



SurfRider/AMC™

Modular AMC Form Factor DSP Resource Board for Carrier Grade Applications

Main Features

- » AMC form-factor DSP farm, pre-integrated with leading ATCA and MicroTCA chassis
- » Complete media processing package for audio, video, modem and fax
- » Flexible and scalable modular design supporting up to 8 TI C64x™ DSPs on board
- » Carrier-grade, field-proven and cost-effective solution saving resources and reducing R&D efforts
- » 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

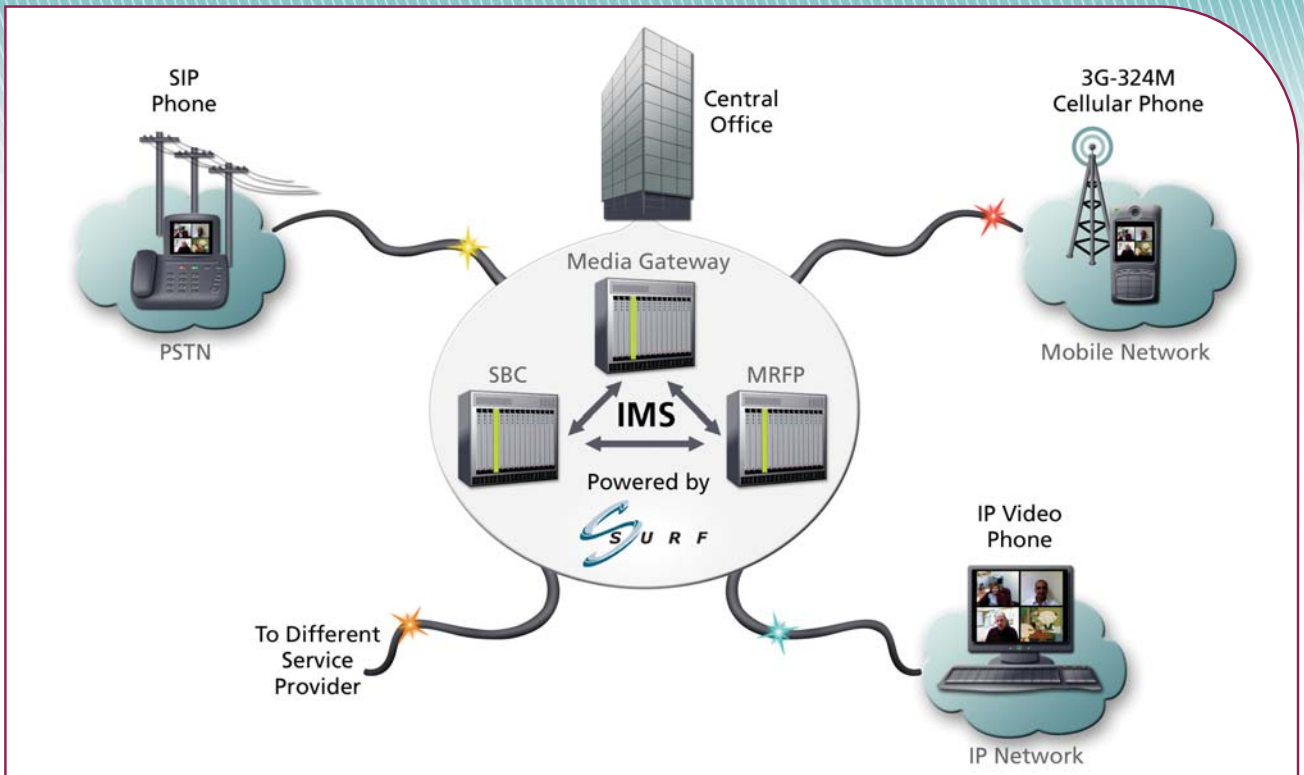
The SurfRider/AMC™ is a fully-integrated RoHS-compliant AMC DSP resource board providing flexible yet heavy-duty multimedia processing capabilities. Featuring Surf's revolutionary patent-pending modular design and Open Framework approach, which allows seamless integration of user-defined and proprietary algorithms, the SurfRider/AMC 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/AMC features the SurfDock™, a modular plug-in that is designed to carry pairs of DSPs, including the latest and future members of Texas Instruments' TMS320 C64x™ series. This paradigm allows population of different types of DSPs on each AMC carrier without modifying the application. Up to four SurfDock modules can be plugged into a single SurfRider/AMC, for a total of eight DSPs per AMC board for maximum flexibility.

The SurfRider/AMC is provided with SurfUP™, Surf's telecom-ready media processing software that allows proprietary applications to be embedded directly into the DSP framework. The SurfRider/AMC supports the standards-based PICMG® SFP I-TDM protocol over Gigabit Ethernet for transporting audio, video, fax and modem traffic. This makes the SurfRider/AMC the perfect solution for ATCA and MicroTCA platforms in various types of systems.

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

Optimized for IMS and Other Carrier-Grade Applications



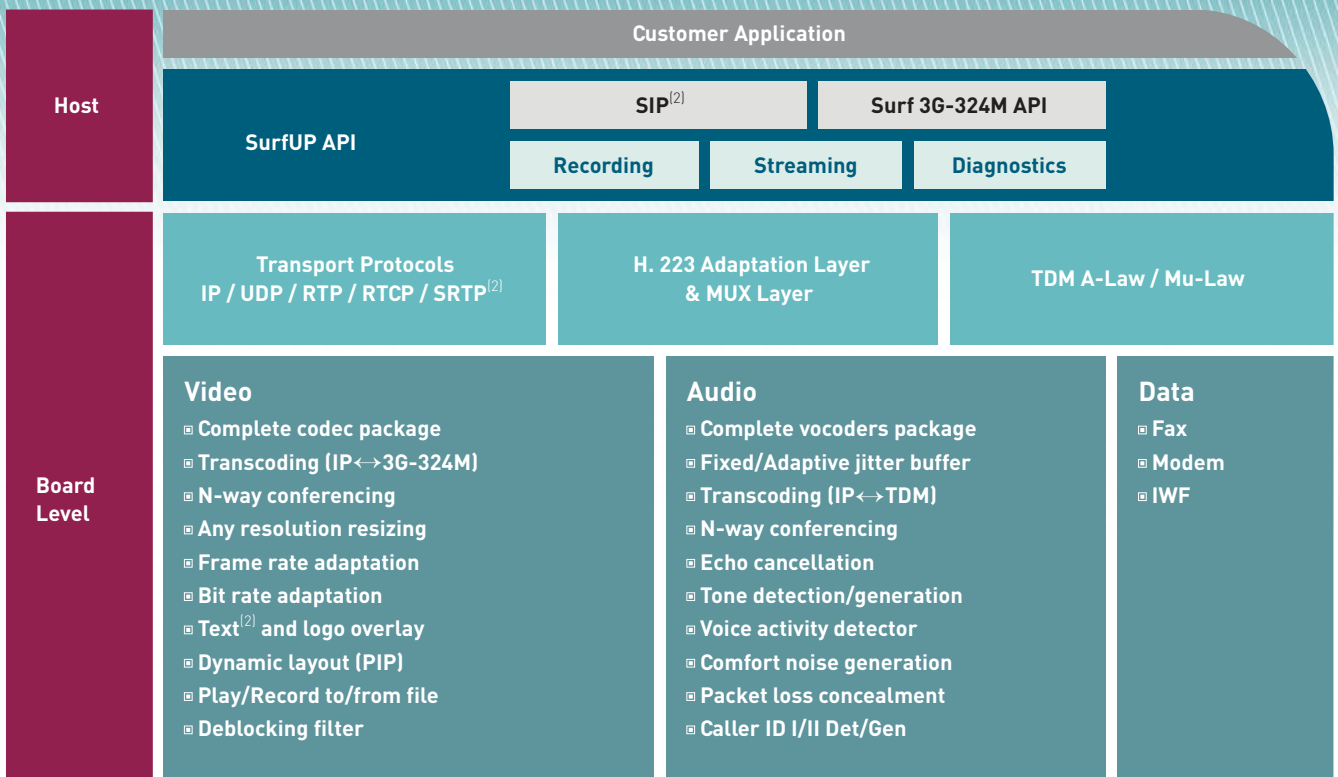
Typical network topology illustrating how the SurfRider/AMC DSP resource card integrates into network infrastructure equipment to enable convergence of Voice + Video + Data across Wireline and Wireless networks.

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
 - ▣ Transparency alpha blending per picture⁽¹⁾
 - ▣ 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

(1) Roadmap feature

System and Board Architecture



The system architecture used in the SurfRider/AMC is optimized to reduce bottlenecks.

Board Architecture: Unique Flexible Design

The SurfRider/AMC has been designed to support application development from prototype through production: the same board can be used for all stages of the development cycle.

With this innovative, modular approach, hardware design decisions can be made in parallel to application development, such as:

- » the specific serial interfaces (such as AMC.1,2,3,4) to be used in the final AMC solution
- » the specific type of DSPs to be used in the final system
- » the number of DSPs per board needed to achieve the required channel density
- » the types of DSPs to be integrated on the same board simultaneously

Pre-Integrated with Leading Telecom Chassis

The SurfRider/AMC is a fully integrated mezzanine card that has been designed as per the PICMG AMC standards. It has been pre-integrated with a number of leading carrier manufacturers' products and can be mounted on various platforms, as follows:

- » ATCA
- » MicroTCA

[2] Roadmap feature

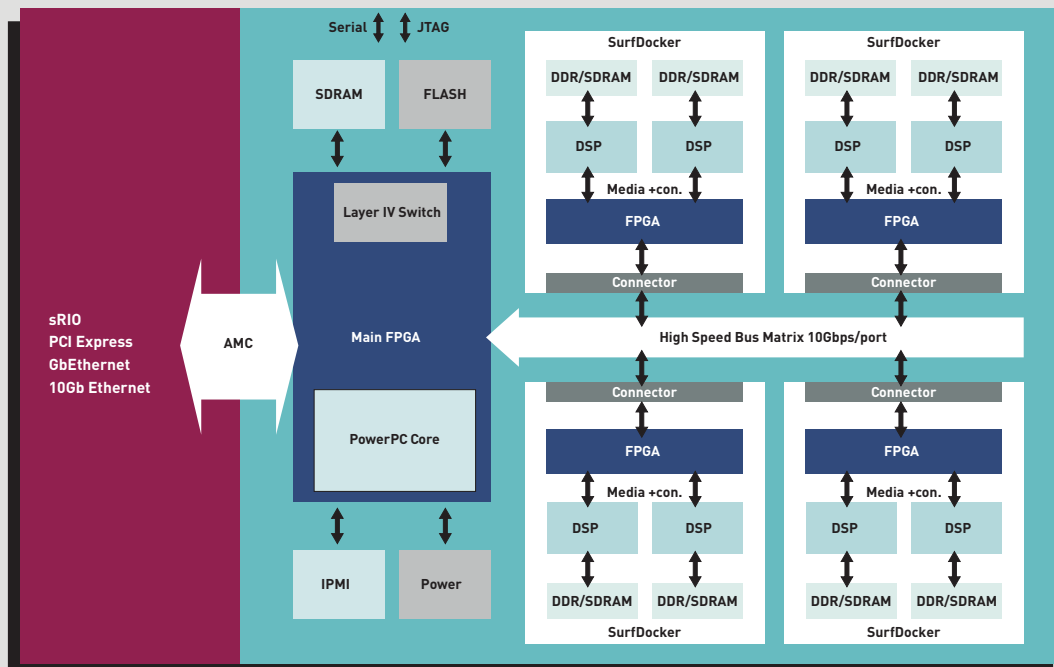


AdvancedMC™

AdvancedTCA®

μTCA™

High-Level Board Design



Surf's SurfRider/AMC solution is comprised of a main board and plug-in modules, enabling exceptional flexibility and comprehensive management and control of all components.

Main Board

- » Supports all AMC configurations/standards (AMC.0, AMC.1, AMC.2, AMC.3, AMC.4)
- » Configurable interfaces to each DSP based on DSP type, including Rapid I/O, Infiniband, Gbit Ethernet, I-TDM, etc.
- » PowerPC 405 implemented within the Interface FPGA for board management
- » Hosts up to eight DSPs using 1-4 SurfDocker plug-in modules, with two DSPs on each module (i.e., flexible support for 2, 4, 6, or 8 DSPs)
- » Supports different types of DSPs on the same AMC board, using different SurfDocker plug-in modules
- » Features shared memory architecture that enables superior performance when heavy intra-DSP communication is required
- » Configurable direct DSP interface to AMC via FPGAs; distributed switching architecture
- » All data and controls are passed to the DSPs via Surf's proprietary high-speed interface
- » Supports single IP for entire board or individual DSP IP for maximum resource management flexibility

SurfDocker Plug-in Module

(module differs per DSP type)

- » Two DSPs from the C64x family (supports other TI DSPs, e.g., C5x)
- » Private memory per DSP (SDRAM, DDR, DDR2; based on the DSP)
- » FPGA: handles the interface between the main board and the specific DSP



Voice Capabilities

Audio Codecs	<ul style="list-style-type: none"> ☐ G.711 ☐ G.726 ☐ G.723.1A ☐ G.722.2 (WB-AMR) ☐ GSM NB-AMR ☐ G.729AB ☐ GSM FR ☐ GSM HR⁽³⁾ ☐ GSM EFR ☐ EVRC ☐ G.729E⁽³⁾ ☐ iLBC⁽³⁾ ☐ QCELP⁽³⁾ ☐ SMV⁽³⁾ ☐ G.728⁽³⁾
Conferencing	<ul style="list-style-type: none"> ☐ N-way: 1560 ☐ 3-way: 720 bridges
Echo Cancellation	G.168 2002 echo tail up to 128ms
Quality	<ul style="list-style-type: none"> ☐ Voice Activity Detection ☐ Comfort Noise Generation ☐ Packet Loss Concealment ☐ Fixed/Adaptive Jitter Buffer Up to 300 ms
Transport	<ul style="list-style-type: none"> ☐ RTP/RTCP: RFC 3550, 3551, 3389 ☐ SRTP: RFC 3711⁽³⁾ <p>Packet Size: 5-60ms (5ms resolution) Single or multiple frames per packet</p>
Caller ID (CID)	Caller ID detection and generation
Tone and Events	<ul style="list-style-type: none"> ☐ Monitoring ☐ Relay ☐ Detection/Generation ☐ User-defined tones

Mobile Video Capabilities

3G-324M Support	<ul style="list-style-type: none"> ☐ H.264⁽³⁾ H.324 Annex C ☐ H.223 Annex A & B ☐ Passive 3G-324M for Lawful Interception ☐ High-level 3G-324M APIs
Protocols	<ul style="list-style-type: none"> ☐ 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⁽³⁾

Hardware Specifications

- » Power Requirements
 - ☐ Up to 40W per fully-populated board (up to 20W for fully-populated C6412)
- » Operating Conditions
 - ☐ Temperature: 0°C - 55°C (32°F - 131°F)
 - ☐ Humidity: 20% to 80% (non-condensing)
- » Storage Conditions
 - ☐ Temperature: -25°C - 85°C (-13°F - 185°F)

Video Capabilities

Video Codecs	<ul style="list-style-type: none"> ☐ MPEG-4 ☐ H.263 ☐ H.264⁽³⁾ ☐ H.261⁽³⁾
Resolution	<ul style="list-style-type: none"> ☐ CIF ☐ QCIF
Frame Rate	☐ 1-30FPS
Bit Rate	☐ Constant and variable ⁽³⁾
Quality	<ul style="list-style-type: none"> ☐ RTP Encapsulation ☐ Configurable deblocking levels ☐ Multiple destination support ☐ Jitter Buffer ☐ Packet rearrangement ☐ Packet loss handling

Modem over IP Capabilities

MoIP	<ul style="list-style-type: none"> ☐ V.8 modem relay as ITU V.150.1 (contributed by Surf) ☐ Connection scenarios ☐ Voice Band Data ☐ MR1
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Fax Capabilities

Data Pumps	<ul style="list-style-type: none"> ☐ V.17, V.29, V.27ter, V.21 ☐ V.34HD High Speed Fax⁽³⁾
Fax over IP	<ul style="list-style-type: none"> ☐ T.38 Protocols ☐ FEC/Redundancy ☐ Max Jitter 1 sec ☐ Supported roundtrip delay up to 6 sec

Typical Channel Densities

IP-TDM G.711	☐ 1088
Video Transcoding Gateway	☐ 224

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

(3) Roadmap feature

