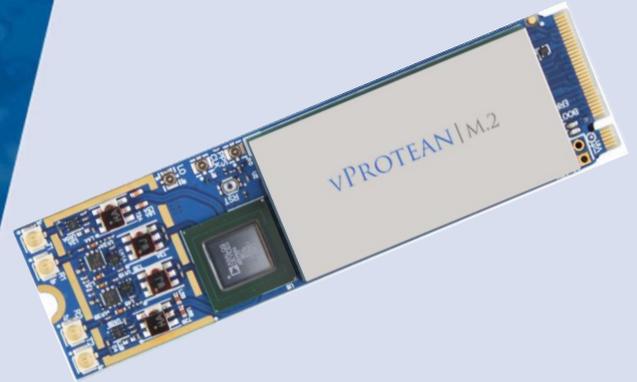# VANTEON®

vPROTEAN|M.2

High-performance Software Defined Radio (SDR) in an extremely low Size, Weight, and Power (SWaP) M.2 form factor. A wideband dual transmit, dual receive SDR with excellent narrowband performance.

vProtean|M.2 is the latest SDR in the vProtean family with the highest density radio processing horsepower available. The vProtean|M.2 is a highly flexible wideband SDR for most any RF processing application. Its high-performance RF is frequency and bandwidth configurable, while its integrated RF transceiver provides optimal narrowband performance with dual transmit and dual receive capabilities.
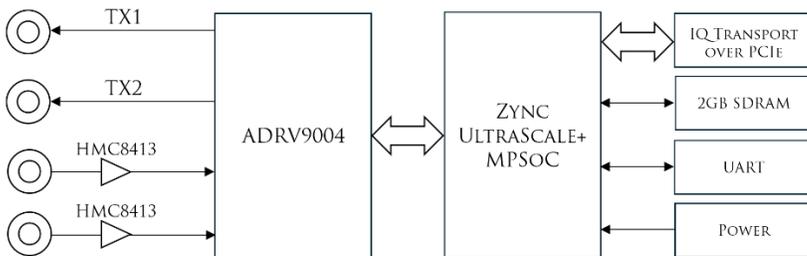
Performance Specifications

- Configurable RF Front End with 0 dBm Transmit Power
- Frequency Range of 30 to 6000 MHz
- Instantaneous bandwidth from 12 kHz to 40 MHz
- Low power consumption
- 2 TX and 2 RX operability
- Small footprint (22 mm x 80 mm)
- On-board 32 MB QSPI Flash and Micro-SD Card slot
- On-board 2 GB LPDDR4 SDRAM
- UART and SPI Debug Ports

Platform Features

The vProtean|M.2 platform offers the following key features:

- Supports full bandwidth IQ transport for both transmit and both receive paths at the same time
- Supports onboard waveform/baseband processing without the need for external IQ generation or receive processing (stand-alone operation)
- Xilinx UltraScale+™ MPSoC for exceptional signal processing performance
- Quad Embedded ARM Cortex®-A53 and Dual Cortex®-R5F processors in the Ultrascale+ core
- ADI ADRV9004 highly integrated, wide frequency range RF transceiver
- Performance enhancing RF Front End (RFFE) to improve on the transceiver FE
- Multi-Channel and Multi-Chip Synchronization
- Full duplex at 40 MHz BW, using I/Q baseband or digital data on both channels
- M.2 M-key with PCIe pluggability
- Four (4) PCI Express lanes, UART, I2C
- External RF inputs for clock reference and sync signals (e.g., 1 PPS)
- IP and DSP core radio functions are available for license

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Technical Specifications: Subject to change without notice.

	CONDITION	UNITS	MIN	TYPICAL	MAX
Absolute Maximum Rating					
VCC		V	3.2	3.3	3.4
RF INPUT POWER	ADRV9004 input attenuation set to 0 dB	dBm			-3
COMPONENT TEMPERATURE RATING		°C	0		85
DC Recommended Operating Conditions & Characteristics					
VCC_SYS	Relative to PCB Ground	V		3.3	
INPUT POWER SUPPLY	Available Current	A	4.0		
CURRENT CONSUMPTION ICC_SYS	Standby, Vcc = 3.3V TX & RX off	A		1.75	
	Vcc = 3.3V 2 RX on, all TX off	A		3.1	
	Vcc = 3.3V 2 RX on & 2 TX on	A		3.7	
RF Performance Specifications (Based on ambient temperature range and VCC_SYS voltage of 3.3V unless otherwise noted)					
FREQUENCY RANGE	Operational Frequency Range	MHz	30		6000
SAMPLE RATE	Sample Rate of RX ADC and TX DAC	Msps			61.44
RECEIVE INSTANTANEOUS BANDWIDTH	3 dB bandwidth, 61.44 MHz sample rate	MHz		37.25	40
RF INPUT POWER	ADRV9004 input attenuation set to 0 dB	dBm		-19	
RECEIVE SPURIOUS FREE DYNAMIC RANGE	Frequency: 2400 MHz	dB		70	
RECEIVE BAND FLATNESS	30 MHz to 3500 MHz	dB		±2.0	
	30 MHz to 6000 MHz	dB		±4.2	
RECEIVE CHANNEL ISOLATION	RX1 to RX2 measured at 2400 MHz	dB		51	
RECEIVE FRONT END NOISE FIGURE		dB		2.1	
TRANSMIT PHASE NOISE	Frequency: 2400 MHz @ 100 kHz offset	dBc/Hz		-101	
	Frequency: 2400 MHz @ 1 MHz offset			-121	
	Frequency: 2400 MHz @ 1 MHz offset			-136	
TRANSMIT POWER	P1dB @ 2400 MHz	dBm		+3.0	
TRANSMIT CHANNEL ISOLATION	TX1 to TX2 measured at 2400 MHz	dB		58	
TRANSMIT BAND FLATNESS	30 MHz to 3500 MHz	dB		±1.5	
	30 MHz to 6000 MHz	dB		±2.5	
Connector Pinout					
J1	M.2 M-Key	PCIe x4 data stream			
J2	microSD	microSD connector for storage system firmware and TX/RX data			
J3	FFC	Cable to connect M.2 and carrier for UART, JTAG, and GPIO functionality. 20 pin 0.5mm pitch.			
J4	U.FL/UMCC	Transmit 1			
J5	U.FL/UMCC	Receive 1			
J6	U.FL/UMCC	Transmit 2			
J7	U.FL/UMCC	Receive 2			
J8	U.FL/UMCC	External Transceiver Device Clock input. 10-80MHz, 0.2-1.0Vpp			
J9	U.FL/UMCC	External LO input. 1.8V IO level.			
J10	U.FL/UMCC	External PPS/sync input 1.8V IO level.			
J11	2-pin PicoBlade header	Fan connector. It may be used to supply 3.3V in standalone (non-M.2) application.			
Safety Standard Certification					
FCC	End product must be FCC certified				
RoHS	Yes – RoHS compliant				