RINCON RESEARCH
EMPLOYEE OWNED

ADVANCED SIGNAL PROCESSOR (ASP)

MODULAR DIGITAL SIGNAL PROCESSING (DSP) HARDWARE RACK

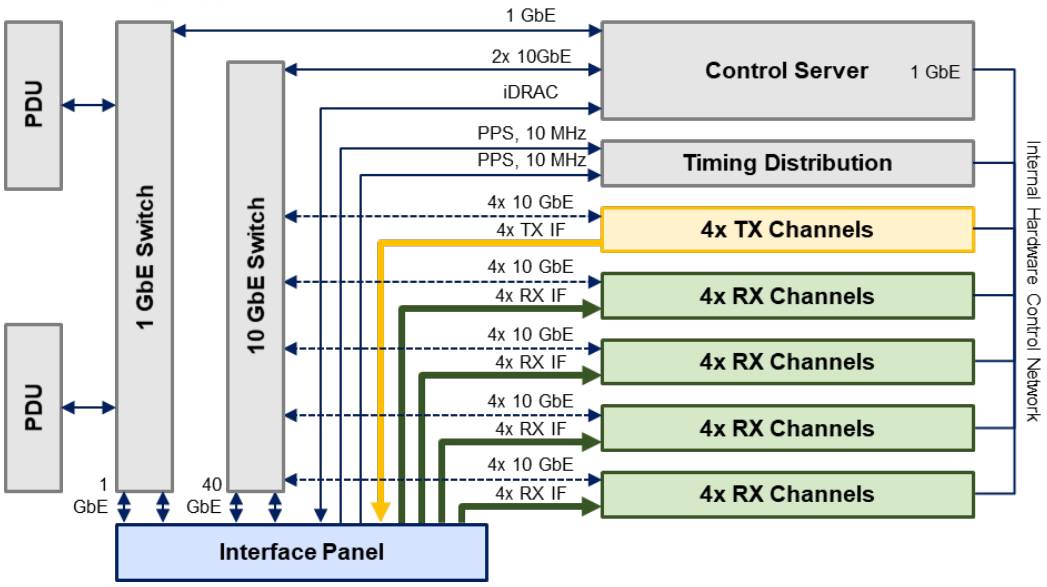
THE ASP provides 8 or 16 independent wideband receive channels and 4 independent wideband transmit channels in an 81" (H) x 23.6" (W) x 41.7" (D) rack. This system was rapidly built from our highly modular DSP hardware to address an extensive set of project-specific requirements. In less than one year after kickoff, we were able to design the ASP system and pass multiple Customer reviews; build, test, and deliver five units; and complete a rigorous acceptance test. We achieved this rapid schedule because of the modular nature of our hardware products and our expertise in FPGA, DSP, and software development.

GENERAL SYSTEM CAPABILITIES

- Highly configurable to accommodate different mixes of Tx and Rx channels
- Control and status via ActiveMQ, WebSocket, or HTTP interfaces
- Continuous BIT with rapid detection and reporting of issues with network, timing signal, firmware, fans, hardware temperature, and more
- Dual-redundant power for all components
- Software and firmware can be readily updated, software is in containers, and firmware is loaded at run-time from config files to allow rapid reconfiguration
- The system is tested, accepted, and operational

ASP

BLOCK DIAGRAM



SPECIFICATIONS

RECEIVE (RX) CHASSIS CAPABILITIES

- Four independent wideband receive channels per chassis
- Customized analog input circuit to meet program requirements
- Control board for HW BIT and power control for each card
- Integrated PPS and 10-MHz distribution system
- Each Rx channel has two independent tuners tunable from 950 to 1750 MHz with sample rates from 128 k to 50 MS/s
- Each Rx channel can provide direct ADC sample snapshots for full-bandwidth analysis of real-time 850-MHz spectrum
- Each Rx channel can output either pre-D data, demodulated/despread output, or both
- Rx channels support precise timing and use NTP as time reference
- V49 packets for output data and context

RX SPECIFICATIONS

- **Dual Redundant Power:** 110/220 VAC 50/60 Hz, 300 Watts (max)
- **Command/Control:** 10/100/1000 Mbit Ethernet, RJ45
- **Operating Temperature:** 0° C to 50° C
- **Analog Input:** –35 dBm, 50 ohm, AC-coupled, 950 to 1750 MHz, SMA
- **10 MHz Reference:** 750 mVpp to 2 Vpp (1.5 dBm to 10 dBm), 50 ohm, AC-coupled, sine or square wave, SMA
- **1 PPS:** CMOS compatible, 50 ohm, SMA
- **Output Data:** One SFP+ port per channel, compatible with 10-Gigabit Ethernet, SR/LR fiber, or direct attach copper

TRANSMIT (TX) CHASSIS CAPABILITIES

- Four independent wideband transmit channels per chassis
- Customized analog output circuit to meet program requirements
- Integrated PPS and 10-MHz distribution system
- Each Tx channel is tunable from 950 to 2200 MHz with sample rates from 32 k to 31.25 MS/s
- Tx sample rate matches requested values for extended, continuous transmission without significant timing error accumulation
- Each Tx channel includes an embedded spread-spectrum modulator
- Tx channels support precise timing and use NTP as a time reference
- V49 packet for input data, control, and context

TX SPECIFICATIONS

- **Dual Redundant Power:** 110/220 VAC 50/60 Hz, 300 Watts (max)
- **Command/Control:** 10/100/1000 Mbit Ethernet, RJ45
- **Operating Temperature:** 0° C to 50° C
- **Analog Output Power:** –10 dBm
- **Analog Output:** 50 ohm, AC coupled, 950 to 2200 MHz, SMA
- **10 MHz Reference:** 750 mVpp to 2 Vpp (1.5 dBm to 10 dBm), 50 ohm, AC-coupled, sine or square wave, SMA
- **1 PPS:** CMOS compatible, 50 ohm, SMA
- **Input Data:** One SFP+ port per channel, compatible with 10-Gigabit Ethernet, SR/LR fiber, or direct attach copper

ADVANCED SIGNAL PROCESSOR

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