

# 12-36 Channel DWDM Muxponders

## DarkStar® DQM10 Series



The DQM10 is part of XKL's DarkStar DWDM Muxponder family of products and is based on XKL's DarkStar architecture, the foundation for addressing today's IT challenges and scalable growth.

These systems enable customers to soft-configure the aggregate of 1G, 10G, and 100G services, including optical amplifiers for extending network reach, filters, protection solutions, and other optical components that are required for any optical network. Organizations can easily plan for increasing capacity to address bandwidth needs, as well as to meet the demand in the growth of mobile devices, streaming video, and bandwidth intensive applications.

The DQM10 systems are field upgradable appliances that grow from 120G to 240G or 360G, making them ideal for point-to-point applications, data center interconnect, as well as for those who are unsure about future bandwidth requirements.

DQM10 systems install in under an hour and are available in 1 rack unit (1U) or 2 rack unit (2U) configurations. A typical DQM10 (i.e., 12 DWDM channels) uses 90 watts of power, and has a data propagation latency of 36 nanoseconds (ns)\* per system (10G or 100G).

The DQM10 is a DWDM appliance. As such, network administrators can deploy and commission these systems in a fraction of the time it takes to deploy traditional optical transport equipment. Setting up the management network, as well as configuring services, are done in minutes. All the complexities of building an optical network are handled by the DQM10 system, leaving network administrators with confidence in their deployments.

\* Test equipment has timestamps with 20ns of resolution.

### More about this product...

#### Integrated System Architecture:

- Fully integrated optical components including DWDM Mux/Demux filter, Erbium-Doped Fiber Amplifier (EDFA), Dispersion Compensation Module (DCM)
- No layer 2/3 protocol processing, no data buffering. This is both a reliability and security feature; impossible to access transport data through management network.

#### System Level Features:

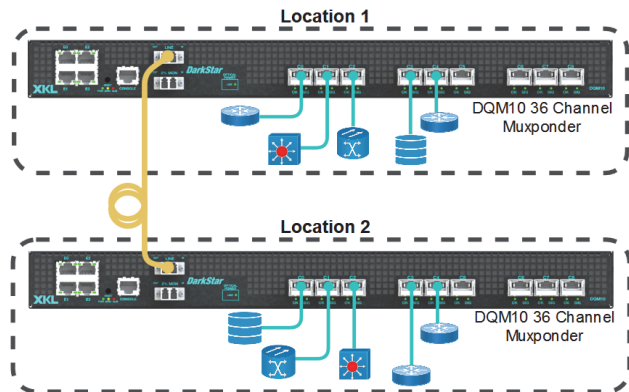
- Hot-swap components:
  - 1+1 redundant power supplies, supports AC and DC
  - Redundant fans
  - Laser transceivers: SFP+, QSFP+, and Optical Service Channel (OSC)
- Field-replaceable dual flash storage modules; one is write-protected
- Hitless software upgrades - no customer data loss
- System-wide watchdog timer to ensure software response

Also see "Technical Specifications" on back.

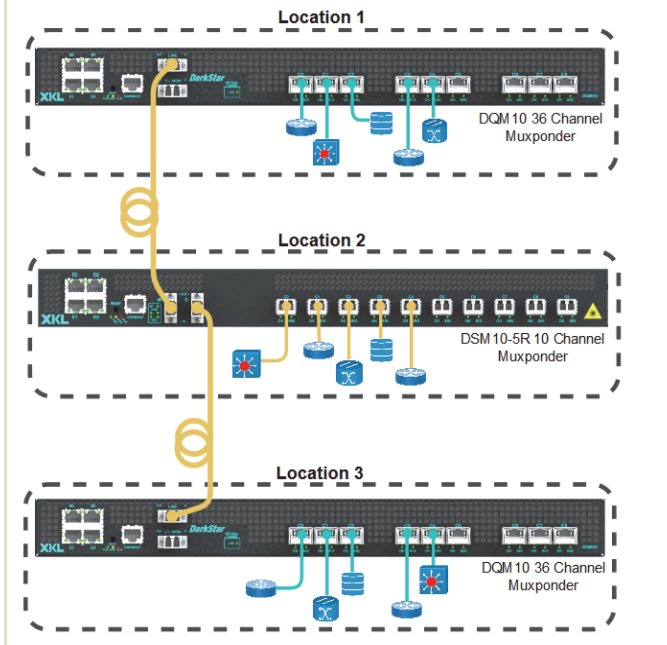


## Typical Use Cases

### 36 x 10G Point-to-Point



### 36 x 10G Linear Topology with Three Locations



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# 12-36 Channel DWDM Muxponders

## Technical Specifications

### Supported Topologies

Point-to-Point, Linear, and Protected (upcoming support)

### Capacity/Growth

120G per chassis.; grows in 120G increments up to 360G per chassis.; no external Mux/Demux filters are required.

### Network Management and Control Plane

#### Command line interface (CLI):

RS-232 serial console port  
TELNET and SSH

#### Dedicated management network:

4x 10BASE-T/100BASE-TX Ethernet ports  
IPv4/IPv6 dual stack  
IPv4 forwarding, RIP routing  
DHCP boot client, BOOTP relay  
DHCP server

#### Security:

Simple password  
Local account database  
RADIUS and TACACS+ client  
Host-based Access Control Lists (ACLs)

#### Monitoring:

Network Syslog, Local event log  
SNMP versions 1 and 2C  
RFC1213-MIB, SNMPv2-MIB, IF-MIB, XKL-MIB

#### Administration:

SNTP time synchronization client  
TFTP file transfer client  
Telnet remote command-line client  
Reboot and upgrade management operating system without interrupting customer data

#### Optical Service Channel

1

### Supported Reach

Links up to 140km, 2000km with DarkStar DLA systems (0.25dB/km of fiber loss)

### Supported Fiber Types

G.652, G.654, G.655 (others supported on demand)

### Product Configurations

12 Channel (120G), field upgradeable to 240G or 360G  
24 Channel (240G), field upgradeable to 360G  
36 Channel (360G)

Optionally includes: EDFA per-amp, EDFA booster, DCM, Optical Protection Switch (upcoming feature), various Client Interfaces, AC/DC power supplies, 1U or 2U chassis

### Optical Components/Characteristics

#### Wavelengths: ITU Grid Channels:

12 Channel: 20-31 grid channels  
24 Channel: 20-43 grid channels  
36 Channel: 20-55 grid channels

#### Wavelengths per Fiber Pair:

12 Channel: 12 wavelengths  
24 Channel: 24 wavelengths  
36 Channel: 36 wavelengths

#### Amplification: EDFA pre-amp, EDFA booster

#### Mux/Demux: 36 Channel Mux/Demux, 100GHz spacing

#### DCM: G.652, G.654, G.655 - up to 160km of dispersion compensation

#### Client-side Optics: QSFP+: 40GBase-SR4 (4 x 850nm), 40GBase-PSM4 (4 x 1310nm), 40GBase-LR4 (CWDM: 1271nm, 1291nm, 1311nm, 1331nm)

#### Line-side Optics: 1528.77nm-1566.31nm with 100GHz spacing

#### Integrated Filter Loss: 10dB (Typical 36 Channel Mux+Demux)

### Optical Protection

Optical Protection Switch (upcoming feature)

### Services

(All services are soft configurable.)

**Ethernet:** 1GE, 10GE, 10GE + FEC, 40GE (4 wavelengths), 100GE (10 wavelengths)

**SONET:** OC48/STM16, OC192/STM64, OC192 + FEC (OTU3)

**Fiber Channel:** 2G, 4G, 8G, 10G

### Client Interfaces

#### Number of client-side ports per system:

12 Channel: 3 x QSFP+  
24 Channel: 6 x QSFP+  
36 Channel: 9 x QSFP+

### Line Interfaces

#### Number of line-side ports per system:

12 Channel: 12 x tunable SFP+  
24 Channel: 24 x tunable SFP+  
36 Channel: 36 x tunable SFP+

### Physical Dimensions

IEC 60297-3 Compliant

**Height:** 1U (1.75"/44.5mm)/2U (3.5"/88.9mm)

#### Width/Depth:

1U: 16.9"/27.3" (29.5" with cable relief)  
429.3mm/693mm (749.3mm with cable relief)  
2U: 16.9"/17.5" (19.8" with cable relief)  
429.3mm/444.5mm (502.9mm with cable relief)

**Weight, minimum:** 32lbs/14.5kg (No options: EDFA, DCM, etc.)

### Power and Cooling

**Power input AC:** 90-264V AC, 50/60Hz

**Power input DC:** -40 to -75V DC

(1+1 redundant AC or DC, or both)

#### Power consumption, typical:

12 channel: 90W  
24 channel: 140W  
36 channel: 190W

### Environmental

**Operating temperature:** 0 to 50°C

**Storage temperature:** -40 to 70°C

**MTBF:** 87,600 hours

**Non-operating (Shock and Vibration):** ISTA-2A, IEC60068-2-6, 60068-2-64, 60068-2-27

### Laser Safety Classification

Class 1

### Regulatory Compliance

**UL:** IEC 60950-1(ed.1), IEC 60825-1:2007 (2nd Edition)

**FCC:** Conducted and Radiated Emissions, Part 15 Subpart B Sections 15.107 and 15.109 Class A

**CE:** EN55024 (1998 w/A1: 01 & A2: 03, EN61000-3-2 (2006), EN61000-3-3 (1995 w/A1:01 & A2:06), EN55022 (2006) Class A & CISPR 22 (2005) Class A

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