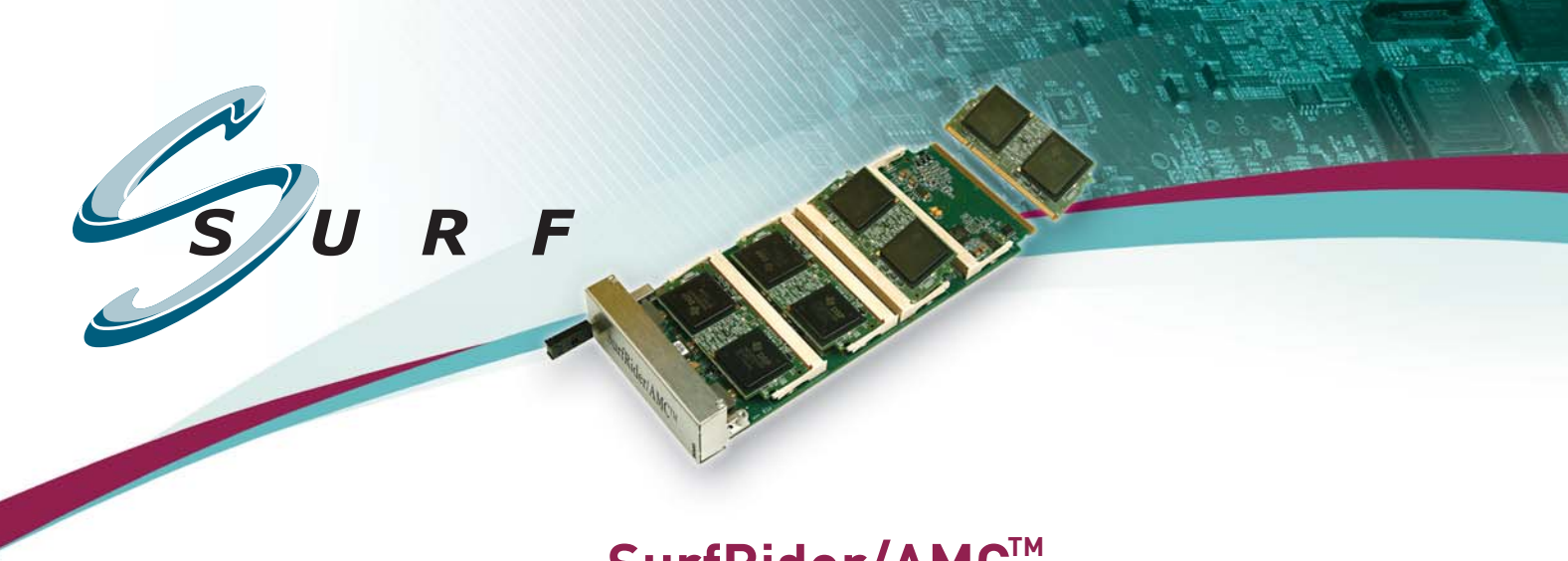


SurfRider/AMC™

Modular AMC DSP Multimedia Processing 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

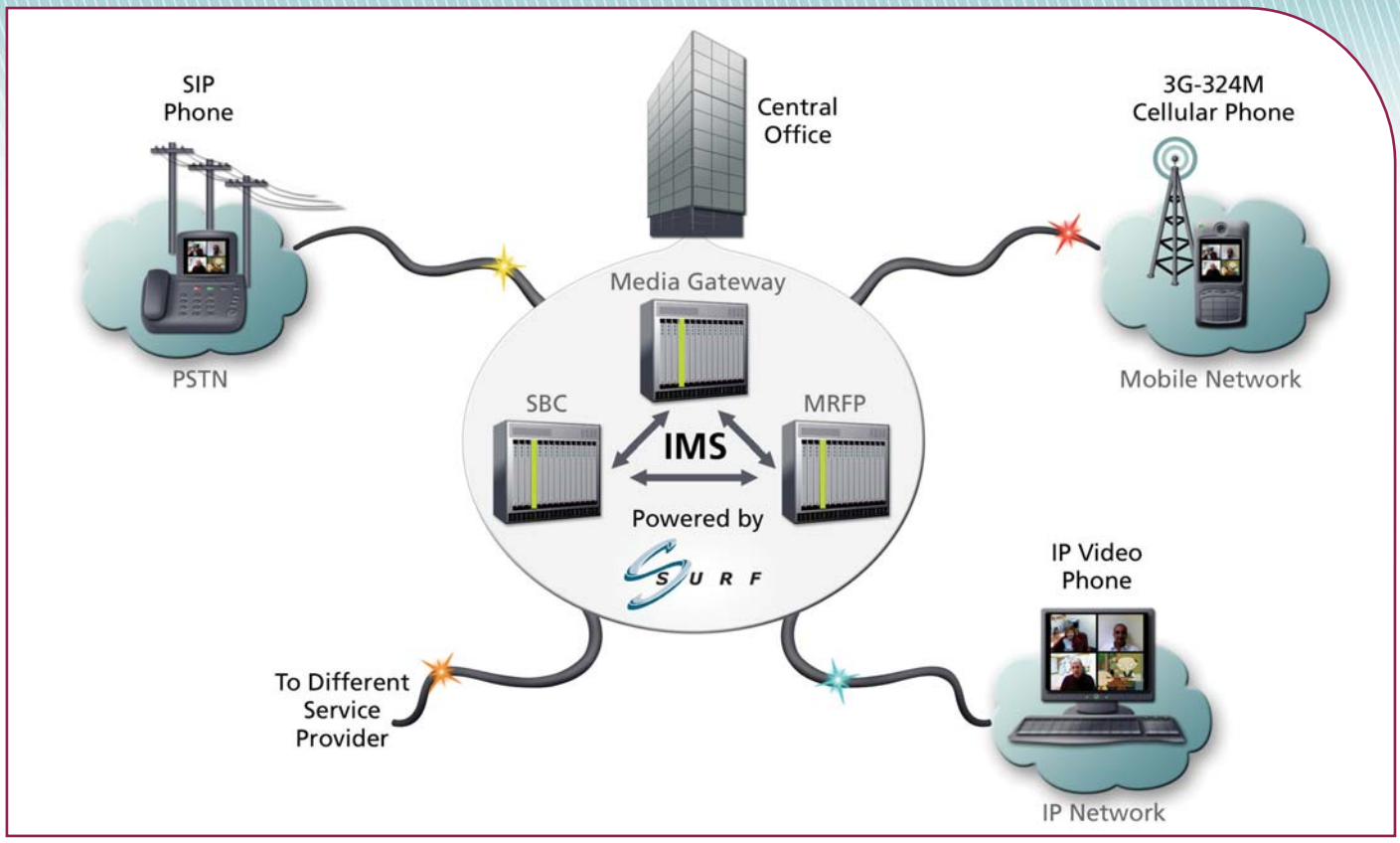
The SurfRider/AMC™ is a fully-integrated RoHS-compliant AMC DSP resource board providing flexible yet heavy-duty multimedia processing capabilities. Featuring Surf's revolutionary patent-pending modular design and Open Framework approach, which allows seamless integration of user-defined and proprietary 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 SurfDocker™, 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 SurfDocker modules can be plugged into a single SurfRider/AMC, for a total of eight DSPs per AMC board.

The SurfRider/AMC is provided with SurfWare-Media™, 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-intense applications such as video processing, VoIP, cryptography, and medical imaging.

Optimized for IMS and Other Carrier-Grade Applications

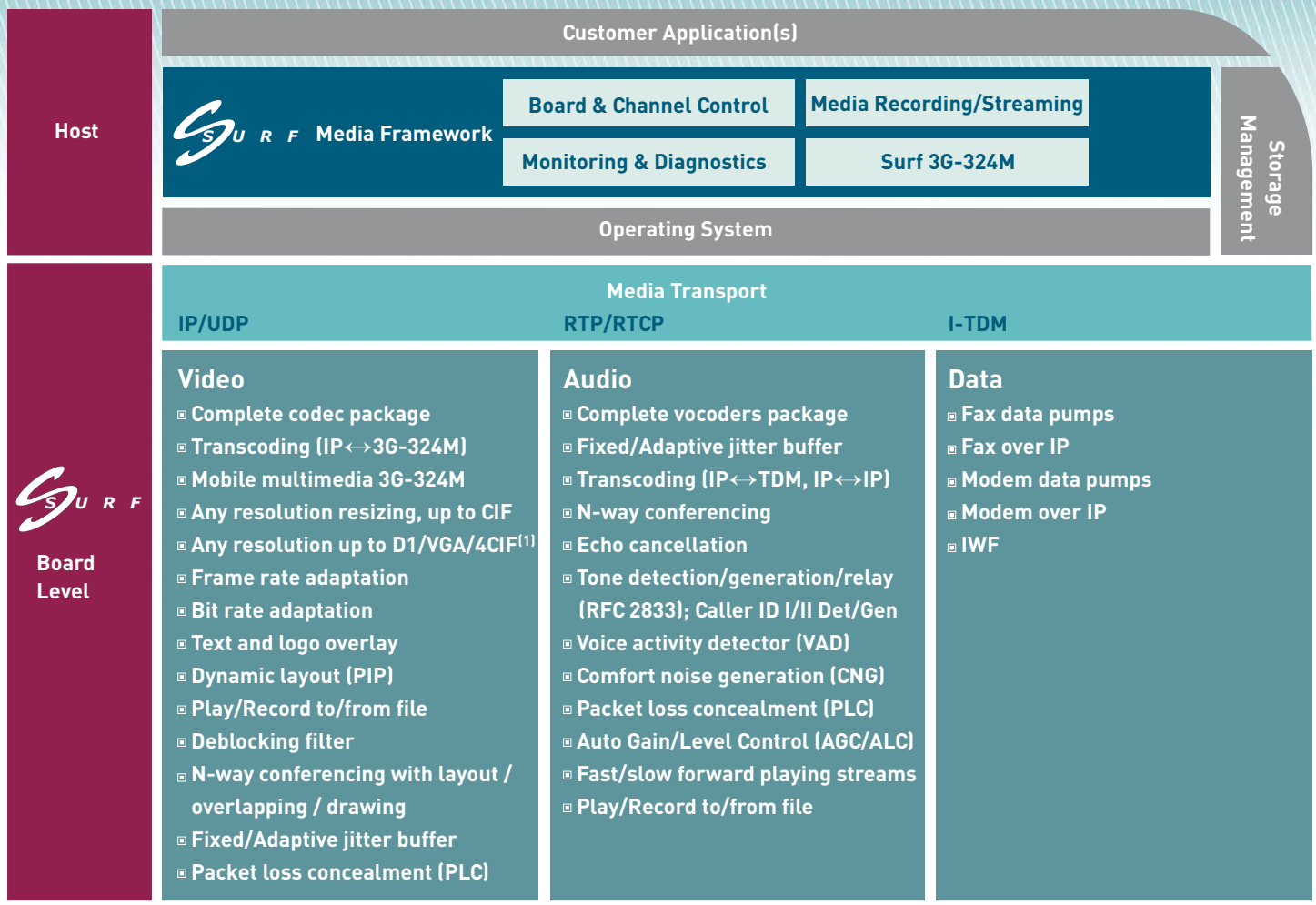


Typical network topology illustrating how the SurfRider/AMC DSP resource card integrates into network infrastructure equipment to enable convergence of Voice + Video + Data across Wireline and Wireless networks.

System Highlights

- Simple, high-level API provides access and control over DSP interfaces
- Audio and Video Streaming
  - Play/record of audio and video streams from Host file system to IP, TDM, or 3G networks
  - Content adaptation; real-time audio-video transcoding
- Voice and Video Conferencing
  - N-Way conferencing on a single DSP
  - Up to 96 participants when using inter DSP communication
  - Dynamic dominant speaker recognition
  - Addition/removal of participants during conference
  - Distributed solution
- Video Display Capabilities
  - 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)
  - Dynamic text overlay (Unicode)
- Advanced Video Toolbox
  - Configurable frame rate
  - Bit rate change
  - Resize to any resolution
  - Video codec change
  - Logo insertion
  - Text overlay
- Supports Linux and Windows Host OS
- Reliable Host-DSP communication over UDP

System and Board Architecture



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 to be used in the final AMC solution
- the specific type of DSPs to be used in the final system
- the number of DSPs needed for 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.

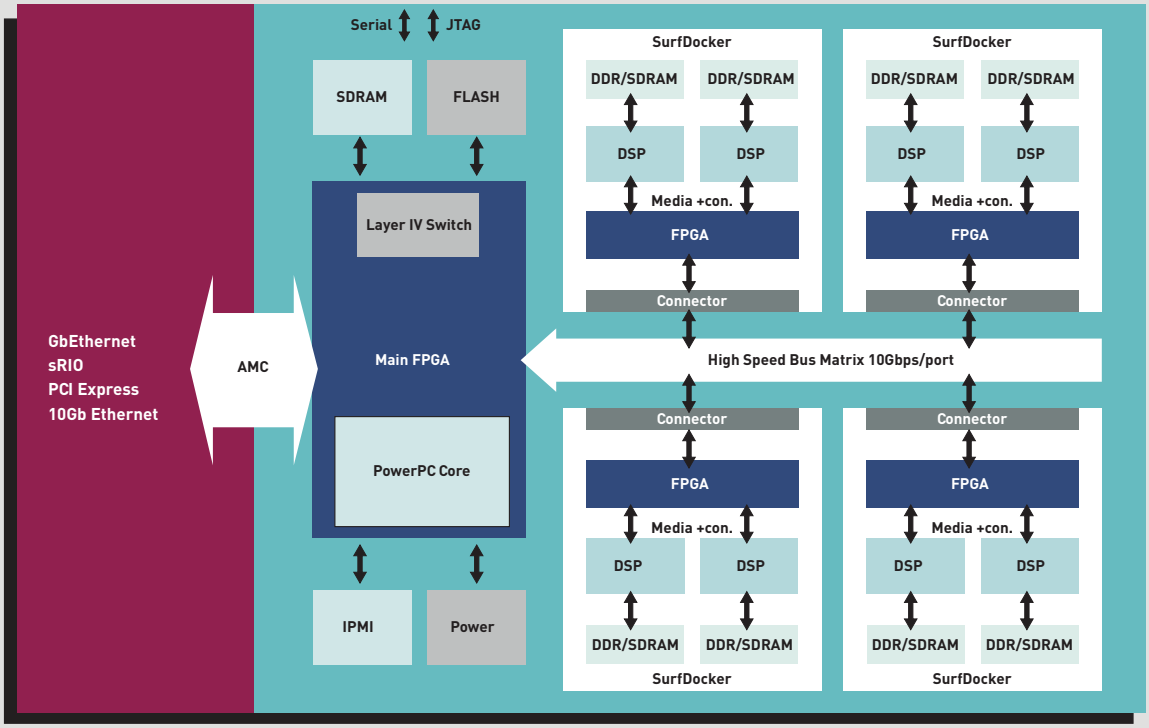
AdvancedMC™ AdvancedTCA® µTCA™ PICMG®

Hardware Specifications

- Power Requirements
  - Up to 35W per fully-populated TCI6482 board
- 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)
- JTAG
  - DSP JTAG connector for DSP emulation
  - FPGA JTAG connector for FPGA booting and programming
  - Boundary-Scan JTAG

(1) Roadmap feature

High-Level Board Design



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

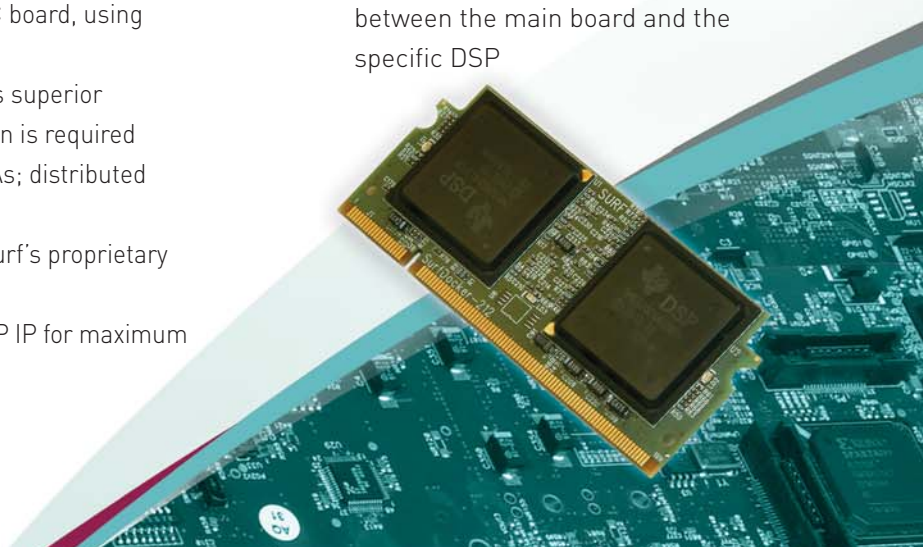
Main Board

- 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, 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, including
  - TMS320C6412 - SurfDocker-212
  - TMS320C6424 - SurfDocker-224
  - TMS320TCI6482 - SurfDocker-282
- 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

Wireline & Wireless Speech Codecs	▣ G.711 ▣ G.729AB ▣ G. 722.2 (WB-AMR) ▣ G.726 ▣ iLBC ▣ GSM NB-AMR ▣ G.723.1A ▣ GSM FR ▣ QCELP[2] ▣ GSM EFR ▣ EVRC
Audio Codecs	▣ WMA9 (decode only) ▣ AAC[2]
Conferencing	▣ N-way: 1360 ▣ 3-way: 720 bridges
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 1000 ms ▣ Auto Gain / Level Control
Transport	▣ RTP/RTCP: RFC 3550, 3551, 3389 ▣ Packet Size: 5-60ms (5ms resolution) ▣ Single or multiple frames per packet
Tone and Events	▣ Monitoring ▣ Detection / Generation ▣ Relay (RFC 2833) ▣ User-defined tones ▣ Caller ID detection and generation

Conferencing & Streaming Capabilities

Video Participants	▣ Up to 96 active ▣ Up to 16 displayed
Supported File Formats	▣ 3GP ▣ AVI[2] ▣ MPEG-4 ▣ ASF (WMV9)

Mobile Video Capabilities

3G-324M Support	▣ H.324 Annex C ▣ H.223 Annex A & B ▣ High-level 3G-324M APIs
Protocols	▣ H.223 running on the DSP for enhanced performance ▣ H.245 running on the host ▣ MONA (H.324 Annex K - fast connect)[2]

(2) Roadmap feature

Video Capabilities

Video Codecs	▣ MPEG-4 ▣ WMV9 (decode only) ▣ H.263 ▣ MPEG2[2] ▣ H.264
Resolution	▣ Any up to CIF ▣ VGA/D1/4CIF[2]
Frame Rate	▣ 1-30FPS
Bit Rate	▣ Constant and variable
Transport	▣ RTP encapsulation ▣ MPEG-TS[2]
Quality	▣ Configurable deblocking levels ▣ Multiple destination support ▣ Packet Loss Concealment ▣ Fixed/Adaptive Jitter Buffer up to 1000 ms

Modem over IP Capabilities

Data Pumps	▣ Up to V.92, including V.42/V.42bis
MoIP	▣ V.8 modem relay (V-MR) as ITU V.150.1 (contributed by Surf) ▣ Universal modem relay (U-MR)
Connection Scenarios	▣ Voice Band Data ▣ MR1

Fax Capabilities

Data Pumps	▣ V.17, V.29, V.27ter, V.21
Fax over IP: T.38	▣ FEC/Redundancy ▣ Max Jitter 1 sec ▣ Supported roundtrip delay up to 6 sec
T.32	
IP-Aware Fax	▣ T.32 to T.38

Typical Channel Densities

IP-TDM G.711	▣ 1024
Video Transcoding Gateway	▣ 224

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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.

www.surf-com.com

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