TDMoE Card

Version 1.0– Oct 2014

HX9400R SDH ADM

Features

- Hot pluggable interface card for HX9400R/RA
- WAN Link
  - Two combo Gigabit Ethernet(GbE) with 2 RJ45 and 2 SFP housing
  - IEEE 802.3ad Link Aggregation
  - RSTP/MSTP
- LAN Interface
  - Three 10/100/1000BaseT Ethernet ports
  - Speed/Half/Full Duplex
- Supports cross-connection from interface cards:
  - STM-1 or OC-3, STM-4* or OC-12*
  - High density E1/T1 card
  - DS3/E3 card
  - High density Ethernet card
- VLAN
  - VLAN ID support: Max. 4K
  - Support C-VLAN/S-VLAN tag adding and removing on Pseudowire
  - Assign VLAN on MAC, IP, protocol or flow
  - VLAN based packet filtering
  - 802.1q port-based VLAN
  - Support Q-in-Q
- QoS
  - Ingress rate limiting per Ethernet port
  - Ethernet Network Level:
    - 3-bit Priority Code Point-PCP field within 802.1P/802.1Q Ethernet frame-CoS
  - Packet classification, 8 queues per port
  - IP Network Level:
    - 8 priority queues per port
    - 6-bit DiffServ Code Point-DSCP field-ToS
  - Scheduling Algorithm
    - Strict Priority (SP)
    - Weighted Round Robin (WRR)
    - Dficit Weighted Round Robin (DWRR)
  - Congestion Avoidance
    - Random Early Detection (RED)
    - Weighted Random Early Detection (WRED)

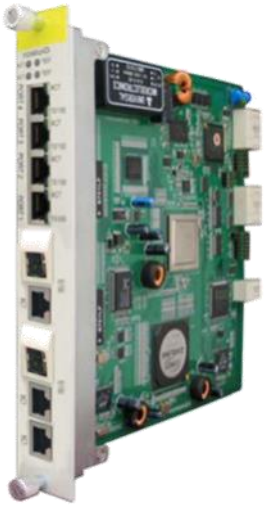
Description

This is a high density TDMoG card to be used with HX9400R/HX9400RA. This is one of the TDMoE family products IMX-M16E1, IMX-MSTM4, QX3440-TDMoE card and the CPE CIP-2E1T1, CIP-SERIAL and CIP-ALL

This card would allow operators to transport up to 252 E1 or 336 T1 or 12 E3 and Ethernet traffic over IP network. This allows cost effective migration to IP network from existing voice and data network using existing TDM based equipment.

The HX9400R-TDMoG module converts the TDM data stream and timing information from the PDH and SDH/SONET ports on the HX9400R into packets through cross connection and transmits to the connected IP or Metro Ethernet network via dual combo Gigabit Ethernet WAN ports with 802.3ad Link Aggregation capability. Another Pseudowire device converts the received packet stream back to original PDH and SDH/SONET data stream along with the original timing information.
The card is hot-swappable and can be installed or removed from a HX9400R chassis when the device is powered up.

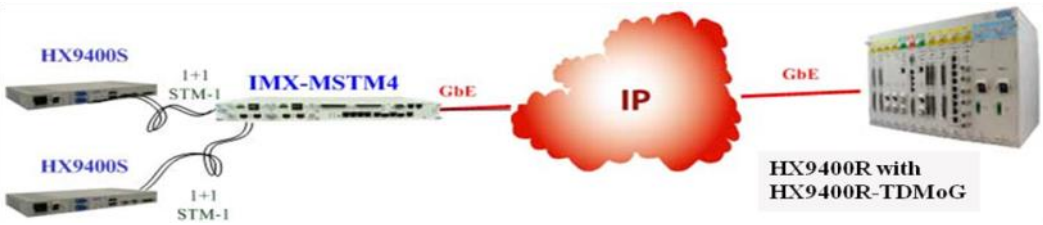
- Pseudowire Diagnostics Function
- ARP, Ping and Trace Route
- IP-MAC Table display
- Pseudowire Information
  - Maximum 4K VLAN ID
  - Packet creation Time (ms)
  - Jitter-Tolerance delay (ms)
  - Single-trip delay (ms)
  - Total Frame Length (bytes)
  - Packet per second
  - Required Bandwidth (Mbps)
  - Header Overhead (%)
  - Remaining WAN Bandwidth (Mbps)
  - Remaining Memory



The system supports

Point to Point infrastructure
- STM1 (VC4) to STM1 (VC4)
- STM4 (VC4-4) to STM4 (VC4-4) *

Point to Multi-Point infrastructure
- VC4 to 63 E1 or
- VC4 to xx FFE1/FFT1 up to 512PW
- STM4 to 4 STM1 *
- VC4 to 3 E3 or 3 DS3



SDH STM4/1 INFRASTRUCTURE

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    - Weighted Random Early Detection (WRED)
- Pseudowire Capability
  - Support SAToP, SDH/SONET CEP, CESoPSN, MEF-8*
  - Support VC4 transparent/ channelized STM-1, STM-1 ATM channelized IMA, STM-1 ATM UNI unframed
  - STS3C transparent/ channelized OC-3
  - Backplane capacity up to 252E1/336T1
  - Maximum 512 Pseudowires
  - Up to 32 Pseudowires can apply Adaptive Clock Recovery (ACR) mechanism

Jitter and Wander

PDV compensation depth up to 128 ms

Jitter Buffer Size up to 256 ms

PPM version: conforms to G.823/ G.824 traffic interface (+/- 1ppm)

Supports 1+1 card protection

Support 802.1d Mac learning: maximum 26K

Per port ingress rate limiting from 8kbps to 1Gbps

Rate-based and Priority-based rate limiting for LAN

Support 803.3x Flow control on input ports

Support 802.1D STP, 802.1w RSTP and 802.1s MSTP

Support IGMP snooping v2 (RFC 2236)

Timing sources
- 09400R system clock
- Adaptive mode: from WAN (GbE) port
- External clock through Controller card

Interworking with other TDMo-Ethernet Series Products
- IMX-M16E1, IMX-MSTM4
- QX3440-TDMoE with QX3440 and HX9500R
- CIP-2E1T1, CIP-SER, CIP-4ALL

CE, FCC, RoHS compliant

(* Future Option)

SPECIFICATIONS

WAN Aggregate Interface

Number of Ports : 2 Combo GbE (Including Electrical and Optical ports; Auto-detection of SFP for highest priority)

Electrical Port		**Optical Port**	
Speed:	10/100/1000 BaseT (802.3i, 802.3u, 802.ab)	Speed:	100/1000 BaseFX (802.3u, 802.3z)
	Auto-negotiation (10/100/1000) Auto MDI/MDIX Full/half Duplex	Connector:	SFP
Connector:	RJ45		

Ethernet Tributary Interface

Number of Ports:	3 ports 10/100/1000 BaseT (802.3i, 802.3u, 802.ab) Auto-negotiation (10/100/1000) Auto MDI/MDIX Full/Half Duplex
Connector :	RJ45

Performance Monitors

Performance Store:	The last 24-hour performance in 15-minute interval		
Performance Reports:	Date &Time, Error Block (EB), Background Block Error (BBE), Error Second (ES), Burst Error Second (BES), Severe Error Second (SES), Unavailable Second (UAS)		
	System Performance	RX-Lost, Cell-Lost, Jit-UR, Jit-OR	
	SDH/SONET Performance	RS-BIP(B1), MS-BIP(B2), MS-REI, HP-BIP (B3), HP-REI, LP-BIP(V5), LP-REI(V5)	
	E1/T1 Performance	CRC, OOF	
Alarm Reports	**SDH/SONET Alarm**	SDH	Line, HO-Path, LO-Path
		SONET	Line, STS-Path, VT-Path
		Multiplexing E1/T1	LOF, AIS, UAS, RAI/YEL
	E1/T1 Alarm	LOF, AIS, UAS, RAI/YEL	
Alarm Queue:	Contains up to 200 alarm records of latest alarm types, alarm severity, date and time.		
Currently-Active Alarm Summary (CAAS)			

Standards Compliance

IEEE		**IETF**	
802.1d	STP and MAC Learning	RFC2236	IGMP Snooping v2
802.1p	Priority Code Point	RFC3411	SNMPv1, v3
802.1q	VLAN Tagging	RFC4553	SAToP
802.1s	MSTP	RFC4842	SONET/SDH CEP
802.1w	RSTP	RFC5086	CESoPSN
802.1ad	Q-in-Q		
802.1ag	Ethernet CFM	**ITU**	
802.3i	10 BaseT	G.703	E1/T1
802.3u	100 BaseT, 100 BaseFX	G.704	DS0
802.3x	Flow Control	G.823/ G.824	Traffic and Synchronous Interface
802.3z	1000 BaseFX	PWE3	Pseudo Wire Emulation Edge-to-Edge
802.3ab	1000 BaseT	**MEF**	
802.3ab	Link Aggregation	8*	CESoETH
RoHS	Restriction of Hazardous Substances Directive		

Certifications

EMC/EMI:	EN55022 Class A, EN55024, FCC15
Safety:	EN60950-1

*Future Option

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