NEC’s Metro WDM TM-Series

Carrier Class Optical Transport Solutions for Metro/Regional Networks

**NEC’s Metro WDM TM-Series**

**TRANSPORTERS**

**2.5G**

<table>
<thead>
<tr>
<th>Model</th>
<th>Transponder Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TP10G5/2</td>
<td>MultiRate FEC</td>
<td>Transponder with 20 x 10/100/1000Mb/s units</td>
</tr>
<tr>
<td>TPQAR</td>
<td>MultiRate</td>
<td>Transponder with 16 x 10/100/1000Mb/s units</td>
</tr>
<tr>
<td>TPQMB</td>
<td>MultiService</td>
<td>Transponder with 4 x STM-16/OC-48 units</td>
</tr>
<tr>
<td>TM-100/102</td>
<td>MultiService</td>
<td>Transponder with 2 x STM-16/OC-48 units</td>
</tr>
</tbody>
</table>

**4G**

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<tbody>
<tr>
<td>TP10G5/4</td>
<td>MultiRate FEC</td>
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<td>TPQAR</td>
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**10G**

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<tr>
<th>Model</th>
<th>Transponder Type</th>
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<tbody>
<tr>
<td>TP10G10</td>
<td>MultiRate FEC</td>
<td>Transponder with 20 x 10/100/1000Mb/s units</td>
</tr>
<tr>
<td>TPQAR</td>
<td>MultiRate</td>
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**LINE CARDS**

**CMX**

<table>
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<th>Model</th>
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<tbody>
<tr>
<td>CMX100</td>
<td>100-port CMX for STM-16/OC-48 (and above)</td>
</tr>
<tr>
<td>CMX400</td>
<td>400-port CMX for STM-16/OC-48 (and above)</td>
</tr>
</tbody>
</table>

**TIME-DIVISION MULTIPLEXERS**

<table>
<thead>
<tr>
<th>Model</th>
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</thead>
<tbody>
<tr>
<td>TM-1001</td>
<td>1001-port TDM for STM-16/OC-48 (and above)</td>
</tr>
<tr>
<td>TM-1002</td>
<td>1002-port TDM for STM-16/OC-48 (and above)</td>
</tr>
</tbody>
</table>

**CHASSIS**

- **TM-3000**
  - Options: 17 full-sized / 10 half-sized units
  - Primary power: 110/230V AC or -48V DC, Max 700W
  - Mounting: ETSI, 19" or 23" racks
  - Size: height: 1U/44mm

- **TM-301**
  - Options: 4 full-sized / 4 half-sized units
  - Primary power: 110/230V AC or -48V DC, Max 120W
  - Mounting: ETSI, 19" or 23" racks
  - Size: height: 3U/133mm

- **TM-1001/1002**
  - Options: 1 full-sized / 1 half-sized units
  - Primary power: 115/230V AC or -48V DC, Max 90W
  - Mounting: ET45, 19" or 23" racks
  - Size: height: 1U/44mm

**MANAGEMENT SYSTEM**

- **SNMP (TM-Series)**
  - End-to-end circuit export: SNMPv3 (TM-Series)
  - Co management: Proprietary TMF 854 compliant
  - Performance management: Proprietary

- **SNMP (v3)**
  - End-to-end circuit export: SNMPv3 (TM-Series)
  - Co management: Proprietary TMF 854 compliant
  - Performance management: Proprietary

- **SNMP (v3)**
  - End-to-end circuit export: SNMPv3 (TM-Series)
  - Co management: Proprietary TMF 854 compliant
  - Performance management: Proprietary

**Other Features**

- **Network Management Systems (NMS)**
  - Browsers: Internet Explorer, Firefox
  - Protocols: HTTP, FTP, Telnet

**For more information, visit:**

http://www.nec.com/global/solutions/nsp/
**Carrier Class Optical Transport Solutions for Metro/Regional Networks**

**Platform Description**

The cornerstone of the TM-Series solution is a unique system architecture based on iWDM™ (intelligent WDM) technology providing highest flexibility, lowest investment and lowest operations costs.

The TM-Series is an integral part of the NEC family of optical transmission solutions which extends all the way from transoceanic cable systems to the last mile of the access network.

The TM-Series gives unique advantages for any operator within the competitive metro/regional environment. Within a TM-Series network you can carry IP, SDH/SONET, SAN or Video services under the same management platform for true end-to-end control with minimum OpEx.

The TM-Series DWDM application includes two concepts of DWDM networking:

1. An un-amplified, single-fiber configuration utilizing optical add/drop filters that are perfect for metro networks with dynamic traffic patterns and a mix of small and larger access nodes.
2. Amplified fiber-pair configurations utilizing optical Mux/Demux units for long-haul point-to-point networks, up to ~1000km using multiple line amplifier sites that can be combined with passive add/drop filters or ROADM technology to create intermediate OADM nodes.

The TM-Series iWDM technology enables building of networks where DWDM and CWDM solutions can be combined on the same fiber, both in single-fiber as well as fiber-pair configurations.

**Transmission Network Manager**

More complex networks can be managed using the network management solution Transmission Network Manager (TNM). This is a client-server based solution that can be installed on computers using Windows or Solaris operating systems (i.e. PCs and Unix workstations). TNM gives a total control of the network with alarm collection, performance management on circuit level plus configuration management over circuit level plus configuration management, security management, software upgrade, graphical interface etc. Alarm notification can as an option be provided via SMS or email.

Standardized management protocols (SNMP) are used to easy integration with other higher order management systems.

Some applications require the more powerful DWDM technology. This may be due to a number of reasons, such as:

- Need for high scalability in terms of wavelengths, e.g. 80 λ on 50GHz spacing
- Need for high capacity per wavelength, e.g. 40Gbit/s
- Longer distances, high fiber losses, etc.

The TM-Series is fully compatible with NEC’s end-to-end higher layer network management solution, the MS-5000.

This feature-rich NMS platform integrates a diverse range of nodes under a common management layer to provide point-and-click provisioning of services and connectivity, along with a full range of fault and performance management functions. This minimizes OpEx even when the network calls for a multiplicity of client signals, transmission media and network layers.

**CWDM – for lower capacity demands**

The majority of the traffic units are based on pluggable transceivers and can thus be used for CWDM as well as DWDM applications. Even 10Gbit/s traffic can be applied on CWDM networks via XFPs that provide up to 8 CWDM channels in the 1470 to 1610nm range.

The TM-Series iWDM™ concept enables transport of C/DWDM signals running at a rate of 2.5Gbit/s, 4Gbit/s and 10Gbit/s enabling a more cost efficient transport solution as compared to other C/DWDM solutions.

The TM-Series CWDM application provides two concepts of CWDM networking:

- Fiber-pair configuration for powerful CWDM solutions that easily can be combined with up to 80 DWDM channels, even amplified DWDM.

In practical multi-service network applications spanning the core, metro and access, transport solutions are commonly constructed of a wide variety of elements, mixing fiber and wireless transmission, and making interconnections at all layers from Layer 0 to Layer 3. The TM-Series is fully compatible with NEC’s end-to-end higher layer network management solution, the MS-5000.