Product page >

Data Sheet

General Availability

Megaplex-4

Next Generation Multiservice Access Nodes

- Carrier-class multiservice platform: Ethernet services, high speed, low speed, analog voice, data, fiber multiplexing and pseudowire connectivity
- Central solution aggregating Ethernet and TDM services over fiber/copper from RAD CPEs towards SDH/SONET and/or PSN core networks
- MEF CE 2.0 certified, support of MEF applications: E-Line, E-LAN and E-TREE, with flexible mapping of user traffic into Ethernet flows
- Certified for IEEE-1613

Central site solution, major building block of RAD's portfolio for service providers, carriers and utilities, Megaplex-4 functions as a carrier-class, TDM and Ethernet aggregator, as well as a high capacity DS0 cross connect and next generation multiservice access node. It transports legacy and next-generation services over any infrastructure for seamless migration.

The Megaplex-4 family includes two devices: a larger 10-slot Megaplex-4100 and a compact 4-slot Megaplex-4104.

When deployed as a carrier-class Ethernet aggregator, Megaplex-4 can terminate Ethernet traffic carried over E1/T1/SHDSL/SHDSL.bis/fiber links or native Ethernet copper and fiber, as well as through a VCG in the SDH/SONET circuits. This traffic can then be switched either to a different PDH/TDM trunk or to Ethernet ports.

With RAD's Service Assured Access (SAA) capabilities, Megaplex-4 provides Carrier Ethernet functionalities, such as traffic management (TM), standards-based operations, Administration and Monitoring and Performance Monitoring (OAM&P).

Using pseudowire, Megaplex-4 provides legacy services over packet-switched networks (PSN) making it a fundamental building block in RAD's Service Migration Hybrid Access solution. Megaplex-4 converts the data stream from TDM/serial modules in the MP-4100/4104 chassis (E1/T1, SHDSL, data or voice ports) into IP or MPLS packets for transmission over Ethernet, IP or MPLS networks.

MARKET SEGMENTS AND APPLICATIONS

Various users can benefit from the Megaplex-4 solution:

- SDH/SONET customers who need to maximize bandwidth utilization of their network
- Subscribers with mixed Ethernet and TDM services
- Subscribers looking for a future-proof migration path to IP connectivity
- Dual network owners using SDH/SONET for voice, and packet for data.

Its ability to handle a broad range of Ethernet, data and voice services, as well as a large variety of network technologies in a single compact managed node, makes Megaplex-4 an ideal core/edge solution for carriers and service providers. It also provides a perfect fit for large enterprises, utilities and transportation companies that require an efficient way to transport and provision multiple legacy and next-generation services over their high capacity pipes.

RAD

Your Network's Edge®

Megaplex-4

Next Generation Multiservice Access Nodes

RESILIENCY

Carrier-Class Reliability

Carrier-class service reliability ensures continuous availability and sub-50ms restoration in the event of network outages through system redundancy options, link and path protection schemes and enhanced support for diverse ring topologies.

Traffic Duplication

Traffic Duplication, a unique technology available in Megaplex-4, allows networks with mission-critical applications to enhance reliability and performance. It can be used to minimize delay on critical utility applications (such as Teleprotection) by capitalizing on Carrier Ethernet reduced latency at higher speeds. Mission-critical traffic can be transported over a new Carrier Ethernet network running in parallel with the existing SDH/SONET network, while preparing for future, full service migration.

MANAGEMENT AND SECURITY

Megaplex-4 offers carrier-class provisioning features, including end-to-end path management, to ensure continuous service availability. Advanced SNMP management capabilities enable Megaplex-4 to control and monitor all network elements: SDH/SONET access and ring units, as well as remote POP and first mile broadband access feeders and CPEs.

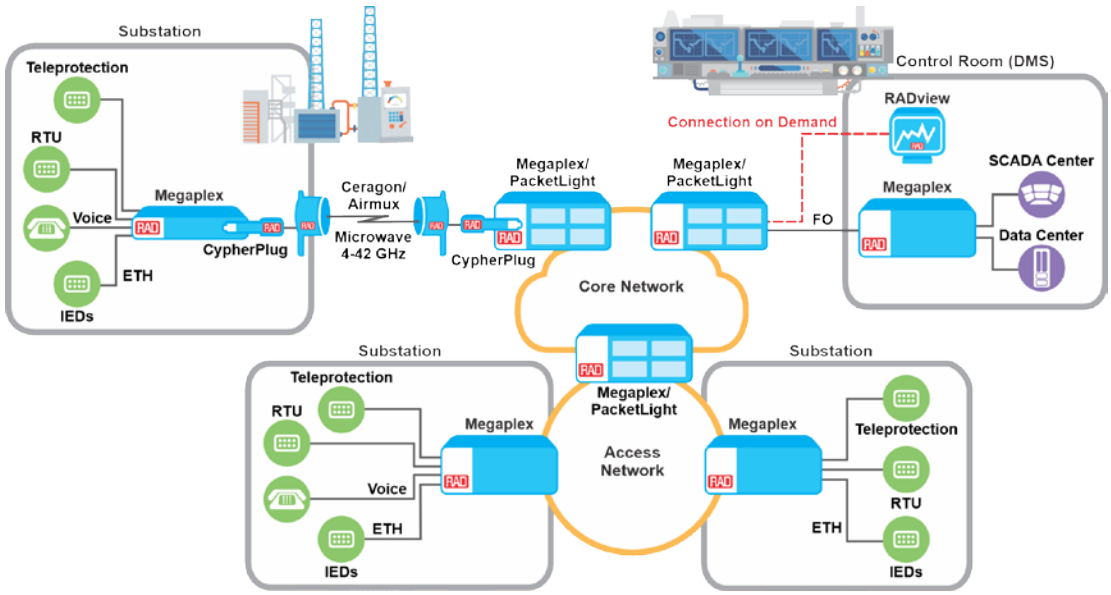

Figure 1. Megaplex-4 as Multiservice Platform with Diverse Interfaces and Access Topologies for U&T Market Segment

Megaplex-4

Next Generation Multiservice Access Nodes

Specifications

SDH/SONET INTERFACE

Number of Ports	2 per CL.2 module (4 per chassis)
Link Protection	1+1 unidirectional / bidirectional APS (G.841, Clause 7.1)
	1+1 bidirectional optimized APS (G.841 Annex B. Linear Multiplex Section (MSP)
Path Protection	1+1 unidirectional APS (G.842,Clause 6.2.3) - Ring interworking with a SNCP ring
Line Coding	NRZ
Connectors	SFP socket
Data Rate	STM-4/OC-12: 622.08 Mbps ± 4.6 ppm
	STM-1/OC-3:155.52 Mbps ± 4.6 ppm
Compliance	SDH: ITU-T G.957, G.798, G.783
	SONET: ANSI T1.105-1995, GR-253-core
	GFP (Generic Framing Procedure): ITU-T G.7041, ANSI T1-105.02, framed mode
	LCAS (Link Capacity Adjustment Scheme): ITU-T G.7042
Framing	SDH: ITU-T G.707, G.708, G.709
	SONET: GR-253-core

ETHERNET INTERFACES

Number of Ports	2 per CL.2 module (4 per chassis)
Data Rate	10/100/1000 Mbps
	Autonegotiation (copper interface only)
Connectors (per port)	RJ-45, shielded
	SFP socket
Maximum Frame Size	9600 bytes (for max. frame sizes supported by different I/O modules, see individual data sheets)
Compliance	CE 2.0, MEF 6 (E-Line – EPL and EVPL, E-LAN – EPLAN and EVPLAN, E-TREE), MEF 10, MEF 9, MEF 8 MEF 14, MEF 20, IEEE 802.3, 802.3u, 802.1q, 802.1p, 802.1X, 802.3ad, 802.3-2005, 802.3ah, 802.1ag, ITU-T Y.1731, G.8032
Service	EPL and EVPL (flow-based)
	E-LAN (EP-LAN and EVP-LAN), bridge-based
	E-TREE (bridge-based)
Bandwidth Profile	CIR/CBS, EIR/EBS per flow
Forwarding Mode	Flow-based, bridge-based
MAC Address Table	Up to 16K entries with configurable limiter
Operation Mode	VLAN-aware, VLAN-unaware

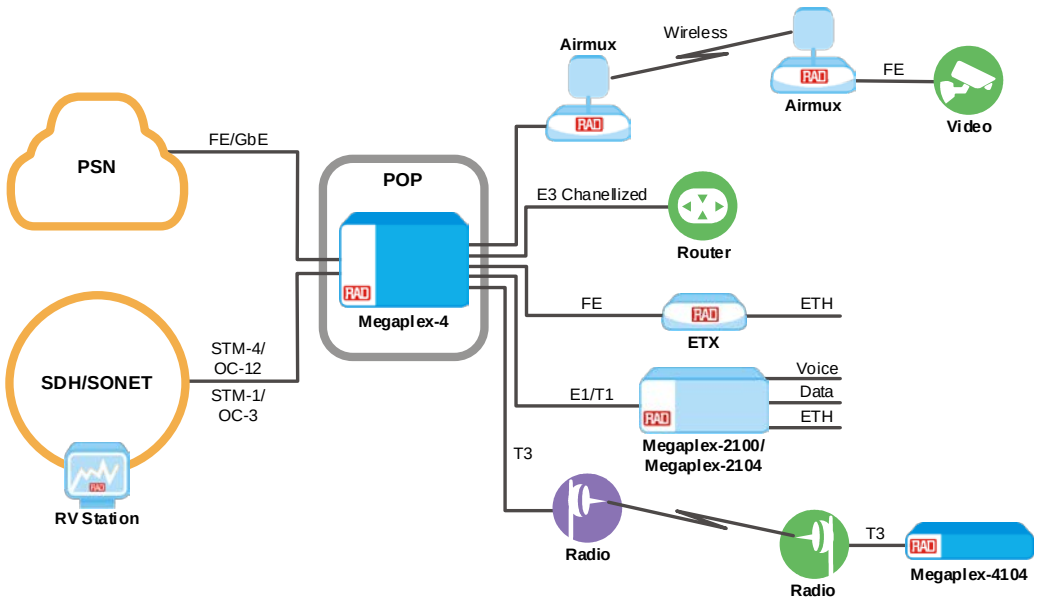

Figure 2. Megaplex-4 as a Central Site Aggregator for different RAD CPEs, Ethernet and TDM Aggregator for SDH/SONET and PSN

OAM	IEEE 802.3ah
	IEEE 802.1ag: CCM, Loopback, link trace, MEP ITU-T Y.1731, Frame-loss, Frame-delay, Frame-delay-variation, PM
Protection	Link aggregation supporting link and equipment protection
	Ethernet Ring Protection Switching complying with ITU-T G.8032 Hitless Switching Redundancy in Ring topology according to IEC 62439-3
	RSTP on network ports (CL.2/A)

SDH/SONET AND GBE SFPS

For full details, see the **Pluggable Transceivers data sheet** at **www.rad.com**

- All SFPs listed for STM-4/OC-12 and STM-1/OC-3 are supported by the SDH/SONET link except for those with external calibration
- All SFPs listed for GbE are supported by the GbE link, except for those with external calibration and SGMII.

Note: *It is strongly recommended to order this device with* ***original*** *RAD SFPs* ***installed****. This will ensure that prior to shipping, RAD has performed comprehensive functional quality tests on the entire assembled unit, including the SFP devices. RAD cannot guarantee full compliance to product specifications for units using non-RAD SFPs.*

I/O MODULES

See *Table 1*. For detailed description, see separate data sheets.

MANAGEMENT

Ethernet Management Port	Interface: 10/100BaseT
	Connector: RJ-45
Control Port	Interface: RS-232/V.24 (DCE)
	CL.2 connectors: DB-9
	CL.2/4104 connectors: MINI-USB
Connectivity	Out-of-band
	Inband, via the STM-4/OC-12/STM-1/OC-3 links or over a dedicated timeslot in any E1/T1 or SHDSL link or via any of the user Ethernet ports
Tools	Telnet/SSHv2, SNMPv2, SNMPv3, SFTP
	RADIUS, TACACS+
Options	CLI
	RADview management and VF orchestration suite
	Standalone Shelf View application

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TIMING

Clock Sources	Recovered from the STM-4/OC-12/ STM-1/OC-3 interface, including automatic selection, based on SSM (Synchronization Status Messaging)
	Sync-E clock, recovered from the GbE interface (CL.2/A modules only)
	Internal crystal free-running oscillator-based clock
	Derived from the Receive clock of a specified user port
	Adaptive clock recovered (ACR) from a pseudowire circuit
	Clock distribution mechanism (SSM-like) over E1 TS0 interoperable with Nokia proprietary timing mechanism.
Station Clock	1.544 Mbps (T1) (AMI)
	1544 sine wave (via AMI-SINE-1544-WAVE-CONV optional accessory)
	2.048 Mbps (E1) (AMI)
	2.048 MHz squarewave
	Connector: RJ-45

SECURITY

Port-Based Network Access Control (PNAC)	As per IEEE 802.1X-2100
	Port-based authorization
	Supplicant for CL.2/A GbE ports
	Authenticator applicable on M-ETH modules and VS modules with Ethernet ports
MAC-based authentication support	802.1X-based
	Key exchange based on 802.1X

DIAGNOSTICS

Alarm Relay	1 inbound relay – RS-232 levels (dry contact)
	2 outbound relays triggered by major/minor alarms
	Operation: normally open, normally closed, using different pins
	CL.2 connector: DB-9, female
	CL.2/4104 connector: 9-pin, flat

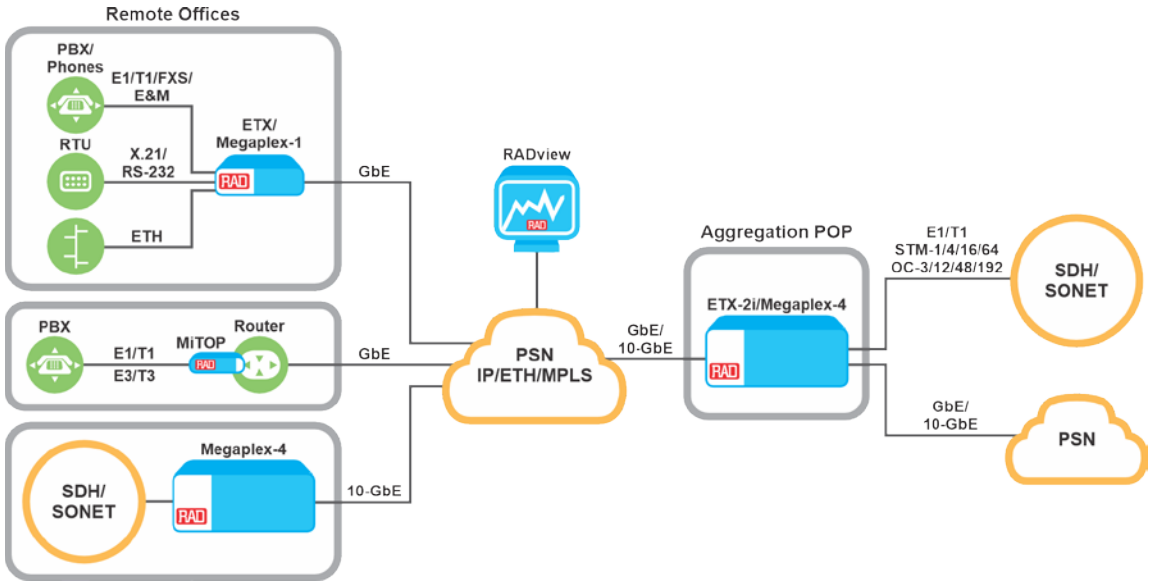

Figure 3. TDM Migration

Table 1. Megaplex-4 I/O Modules

Module	Description	Operating in MP-2100/2104
System Modules		
CL.2/A	Common Logic module, Carrier Ethernet class	
PS	AC or DC power supply module	
I/O Modules	(in alphabetical order of names)	
M-ETH	8-port GbE interface module	
T3	T3 multiplexer module	
TP (Teleprotection)	4-input, 8-output port teleprotection module with selectable trip voltage	
VC-4/4A/8/8A/16	4/8/16-port FXS/FXO/E&M PCM and ADPCM analog voice modules	Yes
VC-4/OMNI	4-port PCM omnibus voice module	Yes
***Note**: For specific HW/SW versions of Megaplex-210x modules supported by the Megaplex-4 chassis, please contact your local RAD partner.*		

Table 1. Megaplex-4 I/O Modules (cont.)

Module	Description	Operating in MP-2100/2104
VS-12	12-port serial module with 2 Ethernet ports	
VS-6/703	6-port serial module with 8 64-kbps G.703 codirectional interfaces and 1 Ethernet port	
VS-6/BIN	6-port serial module with 8 binary in/out command ports and 1 Ethernet port	
VS-6/C37	6-port serial module with 2 fiber optic C37.94 ports and 1 Ethernet port	
VS-6/E&M	6-port serial module with 4 E&M voice ports and 1 Ethernet port	
VS-8/E&M	Voice module with 8 E&M ports	
VS-FXS/E&M	Voice module with 4 E&M ports and 8 FXS ports	
VS-6/FXO	6-port serial module with 8 FXO voice ports and 1 Ethernet port	
VS-6/FXS	6-port serial module with 8 FXS voice ports and 1 Ethernet port	
VS-16E1T1	16-port E1/T1 module with PW or EOP support	
VS-6/E1T1	6-port serial module with 8 E1/T1 ports, 1 Ethernet port and PW support	
VS-OCU/E&M	2-channel OCU-DP module with 4 E&M ports	

GENERAL

Environment

Storage Temperature	-20°C to +70°C (-4°F to +160°F)
Operating Temperature, MP-4100	Regular: -10°C to 55°C (14°F to 131°F)
	IEEE-1613 “no-fan” compliant system and modules: -20°C to 55°C (-4°F to 131°F)
Operating Temperature, MP-4104	-10°C to 55°C (14°F to 131°F)
Humidity	up to 95%, non-condensing

Note: *Actual operating temperature range is determined by the specific modules installed in the chassis. For extended operating temperature ranges, contact your local RAD Business Partner.*

Physical - Chassis

	MP-4100 (4U-high)	MP-4104 (2U-high)
Power supply module slots	2	2
CL. 2 module slots	2	2
Slots for I/O modules	10	4
Height	18 cm (7 in) (4U)	9 cm (3.5 in) (2U)
Width	44 cm (17 in)	44 cm (17 in)
Depth (regular)	33 cm (13 in)	33 cm (13 in)
Depth (IEEE-1613-compliant)	37 cm (14.6 in)	-
Weight, max (fully loaded chassis)*	15.3 kg (33.8 lb)	7.54 kg (16.6 lb)

Note: The chassis weight depends of the type and number of installed modules.

Physical – CL Modules

	CL.2	CL.2/4104
Height	17.3 cm (6.8 in)	17.3 cm (6.8 in)
Width	4.5 cm (1.8 in)	2.5 cm (1 in)
Depth (regular)	32.5 cm	32.5 cm (12.8 in)
Depth (IEEE-1613-compliant)	35 cm (13.8 in)	-
Max weight (regular)	630g (1.3 lb)	540 g (1.2 lb)
Max weight (IEEE-1613-compliant)	2030g	-

Power

MP-4100 Power Supply Input	AC: 115 /230 VAC (allowed range: 85 to 264 VAC), 50/60 Hz
	HVDC support: 100 to 360 VDC
	DC: 48 VDC (allowed range: -36 to -56 VDC); selectable ground reference or floating ground
MP-4104 Power Supply Input	AC: 90 to 264 VAC, 50/60 Hz
	HVDC support: 110 to 300 VDC
	DC: 48 VDC (allowed range: -36 to -56 VDC); selectable ground reference or floating ground
Maximum Input Power	MP-4100: 315W + power supplied for ring and feed voltage
	MP-4104: 200W + power supplied for ring and feed voltage
Maximum Output Power	MP-4100 Regular: 250W
	MP-4100 IEEE-1613 "no-fan" compliant system and modules: 175W
	MP-4104: 160W + power supplied for ring and feed voltage
Power Consumption	Per CL, max: 27.75W

Ordering

Megaplex-4 must be ordered with the RADcare Basic Plus service package for one year.

CHASSIS

MP-4100-MN		**Megaplex-4100 chassis** (regular) with no PS or CL.2 module
MP-4100-MN/H1		Megaplex-4100 IEEE-1613 compliant chassis with no PS or CL.2 module
MP-4100-2/!/*/SA		Megaplex-4100 chassis equipped with PS and CL.2 modules
MP-4100-1613/!/*/SA		IEEE-1613 compliant Megaplex-4100 chassis equipped with IEEE-1613 compliant PS and IEEE-1613 compliant CL.2 modules
!	Power supply modules	
	115 115R	Single/dual, 115 VAC (including HVDC support of 100 to 360 VDC)
	230 230R	Single/dual, 230 VAC (including HVDC support of 100 to 360 VDC)
	48 48R	Single/dual, -48 VDC
	AC48	One AC PS (HVDC support of 100 to 360 VDC) + one -48 VDC PS
MP-4104-MN		**Megaplex-4104** chassis with no PS or CL.2 module
MP-4104-2/!/*/SA		Megaplex-4104 chassis equipped with PS and CL.2 modules

!	Power supply modules	
	48R	Dual, -48 VDC
	ACR	Dual, 90 VAC to 260 VAC (including HVDC support of 110 to 300 VDC)
*	Link	
	DS0 DS0R	Single/dual CL.2 modules without SDH/SONET and without GbE links
	622GBEASFP 622GBEAUTP 622GBEASFPR 622GBEAUTPR	Single/dual CL.2 modules with SDH/SONET SFP sockets and GbE, Carrier Ethernet class
	GBEASFP GBEASFPR	Single/dual CL.2 modules without SDH/SONET sockets and with GbE, Carrier Ethernet class
SA	SW key activation for full STM-4/OC-12 capabilities (Default=full STM-4/OC-12 capabilities)	
	155SK	SW key activation for STM-4/OC-12

Recommended Chassis Configurations

MP-4100-2/48R/622GBEASFPR
MP-4104-2/48R/622GBEASFPR

MP-4100-2/230R/622GBEASFPR
MP-4100-2/115R/622GBEASFPR
MP-4104-2/ACR/622GBEASFPR

MP-4100-2/115R/GBEASFPR
MP-4104-2/48R/GBEASFPR

MP-4100-2/48R/DS0R
MP-4104-2/48R/DS0R

POWER SUPPLY MODULES

MP-4100M-PS/~		Power supply module for MP-4100
~	Power	
	115	Single, 115 VAC (including HVDC support of 100 to 360 VDC)
	115/H1	Single, 115 VAC (including HVDC support of 100 to 360 VDC), IEEE-1613 compliant
	230	Single, 230 VAC (including HVDC support of 100 to 360 VDC)
	48	Single, -48 VDC
	48/H1	Single, -48 VDC, IEEE-1613 compliant
MP-4104M-PS/~		Power supply module for MP-4104
~	Power	
	48	Single, -48 VDC
	AC	Single, 90 VAC to 260 VAC (including HVDC support of 110 to 300 VDC)

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Next Generation Multiservice Access Nodes

Data Sheet

CL MODULES

MP-4100M-CL.2/#/SA/$		CL.2 module for **Megaplex-4100**
MP-4104M-CL.2/#/SA		CL.2 module for **Megaplex-4104**
#	Link	
	DS0	No SDH/SONET and no GbE links
	622GBEAUTP 622GBEASFP	SDH/SONET SFP sockets and GbE interface, Carrier Ethernet class
	GBEAUTP GBEASFP	No SDH/SONET sockets, GbE interface, Carrier Ethernet class
SA	SW key activation for full STM-4/OC-12 capabilities (Default=full STM-4/OC-12 capabilities)	
	155SK	SW key activation for STM-4/OC-12
$	IEEE-1613 compliance for CL module (Default=not compliant):	
	H1	IEEE-1613 compliant

***Note**: CLI prompt and/or SDH/SONET path trace string can be changed (factory-set) according to the customer request.*

Recommended CL Configurations

MP-4100M-CL.2/622GBEASFP
MP-4104M-CL.2/622GBEASFP

MP-4100M-CL.2/GBEASFP
MP-4104M-CL.2/GBEASFP

MP-4100M-CL.2/DS0
MP-4104M-CL.2/DS0

SUPPLIED ACCESSORIES (MEGAPLEX-4100)

CBL-SP-9/SH

Dual DB-9 to single DB-9 control cable (only with MP-4100-2)

RM-MP-MX-23/19

Hardware kit for mounting one MP-4100 unit into both 19-inch and 23-inch racks (only with MP-4100-2)

SUPPLIED ACCESSORIES (MEGAPLEX-4104)

CBL-MUSB-DB9F

Mini-USB to DB-9 control cable (only with MP-4104-2)

PLUG-DC/TB/S/E

DC plug

RM-42

Hardware kit for mounting one MP-4104 unit in a 19-inch rack (only with MP-4104-2)

OPTIONAL ACCESSORIES (MEGAPLEX-4100)

MP-2100-RM-ETSI/19
Hardware kit for mounting one MP-4100 unit into ETSI racks (fits also 10-inch racks)
***Note**: This RM can be either ordered in addition to RM-MP-MX-23/19 or received for free instead of it.*

RM-51
Thermal isolation panel for mounting two fanless MP-4100 devices in 19" rack

OPTIONAL ACCESSORIES (MEGAPLEX-4104)

CBL-MP-4104/AR/OPEN/2M

Open-ended alarm cable

PLUG-DC/TB/S/E

DC plug

RM-42-CM
Hardware kit for mounting one MP-4104 unit in a 19-inch rack with cable management

WM-42
Hardware kit for installing MP-4104 unit on a wall

WM-42-CM

Hardware kit for installing a MP-4104 unit on a wall with cable management

LICENSES

MP-4100-LIC/622SK

SW license key for enabling STM-4/OC-12 in Megaplex-4100 (per CL module, only when 155SK option is ordered)

MP-4104-LIC/622SK

SW license key for enabling STM-4/OC-12 in Megaplex-4104 (per CL module, only when 155SK option is ordered)

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