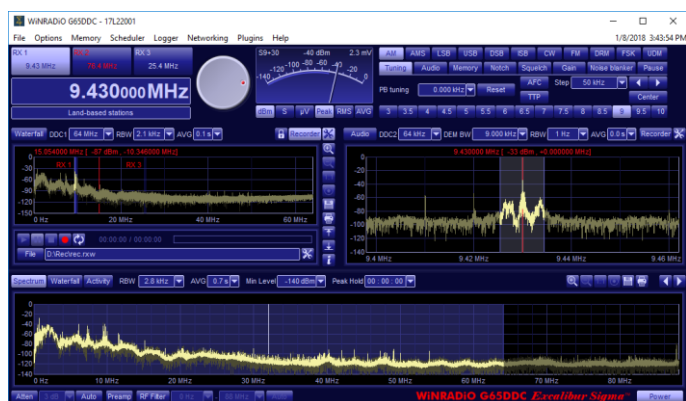


Super-Wideband Direct Sampling Software-Defined HF/VHF Receiver

- 1 kHz to 88 MHz and 118 MHz to 190 MHz frequency range
- Direct sampling with digital down-conversion
- 16-bit 210 MSPS A/D converter
- 88/72 MHz-wide, real-time spectrum analyzer
- 64 MHz recording and processing bandwidth
- Ready for phase-coherent applications
- Continuously adjustable filter bandwidth down to 1 Hz
- Waterfall display functions and audio spectrum analyzer
- Audio and IF recording and playback
- Very high IP3 (+40 dBm typ.)
- Excellent sensitivity (Noise figure 6 dB)
- Excellent dynamic range (111 dB)
- Excellent frequency stability (0.1 ppm)
- Selectable low-noise preamplifier
- Self-diagnostics with BIT and thermal management
- USB 3.0 and 1Gb Ethernet (with PoE) data interfaces

The WinRADIO WR-G65DDC Excalibur SIGMA is a top performance, direct-sampling, software-defined wideband, two in one HF/VHF receiver with two frequency ranges from 1 kHz to 88 MHz and from 118 MHz to 190 MHz. The receiver has two independent and mutually exclusive inputs, one for each range. Features include a real-time 88/72 MHz-wide spectrum analyzer and up to a 64 MHz-wide instantaneous bandwidth available for recording, demodulation and further digital processing.



The receiver's superior performance results from its innovative, direct-sampling, digital down-conversion architecture along with the use of leading-edge components and design concepts. These all result in excellent sensitivity, selectivity and dynamic range, highly accurate and stable tuning, and perfect demodulation.

These key features create a receiver in a class of its own, with wide application potential, with many operational and instrumentation features not usually found on receivers of any price category.



The entire 64 MHz DDC (digitally down-converted) bandwidth is available for recording and demodulation, and ideal for hopping frequencies analysis. Three demodulators allow the simultaneous reception and decoding of radio signals within the entire band.

The receiver's robust front-end is equipped with an ultra-high-linearity amplifier which results in exceptional strong-signal performance while at the same time offering excellent sensitivity.

The WR-G65DDC also features optional external reference clock inputs and outputs, coherence clock input, 1PPS pulse input as well as an FPGA interface, ready for phase-coherent system configurations such as in high performance interferometer direction finding applications. In addition, stereo analog output is also possible, as well as wide audio (10 Hz-150 kHz). The special data port offers numerous possibilities which include GPIO (general purpose I/O), HSP (high speed data output), or a traditional RS232 interface.

Yet again, this is the first time a receiver of such advanced specification and unique combination of features is being offered to the general marketplace.

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

Easily installed to any modern computer with the USB or Ethernet LAN interface, the Excalibur Sigma receiver represents an excellent multi-purpose mobile and stationary solution for advanced HF/VHF monitoring and surveillance.

Hardware

The receiver interfaces to a Windows-compatible PC via USB 3.0, or 1 Gb Ethernet LAN port with PoE (Power over Ethernet functionality according to the IEEE 802.3at standard).



The receiver is very well shielded against interference, making it possible to operate in a noisy computer environment. Its modest power requirements are less than 12 watts. While connected via a LAN interface, thanks to PoE built-in functionality, the receiver can be operated and powered via a long Ethernet cable connection.

Software

The WR-G65DDC control software provides a highly functional and logical user interface. There are several spectrum analyzer configurations available, including the 88/72 MHz full span with 2.8 kHz resolution. The scalable spectrum display can be viewed in either the standard or waterfall mode.

The digital down-converter provides 36 selectable output bandwidths ranging from 20 kHz to 64 MHz. The receiver's selectivity can be adjusted with 1 Hz resolution. Recording and playback are also provided at the output of the digital down-converter, whereby a 64 MHz wide spectrum chunk can be recorded for later demodulation and post-processing.

In spite of the receiver's ground-breaking architecture and powerful functionality, the user interface still remains simple and intuitive to use, with a rich on-line help facility. The control software contains all the features generally expected in modern receivers such as noise blanking, memories, scheduler, squelch (level, voice or noise activated), numerous tuning options, and a wide choice of demodulation modes, including user-defined and ready-for-digital communication modes.

A "toolbox" full of various test and measurement tools, such as frequency error, SINAD, THD and modulation meters, logger and scheduler, complement the entire package and make it possible to use this product as a measuring receiver, replacing much more expensive (and often less capable or accurate) conventional test equipment.

The software-defined architecture allows easy software upgrades for demodulation and decoding requirements. Component variations and aging are greatly diminished in a software-defined receiver, assuring long-term premium performance.

Specifications

Receiver type	Direct-sampling, digitally down-converting software-defined receiver with two independent and mutually exclusive inputs, one for each range
Frequency ranges	Range 1: 1 kHz to 88 MHz Range 2: 118 MHz to 190 MHz
Tuning resolution	1 Hz
Mode	AM, AMS, LSB, USB, DSB, ISB, CW, FMN, FSK, UDM (user-defined mode), DRM mode (optional)
Range 1: 1 kHz to 88 MHz	
Image rejection	100 dB typ. (within frequency range 1-35 MHz) >85 dB (within frequency range 35-88 MHz)
P1dB	-3 dBm typ. (Preamp OFF) -13 dBm typ. (Preamp ON)
IP3	+40 dBm typ. (Preamp OFF) +28 dBm typ. (Preamp ON)
Damage level	+30 dBm
SFDR	111 dB (Preamp OFF) 109 dB (Preamp ON)
Noise Figure	16 dB (Preamp OFF) 9 dB (Preamp ON)
MDS	-128 dBm @ 10 MHz, 500 Hz BW (Preamp OFF) -135 dBm @ 10 MHz, 500 Hz BW (Preamp ON)
Preselection Filters Bank	18 filters available in automatic or manual mode HPF: 850 kHz, 2.4 MHz, 5.4 MHz, 11.8 MHz LPF: 3.1 MHz, 5.4 MHz, 11.8 MHz, 23.3 MHz 10 bandpass, OFF – bypass
Range 2: 118 MHz to 190 MHz	
Image rejection	>80 dB (within frequency range 130-185 MHz) >60 dB (within frequency range 118-130 MHz)
P1dB	-7 dBm typ. (Preamp OFF) -17 dBm typ. (Preamp ON)
IP3	+21 dBm typ. (Preamp OFF) +7 dBm typ. (Preamp ON)
Damage level	+34 dBm
SFDR	101 dB (Preamp OFF) 97 dB (Preamp ON)
Noise Figure	14 dB (Preamp OFF) 6 dB (Preamp ON)
MDS	-130 dBm @ 150 MHz, 500 Hz BW (Preamp OFF) -138 dBm @ 150 MHz, 500 Hz BW (Preamp ON)
Common specs for both, Range 1 and Range 2	
LO Phase noise	-145 dBc/Hz @ 10 kHz
Internal spurious	below -110 dBm
RSSI accuracy	2 dB typ.
RSSI sensitivity	-140 dBm
Processing and recording bandwidth	20 kHz – 64 MHz over USB 3.0 20 kHz – 16 MHz over 1Gbps LAN
Demodulation bandwidth (selectivity)	1 Hz – 64 kHz (continuously variable in 1 Hz steps)
Spectrum analyzers	Input spectrum/waterfall, 88/72 MHz BW, 2.8 kHz RBW DDC spectrum/waterfall, 64 MHz BW, 1 Hz RBW Channel spectrum, 64 kHz BW, 1 Hz RBW Demodulated audio, 24 kHz BW, 1 Hz RBW
ADC	16 bit, 210 MSPS
Tuning stability	0.1 ppm (0 to 50 °C)
Antenna inputs	2 x 50 ohm (SMA connectors)
Output	24/16-bit digitized I&Q signal over USB/LAN interface
Interface	USB 3.0 1 Gbit Ethernet with PoE (Power over Ethernet)
Self-diagnostics	BIT (Built-In test) of the signal and processing path Thermal management - temperature monitoring
Power supply	10 W (12 V/800 mA), or 12 W (PoE – IEEE 802.3at)
Operating temperature	0 to 55 °C
Dimensions	166 x 97 x 59 mm (6.5" x 3.8" x 2.3")
Weight	805 g (28.4 oz)