

# SurfRider-812/PTMC™

## Main Features

- Utilizes eight TI C6412 DSPs for exceptional processing power
- Supports Gbit Ethernet
- Includes Layer-2 switch with direct network connection for each DSP
- Flexible DSP Open Framework™
- Extensive host software support
- Varied carrier board compatibility

## Target Applications

- **Telecom Applications**
  - Audio and Video Gateways
  - Media Servers
  - Packet-to-Packet Applications
  - Session Border Controllers
- **Military Applications**
  - Cryptography
  - Lawful Interception
- **Medical Applications**
  - Image Processing



## General-Purpose PTMC Form Factor DSP Resource Board for Heavy-Duty Processing

### Overview

The SurfRider-812/PTMC is a fully integrated ROHS-compliant PTMC DSP resource board providing heavy-duty processing capabilities for developers of telecom, military, medical and other processing-intensive applications. Featuring cost-effective unmatched processing power and Surf's patent-pending Open Framework design, which allows seamless integration of user-defined and proprietary algorithms, the SurfRider-812/PTMC is the ideal choice for such target applications.

The SurfRider-812/PTMC DSP resource board provides a powerful yet flexible computing environment for developers of embedded applications. The board is supplied with multiple drivers and a variety of interfaces, including Gbit Ethernet. Developers can choose to work with the DSP BIOS supplied by Texas Instruments, or leverage the operating system supplied by Surf to gain streaming support and greatly reduce development time. For developers of telecom infrastructure equipment, the SurfRider-812/PTMC integrates with SurfUP™, Surf's telecom-ready media processing software that allows proprietary applications to be embedded directly into the DSP framework.

Texas Instruments' C64x series of DSP devices are specifically designed to handle converged applications that require a high-performance fixed-point processing architecture with significant memory and multiple high-speed I/O paths, such as audio, video, and wireless applications. The SurfRider-812/PTMC DSP resource board, which carries up to eight C6412 DSPs, is a flexible, high-capacity, programmable platform for processing-intensive applications such as video processing, VoIP, cryptography, and medical imaging.

The SurfRider-812/PTMC DSP resource board is truly a PMC form-factor board. All DSPs are located on the top side for efficient cooling. It includes complete on-board power generation, using strictly 5V and 3.3V levels. The board is fully PMC- and PTMC-compliant, compatible with a wide range of host platforms, and integrates with PCI, cPCI, and ATCA carrier boards.

## Features

### Exceptional Processing Power

- Up to eight C6412 32-bit fixed point DSPs running at 600 or 720MHz
- High density processing
- 64MBytes SDRAM per DSP (64bit-access at 133MHz)
- Enhanced DMA channels for peripherals

### Multiple Interface Options

- 32-bit/33MHz PCI interface
- Gigabit Ethernet interface (for Config. 5);  
Fast Ethernet (100Mbps) interface (for Config. 2-3)
- Non-blocking on board Layer-2 switch
- 8 to 16 internal IP addresses (1-2 addresses per DSP)
- 10 fast serial (up to 32Mbps) interfaces

### Flexible, Open Framework Operating System<sup>1</sup>

- Unique operating system for extensive DSP software support
- Quick integration of user applications/value-add code
- Simple, high-level access to DSP interfaces
- Real-time optimized operating system
- Integrated file streaming support to/from the host

### Telecom-ready Media Processing Software<sup>1</sup>

- Supports SurfUP, a complete media processing package for audio, video, modem and fax integrated into the Open Framework

### Extensive Host Software Support

- Sample application (including download and operation examples)
- Linux/VxWorks/Windows drivers

### Carrier Boards Compatibility

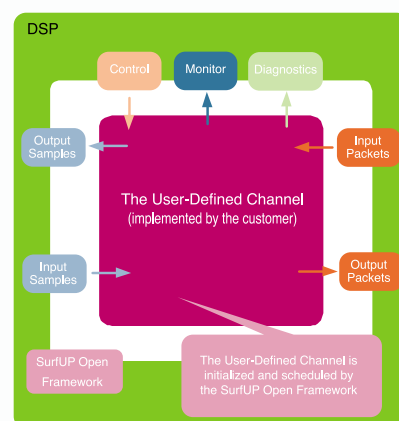
The SurfRider-812/PTMC has been pre-integrated with a number of leading carrier manufacturers' products and can be mounted on various carrier boards, as follows:

- PCI, such as Surf's SurfAce-112™
- cPCI
- ATCA

## Open Framework

The Open Framework<sup>1</sup> add-on module allows application developers to activate their own proprietary algorithms that can run either independently or alongside the existing DSP capabilities that are provided as part of the SurfUP media processing subsystem. The proprietary user implementation is compiled and linked with the existing DSP framework to create a single DSP executable.

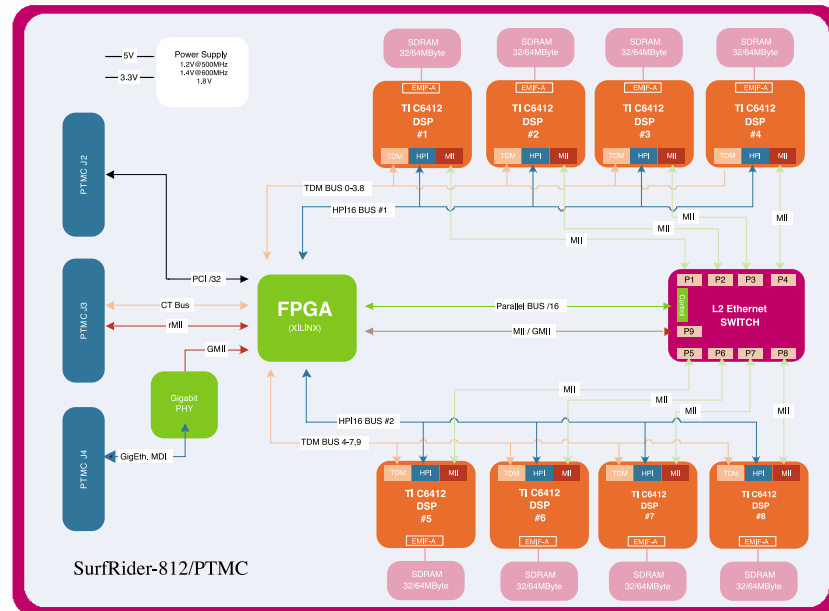
*Block diagram illustrating the relationship between SurfUP Open Framework and a single user-defined channel created by the application developer.*



<sup>1</sup> Optional

## Architecture

The SurfRider-812/PTMC is a PTMC mezzanine card that can be mounted on top of a PCI, cPCI, or ATCA blade.



Block diagram of the SurfRider-812/PTMC DSP resource board.

- Eight TI C6412 DSPs running at 600 MHz or 720 MHz.
- Each DSP contains 64 MB of external memory (SDRAM).
- A PCI interface, as part of the PTMC connector, which enables a host processor to control and send/receive data to/from each one of the DSPs, as well as control the Layer-2 switch and the FPGA.
- PTMC connectors, which include an H.100 interface to connect each one of the DSPs to an external serial line. Each DSP is connected to a separate serial line through a TDM routing mechanism that is located inside the FPGA.
- For Config. 2-3 this is an Ethernet rMII/MII interface, and for Config. 5 this is a GMII interface. It is located on the PTMC connectors and connects all the DSPs to the packet-based network through the Layer-2 switch.
- A Layer-2 switch that connects all the MII interfaces of the DSP to the network. The Layer-2 switch is controlled by the host via the PCI interface. For Config. 2-3, the Layer-2 switch enables 100 Mbps non-blocking connectivity between each one of its ports. For Config. 5, the GMII interface is used, driving connectivity towards the external network at 1000 Mbps.

## Documentation

The SurfRider-812/PTMC DSP resource board is delivered with complete and detailed documentation, as well as various sample code applications, which dramatically shorten integration time and the entire development cycle.

## Hardware Specifications

### Power Consumption

- Less than 15W when fully-populated

### DSP

- Up to 8 x C6412 @ 600 / 720 MHz

### SDRAM

- 256MB organized as 2Mx 4 x 32 bits
- Two SDRAMs per DSP

### Layer-2 Switch

- Direct network connection for each DSP

### Supported PTMC Interfaces

- PCI 32Bit/33MHz
- RMI (for Config. 2-3)
- Gbit Ethernet (for Config. 5)
- CT Bus

### JTAG

- DSP JTAG connector for DSP emulation
- FPGA JTAG connector for FPGA booting and programming
- Boundary-Scan JTAG

### MTBF (Mean Time Between Failures)

- Hours: 346,692
- Years: 40
- Failure rate (per million hrs): 2.88

### Dimensions & Conformity

- Standard PTMC form factor mezzanine card
- Length: 149mm ; Width: 74mm
- Conforms mechanically to IEEE P1386/ P1386.1 and electrically to PICMG 2.15

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### Electromagnetic Compatibility

- **Europe:** EN55022; EN55024; EN61000-3-2; EN610003-3; EN300 386
- **USA:** 47CFR Part 15, Subpart B
- **Canada:** ICES-003

### Product Safety

- **Europe:** EN60950-1
- **USA & Canada:** UL60950-1

### Environmental

- **Europe:** EN300 019-2-2; EN300 019-2-3

### Pending Certifications

- ROHS-compliance

## About Surf

Surf Communication Solutions®, established in 1996, designs, develops, and markets high-capacity, general-purpose, multimedia processing boards. In the telecommunication infrastructure field, Surf's customers use these boards in their Media Gateway and Media Server products. Using their comprehensive transcoding capabilities, Surf's products greatly shorten time to market, are cost effective, and enable true convergence of all major media types—Audio, Video, and Data (Fax/Modem)—over IP, Mobile, Wireline, and Wireless networks. These solutions are provided at various integration levels: PTMC/AMC DSP farm boards; PCI cards; and DSP hardware/software.

Surf Communication Solutions is a member of TI's TMS320™ third party program, the most extensive collection of global DSP development support in the industry. With more than 650 independent companies and consultants, TI's customers have easy access to a broad range of application software, development hardware and software and consulting services. For more information on the TI third party program, please visit [www.ti.com/3p](http://www.ti.com/3p).