



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 aggregation of 1G - 10G services, including optical amplifiers for extending network reach, filters, protection solutions, and other optical components that are required for any optical network.

A network based on DQM10-12 systems, 12x10G channels, can grow to 48 channels. One way growth is accomplished is by stacking DQT400 systems, and cabling to the expansion ports of the DQM10-12. This creates a solution of 10G and 400G DWDM channels. The DQM10-12 contains the Mux/Demux filters and amplifiers that are shared with the DQT400 systems.

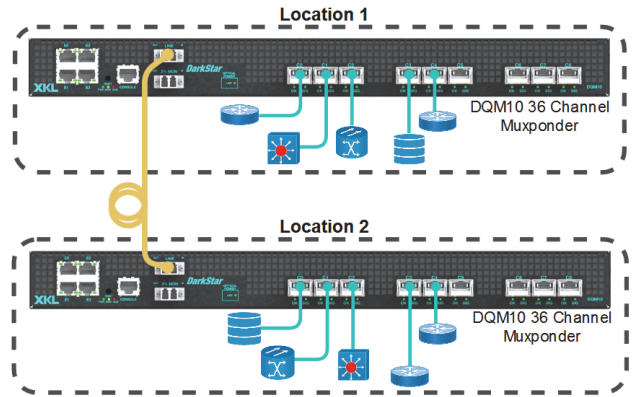
DQM10 systems install in under an hour and are available in 1 rack unit (1U) or 2 rack unit (2U) configurations. A typical DQM10 (i.e., 12 DWDM channels) uses 90 watts of power, and has a data propagation latency of 20 nanoseconds (ns) per system.

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.



Typical Use Cases

36 x10G Point-to-Point



More about this product...

Integrated System Architecture:

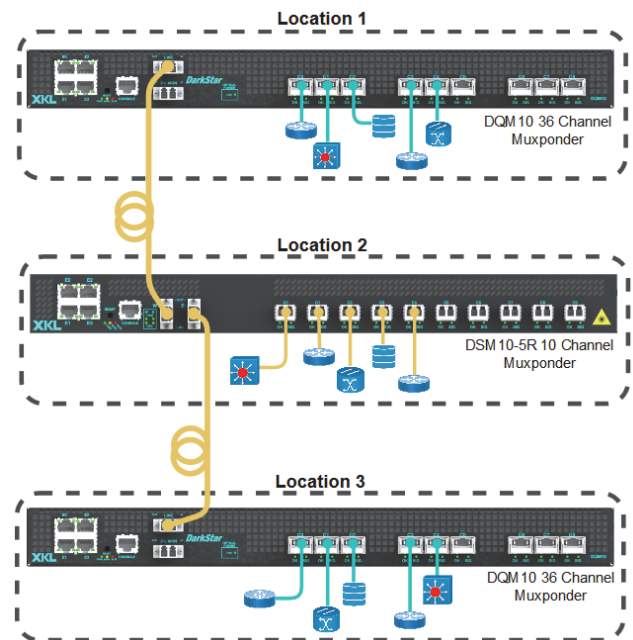
- Fully integrated optical components including DWDM Mux/Demux filter, Erbium-Doped Fiber Amplifier (EDFA), Dispersion Compensation Module (DCM).
- No layer 2/3 protocol processing, no data buffering. This is both a reliability and security feature; impossible to access transport data through management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

36 x 10G Linear Topology with Three Locations



**Supported Topologies**

Point-to-Point, Linear

Capacity/Growth

120G/240G/360G per chassis. Additional growth is accomplished by stacking DQT400 systems and using the expansion ports of the DQM10.

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)
24 Channel (240G)
36 Channel (360G)

Optionally included: EDFA per-amp, EDFA booster, DCM, various client interfaces, Integrated OTDR, 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)**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 DWDM SFP+
24 Channel: 24 x DWDM SFP+
36 Channel: 36 x DWDM 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"/18.8" (19.8" with cable relief)
429.3mm/477.5mm (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 62368-1:2014(ed.2), IEC 60825-1:2014(ed.3)

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

CE/UKCA: EN 55032 (2015) +A11, EN55035 (2017) +A11, EN 61000-3-2 (2014), EN 61000-3-3 (2013), CISPR 32 Class B, ICES-003 Issue 7