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How do all these processors talk together?

[X-link](#) does the job! [Sundance](#) has for the past 18 years been manufacturing multiprocessor solutions. By migrating from one generation to the next and maintaining compatibility between modules, 1997's [SMT331](#) ('C6201 DSP @200MHz + XC4000 FPGA) is compatible with our latest dual 'C6455s + Virtex-4 FX60 module - the [SMT362](#)!

The inter-processor bandwidth has increased from an 8-bit comport that sustained ~100Mbit/s between DSP modules, to the current top-of-the-range "[Rocket-IO Serial Link](#)" running flat-out at 2.5Gbit/s. The SMT362 has no less than 16 of these links, so its performance is an order-of-magnitude higher than the SMT331 with 4 Comports. In line with this, progress in FPGA capacity and DSP parallelism boundaries have been shattered over the last decade. Most important for any COTS development platform, is the fact that it is possible to replace an SMT331 with an SMT362 by recompiling the application program only.

[More Details](#)

Zoom in on the Lab's advanced research

Multiple-Input Multiple-Output (MIMO) technology represents the use of multiple transmitters, antennas and receivers in wireless radio communications. Digital communication using MIMO is emerging as one of the most promising research areas in wireless communications.

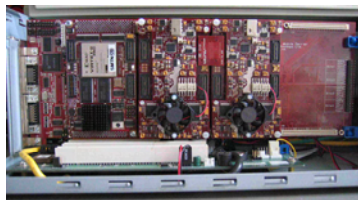
Internet and multimedia communications are now being integrated in wireless communications, and they really need high-data rate and large user capacity. MIMO systems tend to resolve these issues by simultaneously offering high bandwidth, improved range and high mobility at a lower cost. MIMO has key applications especially in streaming video and music, video surveillance, VoIP, video conferencing, interactive Gaming, Mobile TV, RFID...

Most standards for wireless LAN, digital video broadcasting and 4G mobile broadband aim to use the combination of both MIMO and OFDM technologies.

Orthogonal frequency-division multiplexing (OFDM) is a modulation technique well suited for multi-path wireless environments. Coupled with the smart antennas to exploit the spatial domain and software defined radio (SDR), these key technologies enable the wireless industry to deliver the future economic, flexible and scalable wireless network architectures in multi-user systems. Now the research focuses on the integration of multiple antennas in mobile terminals...

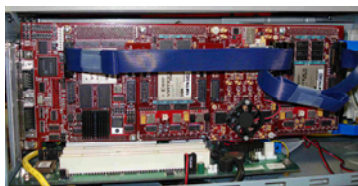
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A Flexible and Scalable 4x4 MIMO transceiver system



SMT8094-T

Transmission terminal



SMT8094-R

Reception terminal

Various MIMO configurations can be used in telecoms applications. For instance, a 2x2 MIMO architecture is able to simulate a base station (with 2 antennas to transmit signals) and a mobile terminal (with 2 antennas to receive signals). From a performance point of view, upgrading to a 4x4 MIMO system will quadruple capacity as the MIMO capacity grows linearly with the number of antennas.

The Sundance 4x4 MIMO transceiver system can be hosted in the [Development Station](#). There is also a similar system for [SDR Development](#).

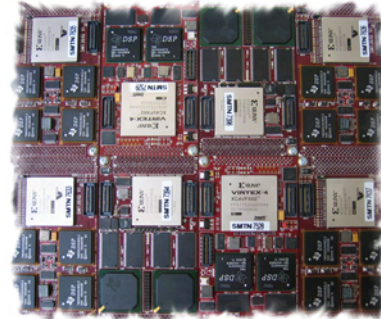
The transmission part ([SMT8094-T](#)) is powered by the 1GHz DSP module ([SMT395VP30](#)) to control the four 16-bit resolution DAC output channels of the two SMT350s. Each [SMT350](#) is controlled by a Virtex-4 SX35 FPGA ([SMT368](#)) that can implement DSP hardware algorithms.

The reception part ([SMT8094-R](#)) comprises the SMT395VP30, connected via the SHBs to two 1GB DDR-SDRAM memory modules. These [SMT351-G](#) embedded memory boards store the high-speed data coming from the ADC stage. The four 14-bit ADCs of an [SMT384](#), plus its SMT368 FPGA-base module compose the sampling stage.

Both Tx and Rx platforms are mounted on their own PCI-type carrier board ([SMT310Q](#)). Support for cPCI, VME, PC104-type carrier boards are also available from [Sundance](#).

[More Details](#)

February 2007



Multiprocessor modules

[SMT362](#) (Dual C6455 DSPs)

[SMT374](#) (2 floating-point DSPs)

[SMT361Q](#) (4 fixed-point DSPs)

Newsletter Spotlight

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