

TDM boards for signalling, call control and PSTN connectivity

The functionality available from Aculab's Prosody X range of boards extends to PSTN connectivity for circuit switched networks, providing developers with high performance options when needing to connect their communications solutions to public or private TDM infrastructures. TDM boards from the range provide E1/T1 connectivity for signalling and call control applications, and are suitable for many global deployment scenarios.



Aculab's high performance, industry standards compliant range of TDM boards offer the essential attributes, including high density, high availability, reliability and scalability, for both enterprise and telco grade platforms. Platform vendors looking to deploy signalling solutions into the telco or service provider space have an excellent choice in Aculab's boards. The products also provide developers and systems integrators with a durable competitive advantage for a wide variety of communications applications in the enterprise environment.

Its portfolio of worldwide protocols and regulatory approvals has established Aculab as a key supplier for many communications solutions. Ideal for developers targeting applications for worldwide deployment, Aculab's TDM boards are complemented by the industry's broadest protocol coverage, including many national and international variants of CAS, ISDN and SS7.

Aculab's signalling, switching and call control APIs provide high and low level control of all available timeslots at the network line interface through the on-board switch connections and via the H.100/H.110 CT bus. Driver software and API support is available for Linux, SPARC Solaris and Windows operating system environments.

For packet network access and IP telephony support, see Aculab's Prosody family of media processing platforms.

Product features

- Available with 1, 2 or 4 trunks per board
- Software selectable E1/T1 interfaces
- Worldwide protocol support including CAS and ISDN
- On-board IP architecture
- National and international SS7 variants including ITU-T, ANSI and China
- Up to 124 SS7 signalling links per board
- Widest range of host independent telecom approvals

Product benefits

- Protocol support means solutions can be readily deployed anywhere in the world
- Flexible mix of protocols, including SS7, means a variety of interconnect, switching and protocol conversion solutions can be readily crafted
- Software selectable E1/T1 means reduced spares holding and possible reductions in system board count
- All protocols available under a cost free licence, leading to improved margins and ROI
- Ease of use through a consistent API means faster time to market
- Full 4096 timeslot access to H.100/H.110 CT bus is important for high density solutions
- No loss of service as protocols can be changed in a live system
- Industry standard hardware and software interoperability
- High availability, reliability and scalability, which is essential for telco grade server solutions
- 'Non-circuit related, messaging intensive applications such as SMS are possible

Target applications

- Call control, call routing and protocol conversion applications
- Directory assistance and call completion services
- Fixed and mobile SMS applications
- Premium rate services
- Prepaid services and calling card platforms
- PSTN connectivity for IP PBXs
- SS7 traffic acquisition and recording
- Statutory requirements; lawful interception/CALEA
- Televoting or mass calling platforms
- Welcome/win-over message generation; mobile roaming

Choose Aculab, choose success

Aculab's TDM boards, protocols and APIs provide platform developers and major equipment manufacturers with the options they need to create innovative, revenue generating products for their telecom customers. Aculab's reputation for reliability and performance was forged with its E1/T1 boards, which can be used to rapidly develop scalable, high capacity terminating, monitoring, messaging and signalling solutions for fixed and mobile networks.

With Aculab, developers gain a distinct advantage in terms of system cost and value per channel.

Benefits and choice

When selecting a TDM board, planning of international product roll out should be fully considered. Key benefits of Aculab's boards stem from available host independent approvals and the extensive, worldwide protocol coverage, including SS7. Aculab's policy of enabling developers to download the TDM protocol software as and when needed, under a cost free licence, continues.

In many countries it is possible to obtain host independent type approval, such that a board may be integrated into PC or server-based solutions without further telecom approvals being required. In regions where this option is not available, each complete customer solution will need to be submitted for approval and Aculab has experience in supporting its customers in gaining such system level type approvals.

Customers also benefit from Aculab's operating system independent API, which makes it easier to migrate existing applications onto new platforms and hardware. In seeking to assist developers and integrators to swiftly bring their solutions to market, Aculab has always employed a consistent API across the whole product range, so the learning curve has a low gradient. This consistency also makes the inclusion of new protocols equally straightforward for applications that are to be deployed internationally. These attributes help developers and integrators to leverage existing solutions or bring new solutions to market quicker, with a faster time to money result.

Extensive protocol coverage

For developers targeting their applications at markets worldwide, Aculab's entire TDM protocol heritage is readily available to download. Protocols are offered for both public and private network connectivity and include options for network or user terminations. This adds to the value to be gained when using Aculab's TDM boards.

The wide range of protocols available includes many different types of common channel signalling (CCS), channel associated signalling (CAS), and multi-frequency (DTMF, MF, and MFC) signalling. In North America and some South East Asian countries, it is 1.544MHz T1-based signalling variants that are mostly deployed. Europe and the rest of the world use mainly 2.048MHz E1, ISDN-based signalling, but with a rich legacy of CAS and R2 derivatives where network infrastructures are still transitioning from analogue to digital. Public networks worldwide utilise SS7 (signalling system No. 7, or C7) variants.

Aculab's dual redundant SS7 protocol stack, with flexible configuration options and accessible APIs, enables the development of resilient call and non-call related signalling applications. Signalling link capacity is 124 links per board and the SS7 software itself imposes no limit on the number of bearer channels that can be configured. MTP, ISUP, SCCP and TCAP procedures are supported, with the integrated SS7 signalling monitor and maintenance APIs adding even greater value.

Further information on the rich heritage of protocols available, and the national and international SS7 variants supported, can be found on the protocols and approvals pages on Aculab's website.

Protocol flexibility

Beneficially, users can mix and match several protocols on the same board and in fact, as each trunk or 'span' is independently software selectable between E1 and T1, both interface types can be supported simultaneously on a single board. Importantly, network impedance terminations are also software selectable on a per trunk basis. Tone based signalling for inter-working into legacy CAS and R2 derivative infrastructures is supported as are A-law and μ -law coding conversions on a per channel basis.

Essential variants include 1, 2 or 4 trunk options and, therefore, a single board, occupying one backplane slot, can provide up to 124 voice/data channels. Multiple boards can be installed in a chassis, providing a scalable, high capacity solution in a single server. Dedicated applications can make full use of board bus capacity, which is essential for switching and gateway applications. This means customers gain a distinct advantage in terms of overall system cost and resultant margins.

Importantly, for platform vendors, Aculab's board configurations allow any protocol – whether E1 or T1 – to be used and changed independently, without the need for a restart, on a per network line interface basis.

Through this inherent flexibility in board configuration, users get the benefit of being able to specify one product for all systems regardless of where in the world they are deployed. In addition, high density means system board count can be minimised, providing excellent cost-effectiveness on a per channel basis.

Telco grade functionality

Aculab's boards have been designed with a focus on reliability and system availability – critical requirements for a telecom server application. All Prosody X boards support sophisticated redundancy management to allow the creation of applications with 'five 9s' availability (99.999%), independent of the final solution scale or channel count.

Critically, for resilience and failover purposes, trunks on Prosody X boards can be independently accessed by several high level applications, either on the local host or on remote machines. In case of failure of the main high level application, the board control can be switched to a remote standby alternative, therefore, providing service continuity by implementation of either N+1 or 1+1 protection schemes. Fundamentally, this also means that applications can share on-board trunk resources, which gives the benefit of being able to provision hardware for hosted applications in an optimal, cost-effective way.

Prosody X E1/T1 boards can be distributed amongst different chassis platforms offering added resilience and further scalability. A dual redundant 10/100 Ethernet interface provides the external IP connection, while the host's PCIe bus will view a board as if it were a NIC. Support for SNMP is offered to help manage boards, with appropriate information usually provided via the API being made available via the MIB. Both Net-SNMP and Microsoft's SNMP are offered to provide choice and the host-based solution allows one agent to report on multiple boards.

Switching

To ensure maximum flexibility within applications, all boards offering PSTN connectivity support local, on-board voice path switching, as well as arbitrary switching to the various external connections and buses. This can be crucial when determining system traffic capacities.

Inherent A-law and μ -law encoding conversion allows incoming PCM streams in one format to be changed to the other format (with or without gain), prior to being connected to another network, or speech resource.

For complex system designs requiring additional media processing resources, channels can be routed over any of the 4096 timeslots on the CT bus to other boards in the Prosody X range. A complementary mix of Prosody X E1/T1 boards and Prosody X DSP boards can be combined for applications that require media processing resources, such as record, playback and echo cancellation, to deliver powerful communications solutions.

For more information, please contact your Account Manager or view our website:

<http://www.aculab.com>

Technical summary

TDM board functionality		Prosody X PCIe E1/T1
Network line interfaces		1, 2 or 4 E1/T1 trunks on board
Point of sale module options	ISDN PRI	Supported on board
	SS7	DSP module needed for CAS/SS7
	CAS	
A/μ, μ/A law conversion		Via base board
I/O options		Front panel I/O only
Network connectors (BNC via adapter – not supplied)		1, 2 or 4 off RJ45/RJ48C
Adapter cables (supplied)		Not applicable
Network terminations		Software selectable E1/T1 and line impedance (75R, 100R or 120R)
Telephony protocols and approvals		A wide range of global CAS and ISDN PRI protocols; many with host independent approvals – see website for further details
Protocol highlights		Aculab's protocol software, available under a cost free license includes: AT&T; DMS 100; DPNSS; ETS300; MFC R2 CAS; NI-2; Q.SIG; INS1500; T1 Robbed bit
SS7 protocol stack support		MTP1-3; SIGTRAN M3UA; ISUP; SCCP; TCAP – with dual resilient MTP3; distributed ISUP; flexible ISUP ¹ ; distributed TCAP
SS7 signalling links		Up to 124 user-defined 64kbits/s timeslots per board / local pointcode ²
SS7 signalling monitor (for lawful intercept, etc.)		API software option
Physical and environmental		
Operating systems supported		Operating system support for Linux, SPARC Solaris and Windows; see http://www.aculab.com/support/software-downloads for more details
Board format		Full size, single slot PCIe board
Bus type		PCI-SIG 1.1; electrical / mechanical x4
CT board interconnections		H.100
Board/API control		Host-based via PCI/PCIe bus or remote via Ethernet
Remote board management		SNMP V1; SNMP V2c; Aculab ACT and remote control toolset
Power consumption (maximum in Watts)		25W
RoHS compliance		Fully compliant
EMC standards		Meets all mandatory international standards
Safety standards		Meets all international certification schemes e.g., CB, UL, CUL
Operating environment		Temperature: 0 to 50°C. Humidity: 10 to 95% RH non-condensing. Altitude: 0 to 2500m
Other functionality		
Software licensing		SIGTRAN M3UA is licensed on a per host basis; options range from 100 to 12,800 transmit messages per second

Notes:

- Aculab's SS7 software is offered with support for many national and international variants, including ANSI, China and ITU-T, and an option to enable user-configuration of ISUP message formats, which can be defined to meet specific needs.
- System capacity depends on the hardware types used – contact Aculab for details.