DATA SHEET

Virtual Container over Packet Transceiver

T3/DS3

Ciena's Virtual Container over Packet Transceiver enables cost-effective transport of T3 (DS3) signal over Ethernet.

The Small Form-factor Pluggable (SFP) module converts a data stream from its user T3 port into circuit-emulated frames for transmission over a Packet Switched Network (PSN). Frames are transmitted via a 1 Gigabit Ethernet (GbE) port on the host device through one or more PSNs (in the case of multiple operators, for example). At the remote end, packets are converted back to TDM traffic for handoff as TDM services.

TDM-to-packet modernization

With many network operators transforming their networks to IP/MPLS transport, TDM over packet emerges as a key enabler to efficiently migrate legacy services to the new IP/MPLS infrastructure. A single unified network for both data and TDM can streamline operations and reduce capital and operational expenditures.

The IP/MPLS network allows for greater economies of scale for multiple service types (video, voice, mobile, etc.) while accommodating the need to reliably carry legacy traffic from TDM interfaces, which are likely still in use in many enterprise and industrial scenarios. Whether servicing traditional PBX units, utility teleprotection relays, digitized voice equipment, or Supervisory Control and Data Acquisition (SCADA) systems, TDM end-points will remain common interfaces into the modernized network for decades to come. These services will need to be accommodated within the same infrastructure as the growing data network to remain cost-effective while not sacrificing the highest reliability these systems require.

Features and benefits

- Incorporates T3 (DS3) function into an SFP, 20-pin MSA-compliant transceiver that can be inserted into routing and switching platforms
- Integrates Circuit Emulation over Packet (CEP) RFC4842-compliant framing, reducing system and network complexity while offering lower footprint for significant CAPEX and OPEX savings
- Provides a mini-coax, 75 Ohm, T3 connector supporting cable lengths up to 450 feet
- Operates at industrial temperature range (-40°C to 85°C)
- Eliminates TDM leased-line costs
- Delivers plug-and-play operation with CEP equipment, including OC-N SFPs, in Ciena's pluggable transceiver family

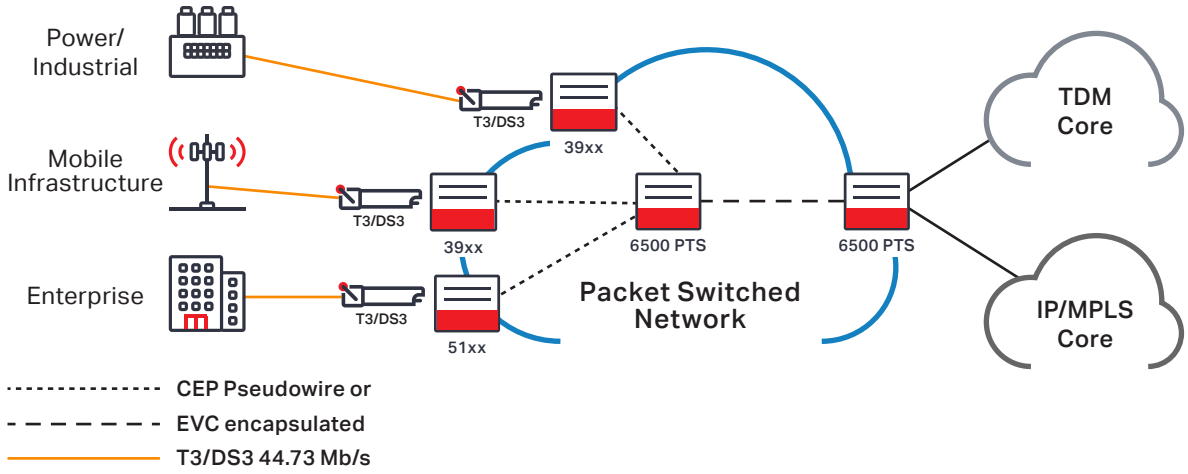

Figure 1. Aggregation of T3 to SONET/SDH

Cost-effective yet reliable TDM transport

The transceiver provides a 75-Ohm, unbalanced T3 interface via a mini-coax supporting cable lengths of up to 450 feet. The DS 3 signal is mapped into a STS-1, to be transported across an Ethernet network using the CEP (RFC4842) protocol.

To transport SONET/SDH circuits through a IP/MPLS network, the SONET/SDH payload is broken into fragments, and a CEP header is prepended to each fragment. The CEP header supports Basic and Extended modes. Basic mode provides functionality necessary to accurately emulate a SONET/SDH circuit over a PSN, while Extended mode headers are utilized for optional SONET/SDH fragment formats.

The transceiver achieves a CEP frame latency of 125µs and performs Explicit Pointer Adjustment Relay (EPAR) clock recovery using SyncE as a reference clock. It is jitter- and wander-compliant to ITU-T G.8261, G.824, and GR-253

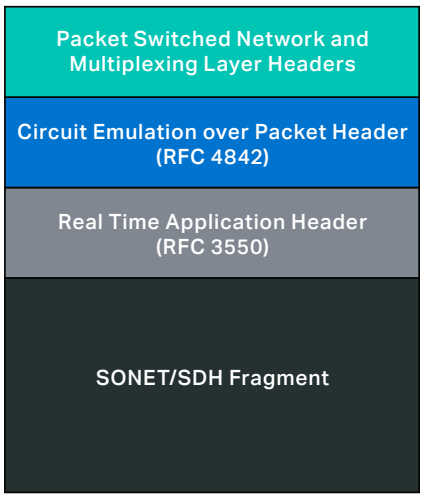

Figure 2. Basic CEP

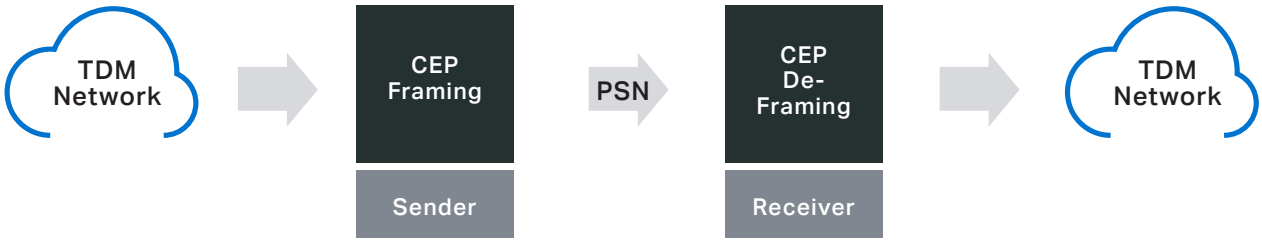

Figure 3. Sender and Receiver functions

CEP: Framing and de-framing

The device supports the following functions in the direction from T3 to PSN (sender):

- Map T3 flow into STS-1
- Framing the STS-1 using CEP to adapt T3/DS3 into a Ethernet, IP/MPLS stream
- Map the T3 fragments into SONET/SDH payload
- Encapsulate data blocks with headers and FCS, which are configurable per PW channel
- Transmit frames via electrical GbE interface toward PSN

The device supports the following functions in the direction from PSN to T3 interface (receiver):

- Reception and validation of signal from the PSN via the GbE interface
- Validation can be configured per channel
- Decap the CEP Ethernet, IP/MPLS frames into STS-1 stream
- Delay buffer management and frame sequencing
- Generate the STS-1 bit stream using EPAR clock recovery method
- Extract the T3 from the STS-1
- T3 frequency is recovered from EPAR
- Transport the T3 signal on the interface

Technical Information

Specifications	
Interface	T3/DS3 44.736 Mb/s 75 Ohm mini-coax (DIN 1.0/2.3) connector Supports cable lengths up to 450 feet
Header formats	MEF8 and MPLS frame header format with optional VLAN tag
Management and Support	Management via Service Aware Operating System (SAOS)
Host device compatibility	3904, 3905, 3926, 3928, 3930-930, 3932, 5142, 5160
Mechanical	Conforms to SFP 20-pin Multi Source Agreement (MSA) 1000Base-X SerDes via MSA
Physical Dimensions in Millimeters	Length= 60.05 , Width= 13.7 , Height = 8.53
Operating temperature	-40°C to 85°C (industrial)
Jitter	8 ms Compliant to ITU-T G.8261, G.824, and GR-253

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