SurfRider-812/PTMC™

PMC/PTMC Form Factor DSP Resource Board for Carrier Grade Applications

Main Features

- PMC/PTMC form-factor DSP farm, pre-integrated with leading cPCI and ATCA chassis
- Complete media processing package for audio, video, modem and fax
- Utilizes eight TI C6412 DSPs on board for exceptional processing power
- Includes Layer-2 switch with direct network connection for each DSP
- Carrier-grade, field-proven and cost-effective solution
- Dedicated customer service, ensuring fastest time-to-market
- Built-in diagnostics, providing easier troubleshooting and better application control
- Can be provided as hardware-only solution for DSP-intensive applications

Target Applications

- Telecom Applications
  - IMS MRFP
  - Audio and Video Gateways
  - Media Servers
  - Packet-to-Packet Applications
  - Session Border Controllers
  - Remote Access Servers
- Military Applications
  - Cryptography
  - Lawful Interception
- Other DSP-intensive Applications
  - Image processing
  - Video processing

Overview

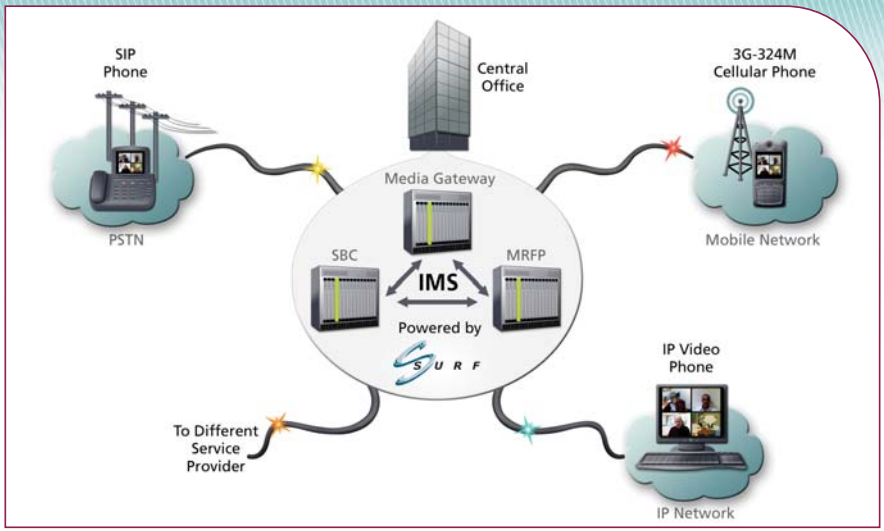
The SurfRider-812/PTMC™ is a fully integrated RoHS-compliant PMC/PTMC DSP resource board providing multimedia processing capabilities. Featuring cost-effective processing power and Surf's patent-pending Open Framework™ design, which allows seamless integration of user-defined and proprietary algorithms, the SurfRider-812/PTMC meets IMS requirements and is the ideal choice for development of a wide range of carrier-grade telecom applications. It is field-proven, having already been implemented by a number of Tier-1 TEMs.

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. Developers can choose to work with the DSP BIOS supplied by Texas Instruments, or leverage the Surf framework that provides a complete multimedia processing package and greatly reduces 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.

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. In addition to its suitability for telephony applications, the SurfRider-812 PTMC DSP resource board can serve as a flexible, high-capacity, programmable platform for other processing-intense applications such as video processing, VoIP, cryptography, and medical imaging.

Optimized for IMS and Other Carrier-Grade Applications

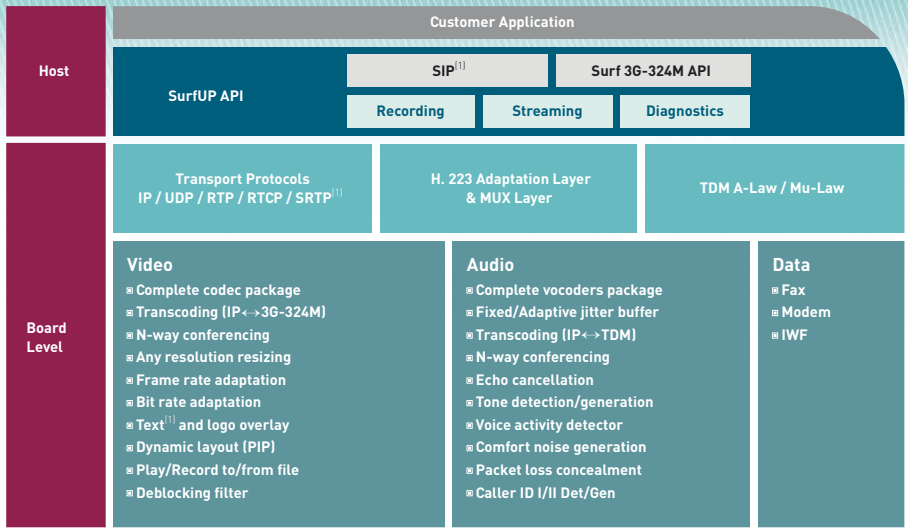


Typical network topology illustrating how the SurfRider-812/PTMC DSP resource card integrates into network infrastructure equipment to enable convergence of Voice + Video + Data across Wireline and Wireless networks.

System Highlights

- Simple, high-level API provides access and control over DSP interfaces
- Video Features
  - Play/record of audio and video streams from Host file system to IP, TDM, or 3G networks
  - Content adaptation; real-time audio-video transcoding
  - Video Conferencing
    - N-Way conferencing on a single DSP
    - Dynamic dominant speaker recognition and participants display layout
    - Addition/removal of participants during video conference
    - User-defined/pre-defined screen layout defining size and location for each picture component
    - Background and foreground setting in run-time
    - Picture overlap support (picture-in-picture)
  - Advanced Video Toolbox
    - Configurable frame rate
    - Bit rate change
    - Resize to any resolution
    - Video codec change
    - Logo insertion
    - Text overlay
- Supports Linux, VxWorks, Windows Host OS
- Reliable Host-DSP communication over UDP
- Quick integration of user firmware value-add code

System Architecture



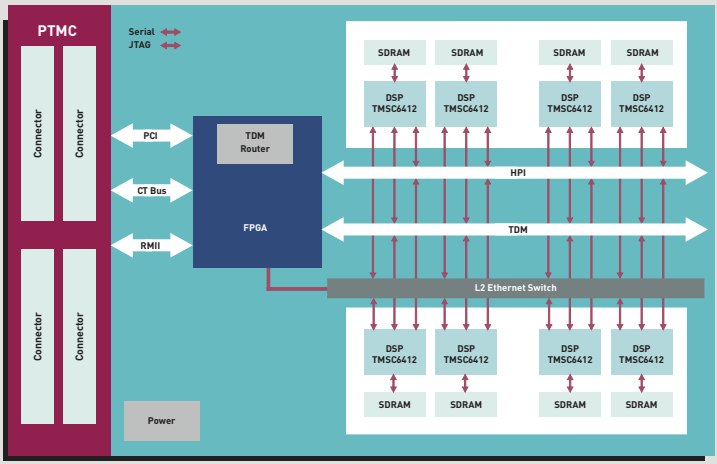
The system architecture used in the SurfRider-812/PTMC is optimized to reduce bottlenecks.

Typical Channel Densities

Application	8 x TMS320C6412 @ 720 MHz	Feature
IP↔TDM G.711	560	▪ Full duplex ▪ Block size 20ms ▪ Echo canceller (32ms) ▪ VAD ▪ Adaptive jitter buffer ▪ Full tone detection enabled
IP↔TDM LBR G.729	304	
N-way G.711 voice conference	800	▪ Full duplex ▪ 3 dominant speakers
Audio/Video conferencing server	4 participants on 8 bridges	▪ 4 Decoders H.263 @CIF, 20fps ▪ 4 VoIP G.711 front ends ▪ Video mixing & resizing ▪ 1 Encoder H.263 @CIF 20fps
IP↔3G 324M	16	▪ 15fps, CIF→10fps QCIF ▪ Bi-directional
Video transcoding gateway	144	▪ H.263→MPEG-4, 10fps, QCIF ▪ Uni-directional

(1) Roadmap feature

High-Level Board Design



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

Board Architecture

- Eight TI TMS320C6412 DSPs running at 500/600/720 MHz with 64MB SDRAM per DSP
- Supports PTMC Configuration 2-3; also supports proprietary configurations with ease
- PCI interface, via PTMC connector, enables the host to communicate and configure DSPs
- H.100 interface, via PTMC connector, with internal TDM router
- RMII/MII Ethernet interface (Configuration 2-3)
- Layer-2 Ethernet switch

Pre-Integrated with Leading Telecom Chassis

The SurfRider-812/PTMC is a fully integrated mezzanine card. It has been pre-integrated with a number of leading carrier manufacturers' products and can be mounted on various platforms, as follows:

- cPCI
- ATCA

PICMG® CompactPCI® AdvancedTCA®

Voice Capabilities

Audio Codecs	▣ G.711	▣ G.729AB	▣ G.729E[2]
	▣ G.726	▣ GSM FR	▣ iLBC[2]
	▣ G.723.1A	▣ GSM HR[2]	▣ QCELP[2]
	▣ G. 722.2 (WB-AMR)	▣ GSM EFR	▣ SMV[2]
	▣ GSM NB-AMR	▣ EVRC	▣ G.728[2]
Echo Cancellation	G.168 2002 echo tail up to 128ms		
Quality	▣ Voice Activity Detection ▣ Comfort Noise Generation ▣ Packet Loss Concealment ▣ Fixed/Adaptive Jitter Buffer Up to 500 ms		
Transport	▣ RTP/RTCP: RFC 3550, 3551, 3389 ▣ SRTP: RFC 3711[2] ▣ Packet Size: 5-60ms (5ms resolution) ▣ Single or multiple frames per packet		
Caller ID (CID)	Caller ID detection and generation		
Tone and Events	▣ Monitoring ▣ Relay	▣ Detection/Generation ▣ User-defined tones	

Mobile Video Capabilities

3G-324M Support	▣ H.264[2] H.324 Annex C ▣ H.223 Annex A & B ▣ Passive 3G-324M for Lawful Interception[2] ▣ High-level 3G-324M APIs
Protocols	▣ H.223 running on the DSP for enhanced performance ▣ H.245 running on the host ▣ H.324 interface to modem channel to support ▣ H.324 over V.34[2]

Video Capabilities

Video Codecs	▣ MPEG-4 ▣ H.263	▣ H.264 ▣ H.261[2]
Resolution	▣ CIF ▣ QCIF	
Frame Rate	▣ 1-30FPS	
Bit Rate	▣ Constant and variable	
Quality	▣ RTP Encapsulation ▣ Configurable deblocking levels ▣ Multiple destination support ▣ Jitter Buffer ▣ Packet rearrangement ▣ Packet loss handling	

Modem over IP Capabilities

MoIP	▣ V.8 modem relay as ITU V.150.1 (contributed by Surf) ▣ Connection scenarios ▣ Voice Band Data ▣ MR1

Fax Capabilities

Data Pumps	▣ V.17, V.29, V.27ter, V.21 ▣ V.34HD High Speed Fax[2]	
Fax over IP	▣ T.38 Protocols	▣ FEC/Redundancy ▣ Max Jitter 1 sec ▣ Supported roundtrip delay up to 6 sec

Hardware Specifications

- Power Requirements
  - Up to 15 Watts
- DSP
  - Up to 8 * C6412@500 / 600 / 720 MHz
- SDRAM
  - 64 MB per DSP (512 MB for fully-populated board)
  - Two SDRAMs per DSP
- Supported PTMC Interfaces
  - PCI 32Bit/33MHz
  - RMII
  - CT Bus
  - Serial Rx/Tx
- JTAG
  - DSP JTAG connector for DSP emulation
  - FPGA JTAG connector for FPGA booting and programming
  - Boundary-Scan JTAG
- Operating Temperature
  - 0°C-55°C (32°F-131°F)
- Storage Temperature
  - -25°C-85°C (-13°F-185°F)
- Relative Humidity
  - 20% to 80% (non-condensing)
- Dimensions
  - Length: 149mm
  - Width: 74mm

(2) Roadmap feature

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About Surf Communication Solutions®

SURF Communication Solutions develops a suite of hardware and software products that drives a wide variety of applications whose common goal is high-capacity distribution of voice and video. These applications are predominantly developed by media gateway, media server and IMS equipment manufacturers in the telecommunication infrastructure field.

The Surf media processing engine is available in a variety of integration levels, such as AMC, PTMC and PCI form factor resource boards or DSP chips, which are pre-integrated with leading ATCA, MicroTCA and cPCI carrier boards and blades.

By utilizing the capabilities and flexibility of Surf's media processing engine, customers can significantly reduce time–to–market while supporting market demands for true convergence of all media types: audio/voice, video, and data (fax/modem), over all networks: IP, mobile, wireline, and wireless – all on a single DSP.

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BR.SR.200701