The HX9416R is the last largest configuration of HX9400R series of the ADM/TM SDH multiplexer range from CXR. This configuration with two CC16 CPU and aggregate provide a traffic’s concentration over the two 2 STM16 (2,488 Gbps) SNCP rings up to 8 STM1 or 2 STM4 sub-rings in a single node and the full cross-connect of all VC12, VC3 and VC4.

This new generation equipment, based on SDH+ technology, is design to have full non blocking add & drop up capabilities from the following tributaries:
- 252 x E1/T1 protected (1+1) or 504 unprotected
- 12 x DS3/E3 protected (1+1)
- 64 x 10/100M Ethernet
- 8 Gigabits Ethernet
- 8 x STM1 with MSP (1+1) or 8 x STM1 SNCP Ring
- 4 x STM4 with MSP (1+1) or 2 x STM4 SNCP Ring
Or a combination of all

The modular SDH-ADM node HX9416R support 2 STM16 per card CC16 and 4 STM16 payload per chassis with 2 CC16 card. The selection of the STM1-4-16 is operated by software selection and SFP module exchange.

The system support the following aggregate interfaces and Network topologies:
- 2 STM16/4/1 rings with SNCP protection
- 2 STM16/4/1 linear with MSP(1+1) protection,
- Or a combination of both

The HX9416R with a full cross-connect VC4, VC3 and VC12/VC11 has the power of a high density concentration node for TDM links and Ethernet or Gigabit Ethernet flows. SDH bus or ring infrastructures are supporting with high level of QoS all Ethernet infrastructure.
The HX9416R is an ETSI shelf 19" 6U fully modular. This equipment and all cards is compliant with relevant ITU recommendations, the ETSI standard, all European regulation CE, EMC and RoHS.

The security of operation is guaranteed by the redundancy of AC or DC power supply with load sharing, the redundancy of the CPU and all aggregate or tributary fiber optic interfaces are protected in MSP (1+1) or SNCP Ring or MESH SNCP modes. Every cards is hot-swappable and doesn’t affect the running services.

The HX9416R is a chassis HX9400R with two card CPU/Cross-connect HX9400R-CC16 has a non blocking cross-connect capability of VC4 in any STM1/STM4/STM16 , VC12 in V4 or VC3 in VC4. The cross connect capability is 5 x 16= 80 VC4 or 5 x 16 x 63= 5040V C12. This gives to this equipment a large capacity as an SDH central node or hub.

The HX9400R, like all devices of the HX9100 and HX9400 ranges, are based on the SDH-Plus feature. They are supporting GFP, VCAT and LCAS protocols. These are optimizing the transport of IP over SDH infrastructure. These features give to this range of equipment a real capability to transport the Ethernet flow with a high level security and a permanent QoS.

The system can bound in a GFP trunk n x VC12 or n x VC3 and could reserve VCxx for variable bandwidth on demand.

The HX9416R provides powerful Operation, Administration, Maintenance and Provisioning (OAM&P) functionality. This includes fault management, performance monitoring, configuration management, and network security management. Logs and reports can be printed as well as viewed directly.

The SFP optical module can be delivered as an option with the Digital Diagnostic Monitor (DDM) feature which controls the temperature and the receiving and transmitting power very reliable for the management of optical interfaces and permit to optimize the life of the optical modules.

The maximum distance with direct SFP interconnection is 240km for STM1, 200km for STM16. But CXR supply external EDFA-PA, EDFA-BA and Raman amplifier to rich in one jump up to 320km;

The HX9400R series can be managed locally over a console port or LAN port as a craft interface with a menu-driven interfaces or remotely via DCC channel or in-band/out-band LAN with a menu-driven or in SNMP.

For centralized administration of the SDH and PDH equipments CXR proposes a light solution named CXRView-Plus and a very power Telecommunication system (TMS) named the CXR-iNMS.

CXRView-Plus is a NMS system based on SNMPc from Castle Rock an SNMP management. Over a Windows interfaces the user can setup, monitor all devices, store and restore configuration and software release and their update and exchange of PDH/SDH devices and the user can show the active status of all links between devices.

The CXR-iNMS is a powerful SDH EMS/NMS. It provides a complete set of operation interfaces that are consistent with the Telecommunication Management Network (TMN) concept (ITU Recommendation M.30,0,784) for SHD Network Element/Operations System (NE/OS), NE/NE, and NE/Craft communications. This system give the possibility to create circuits end to end with automatic commissioning of the traversed PDH and SDH nodes.
The HX9416R structure with two CPU/Aggregate HX9400R-CC16 give it the possibility to deploy different topologies of SDH aggregates and tributaries. This configuration support 2 SNCP ring STM1/4/16 or 2 MSP 1+1 or one SNCP + MSP (1+1) STM1/4/16 ring with 4 fibers or 4 independent STM1/4/16.

Each interface STM1, STM4 or STM16 are independent and can be selected by the selection of optical module or the settling for multi-rate SFP module.
This mains interfaces are also supporting serial or bus topologies as a drop insert (ADM) or as a simple or double Terminal Multiplexer (TM). The HX9400R can also provide a mix of ring and TM. This can be STM1 or STM4 link depending on settling and optical module selection.
The SNCP MESH feature gives the possibility to mix several SNCP protection and to share VC4-x-pipe with different circuits protected in SNCP. This is possible only with HX9400R-CC16 CPU/Cross-connect. It is possible at VC4, VC3 or VC12 level.

**CCU16 SNCP Ring Configuration:**
- 2 * CC16 aggregate STM-16 Ring
- 8 * STM-1 Ring (Tributary)
  - 2 * STM-1 Slot 1&3
  - 2 * STM-1 Slot 2&4
  - 2 * STM-1 Slot 5&7
  - 2 * STM-1 Slot 6&8
- 2 * STM-4 Ring (Tributary)
  - 1 * STM-4 Slot 1&3
  - 1 * STM-4 Slot 5&7

**Capacity BW Slot:**
- Trib Group #1 = 4 *VC4 Slot 1&2
- Trib Group #2 = 4 *VC4 Slot 3&4
- Trib Group #3 = 4 *VC4 Slot 5&6
- Trib Group #4 = 4 *VC4 Slot 7&8

Or 2 VC4 per Slot for E1, Ethernet
### HX9416R Capacity with 2 CC16

<table>
<thead>
<tr>
<th>TRIBUTARY GROUP</th>
<th>TG 1</th>
<th>TG 2</th>
<th>AGGREGATES</th>
<th>TG 3</th>
<th>TB4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SLOTS</strong></td>
<td></td>
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<tr>
<td><strong>GLOBAL PAYLOAD SDH</strong></td>
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<tr>
<td>4 X 155M</td>
<td>N/A</td>
<td>4 X 155M</td>
<td>2 x 2.5G</td>
<td>4 X 155M</td>
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<tr>
<td>2 x 155M</td>
<td>2 x 155M</td>
<td>2 x 155M</td>
<td>2 x 155M</td>
<td>2 x 155M</td>
<td>2 x 155M</td>
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</tbody>
</table>

| **Link without MSP** |      |      |            |      |     |
| STM-1             | STM-1 | STM-1 | STM-1 | STM-1 | STM-1 |
| (2 ports)         | (2 ports) | (2 ports) | (2 ports) | (2 ports) | (2 ports) |
| STM-4             | N/A   | STM-4 | N/A   | STM-4 | N/A |

| **Link with MSP (1+1)** |      |      |            |      |     |
| STM-1             | STM-1 | STM-1 | STM-1 | STM-1 | STM-1 |
| (2 ports)         | (2 ports) | (2 ports) | (2 ports) | (2 ports) | (2 ports) |
| STM-4             | STM-4 | STM-4 | STM-4 | STM-4 | STM-4 |
| (2 ports)         | (2 ports) | (2 ports) | (2 ports) | (2 ports) | (2 ports) |

| Maxi 504 E1       | 63 E1 | 63 E1 | 63 E1 | 63 E1 | 63 E1 |
| or 252 (1+1)     | 63 E1 | 63 E1 (P) | 63 E1 | 63 E1 | 63 E1 |
| Max. 24 E3       | 3 E3  | 3 E3  | 3 E3  | 3 E3  | 3 E3  |
| or 12 (1+1)      | 3 E3  | 3 E3 (P) | 3 E3  | 3 E3 (P) | 3 E3 (P) |

| 64 FE or 8 GE w/o protection | 8 FE or1 GE | 8 FE or1 GE | 8 FE or1 GE | 8 FE or1 GE | 8 FE or1 GE |
| 64 FE or 8 GE w 1+1 protection | 8 FE or1 GE (P) | 8 FE or1 GE (P) | 8 FE or1 GE (P) | 8 FE or1 GE | 8 FE or1 GE |

| 56 FOM w/o protection | 7 FOM | 7 FOM | 7 FOM | 7 FOM | 7 FOM |
| 56 FOM w 1+1 protection | 7 FOM | 7 FOM | 7 FOM | 7 FOM | 7 FOM |

| Max. 24 E3       | 3 E3  | 3 E3  | 3 E3  | 3 E3  | 3 E3  |
| or 12 (1+1)      | 3 E3  | 3 E3 (P) | 3 E3  | 3 E3 (P) | 3 E3 (P) |

| Maxi 504 E1       | 63 E1 | 63 E1 | 63 E1 | 63 E1 | 63 E1 |
| or 252 (1+1)     | 63 E1 | 63 E1 (P) | 63 E1 | 63 E1 | 63 E1 |
| Max. 24 E3       | 3 E3  | 3 E3  | 3 E3  | 3 E3  | 3 E3  |
| or 12 (1+1)      | 3 E3  | 3 E3 (P) | 3 E3  | 3 E3 (P) | 3 E3 (P) |

| 64 FE or 8 GE w/o protection | 8 FE or1 GE | 8 FE or1 GE | 8 FE or1 GE | 8 FE or1 GE | 8 FE or1 GE |
| 64 FE or 8 GE w 1+1 protection | 8 FE or1 GE (P) | 8 FE or1 GE (P) | 8 FE or1 GE (P) | 8 FE or1 GE | 8 FE or1 GE |

| Maxi 504 E1       | 63 E1 | 63 E1 | 63 E1 | 63 E1 | 63 E1 |
| or 252 (1+1)     | 63 E1 | 63 E1 (P) | 63 E1 | 63 E1 | 63 E1 |
| Max. 24 E3       | 3 E3  | 3 E3  | 3 E3  | 3 E3  | 3 E3  |
| or 12 (1+1)      | 3 E3  | 3 E3 (P) | 3 E3  | 3 E3 (P) | 3 E3 (P) |

| 64 FE or 8 GE w/o protection | 8 FE or1 GE | 8 FE or1 GE | 8 FE or1 GE | 8 FE or1 GE | 8 FE or1 GE |
| 64 FE or 8 GE w 1+1 protection | 8 FE or1 GE (P) | 8 FE or1 GE (P) | 8 FE or1 GE (P) | 8 FE or1 GE | 8 FE or1 GE |

| Maxi 504 E1       | 63 E1 | 63 E1 | 63 E1 | 63 E1 | 63 E1 |
| or 252 (1+1)     | 63 E1 | 63 E1 (P) | 63 E1 | 63 E1 | 63 E1 |
| Max. 24 E3       | 3 E3  | 3 E3  | 3 E3  | 3 E3  | 3 E3  |
| or 12 (1+1)      | 3 E3  | 3 E3 (P) | 3 E3  | 3 E3 (P) | 3 E3 (P) |

| 64 FE or 8 GE w/o protection | 8 FE or1 GE | 8 FE or1 GE | 8 FE or1 GE | 8 FE or1 GE | 8 FE or1 GE |
| 64 FE or 8 GE w 1+1 protection | 8 FE or1 GE (P) | 8 FE or1 GE (P) | 8 FE or1 GE (P) | 8 FE or1 GE | 8 FE or1 GE |

| Maxi 504 E1       | 63 E1 | 63 E1 | 63 E1 | 63 E1 | 63 E1 |
| or 252 (1+1)     | 63 E1 | 63 E1 (P) | 63 E1 | 63 E1 | 63 E1 |
| Max. 24 E3       | 3 E3  | 3 E3  | 3 E3  | 3 E3  | 3 E3  |
| or 12 (1+1)      | 3 E3  | 3 E3 (P) | 3 E3  | 3 E3 (P) | 3 E3 (P) |
HX9400R-6U  Main chassis 6U, STM1/4/16 or OC3/12/48 modular system w/o modules, CPU & power supply
HX9400R-CB  Connector board (1 per chassis)
HX9400R-FAN  FAN board (1 per chassis)
HX9400R-CC4  CPU card with cross-connect and 2 aggregate STM1/4 or OC3/12 with 2 SFP slots w/o SFP module (2 per chassis)
HX9400R-CC16  CPU card with cross-connect and 2 aggregate STM1/4/16 or OC3/12/48, with 2 SFP slots w/o SFP module (2 per chassis)
HX9400R-DC48  DC power supply for HX9400-6U, -48v (2 per chassis)
HX9400R-ACDC  AC power supply for HX9400-6U and DC 48v (2 per chassis)

TRIBUTARY CARDS

HX4000-ADSTM1/4  ADM for 2 STM1 or 1 STM4 with 2 SFP slots
HX4000-16E1/T1 or E1-75  Tributary card 16 E1-120ohms and 16 T1-100ohms or 16 E1-75ohms
HX4000-32E1/T1 or E1-75  Tributary card 32 E1-120ohms and 32 T1-100ohms or 32 E1-75ohms
HX4000-43E1/T1 or E1-75  Tributary card 63 E1-120ohms and 63 T1-100ohms or 63 E1-75ohms
HX4000-RDSE3  Tributary card 3 E3 or 3 DS3
HX4000-RDSM13  Software M13 for HX9400R-RDSM3E, support only DS3 to 21E1 or to 2B1T
HX4000-10GTX-8TXX  Ethernet tributary card manageable switch level 2 with 1000BaseT and 8 x 10/100BaseT, 8 WAN, GE and FE cannot be used together, support E-LINE and E-LAN
HX4000-2GTX-8TXX  Ethernet tributary card manageable without switch, 1 x 1000BaseT and 8 x 10/100BaseT, 8 WAN, GE and FE cannot be used together, support E-LINE only
HX4000-2CB-2GQF  Ethernet tributary card manageable with switch, 2x 10/100/1000BaseT and 2 Combo 10/100/1000BaseT and 2 SFP, 64 WAN support E-Line and E-WAN.

SFP MODULES

SFP-STMI-E  SFP module STM1 electrical
SFP-STMI-MM2  SFP module 100FX, STM1 - OC3 single mode 1310 for 2km, LC
SFP-STMI-SM30D  SFP module 100FX, STM1 - OC3 single mode 1310 for 30km, LC, w ith DDM
SFP-STMI-SM50D  SFP module 100FX, STM1 - OC3 single mode 1310 for 50km, LC, w ith DDM
SFP-STMI-SM15-W13  SFP module 100FX, STM1 - OC3 single mode CWDM 1310 for 10km, LC, must be used face to SFP-100FX, STM1 - OC3-SM15-W13-LC
SFP-STMI-SM15-W15  SFP module 100FX, STM1 - OC3 single mode CWDM 1550 for 10km, LC, must be used face to SFP-100FX, STM1 - OC3-SM15-W15-LC
SFP-STMI-SM50-W13  SFP module 100FX, STM1 - OC3 single mode CWDM 1310 for 60km, LC, must be used face to SFP-100FX, STM1 - OC3-SM50-W13-LC
SFP-STMI-SM50-W15  SFP module 100FX, STM1 - OC3 single mode CWDM 1550 for 60km, LC, must be used face to SFP-100FX, STM1 - OC3-SM50-W15-LC
SFP-STMI-SM100-15D  SFP module 100FX, STM1 - OC3 single mode 1550 for 100km, LC, w ith DDM
SFP-STMI-SM120-15D  SFP module 100FX, STM1 - OC3 single mode 1550 for 120km, LC, w ith DDM
SFP-STMI-SM160-15D  SFP module 100FX, STM1 - OC3 single mode 1550 for 160km, LC, w ith DDM
SFP-STMI-SM200-15D  SFP module 100FX, STM1 - OC3 single mode 1550 for 200km, LC, w ith DDM
SFP-STMI-SM240-15D  SFP module 100FX, STM1 - OC3 single mode 1550 for 260km, LC, w ith DDM
SFP-STMI-SM80-CxxD  SFP module 100FX w ith DDM, CWDM lambda au choix de 1430 to 1610nm, budget 29 dB for 80km, connector LC

SFP-STM16-SM15D  SFP module STM16/OC12 single mode single 1310 DBF for 15km, LC, w ith DDM
SFP-STM16-SM30D  SFP module STM16/OC12 single mode single 1310nm for 30km, LC, w ith DDM
SFP-STM16-SM40D  SFP module STM16/OC12 single mode single 1310nm for 40km, LC, w ith DDM
SFP-STM16-SM50D  SFP module STM16/OC12 single mode single 1310nm for 50km, LC, w ith DDM
SFP-STM16-SM80-15D  SFP module STM16/OC12 single mode single 1310nm for 80km, LC, w ith DDM
SFP-STM16-SM100-15D  SFP module STM16/OC12 single mode single 1310nm for 100km, LC, w ith DDM
SFP-STM16-SM120-15D  SFP module STM16/OC12 single mode single 1310nm for 120km, LC, w ith DDM
SFP-STM16-SM160-15D  SFP module STM16/OC12 single mode single 1310nm for 160km, LC, w ith DDM
SFP-STM16-SM200-15D  SFP module STM16/OC12 single mode single 1310nm for 200km, LC, w ith DDM
SFP-STM16-SM240-15D  SFP module STM16/OC12 single mode single 1310nm for 260km, LC, w ith DDM
SFP-STM16-SM80-CxxD  SFP module STM16/OC12 single mode single 1310nm for 80km, connector LC
SFP-STM16-SM80-CxxC  SFP module STM16/OC12 single mode single 1310nm for 80km, connector LC
SFP-STM16-SM100-CxxC  SFP module STM16/OC12 single mode single 1310nm for 100km, connector LC
SFP-STM16-SM120-CxxC  SFP module STM16/OC12 single mode single 1310nm for 120km, connector LC
SFP-STM16-SM160-CxxC  SFP module STM16/OC12 single mode single 1310nm for 160km, connector LC
SFP-STM16-SM200-CxxC  SFP module STM16/OC12 single mode single 1310nm for 200km, connector LC
SFP-STM16-SM240-CxxC  SFP module STM16/OC12 single mode single 1310nm for 260km, connector LC
SFP-STM16-SM80-CxxD  SFP module STM16/OC12 single mode single 1310nm for 80km, connector LC
SFP-STM16-SM80-CxxCC  SFP module STM16/OC12 single mode single 1310nm for 80km, connector LC
SFP-STM16-SM100-CxxCC  SFP module STM16/OC12 single mode single 1310nm for 100km, connector LC
SFP-STM16-SM120-CxxCC  SFP module STM16/OC12 single mode single 1310nm for 120km, connector LC
SFP-STM16-SM160-CxxCC  SFP module STM16/OC12 single mode single 1310nm for 160km, connector LC
SFP-STM16-SM200-CxxCC  SFP module STM16/OC12 single mode single 1310nm for 200km, connector LC
SFP-STM16-SM240-CxxCC  SFP module STM16/OC12 single mode single 1310nm for 260km, connector LC
SFP-STM16-SM80-CxxC  SFP module STM16/OC12 single mode single 1310nm for 80km, connector LC
SFP-STM16-SM80-CxxCC  SFP module STM16/OC12 single mode single 1310nm for 80km, connector LC
SFP-STM16-SM100-CxxCC  SFP module STM16/OC12 single mode single 1310nm for 100km, connector LC
SFP-STM16-SM120-CxxCC  SFP module STM16/OC12 single mode single 1310nm for 120km, connector LC
SFP-STM16-SM160-CxxCC  SFP module STM16/OC12 single mode single 1310nm for 160km, connector LC
SFP-STM16-SM200-CxxCC  SFP module STM16/OC12 single mode single 1310nm for 200km, connector LC
SFP-STM16-SM240-CxxCC  SFP module STM16/OC12 single mode single 1310nm for 260km, connector LC

SDH STM16/4/1 INFRASTRUCTURE
**Physical/Electrical**

**HX9400R-6U**
- 6U chassis 433mm x 264mm x 223,5mm (W/H/D)

**HX9x0R-FILTER**
- 0,5U chassis 433mm x 22mm x 223,5mm (W/H/D)

**HX9x0R-FILTER-CBL-T**
- 2U chassis 433mm x 88mm x 223,5mm (W/H/D)

**AC Power**
- 90 to 240 VAC, 50/60Hz

**DC 48v Power**
- -36 to ~72 Vdc ± 15%

**DC 24v Power**
- By use of DC 48v card and a 1U 19” chassis with dual channel converter 24V to 48V the **DCDC-2X24-48-300W-1U**
- DC 17 to 31 V to DC 48 V 300W each channel

**Temperature**
- -5 to +55°C

**Humidity**
- 0-95%RH (non-condensing)

**Mounting**
- Desk-top stackable, 19/23 inch rack mountable supply with brackets, and wall mountable

**EOW**
- RJ-45

**LAN port**
- RJ-45

**Console port**
- DB-9 and Ethernet

**E1/T1 interface connector**
- SCSII-II 68 pins

**Optical Interface connector**
- SFP module with LC connectors

**Number of Optical STM-x**
- Up to 4 STM16, 4 STM4 or 16 STM1

**Number of E1/T1 channels**
- Card of 16E1/T1, 32 E1/T1 or 63 E1/ 63T1

**Clock Source**

**Up to 4 clocks with priority from**:
- Internal,
- STM-N Line 4 aggregate or 6 tributaries,
- 2 External input 2MHz or G704 w or w/o SSM,
- E1 PDH source,
- 2 output clocks

**Management Interface**

**Conso port**
- DB9F, RS232 DCE, user interface VT100 menu driven

**Standard**
- SNMP V1 and V3 (RFC1213, RFC2571 to RFC2575)

**OSS interface**
- 10/100BaseT FE (IEEE 802.3u ), Telnet and SSH V2

**NE/NE interface**
- DCC/HDL/Ethernet type II

**Alarm Input/Output**

**Inputs**

- **Ports**
  - 4
  - Activation current: 3 mA
  - Internal resistance: 1K
  - Deactivation current: 1.5 mA
  - Connectors: RJ45

**Outputs**

- **Ports**
  - 4
  - Maximum switching voltage: 110 Vdc, 125 Vac
  - Initial insul. resist.: Min. 100M ohm (at 500Vdc)
  - Connectors: RJ45
  - Use: SNMP TRAP or Transmission from Input to Output

**Standards Compliance**

**ITU-T**
- T1.105, T1.107

**ANSI**
- T1.105, T1.107

**IEEE**
- 802.1q & 802.1ad(VLAN), 802.1w(RSTP), 802.1s(MSTP), 802.3x(flow control), 802.3u, 802.1p(QoS)

**Certification**

**EMC:**
- FCC Part 15 Subpart B, Class A; EN 55022, Class A; EN55024; EN300 386
- * In test for DC48v only:
- IEC61950-3, IEEE1613 for utilization in electric substation

**SAFETY:**
- IEC60950-1/EN 60950-1
**Specifications 2/4**

**Maximum Cross-connect Aggregate module HX9416R**
- HX9400R-CC16 owns dual SFP STM1/4/16 or OC3/12/48 ports, supports 2 x 16 VC4 Payload
- Chassis support maximum 2 HX9400R-CC16 or supports 4 x 16 VC4 Payload aggregate

**Maximum Number of Tributary Modules**
- 4 STM4/OC12
- 16 STM1/OC3
- 504 E1/T1 Tributaries
- 24x DS3/E3 Tributaries
- 8 x Gigabit Ethernet Tributaries

**Optical STM16/STM4/STM1 aggregate line: HX9400R-CC16 card**
- Card: CPU with 2 SFP slot for STM1/4/16 or OC3/12/48 modules
- SFP module w DDM: Dual uni-directional fiber 1310 or 1550nm up to 160km in STM16
  - Single bi-directional fiber WDM 1310 and 1550nm up to 50km in STM4
  - Dual uni-directional fiber CWDM 80km
- Long distance fiber: CXR can provide solution with E DFA-PA, E DFA-BA and Raman Amplifier to reach maximum: 310km for STM1/STM4 and 260km for STM16
- CPU: Fiber section is independent of the CPU, the Fiber section can work if the CPU is off.

**Tributary STM1/STM4 card HX9400R-ADSTM1/4**
- Optical interfaces: 2 SFP slots for 2 STM1 or 1 STM4 modules
- Payload support: See table with according to the tributaries groups # 1, 2, 3 and 4
- Maximum number of card:
  - 8 cards with 2 SFP STM1
  - 4 cards with 1 SFP STM4
  - 4 +4 cards with 1 SFP STM4 in 1+1 protection

**Tributary 4STM1/OC3 card HX9400R-4STM1-OC3**
- Q2 2013
- Optical interfaces: 4 SFP slots for 4 STM1/OC3 module
- Payload support: See table with tributaries groups # 1, 2, 3 and 4, usable with HX9416R only

**Tributary 7 FOM for QX3440 card HX9400R-7FOM-4E1**
- Optical interfaces: 7 SFP slot for 7 FO link to QX3440-4E14FO in QX3440, QX3440S and QX3440D
- Use SFP: SFP-STM1-MM or SMxx
- Payload support: 7 x 4 E1 with independent clock
- MSP 1+1: 2 cards support 7 link of 4E1 to QX3440 with 1+1 PDH protection.
**SPECIFICATIONS**

**Tributary 16/32/63 E1 card: HX9400R-16E1/T1 or HX9400R-16E1-75**
- Line Rate: 2.048 Mbps ± 50 ppm
- Framing: Unframed, Framing monitor on receiving side
- Line Code: AMI/HDB3
- Input/Output Signal: ITU G.703
- Impedance: 75ohms or 120ohms on order

**Tributary 16/32/63 T1 card: HX9400R-16E1/T1**
- Line Rate: 1.544 Mbps ± 32 ppm
- Framing: Unframed
- Line Code: AMI/B8ZS
- Output Signal: DSX-1 w/short haul
- Impedance: 100ohms

**Tributary 3 E3 card: HX9400R-3DS3E3**
- Data Rate: 34.368 Mbps ± 20ppm
- Framing: Unframed
- Line Code: HD83
- Connector: BNC connector
- Impedance: 75 Ohm Coax

**Tributary 3 DS3 card: HX9400R-3DS3E3**
- Data Rate: 44.736 Mbps ± 20ppm
- Framing: Unframed
- Line Code: B32S
- Connector: BNC connector
- Impedance: 75 Ohm Coax

**Software HX9400R-DS3M13**
- M13: Support multiplexing from one DS3 to 28 T1
- G.747: Support multiplexing from one DS3 to 21 E1
- E13: Attention NO NOT supports multiplexing from one E3 to x E1
**SPECIFICATIONS**

**Tributary Ethernet/Gigabit Ethernet card: HX9400R-GTX-8TTX**

<table>
<thead>
<tr>
<th>Line Rate</th>
<th>Mapping</th>
<th>Mode</th>
<th>Point-to-Point</th>
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<tbody>
<tr>
<td>8 x 10/100 Mbps RJ45</td>
<td>n x VC12, n x VC3 or n x VC4</td>
<td>E-Line</td>
<td>FE and GE can’t work together</td>
<td>VCAT, GFP(G.7041), LAPS, LCAS (G.7042) and non-LCAS</td>
</tr>
<tr>
<td>1 x 10/100/1000Mbps RJ45</td>
<td>Maximum 1 WAN or 622Mbps</td>
<td>Non switch card support 8 E-Line mode</td>
<td>Or 8 WAN 155Mbps</td>
<td></td>
</tr>
</tbody>
</table>

**Tributary Ethernet/Gigabit Ethernet switch card: HX9400R-SWM-GTX-8TTX**

<table>
<thead>
<tr>
<th>Line Rate</th>
<th>Mapping</th>
<th>Mode</th>
<th>Layer2 Protocol</th>
<th>Process Protocol</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 x 10/100Mbps RJ45</td>
<td>n VC12, nVC3 or nVC4, Maximum 622Mbps</td>
<td>E-Line</td>
<td>FE and GE can’t work together</td>
<td>VCAT, GFP(G.7041), LAPS, LCAS (G.7042) and non-LCAS</td>
</tr>
<tr>
<td>1 x 10/100/1000 Mbps RJ45</td>
<td>Maximum 8 WAN</td>
<td>E-LAN</td>
<td>QoS</td>
<td>BCP-PPP or EoS Layer 2 RFC2615 (Q4 2009)</td>
</tr>
</tbody>
</table>

**Tributary Gigabit Ethernet switch card: HX9400R-2TGX-2UCB**

This support will be particularly use with HX9400RA chassis TG2 wich will support 2.4Gbps but will also work on other models with less WAN bandwidth;

<table>
<thead>
<tr>
<th>Line Rate</th>
<th>Mapping</th>
<th>Mode</th>
<th>Layer2 Protocol</th>
<th>Process Protocol</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 ports Gigabit Ethernet</td>
<td>n VC12, nVC3 or nVC4, Maximum 1GE per WAN</td>
<td>E-Line</td>
<td>Maximum 64 WAN</td>
<td>VCAT, GFP(G.7041), LAPS, LCAS (G.7042) and non-LCAS</td>
</tr>
<tr>
<td>2 Optical ports with SFP 1000SX/LX</td>
<td></td>
<td>E-LAN</td>
<td></td>
<td>BCP-PPP or EoS Layer 2 RFC2615 (Q4 2009)</td>
</tr>
<tr>
<td>2 Combo 10/100/1000BaseT and SFP 1000SX/LX</td>
<td></td>
<td>Port-MAP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Support 2.4Gbps or 16 VC4</td>
<td></td>
<td>Port-Trunking</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Need future chassis HX9400RA</strong></td>
<td></td>
<td>Point-to-point</td>
<td>8 Gbps of switching matrix</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maximum 1GE per WAN</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Q1 2012**

Layer2 Protocol:
- RSTP (802.1W), VLAN (802.1Q, 802.1P)
- Flow Control (802.3X)
- MSTP (802.1S)
- IGMP Snooping
- QoS

Process Protocol:
- VCAT, GFP(G.7041), LAPS, LCAS (G.7042) and non-LCAS
- BCP-PPP or EoS Layer 2 RFC2615 (Q4 2009)