Epiq Solutions’ Quadratiq™ SDR is an advanced multichannel software defined radio platform combining four RF receivers with dual 10 GbE interfaces supporting I/Q streaming using VITA49. Quadratiq™ offers a wide tuning range, advanced FPGA fabric for user-customized signal processing and sophisticated web-based user interface.

**KEY FEATURES**

» Four RF receiver paths (configured as two separately tunable phase coherent pairs)

» RF tuning range between 70MHz and 6GHz, with sub-3Hz tuning resolution

» Supports RF channel bandwidths up to 50MHz per receiver (max sample rate of 61.44 Msamples/sec)

» Supports both manual gain control and automatic gain control

» Dual 10 Gigabit ethernet (10 GbE) interfaces provided through dual SFP+ ports

» Supports unidirectional VITA49 streaming (UDP) over dual 10GbE interfaces

» Separate RJ45 Gigabit ethernet interface for command, control, and serving up the web-based user interface

» Supports external 10MHz reference and 1PPS inputs for synchronization

» Integrated GPS receiver with 1PPS for disciplining the internal TCVCXO reference clock
**BLOCK DIAGRAM**

**RECEIVER RF SPECIFICATION**

- **RF INPUT**: SMA (50 Ω)
- **NUMBER OF RF RECEIVERS**: 4
- **ARCHITECTURE**: Zero-IF (direct conversion)
- **TUNING RANGE**: 70 MHz to 6 GHz
- **TUNING STEP-SIZE**: < 3 Hz
- **TUNING TIME**: < 2 mS
- **PRE-SELECT FILTER BANK**: 6 internal filter paths
- **TYPICAL NOISE FIGURE**: 8 dB
- **TYPICAL IIP3**: -10 dBm
- **GAIN CONTROL RANGE**: 0 to 76 dB
- **RF CHANNEL BANDWIDTH**: 200 KHz to 50 MHz
- **TYPICAL I/Q BALANCE**: > 50 dB
- **A/D CONVERTER SAMPLE RATE**: 233 Ksamples/sec to 61.44 Msamples/sec
- **A/D CONVERTER SAMPLE WIDTH**: 12 bits
- **MAX SAFE RF LEVEL AT RF INPUT (AT MAX GAIN)**: 20 dBm
- **ESD PROTECTION AT RF INPUT**: 20 kV (human body model)

**IF/TRANSMITTER RF SPECIFICATION**

- **IF OUTPUT**: SMA (50 Ω)
- **ARCHITECTURE**: Zero-IF (direct conversion)
- **TX TUNING RANGE**: 70 MHz to 6 GHz
- **TUNING STEP-SIZE**: < 3 Hz
- **TUNING TIME**: < 2 mS
- **GAIN CONTROL RANGE**: 0 to 90 dB
- **RF CHANNEL BANDWIDTH**: 200 KHz to 50 MHz
- **D/A CONVERTER SAMPLE RATE**: 233 Ksamples/sec to 61.44 Msamples/sec
- **D/A CONVERTER SAMPLE WIDTH**: 12 bits
- **MAX TX OUTPUT POWER**: +5 dBm
- **ESD PROTECTION AT RF INPUT**: 20 kV (human body model)
DIGITAL SPECIFICATION

CPU/FPGA: Xilinx Zynq ZC7030 (Dual-Core ARM Cortex A9)
Optional: Xilinx Zynq ZC7045

PROCESSOR MEMORY: 1GB DDR3-1066 SDRAM

INTERNAL FLASH STORAGE: 16GB MicroSD card for Linux and root filesystem

OPERATING SYSTEM: Linux 3.6 kernel

I/O PORTS: 2x 10 GbE SFP+ port, streaming VITA49 protocol
RJ45 for 10/100/1000 Base-T Ethernet to web server
Linux serial console access via microUSB

GPS SPECIFICATION

NUMBER OF CHANNELS: 50
SENSITIVITY: -162 dBm (navigation), -148 dBm (cold start)
ACCURACY: < 2.5 meters
HOT START: 1 second
COLD START: 26 seconds
RF INPUT: SMA
SUPPORT FOR ACTIVE ANTENNAS: Yes (3V bias default, additional bias voltages possible)
INTERFACE: NMEA sentences over UART (9600 baud, N81)
1 PPS signal

SYSTEM REFERENCE CLOCK SPECIFICATION

TYPE: Temperature Compensated,
Voltage Controlled Crystal Oscillator (TCVCXO)
FREQUENCY: 40 MHz
FREQUENCY ACCURACY: +/- 1 ppm (-30 deg C to +85 deg C)
FREQUENCY WARPING: +/- 5 ppm
EXTERNAL REF CLOCK INPUT: 10 MHz (for phase locking)
EXTERNAL SYNCHRONIZATION: 1PPS

POWER INPUT SPECIFICATION

POWER INPUT CONNECTOR: Lemo EGG.1B.306
POWER INPUT VOLTAGE RANGE: 9V to 16V DC
TYPICAL POWER CONSUMPTION: 18W

PHYSICAL SPECIFICATION

DIMENSIONS: 8.42" x 5.75" x 1.61"
WEIGHT: 1 lb, 9 oz

Epiq Solutions exports its products strictly in accordance with all US Export Control laws and regulations which shall apply to any purchase or order.

Specifications subject to change without notice
Epiq Solutions designs and builds state-of-the-art low power reconfigurable radio systems for mission critical applications. With expertise spanning RF system design to physical layer signal processing and higher layer protocol processing, Epiq Solutions provides engineering development services for customers requiring specialized signal processing hardware and software. In addition, Epiq Solutions has developed a variety of commercially available low power software defined radio platforms. These radios dramatically lower the barrier to entry for building a reconfigurable radio system, while providing high performance, an easy-to-use interface, and a small form factor.

**Maveriq™ Multichannel SDR Transceiver**
- 2x2 MIMO or 4 channel Rx configurations
- 70 MHz to 6 GHz
- Up to 50 MHz RF bandwidth per channel
- Internal hard drive for RF recording/playback
- On board FPGA + CPU for local processing
- 9.1" x 6.6" x 1.7
- Power consumption < 20 W (typical)

**Sidekiq™ MiniPCIe Card SDR**
- MiniPCIe card form factor (30mm x 51mm x 5mm)
- 2 channel Rx or 1x1 Tx/Rx configurations
- 70 MHz to 6 GHz
- Up to 50 MHz RF bandwidth per channel
- Integrated FPGA for custom signal processing
- Power consumption < 2W (typical)

**Matchstiq™ S10 Handheld SDR Transceiver**
- Single RF transceiver covering 70 MHz to 6 GHz
- Up to 50 MHz RF bandwidth
- Xilinx Spartan®6 LX45T FPGA for signal processing tasks
- Quad-core ARM Cortex A9 CPU @ 800 MHz (Freescale i.MX6) running Linux
- Integrated GPS receiver with 1PPS
- Gigabit ethernet, USB 2.0 OTG, and HDMI ports
- 4.41" x 1.65" x 1.13"

**Skylight Multi-Technology Cellular Scanner**
- Downlink channel scanner and decoder
- High performance decoding for real-time analysis
- Log and export survey information for post-processing and record keeping
- Results can be sent over Wi-Fi or USB to Android or other supported devices
- Software only and FPGA-accelerated versions available
- Supported technologies include: GSM, UMTS, CDMA2K, FD-LTE and TD-LTE