 represents a ground breaking new concept to your signal measuring needs.

Ultra low noise down converter: The 3.15 GHz to 6 GHz portion is realized by cleverly designed, internal down conversion circuitry, offering ultra-low noise figures comparable to high-end microwave-only receivers.

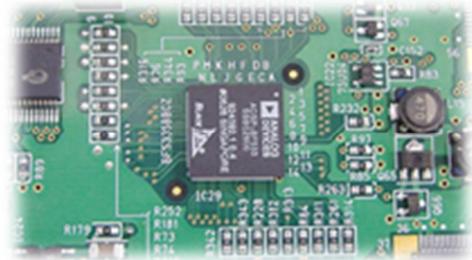
Distributed constant circuit: To ensure low noise performance and minimal performance deterioration over time and environmental variations, AR6000 is based on distributed constant circuitry, carefully designed by CAD/CAM and is therefore much superior to conventional lumped element circuit based receivers.

SDR architecture: Signals are processed digitally from the 3rd IF stage for better performance compared to typical analog receivers which require a detection circuit with a separate filter. The firmware of the high speed DSP is upgradable with great possibilities of customization to meet future diverse needs.

Direct conversion: For LF, MF and HF (9kHz~25MHz), signals from the antenna are converted directly to digital baseband format through a single frequency conversion. This method based on LSI circuitry provides high selectivity and greatly reduces image effects.

Zero IF system: While AR6000 applies direct conversion for frequencies below 25MHz, for higher frequencies the Zero IF system is used. Incoming radio signals are processed using synchronous detection driven by a local oscillator whose frequency is identical to, or very close to the carrier frequency of the intended signals. This method reduces image effects and allows output of a clean digital I/Q signal.

Digital I/Q output: After the A/D conversion, the analog IF signal becomes a quadrature demodulation zero-IF signal. This signal has two components known as I (In-phase) and Q (Quadrature). I/Q signals are expressed on a complex plane, even at the same angular frequency; the digital signal can be processed clockwise and counterclockwise. With the option board IQ5001, digital I/Q can be output through USB 2.0 for demodulation by PC.



Highly accuracy reference frequency: When connected to the AR6000 communications receiver, the GP5001 GPS receiver improves the frequency stability from +/- 0.1ppm to +/- 0.01 ppm; by using the GPS pulse signal (one pulse per second) for an accurate time base of the local oscillator circuit. +/- 0.01ppm frequency stability of the 10MHz internal master oscillator is achieved when synchronized to a GPS signal.

Outstanding signal level correlation: The signal input level from the antenna is tightly correlated to the analog 15MHz wide, 45.05MHz IF output and readings of the signal meter. Variations less than +/-1.5dB throughout all bands! Ideal for signal spectrum analysis, precise signal level measuring and demodulation, system calibration etc...

Up to 240 hours of audio recording: Demodulated audio can be easily recorded as a PC compatible wav file with the built-in SD media recorder. Approximately 8 hours of recording per 1 GB. Max. SD size: 32GB (approx. 240 hours). Squelch recording function to avoid blanks.

Numerous powerful features: High-speed scan & search, two-band & offset reception, High-speed FFT spectrum display on built-in LCD screen with selectable bandwidth 400kHz to 10MHz, CTCSS, DCS, DTMF, AFC, voice inversion, auto-notch, noise blanker, noise reducer, analog video out, etc...



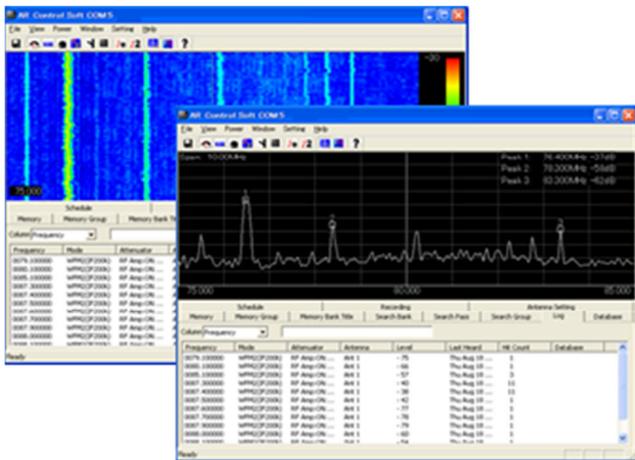
Accessories and software to optimize the performance

■ Software



Standard control software: (Free to download from our website)

Our control software provides powerful features such as spectrum display (selectable bandwidth 400kHz to 10MHz), waterfall display, memory management, memory & bank scan, search, event scheduler, activity logging, audio recording, etc... it even allows to simultaneously control several receivers with one PC.



I/Q software: (only supplied with IQ5001 hardware option)

This software developed by MICROTELECOM allows, in addition to receiver control, the possibility to store (on a hard disk) and playback a full 0.9MHz (± 450 kHz) bandwidth with no loss of quality!

AR6000 is the world's first receiver of its class to offer an optional digital I/Q output (USB 2.0 compatible isochronous transfer). The information held in the I/Q signal is almost identical to a 1 MHz bandwidth (± 500 kHz) of analog I.F. 30 bit each for I and Q, high-speed output with sampling rate of 1.125 Msample/sec (two complement fixed point data).



■ Optional accessories

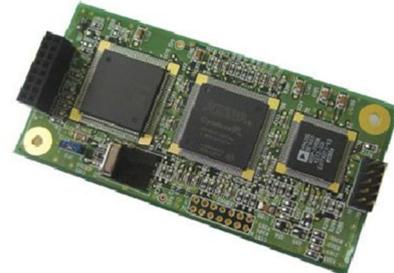
I/Q output board – IQ5001: Enables output of a 0.9MHz wide digital I/Q baseband signal, to be captured, stored and played-back on a PC with the supplied AR-IQ2 software. Frequency coverage 100kHz – 6GHz. Factory installed board.



GPS receiver – GP5001: Improves the frequency stability of AR6000 from ± 0.1 ppm to ± 0.01 ppm, by using the GPS pulse signal for an accurate time base of the local oscillator circuit.



APCO P-25 decoder board: Enables decoding of APCO P-25 digital voice communication (non-encrypted, conventional mode). Factory installed board.



Ethernet controller - ARL2300: Allows remote control, 10MHz spectrum display, remote listening and audio recording of your AR6000 receiver, through the local network and Internet. Selectable audio bit rate.



Rack mount kit - HRE5001: EIA standard 19 inch rack mount kit for your AR6000 receiver. Front panel fitted with external speaker and handles.



AR6000 Specifications

GENERAL

| | |
|-----------------------------|--------------------------------------------------------------------------------------------|
| Frequency range | 9kHz to 6 GHz |
| Frequency resolution | 1Hz (2Hz - Frequency above 3.15GHz) |
| Tuning steps - program | 1Hz to 999.999kHz (2Hz - Frequency above 3.15GHz) |
| Receiving mode | USB/LSB, CW, AM, FM, WFM, FM-Stereo, APCO P-25 Optional |
| Number of VFO | 5 (A through E) |
| Memory channel | 2,000 channels (50 channels x 40 Memory banks) |
| Memory bank | 40 banks (each bank can be customized between 5 to 95 channels) |
| Pass frequencies | 1,200 frequencies or 1,200 frequency ranges 30 frequencies(ranges) x 40 banks |
| Priority channel | 1 (one) |
| Selected memory channel | 100 channels through memory banks |
| Typical scanning speed | Approx. 100 channels/steps per second |
| Antenna impedance | 50Ω |
| Operating temperature range | 0°C to +50°C / 32°F to 122°F |
| Frequency stability | Less than ±0.1ppm after warm-up (5 minutes). Less than ±0.01ppm with optional GPS unit. |
| Power supply requirement | 10.7V to 16V DC, 2.0A @ 12V |
| Audio output | > 1.5W 10% T.H.D. (8Ω) |
| Power consumption * | Stand-by: 400mA, Max. Audio : 1.5A |
| Dimensions * | 304mm(D) x 220mm(W) x 97mm(H) |
| Ground system | Negative ground |
| Weight* | 5kg. (11 lb.) |

RECEIVER

| | | |
|------------------------------|-----------------------------|-------------------------------|
| Receiver system | 9kHz - 25MHz | Direct conversion |
| | 25MHz - 220MHz | Double conv. super-heterodyne |
| | 220MHz - 360MHz | Triple conv. super-heterodyne |
| | 360MHz - 3.15GHz | Double conv. super-heterodyne |
| | 3.15GHz - 6GHz | Down conversion |
| Intermediate frequencies | 1st - 321.95MHz / 412.05MHz | |
| | 2nd - 45.05MHz | |
| Third-order IMD (IP3) | > +20 dBm at 14.1MHz | Pre-selector off |
| Typical Value | > +6 dBm at 50MHz | Preamp off |
| | > +8 dBm at 620MHz | " |
| | > 0 dBm at 1250MHz | " |
| | > +3 dBm at 2450MHz | " |
| Spurious and image rejection | > 70dB for 40kHz - 25MHz | Preamp off |
| | > 50dB for 25MHz - 2GHz | " |
| | > 40dB for 2.0GHz - 3.15GHz | " |
| Noise Figure (NF) | > 7dB for 25MHz - 1GHz | Preamp on |
| Typical Value | > 10dB for 1GHz - 2.75GHz | " |
| | > 12dB for 2.75GHz - 4.6GHz | " |
| | > 14dB for 4.6GHz - 5.8GHz | " |
| | > 18dB for 5.8GHz - 6GHz | " |

Sensitivity (Specifications not guaranteed for received frequencies below 40kHz.)

| Mode | SSB, CW | AM | FM | WFM |
|-------------------|----------|----------|------------|------------|
| Test Method | 10dB S/N | 10dB S/N | 12dB SINAD | 12dB SINAD |
| Filter B/W | 3kHz | 6kHz | 15kHz | 200kHz |
| 40kHz to 50kHz | 6.0μV | 15.0μV | / | |
| 50kHz to 60kHz | 4.0μV | 10.0μV | | |
| 60kHz to 80kHz | 3.0μV | 7.0μV | | |
| 80kHz to 100kHz | 1.5μV | 4.0μV | | |
| 100kHz to 25MHz | 0.7μV | 2.0μV | | |
| 25MHz to 2.75GHz | 0.5μV | 1.0μV | 0.4μV | 1.5μV |
| 2.75GHz to 3GHz | 0.7μV | 1.7μV | 0.6μV | 2.5μV |
| 3GHz to 3.15GHz | 1.5μV | 4.0μV | 0.6μV | 3.5μV |
| 3.15GHz to 4.6GHz | / | | 0.5μV | |
| 4.6GHz to 5.8GHz | | | 0.7μV | |
| 5.8GHz to 6GHz | | | 1.5μV | |

AUXILIARY FUNCTIONS

| | |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Simultaneous reception | Two types of simultaneous reception (dual-watch) are possible. |
| 2 band reception | One HF (9kHz-25MHz) frequency plus one VHF/UHF(25MHz and above) frequency. |
| Offset reception | Main frequency plus sub-frequency (within ±5MHz from the center frequency) Offset reception is possible only for VHF/UHF. |
| Triple reception | Triple receptions are possible by combining simultaneous reception mode. I.E. One HF frequency plus offset reception. |
| Squelch system | CTCSS, DCS |
| Demodulation Aid | Auto Notch Filter (NOTCH), Noise Reduction (NR), Noise Blanker, IF Shift, CW Pitch, AGC, AFC, DTMF APCO (P-25) Phase 1 conventional mode only (optional) |

AUDIO RECORDING

| | |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| Type of recording | Record/Playback through SD or SDHC |
| SD card type | SD or SDHC card per SD Card Association More than 256MB is required. Use card adapter for miniSD and microSD cards. FAT16 and 32 only. |
| File Format | Windows(R) compatible WAV file format. RIFF (little-endian) data, WAVE audio, Microsoft PCM, 16-bit mono 17.578kHz |
| Recording time | Approximately 8 hours of continuous recording by 1GB SD Card. Squelch synchronization is possible to eliminate inactive time. |

INPUT & OUTPUT

| | |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| Antenna Input | ANT 1: 25MHz - 6 GHz, N female ANT 2: 9kHz - 3.15GHz, N female |
| 10MHz reference input | SMA female Typical input: +2dBm for 50Ω |
| 45.05MHz Analog IF output | BNC female, 45.05MHz±7.5MHz Typical output: Antenna input +10dB for 50Ω Frequency range 100kHz - 6GHz. |
| Digital I/Q output (Optional) | USB2.0 compatible isochronous transfer Digital I/Q output through USB Type-B Jack. Frequency range 100kHz - 6GHz. |
| 12kHz offset output | 12kHz offset analog I/Q Φ 3.5mm stereo-phone jack. |
| Line output | Φ 3.5mm stereo-phone jack. |
| Accessory | 8-pin miniature DIN |
| DC Power Input | EIAJ MP-121C (5.5 x 2.1mm) plug. Positive center. |
| External speaker | Φ 3.5mm miniature phone jack (2-wire) |
| RS-232C | 9-pin D-subminiature type (Male) - Firmware update and remote control by PC. |
| USB | USB Type-A; USB 1.1/2.0 Jack for PC control. |
| VIDEO output (Rear Panel) | RCA Jack, 75Ω 1V p-p |

Specifications not guaranteed for received frequencies below 40kHz.

Specifications subject to change without prior notice for product improvement or modification.

Power consumptions, size and dimensions are only approximate values.
Dimensions do not include projections. E. & O. E.



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