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MindController™ AAL1/AAL2 Voice SAR Controller

M27601

Integrated AAL1 and AAL2 Functionality for Voice and Compressed Voice Solutions

The MindController M27601 AAL1/AAL2 Voice SAR Controller from Mindspeed Technologies™ delivers AAL1 and AAL2 segmentation and reassembly for ATM voice applications, with flexible provisioning of each service.

The M27601 supports the prevailing AAL1 circuit emulation technology over its TDM links. It also supports AAL2 technology for more efficient bandwidth use along with real-time traffic processing. The combination of AAL1 and AAL2 in a single chip allows for the flexible provisioning of either or both services without the need for hardware upgrades. The M27601 also enables initial deployment of AAL1 hardware that can later be upgraded via firmware for AAL2 processing, either instead of or in addition to AAL1.

Processing Services

The M27601 AAL1/AAL2 Voice SAR Controller delivers two industry-standard communication services.

> AAL1: This constant bit rate (CBR) service complies with the ITU I.363.1 specification and the ATM Forum's circuit emulation service (CES) specification. It provides both structured data transfer (SDT) and unstructured data transfer (UDT) of voice between

> **KEY FEATURES**
>
> > Delivers AAL1 and AAL2 integrated in a single chip
>
> > Supports flexible provisioning of services to suit various applications
>
> > Enables AAL1 hardware to accommodate future AAL2 requirements

the eight T1/E1 (24/32 DSO) links and the UTOPIA interface. AAL1 SDT can map an entire T1/E1 link or selected DS0s from the link to an ATM channel, and supports channel associated signaling (CAS) and partial cell fill modes. AAL1 UDT provides circuit emulation for complete T1s and E1s. The M27601 provides synchronous residual time stamp (SRTS) and adaptive clock recovery with no need for external hardware.

> AAL2: This variable bit rate (VBR) service complies with the ITU I.363.2 specification and the ATM Forum's Traffic Management 4.1 specification. It also supports raw cell insertion and extraction, and CPS layer switching. AAL2 SARing of up to 16.4 Mbps of voice traffic is supported using the typical compression schemes – the equivalent of 256 uncompressed voice channels.

Hardware Features

The MindController M27601 provides standard interfaces to allow straightforward connection to other industry-standard devices. The Level I/II-compliant UTOPIA interface operates as an eight-bit bi-directional cell port and supports both master and slave modes as well as single and multi-PHY modes. The host interface for the M27601 is a revision 2.1-compliant, 32-bit PCI interface running at up to 66 MHz. Byte lane swap capabilities are provided to ease design in little Endian systems. The M27601 has eight TDM interfaces that connect directly to T1/E1 framers. These interfaces provide both in-line and host-based CAS support, independent Tx and Rx clocks, DSO tri-state control, and multiframe synchronization. Adaptive and SRTS clock recovery are supported with no need for external circuitry.
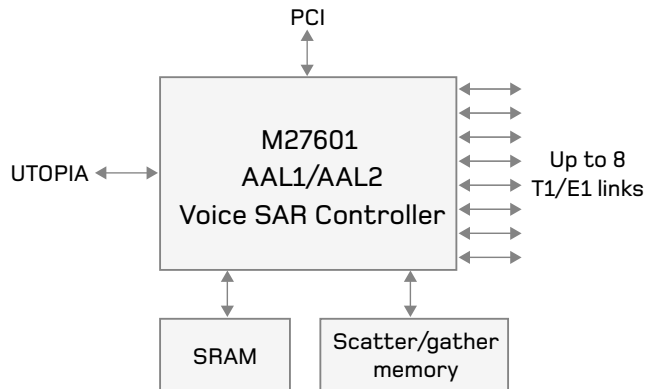
Application Example

Integrated Access Device for Voice Processing

An integrated access device, or IAD, combines multiple standalone communications services into one cost-effective solution. The M27601 provides integrated AAL1 and AAL2 functionality, allowing a single chip to address solutions requiring one or both of those services. The following block diagram shows the M27601 in a voice application. The M27601 simultaneously manages compressed and uncompressed voice traffic between the enterprise and the WAN. In this example, it is used in conjunction with Mindspeed's octal T1/E1 framer to implement AAL1 processing of voice traffic. In addition, PCI-based DSPs provide compressed voice traffic to the M27601 for AAL2 processing.
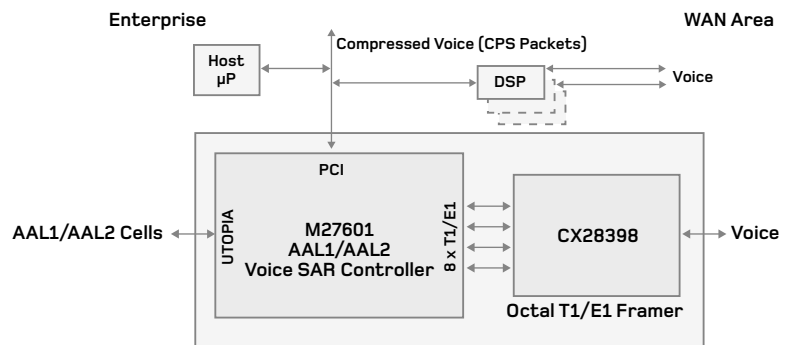
Product Highlights

Services
- AAL1
- AAL2

Applications
- Voice line cards
- CPE integrated access devices

Versatile
- Flexible provisioning of AAL1 and AAL2 services
- High–level API for minimal host–driver development time

Reduced System Cost
- Industry–standard PCI, UTOPIA, TDM and memory interfaces

- Support for both AAL1 and AAL2 on common hardware

Physical Interfaces
- **UTOPIA**
  – Level I/II
  – Cell mode
  – Master or slave mode
  – Single or multi–PHY mode
  – Eight-bit Tx/Rx
- **PCI**
  – Revision 2.1–compliant
  – 32 bits at up to 66 MHz
  – PCI master and target

TDM
  – Eight T1/E1 links interface directly to framers
  – Direct CAS interface for circuit emulation
  – Integrated SRTS and adaptive clocking

External Memory
- 1 MB flow–through, synchronous SRAM for fast context memory
- 256 kB pipelined, synchronous SRAM for scatter memory
- 256 kB pipelined, synchronous SRAM for gather memory

Performance Guidelines
- AAL1: Eight T1/E1 links of voice, or
- AAL2: 16.4 Mbps of compressed voice

Device Information
- Power supply: 1.8 V and 3.3 V (optional 5 V–tolerant operation)
- Core clock: 133 MHz
- Package: 553 PBGA
- Operating temperature: –40° C to 85° C
- Θ_{ja} (°C/W): 13.3 in still air, 11.5 at 1 mps air flow
- Maximum device junction temperature: 110° C

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