WR-G526e/DSP Wide-Band Phase-Coherent DSP Back-End

Overview

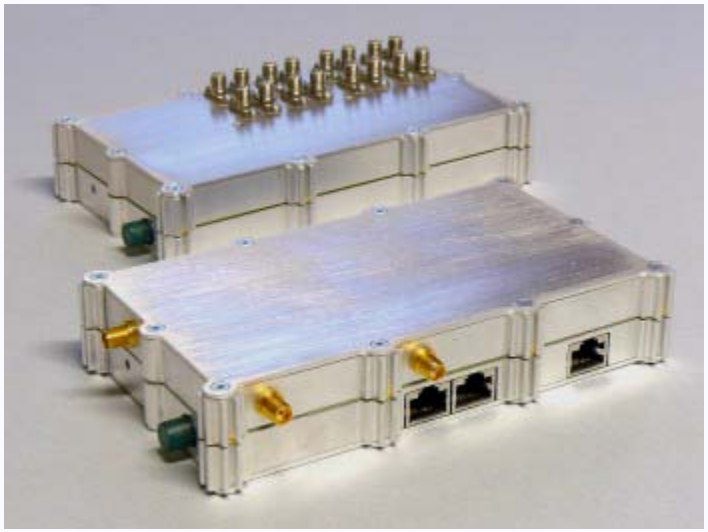
The WiNRADiO WR-G526e/DSP is a versatile DSP back-end platform of USB-interfaced modular digital signal processing building blocks. Together with the WiNRADiO ***WR-G526e*** or ***WR-G527e*** Wide-Band Phase Coherent Tuner front-end they offer a complete Software-Defined Radio receiver solution for high-performance signal intercept, acquisition and monitoring applications, precision direction finding and beam-forming.

The WiNRADiO WR-G526e/DSP is designed to be a compact, low-cost DSP back-end of choice for Software-Defined Radio applications wherever digitizing and digital signal processing of instantaneous IF bandwidth greater than 20 MHz is required. This robust, low-power back-end can be deployed in fixed, land mobile, or airborne installations, and is able to support single-channel as well as multi-channel phase-coherent applications with excellent phase matching between channels.

Application examples include fast-search receivers, TDOA (Time Difference of Arrival) and interferometry based direction-finding systems, spectrum analyzers and recorders.

Features

- 16-bit 100 MHz ADC
- Input frequency range 0-33 MHz (or ADC direct <250 MHz)
- 1GB IF snapshot memory
- Up to four DDC channels
- DDC output bandwidths selectable in 30 steps between 20 kHz and 20 MHz
- Powerful 2.4 GMAC/s DSP (Blackfin, dual core)
- GPS time stamping and synchronization, external triggering
- Low phase noise
- Low phase and amplitude distortion
- High frequency stability 0.01 ppm
- High dynamic range
- Single or multi-channel operation
- USB and LVDS interface



The DSP back-end is based on a high performance 100 MSPS 16 bit ADC, powerful and versatile FPGA and dual-core DSP with peak performance of 2.4 GMAC/s. The incoming signal is first filtered by a high performance low pass filter with alias rejection below -120 dB (operation range below 35 MHz), which can be bypassed for IF undersampling applications up to 250 MHz. The digitized signal is then fed into the FPGA, which can perform digital downconversion (DDC), IF snapshot into the 1 GB internal memory, a variety of other signal processing or pass the digitized signal to the DSP for further processing. The whole digitized signal can be streamed through the 2 Gbit/s serial LVDS interface for HDD recording or custom processing.

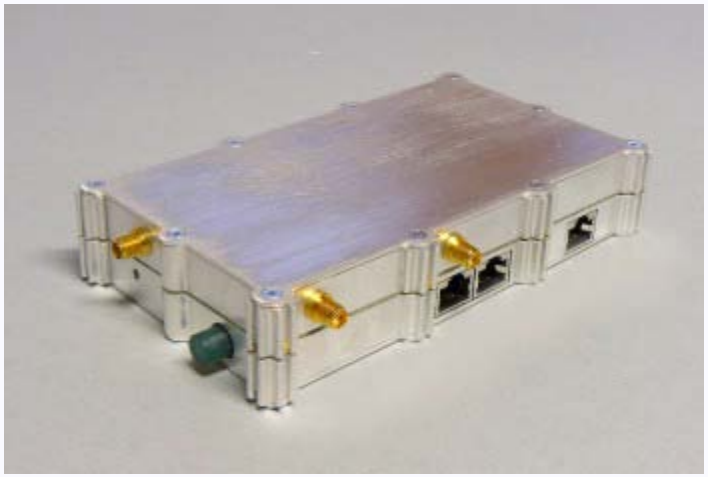
The entire system features an excellent phase stability and flatness throughout the entire frequency range, with minimum amplitude and phase distortion, as well as minimum amplitude and phase mismatch between channels. The system is capable of coherent triggering and coherent digital downconversion, GPS time stamping and GPS synchronization and external TTL triggering.

Even though the WR-G526/DSP Back-End is especially suitable for use with WiNRADiO ***WR-G526e*** Wide-Band Phase Coherent Tuner Front-End, it can be used with any third-party receiver front-end.

WR-G526e/DSPC

The WR-G526e/DSPC module can be used as a DSP back-end for a multi-channel phase-coherent receiver system. The module contains signal digitizing circuitry with a bypassable anti-aliasing filter, an FPGA and DSP and 1 GB of snapshot memory. The modules can be daisy-chained through 60 Mbit/s full duplex serial interface for advanced DSP algorithms. The digitized signal can be streamed through a 2 Gbit/s serial LVDS interface.

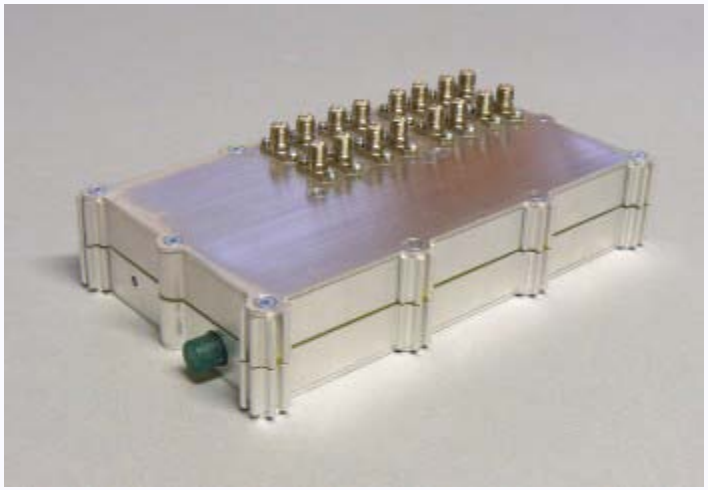
The digitizer provides excellent phase matching (typically 1 degree across the entire frequency range) between channels. Even higher accuracy is possible using the digital down-converter (DDC) with built-in digital phase-shift facility, whereby the phase of the down-converted signal of each DDC can be controlled with a better than 0.1 degree resolution.



WR-G526e/DSPR

The WR-G526e/DSPR is a reference oscillator, trigger and distribution module suited for phase-coherent multi-channel systems, capable of driving up to eight WR-G526e/DSPC back-end modules. The reference oscillator features a very high frequency accuracy and stability of 0.01 ppm, thanks to a built-in OCXO. Higher frequency stability is possible using an external frequency reference input. The unit also features 1 PPS input for time stamping and precise time synchronization, and external TTL trigger input with programmable polarity.

The system's small dimensions and low power consumption make it suitable for integration with mobile surveillance and direction finding systems, including airborne systems, UAVs, and other demanding applications where wide frequency range, wide instantaneous bandwidth and consistent phase characteristics are desirable.



WR-G526e/DSPS

The WR-G526e/DSPS single-channel module is an integrated system combining the functionality of the WR-G526e/DSPC back-end with the WR-G526e/DSPR frequency reference, suitable for single-channel applications. The unit has a 0-33 MHz IF input with software controlled bypass of the anti-aliasing filter for IF undersampling applications up to 250 MHz. It contains a built-in OCXO frequency reference (10 MHz, 0.01 ppm) with a software selectable input for an external frequency reference.

A typical application for this product would be a fast-search receiver, spectrum analyzer or recorder.