IMX-MSTM4

TRANPORT AND CONCENTRATION OF PDH/SDH SAToPSN/TDMoE/CESoPSN

Features

- Transport of STM1, STM4 or OC3/OC12 E1/T1 over Ethernet or IP

- Encapsulation:
  SAToP (RFC4553)
  CESoPSN (RFC5086)
  SONET/SDH CEP V4 framed / unframed, VC3, VC11/VC12 (RFC4842), MEF-8

- Support Pseudo-Wire or bundle
  for: point to point
  32 E1/T1 to 32 E1/T1
  or to xx FE1/FT1
  STM1 to STM1
  STM4 to STM4 *
  for: point to multi-point
  FE1/FT1 to n FE1/FT1
  STM1 to 63 E1/T1 or to
  STM1 to x FE1/FT1
  STM4 to 4 STM1

- Maximum 1024 Point to point PW Pseudo-Wire

- Support STM1 ATM channelized IMA and
  STM1 ATM unframed VC4

- 2 WAN ports: Combo 10/100/1000BaseT or SFP for 1000SX/LX/SX

- Tributary ports:
  - 1 Modules 8, 16 or 32E1/T1
  - 2 module 2 STM1 or STM4 (maxi 4 VC4), support MSP
  - 3 x 10/100/1000BaseT LAN

- 802.1q VLAN per MAC, IP, protocol or flow. C-VLAN and S-VLAN Q-in-Q,

- 802.1p w 8 queues/port, Diffserve /TOS, DSCP mapping...

- MPLS-TP **

- STP, MSTP and RSTP

- Version S* for G.823 Traffic and Synchronization transport

- Alarm relay

- Power DC (-20 to -72 Vdc) max. 2

- Management over console and Ethernet LAN Port, SNMPv3, SSH

- OAM link level 802.3ah,* service level 802.1ag*, ITU Y.1731**

- IP v4 and IP v6 **

TRANSPORT E1/T1 STM1/STM4 OVER ETHERNET/IP

The *IMX-MSTM4* is a powerful equipment witch is providing transport and interconnection of PDH and SDH links or networks over IP or Ethernet backhaul. It is performing up to 512 TDM Pseudo-Wires to carry STM4, STM1, E3, DS3, E1, T1 or FE1, FT1 in point to point or point to multipoint modes.
The *IMX-MSTM4* gives the possibility to use a Gigabit Ethernet to interconnect several PDH/SDH nodes in Utilities/Transportation/Defence infrastructure.
Thanks to the support of E1 ATM IMA , STM1 ATM with VC4 framed and unframed Ethernet and OAM service level the *IMX-MSTM4* is the right equipment to interconnect 2G/3.5G BTS to BSC or MSC/RNC over Ethernet backhaul.

The *IMX-MSTM4* is a modular system with the function to encapsulate TDM circuit in Packet PseudoWire Network IP or Ethernet. It's owns one slot for 8, 16 or 32 E1/T1 module with SCSI, 2 slots for SDH interfaces. One module provides 2 STM1 interfaces and another with one STM4. The maximum payload of 4 VC4 is supported in the following configuration: 4 STM1, 2 STM1 (1+1) or 1 STM4 (1+1). The modules are providing with SFP slot for optical or electrical SDH interface. The system includes 2 WAN Gigabit Ethernet Combo interfaces and 3 copper LAN GE interfaces. This 19" one 1 include power supply slot 2 redundant DC48A and one CPU. A future 2U version will include 2 redundant CPU and AC/DC power supply.

The *IMX-MSTM4* is carrying point to point of PDH or SDH link. The E1/T1 are transported transparently including the full signalization without modification or compression of clear channel E1, G704 channelized data circuit, voice circuit E1-PRI / E1 –R2/ E1-CAS / T1 or E1 A-Bis or E1 A-Ter 2G circuits or 3.5G ATM circuits with one bundle per circuit. The full VC4 or STM1 or VC4-x of STM4 is transported transparently with inside VC12/V11 voice/data/ATM E1 circuit or VC3 or full VC4 ATM.

The *IMX-MSTM4* provides point to multipoint services. At the PDH level an E1/T1 of the *IMX-MSTM4* will groom all TS or group of TS from distant device like CIP-2E1. Each Time-Slot of

group of TS is encapsulated in a bundle. The system supports up to 512 bundles. In case of E1-CAS it is grooming the TS and together the CAS signalization from the different distant sites then all signalization and ringing functions are supported. At the SDH level the *IMX-MSTM4* is grooming up to 63 E1 bundles and provides a VC4 is a STM1 or STM4 of the IMX-MSTM4. This feature saves the utilization of a PDH and SDH multiplexer.

The *IMX-MSTM4* is using the standard PW3E PseudoWire Emulation End to End or encapsulation protocols:
- SAToP(RFC4553) for unframed E1/T1,
- CESoPSN(RFC5086) for framed E1/T1
- SONET/SDH CEP for VC4/VC3/VC11/V12 (RFC4842).
- MEF-8*

The *IMX-MSTM4* is compatible will the PW CXR range with CIP-2E1, IMX-M16E1 and the QX3440-TDMoE card in PDH DACS QX3440 and with other vendors supporting these protocols.

WAN protection is provided with link aggregation (802.3ad) or in ring or mesh structure with MSTP/RSTP . The IMX-MSTM4 as the other CXR devices provides the bundle protection to secure the Pseudo-wire.

Application
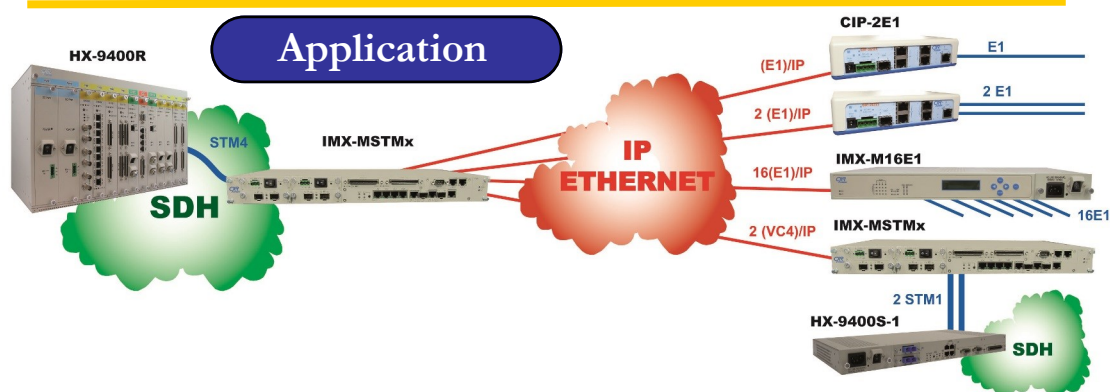
TDM TDM/SDH over
PseudoWire

Smart Solutions for
Smart Networks

www.cxr.com

SPECIFICATIONS

- Full front access 1U height (ETSI) or future 2U with 1+1 protected main boards (ETSI)

Aggregate ports
- 2 x WAN ports: combo Gigabit Ethernet (GbE) 10/100/1000Baset and SFP 1000SX/LX/ZX

LAN ports
- 3 x 10/100/1000Baset RJ45

Protection
- 820.3ad Link Aggregation
- RSTP and MSTP

Tributary ports
- Hot-swappable plug-in card type:
- Dual STM-1 card with 2 SFP
- Single STM-4 card with 1 SFP
- 4 VC4 payload usable as 4 STM1, 2+2 MSP STM1, 1 STM4* and MSP 1+1 STM4
- LAN interface: 3 x 10/100/1000 BT Ethernet ports, auto-negotiation
- E1/ T1 Interface: E1/ T1: 8 */16* /32 w SCSI
    - If E1 card installed only 3 STM1 are available or 3 VC4 or an STM4
    - Please order separately SCSI cable and PAN
    - E1/T1 software selectable
    - E1 120/75ohms
    - Line Rate 2.048M bps ± 50 ppm
    - Line Code AMI/ HDB3
    - Framing ITU G.704
        (CRC: on/off, CAS: on/off, unframed)
    - Output/Input signal ITU G.703, Jitter G.823
    - T1 100ohms
    - Line Rate 1.544M bps ± 32 ppm
    - Line Code AMI / B8ZS (selectable)
    - Framing D4 / ESF/ ESF&T1.403/ OFF
    - Output Signal DSX-1, DS-1
    - Pulse Template Per AT&T TR 62411

Encapsulation or Pseudowire (PW)
- The PseudoWire Emulation End to End defines the service of the circuit
- The bundle defines the both end addresses and the bandwidth of n 64kbps to 2Mbps.
- The largest bundle include a full E1 or T1, E3 or DS3, STM1.
- Framed G704 bundle will include a group of n TS with n = 1 to 31.
  Encapsulation over **Ethernet or over IP** are supported:
- SAT over Packet : rfc 4553 for unframed only E1, T1, E3, DS3, STM1, STM4
- CES over PSN: rfc 5086, CES over Ethernet* for framed G704 E1/T1 only
- SONET/SDH CEP for VC4 framed or unframed, VC3, VC11 and VC12 (RFC 4842), support STM1-ATM channelized with E1 IMA and STM1-ATM VC4 unframed
- Support of 512 bundles or PW
- Each PW can be assigned a separate VLAN

Packet Delay Variation
- Selection 1 to 30 E1 frame per IP frame
- Delay/latency from 1,37 to 28ms

Bridging & Switching
- MTU: Jumble frame up to 13K bytes
- Transparent support of IS-IS frame
- Max. 4K VLAN
- Assign VLAN based on MAC, IP, protocol, or flow*
- VLAN based packet filtering
- Translation on ingress and egress
- Q-in-Q: add, remove, and translate both S-VLAN and C-VLAN

QoS
- 8 priority queues/port

- User config CoS and DiffServ/ToS in outgoing IP frame
- DSCP mapping
- Strict priority, WRR, WDRR for queue shaping
- RED and WRED for queue management

Others
- Support 802.1d MAC learning (maxi.32K)
- 803.3x Flow control on input ports
- 802.1d STP, 802.1s MSTP, 802.1w RSTP
- IGMP Snooping (RFC 2236)
- Storm control: packet based or byte based
- Ingress rate limit per port: 8kbps to 1Gbps
- Support IPv4 Routing & IPv6* Routing
- Support SNTP
- Support MPLS-TP*

Clock
- Primary and secondary Clock : Internal, or from STM-x tributary port
- Jitter and Wander
- Standard: per G.823 Traffic (+/- 1ppm)

OAM
- OAM Link-Level , 802.3ah, Clause 57**
- OAM Service-Level, 802.1ag, ITU Y.1731**
- MEF-8 compliance **

Management port and interface
- Console port, VT100 menu-driven
- SNMP port
- SNMP v1/v3 management
- SSH
- Telnet via SNMP port
- In-band management
- IP management information through Ethernet WAN ports
- Through a VLAN port
- Through any one of the DCC channels

Alarm Relay:
- Fuse & performance alarm terminal block

Misc
- Hot-swappable Power
- -36 to -75 Vdc plug-in, dual for redundancy
- Consumption <60W
- Dimension: 1U ETSI
  438 x 44 x 226 mm (W x H x D)
- Alarm Relay and ACO (Alarm Cutoff) button
- EMC   EN55022 Class A, EN55024, FCC15
- Safety   EN60950-1, IEC60950-1
- IEC   61000-4-5 class 3

MTBF
- Hot-swappable Power

*(** Phase 3)*

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ETSI FRONT PANEL

| 2 DC Power Supplies | 8/16/32 E1/T1 board | Consol | Alarm In/Out |

| Air Filter | 2 STM1 or 1 STM4 | 2 STM1 or 1 STM4 | 3 LAN and SNMP port | 2 WAN port GbE Combo | Clock In/Out | FAN |
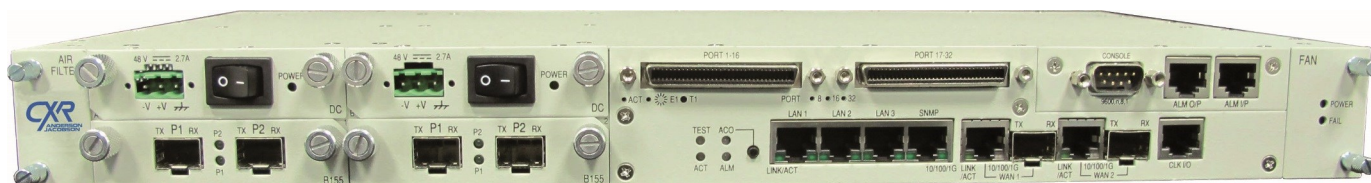
PSEUDOWIRE EMULATION MODES

The system will support according to the software releases: (*Phase 2)

Point to Point infrastructure
- 32 E1/T1 to 32 E1/T1
- STM1 to STM1
- STM4 to STM4

Point to Multi-Point infrastructure
- 32 E1/T1 to 32 E1/T1 or to xx FFE1/FFT1 up to 512PW
- STM1 to 63 E1/T1 or to xxx FFE1/FFT1 up to 512 PW
- STM4 to 4 STM1
- STM4 to 4 x 63 E1/T1 or to xxx FFE1/FFT1 up to 512 PW

CXR offers TDM PseudoWire Emulation from a single analog signal to a 622Mbps STM4

ORDER NUMBER

IMX-MSTM4	Modular SAToP/TDMoIP/CESoPSN system for 32 E1, 4 STM1 or 1 STM4
IMX-BASESTM-3TGX2CB	Base of the modular SAToP/TDMoE/CESoPSN multiplexor IMX-MSTM4 ETSI: 3 LAN 10/100/1000BaseT, 2 WAN GE Combo 10/100/1000BaseT and SFP, encapsulated transport w SAToP, TDMoEthernet/IP or CESo-PSN , slots for one 8/16/32E1 card, 2 cartes 2 STM1 ou STM4, 2 slot power supply, include the filter and the FAN.
IMX-MSDHMOD-FILTER	Spare ** Physical filter module for IMX-BASESTM
IMX-MSDHMOD-FAN	Spare ** FAN module for IMX-BASESTM
IMX-MSDHMOD-32E1T1	32E1/T1 module for IMX-BASESTM: E1 in 75/120ohms or T1 Module, 2 SCSI connector, maxi 1 ** Please order 2 CA-SCSI-M-2 and 2 IX-PAN-16E1T1-xxx
IMX-MSDHMOD-2STM1	2 STM1 module w 2 SFP slot for IMX-BASESTM, maxi 2 with 4 payload or MSP
IMX-MSDHMOD-STM4*	1 STM4 module w SFP slot for IMX-BASESTM, maxi 2 for MSP
IMX-MSDHMOD-DC48	Modular DC48v power supply 48V cc for IMX-BASESTM (maxi 2)
IX-PAN-16E1T1-RJ45	19" panel without SCSI cable for 16 E1/T1 RJ45 120ohms
IX-PAN-16E1-BNC	19" panel without SCSI cable for 16 E1 BNC 75ohms
IX-PAN-16E1T1-WR	19" panel without SCSI cable for 16 E1/T1 wire
CA-SCSI-M-2	SCSI cable: 2 m