# WR-G313e

## High Performance Software-Defined HF Receiver

- 9 kHz-30 MHz frequency range
  *(optionally extendable to 180 MHz)*

- Software-defined DSP demodulation

- Excellent sensitivity

- High dynamic range

- Continuously adjustable IF bandwidth

- Excellent suppression of internal spurii

- Real-time spectrum analyzer

- Graphical IF shift and notch filter

- Noise blanker

- Audio and IF recording and playback

- Test and measurement facilities



The WiNRADiO WR-G313e receiver is a USB-controlled, software-defined high-performance HF receiver (9 kHz to 30 MHz, optionally extendable to 180 MHz).

This receiver is intended for government, military, security, industrial, surveillance, broadcast monitoring, and demanding consumer applications.



The receiver is extremely sensitive, making it possible to comfortably read CW signals well under -130 dBm input levels, yet featuring a respectable 95 dB dynamic range making the receiver resistant to strong signal overload.

The high sensitivity is also matched by that of the S-meter: The calibrated S-meter shows the received signal levels in dBm, µV or S-units, down to the receiver noise floor. The IF bandwidth of the receiver is continuously adjustable from 1 Hz to 15 kHz, in 1 Hz steps.

Several WR-G313e receivers can be controlled by a single PC, which provides an ideal solution for high-performance multi-channel surveillance and monitoring systems.

As the last IF and demodulation processing are entirely software-defined, additional demodulation or decoding modes can be easily added by a mere software change.

In addition to audio recording, the receiver can also record a 20 kHz wide spectrum at the IF level, making it possible to thoroughly analyse a signal, and experiment with extracting a weak signal with different filter settings for the best reception.

The receiver is lightweight and portable, an ideal accessory for laptop and notebook computers. Every modern portable computer can be quickly and easily converted into a powerful HF monitoring station with minimum fuss.

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## Hardware

The construction of the WiNRADiO WR-G313e receiver is truly ground breaking and innovative: The remarkably compact receiver connects to the computer via standard USB interface which facilitates the receiver control as well as transfer of the demodulated audio. The enclosure is very well shielded against interference, making it possible for the receiver to operate in a noisy computer environment.



The receiver is supplied with an external AC/DC power adapter, working in linear mode to avoid even the slightest possibility of interference emanating from the power supply.

## Software

The WR-G313e software contains numerous advanced features, many tuning and scanning options, virtually unlimited memories and a rich on-line help facility.



*WiNRADiO G3 Series Demodulator*

There are numerous modulation modes, variable IF bandwidth 1 Hz to 15 kHz, two spectrum analyzers with 16 Hz resolution, graphically controlled IF shift and notch filter, and noise blanker. The built-in recorder can record and play back demodulated audio as well as the IF signal, which means that it is possible to "re-receive" the same signal again and again with different IF filter bandwidths, notch filter, noise blanking or demodulator settings, to arrive at the best possible reception of a weak or interference-prone signal.
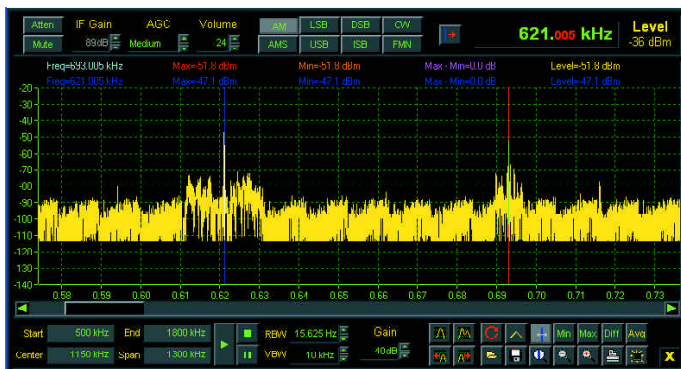


*One of the many integrated spectrum analysis functions.*

The signal test facility can perform various measurements on the received signal including frequency accuracy, amplitude modulation depth, frequency deviation, THD (total harmonic distortion) and SINAD.

There is also a unique research and education function making it possible to explore interactive block diagrams of the software-defined demodulator, for each demodulation mode, and observe demodulation taking place on real-time signals using two spectrum analyzers and a vector voltmeter.

## G313e Options

The G313/180 Frequency Extension Option extends the frequency coverage from the standard 9kHz-30MHz to 9kHz-180MHz. This makes it possible to use this receiver for narrow-band communications in the low VHF range. The receiver's variable IF bandwith makes this receiver particularly suitable for surveillance and monitoring of civilian and military aircraft and marine communications.

Other hardware options may be customized to specific customer requirements, including external frequency reference, IF outputs, etc.

In addition to hardware options, there are many software options available for this receiver, such as the DRM demodulation option, Client/Server option, and others. Please visit our Web site www.winradio.com for the latest news on the available options.

## Specifications

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|---|---|
| Receiver type | DSP-based SDR with DDS-based dual-conversion superheterodyne front end |
| Frequency range | 9 kHz - 30 MHz (optionally 9 kHz - 180 MHz) |
| Tuning resolution | 1 Hz |
| Mode | AM, AMS, LSB, USB, DSB, ISB, CW, FM |
| Image Rejection | 1.8-7.3 MHz:  80 dB<br>7.3-30 MHz:  70 dB |
| Spurious-free dynamic range | 95 dB |
| IP3 | +8.5 dBm @ 20 kHz |
| Phase noise | -148 dBc/Hz @ 100 kHz |
| Internal spurious | Internal spurious: Less than equivalent input of -105 dBm |
| RSSI accuracy | 2 dB |
| RSSI sensitivity | -137 dBm |
| Bandwidth | 1 - 15000 Hz (adjustable in 1 Hz steps) |
| Scanning speed | 400 steps/s (at 1kHz steps) |

| Sensitivity | Mode | 0.15-0.5 MHz | 0.5-1.5 MHz | 1.5-30 MHz |
|---|---|---|---|---|
| (AM/SSB/CW 10dB S/N) | AM, AMS (30% modulation) | -103dBm (1.6µV) | -106dBm (1.1µV) | -108dBm (0.9µV) |
| (FM 12dB SINAD) | AM, AMS (80% modulation) | -111dBm (0.63µV) | -115dBm (0.4µV) | -116dBm (0.35µV) |
| | LSB, USB, ISB, DSB | -115dBm (0.40µV) | -118dBm (0.28µV) | -119dBm (0.25µV) |
| | CW | -122dBm (0.18µV) | -125dBm (0.13µV) | -130dBm (0.07µV) |
| | FM | -110dBm (0.7µV) | -113dBm (0.5µV) | -117dBm (0.32µV) |

*Note: Below 150 kHz, the sensitivity gradually drops. Typical figures (CW) are:*
*100 kHz: - 113 dBm      50 kHz: -102 dBm      25 kHz: - 98 dBm      10 kHz: - 90 dBm*

| | |
|---|---|
| Intermediate frequencies | IF1: 45 MHz<br>IF2: 16 kHz (variable 12-22 kHz) |
| Tuning accuracy | 1 ppm (25°C ±2°C) |
| Frequency stability | 0.5 ppm (0 to 60° C) |
| Antenna input | 50 ohm (SMA connector) |
| Output | 600 ohm line audio |
| Interface | USB 1.0 and 2.0 compatible |
| Dimensions | Length: 166 mm (6.5")<br>Width:  97 mm (3.8")<br>Height: 41 mm (1.6") |
| Weight | 430 g (15.1 oz) |
| System requirements | IBM PC compatible (CPU 500MHz or higher, USB port), Windows 98/ME/2000/XP |

*Specifications are subject to change without notice due to continuous product development.*

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