

Benefits

- Provides a multiprocessing solution on Texas Instruments' highest performance DSP platform
- *quicComm* software simplifies algorithm partitioning across multiple processors
- Provides high-speed, low latency, deterministic data flow between the DSPs and off-module resources as required in communications applications
- Provides application reconfigurability on-the-fly via dynamic task loading on individual processors
- Modular architecture integrates seamlessly with Spectrum's HCDR-100x and SDR-3000 platforms, providing a tight integration between DSPs, general purpose processors (GPPs), and FPGAs

Applications

- Wireless infrastructure, wireless surveillance, wireless test and measurement, satellite earth stations, video and imaging, and other digital signal processing applications

Features

- Choice of one or two 600 MHz TMS320C6416 or TMS320C6415 fixed-point DSP processors with a peak performance of 4800 MIPS per processor
- Integrated Viterbi and Turbo co-processors
- Eight dedicated high-speed data paths to the DSPs, connected through a programmable router for dataflow reconfigurability
- 32 MB of SDRAM per DSP
- 32-bit, 33 or 66 MHz PCI Bridge to host PCI bus
- 32-bit, 33 MHz Local PCI bus primarily for control plane data
- Software support includes *quicComm*, a multiprocessing enabler for Spectrum's *flexComm* products.
- *quicComm* can be run in conjunction with Texas Instruments' DSP/BIOS, providing multiprocessing capabilities with a real-time operating system
- Single-width enhanced PMC (ePMC) form factor compatible with Spectrum's ePMC carriers and third-party PMC carriers

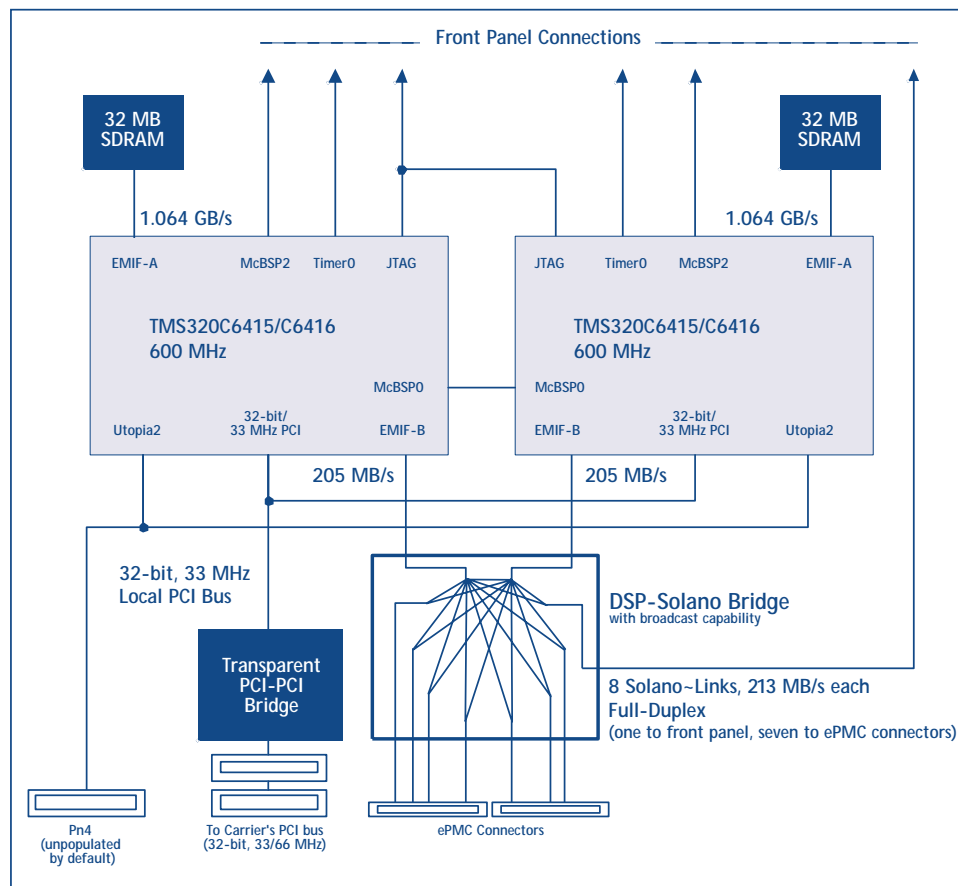
Description

The ePMC-8310 family of DSP modules utilize the 600 MHz TMS320C6416/C6415 devices from Texas Instruments and is Spectrum's highest performance DSP-based solution for multiprocessing applications. The ePMC-8311 is the standard configuration within the ePMC-8310 module family, and includes two 600 MHz C6416 DSPs. The built-in Viterbi and Turbo co-processors in the TMS320C6416 make this module ideally suited for 2G, 2.5G, and 3G base station development, 3G test and measurement, as well as for the surveillance of modern digital cellular waveforms.

The architecture is simple yet extremely powerful when combined with Spectrum's ePMC-based carriers and I/O solutions. Separate control and data paths are provided, with a focus on providing data paths that are high-speed, deterministic, and have a low latency. The high-speed data paths can come from up to eight different sources, and the routing of each path can be individually programmed. Spectrum's *quicComm* software seamlessly integrates this module with other *flexComm* offerings, creating powerful multiprocessing solutions for demanding communications applications.



Block Diagram



Architecture

The architecture of the modules was designed for scalability; multiple modules from the ePMC-8310 family can be installed on ePMC carriers to create C64 cPCI carriers or C64 VME carriers based on this high-performance building block. The modules may include up to two TMS320C6416/C6415 processing nodes, each running at 600 MHz with 32 MB of SDRAM, connected to each other and the outside world through a variety of interfaces.

Eight Solano~links: Designed for high-speed, deterministic, low latency data movement, the eight Solano~links each provide a 213 MB/s (full-duplex) data path between the C64x DSPs and off-board I/O, GPPs, FPGAs, or other DSPs. For more details on the Solano Communications IC®, please refer to the Solano datasheet on the Spectrum website.

DSP-Solano Bridge: Designed to support dataflow reconfigurability, the DSP-Solano Bridge provides a programmable interconnect between the 205 MB/s EMIF-B interfaces of the DSPs and the eight Solano~links. The DSP-Solano Bridge is user programmable and is capable of connecting any DSP on the module with any other Solano~links. In addition it supports multi-casting and broadcasting from any source.

PCI Bridge: Designed for control, setup, and low-speed payload data, the local side is a 32-bit, 33 MHz interface. The host-side of the bridge can run at 33 MHz or 66 MHz.

McBSP, Timers, JTAG, and Utopia2: One McBSP serial port is routed between the DSPs, and each DSP brings one serial port to the front panel. One timer interface from each DSP is brought to the front panel, and the JTAG interfaces are brought out to a single front panel connector. The Utopia2 interface is routed to Pn4 (the Pn4 connector can be populated for users requiring Utopia2).

Software

quicComm Software Development Kit (SDK)

quicComm is a high-performance software development tool that provides an API for inter-processor and I/O-to-processor communications. *quicComm* can be run in native mode or in conjunction with Texas Instruments DSP/BIOS.

quicComm has been a standard on Spectrum's products since 2000, and therefore spans all of our processing technologies, including DSPs, GPPs, and interfaces to FPGAs and I/O. *quicComm* enables developers to create multiprocessing communications platforms, with a mixture of processing engines and I/O devices, with minimal headache and maximum code portability. *quicComm* also provides board-level setup and programming interfaces.

A *quicComm* VxWorks® Host software development kit (SDK) is also available for all the ePMC-8310 DSP modules.

Please see the *quicComm* datasheet for more details about the benefits and features of *quicComm*.

Tornado II and the VxWorks RTOS

Tornado II, the development toolset for the VxWorks real-time operating system (RTOS), runs on the carrier board's host controller. The ePMC-8310 modules support the carrier's supplied VxWorks Host SDK. You can purchase Tornado II and VxWorks from Spectrum to facilitate one-stop shopping, minimize your license fees, and avoid any potential configuration problems.

Debug and Compile Tools

Spectrum builds on Texas Instruments' proven eXpressDSP™ software tools to provide system-level, multiprocessing tools and configuration utilities that enable application developers to work at a system level. The ePMC-8310 DSP modules support TI's Code Composer Studio™ Development Tools.

System-level Solutions

The ePMC-8310 module integrates seamlessly into Spectrum's existing SDR and HCDR architectures. Please visit Spectrum's website to view the online datasheet with additional diagrams of ePMC-8310 integrated with our SDR-3000 and HCDR platforms.

[[ePMC-8310 within SDR-3000](#)]

SDR-3000 is a CompactPCI solution that provides a tightly integrated communications platform for demanding multi-channel wireless infrastructure and surveillance applications. Dataflow within SDR-3000 is packet-based and makes use of the concept of both physical and logical channels. The ePMC-8310 DSP module family is designed to support multiple logical channels within the DSP-Solano Bridge, allowing multiple instances of a modem to run on a single DSP while maintaining separate logical data streams into and out of the modems. The ePMC-8310 mount on the PRO-3500 and therefore has tight coupling to the FPGAs, and also GPP's. It also has tight coupling to A/D data, and channelized baseband data for running higher layers of a protocol stack while still maintaining a tight coupling to the physical layer code running on the DSPs.

Please refer to the SDR-3000 datasheet and the individual component datasheets for more details.

[[ePMC-8310 within HCDR](#)]

HCDR-100x is a VME architecture based on the PRO-1900/PRO-1901 carrier boards, which provide four ePMC sites and one PMC site in two VME slots. A flexible multi-channel receiver platform can be easily created by combining Spectrum's ePMC-based A/D converter, digital down converters, and ePMC-8310 modules on the PRO-1900/1901 carriers.

Please refer to the HCDR-100x datasheet and the individual component datasheets for more details.

Specifications

The ePMC-8311 is the standard configuration for the ePMC-8310 family of C64x DSP modules

[general]	Processors	Two 600 MHz TMS320C6416 fixed-point DSPs from Texas Instruments (Single-node or 600 MHz TMS320C6415 available upon request)
	Memory	32 MB of SDRAM per DSP
[buses]	Local PCI	32-bit, 33 MHz
	Host PCI	32-bit, 33 or 66 MHz
[external interfaces]	Solano-link	One Solano-link to front panel, seven to the carrier, each capable of over 213 MB/s full-duplex between the ePMC connectors and the Solano Communications ICs
	Serial Ports	One McBSP serial port routed from each DSP site to the front panel
	JTAG Connection	Available for debug support via a 2x5 pin header accessible on the front panel
	Timer	One Timer interface routed from each DSP to the front panel
	Utopia2	Utopia2 interface from each DSP routed to Pn4 (Pn4 unpopulated by default)
[performance]	Peak Data Transfer Rates	205 MB/s sustained between EMIF-B interfaces of the DSPs and the eight Solano-links
[host requirements]	Host Operating System	PRO-1900/1901 VME or PRO-3500 cPCI carrier VxWorks
[development software]	quicComm	The <i>quicComm</i> software suite is available on both the host and target processors. <i>quicComm</i> provides functions for: <ul style="list-style-type: none"> • Configuration and control of the Solano-links • High-speed data transfers across the Solano-links • Initiating PCI data transfers It also provides examples to do the following: <ul style="list-style-type: none"> • Setup and initiate Solano-link data transfers • Demonstrate carrier-to-module interrupts • Demonstrate interprocessor interrupts • Logical channel data transfers • Demonstrate continuous data loop back at the systems level (SDR-3000 system) • Illustrate receiver subsystem data flow (HCDR-10xx system)
[other software]	Debug Support	Support for TI's Code Composer Studio via JTAG emulator is provided (JTAG emulator sold separately)
[electrical]	Supply Voltage (DC)	+5V +5% or -3% and +3.3V +5% or -3% (supplied by the PMC connector)
	Current Consumption	1.2A at 3.3V and 0.6A at 5.0V
	Power Consumption	4W at 3.3V and 3W at 5.0V for a total of approximately 7W
	The User Should Budget	1.5A at 3.3V and 1.5V at 5.0V for a total of approximately 13W
[mechanical]	Size	149 mm (height) x 74 mm (width)
[environmental]	Operating Temperature	Operating temperature range of 0 to 50° C
	Storage Temperature	Storage temperature between -20 to 85° C
[ordering information]	650-00112	ePMC-8311 Dual C6416 600 MHz 64 MB SDRAM Module + Solano Inter-Connect Module (ICM)
	100-00354	cPCI SDR-3000 Series Base Software and Docs with ePMC-8310 VxWorks Software Development Kit
	100-00493	VME HCDR-10xx Series Base Software and Docs with ePMC-8310 VxWorks Software Development Kit
	202-00236	ePMC-8310 Cable Kit
[custom configurations]		For custom configuration options, such as a single node C6416 or C6415 module, please contact Spectrum Sales. For further information about the ePMC-8310 module family and its applicability to your next high-performance communications project, please contact Spectrum Sales.



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