TRIDENT SYSTEMS’
Multifunction RF Electronics Unit (MFREU)

Built around Trident’s Space Qualifiable Digital Radar Transceiver and our mature RAPTOR digital RF architecture, the MFREU provides a complete solution for flexible high-bandwidth programmable RF system needs in space, enabling rapid implementation of radar and other advanced programmable multifunction RF capabilities in a compact form factor.

Highly Integrated.
The MFREU combines Trident’s SQDRT with supporting telemetry and is based on our powerful, flexible RAPTOR architecture, programmability over all key RF features in a very small size, weight, and power footprint. SpaceVPX compatibility provides modularity and simplifies integration of peripherals and additional capability.

Highly Reliable.
A Single Event Effects aware FPGA architecture, coupled with radiation-tolerant components and a robust mechanical design, provide a high-reliability platform for operation in harsh orbital and interplanetary environments.
Space Qualifiable MFREU

Programmable radar features:
– On-orbit re-programmability
– Waveform (pulse-to-pulse)
– Pulse length & chirp rate
– Pulse repetition interval
– Range gates position and size
– Block adaptive quantization

Multifunction Reconfigurability:
– Multiple FPGA boot load options
– Dynamically reconfigurable
– On-orbit re-programmability

Specifications:
– Number of Channels: 1 Transmit, 2 Simultaneous Receive
– Digital Converters: 12 bits transmit, 12 bits receive; synchronization across multiple transceivers
– Sample Clock Range: programmable up to 3.2 Gsamples/sec
– Instantaneous BW: programmable up to 800MHz
– FPGA: Xilinx Virtex-5QV
– Power: < 85W (FPGA mode & duty cycle dependent; flexible low-power/standby modes)
– Weight: < 13kg
– Shock/Vibration: packaging, materials, construction per NASA and DoD test methods
– Temperature: -20° C to +40 °C Operation (at thermal interface)
– Memory: 1Gbyte SDRAM, 16MB QDR II+ SRAM (with EDAC)
– Form Factor: 10.7” x 10.7” (baseplate dimensions), 5.5” height
– Radiation tolerance: All components selected for high latchup immunity and total dose
– Fault Tolerance: TMR program flow
– Parts/Materials/Processes: SEU/SEFI fault detection/recovery
– Base Transceiver Card: Configurable scrubbing
– Expansion Slot: Exceeds requirements for targeted missions; contact Trident for details
– Telemetry: Trident Space Qualifiable Digital RF Transceiver (SQDRT)
– System Controller: OpenVPX Specification, SRIO and SpaceWire connectivity, accepts SQDRT card
– System Controller: Dedicated card collects and manages both in-chassis and external telemetry data
– System Controller: PowerQUICC III based system controller with 512MB onboard DDR1 memory

Interfaces:
– High-speed data: Serial RapidIO
– Control & low-speed data: Dual-Redundant SpaceWire Interfaces
– General Purpose I/O: LVTTL and LVDS
– RF: 50 ohm single ended
– Reference & Sample Clocks: Internal or External
– Backplane Interface: SpaceVPX/OpenVPX per VITA 78/65
– Power: 28VDC

Form-Factor Engineering Development Models/Rapid Response Flight Units
-- Spring 2017

Hardware & FPGA firmware customization available

Contact Us: rs@tridsys.com

Because we are constantly improving our products, these specifications are subject to change without notice.
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