BAE SYSTEMS

Eclipse RF™ Products
RXT7406

The RXT7406 is the flagship product in the new Eclipse RF 7000 line of open standards based software-defined receivers, transmitters, and application-ready subsystems.

The RXT7406 is the ideal choice for applications requiring high channel density and performance at a more affordable price per channel.

The RXT7406 is a high performance module that provides four radio frequency (RF) channels, which can either receive or transmit information in the range of 10 MHz to 6 GHz. Each channel operates independently or as part of a phase-coherent group. Its phase coherency extends across multiple modules through the sharing of sample clocks from a group master. The module has 18 front-end pre-selected filters, which are implemented per channel, and are sub-octave above 90 MHz to mitigate the effects of second order intermodulation (IMD2). These filters are implemented in custom chip level filter banks for frequencies above 687 MHz, while discrete component filters are used below that mark. There is also the option to select a front end bypass filter instead, which provides 800 MHz direct to the A/D converter.

The module uses the latest in Xilinx® Ultrascale™ architecture to make it possible. The RXT7406 module uses the XCZU47DR Radio Frequency System on a Chip (RFSoC) to sample the analog input and generate wideband complex outputs supporting 150 MHz instantaneous bandwidth as well as multiple narrowband digital down-converter (DDC) outputs at the same time. When configured for transmit, the RFSoC generates the output waveform through D/A conversion.

The RXT7406 operates independently or within a 1U high 19-inch rackmount chassis. It is similar to our RXT7306 3U VPX receiver and transmitter module. As such, it uses all of the same front-end RF sub-modules and most of the motherboard design. This gives system integrators an advantage, as they're able to put multiple embedded systems on the same network with ease.

BAE Systems has been designing and delivering open standard and high performing signal intercept receivers and transmitters for more than 30 years. We work closely with our customers to ensure that our products achieve the highest level of performance in the field for any platform and application.

Features

- Four channels in a 3U brick form factor, dynamically configurable as either transmit or receive, supporting embedded systems optimized for size, weight, power, and cost.
- Each RF channel operates independently or as part of a phase-coherent group to support signal search and copy while also supporting spatial processing algorithms.
- Large Spur Free Dynamic Range (SFDR) captures weak signals in the presence of strong in-band and out-of-band interference.
- Built in narrow-band digital down converters filter and separate the signal of interest, while providing an optimal IQ sample rate.
- Low-latency tuning to support high speed scanning and collection of frequency agile transmitters.
- High-speed 100 GigE interface simultaneously transports multi-channel wideband digital data and filtered narrow-band streams over VITA 49.

Receiver specifications

Rx tune range	10 MHz to 6 GHz
Rx tune resolution	1 MHz
Rx tune speed	<= 15 microseconds
RF input impedance	50 Ohms
Instantaneous bandwidth	150 MHz (pre-selector limited in some bands)
VSWR	< 2.5:1
Max input level	+ 20 dBm (hot-switched)
Noise figure	14 dB typical
Single tone SFDR	72 dBc typical
IIP3[1]	+5 dBm typical
Third-order intermodulation (IMD3)	>76 dBc Typ
Second-order intermodulation (IMD2)	>90 dBc Typ
Internal spurious	<-100 dBm
Channel to channel isolation	>70 dB
SSB phase noise (at offset)[2]	
100 Hz	-90 dBc/Hz
1 kHz	-100 dBc/Hz
10 kHz	-105 dBc/Hz
100 kHz	-110 dBc/Hz
1 MHz	-125 dBc/Hz
Pre-select filters	18 Total and an 800 MHz Low Pass

[1] Input signal of -27 dBm

[2] Sample clock generated using 100MHz reference

Transmitter specifications

Tx tune range	10 MHz to 6 GHz
Tx tune resolution	1 MHz
Tx tune speed	15 microseconds
Output power	+6 dBm single tone; +0 dBm two-tone
Modulation bandwidth	Up to 150MHz
Spurious bandwidth in-band	< -55 dBc typical
Spurious bandwidth out-of-band	< -70 dBc typical

Basic features

Number of RF channels	4 simultaneous, configurable as RX or TX in half-duplex operation. Full duplex achieved by using 2 RF channels
ADC resolution	14 bit
DAC resolution	14 bit
Wideband data	32 bit complex
Wideband sample rate	190, 100 and 80cMSPS
Number of narrowband DDCs	32 per RF channel

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