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**ACE-2002, ACE-2002E**

Multiservice Access Concentrators

ACE-2002/#/@

ACE-2002E/#/@

Power supply

AC	100-230 VAC
DC	-48 VDC
24DC	24 VDC

@ Redundant power supply

R	Redundant power supply (same as the first one)
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Supplied Accessories

RM-ACE-2002/P2

Hardware kit for mounting one ACE-2002 unit in a 19" rack

RM-ACE-2002E/P2

Hardware kit for mounting one ACE-2002E unit in a 19" rack

Optional Accessories

CBL-DB9F-DB9M-STR

DB-9 to DB-9 control port cable

For ACE-2002/2002E Modules see below.

ACE-202

Dedicated Multiservice Access Concentrator

ACE-202/#/@/%

Power supply

AC	100-250 VAC
DC	-48 VDC

@ Redundant power supply

R	Redundant power supply (same as the first)
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% Fixed interface for slot 3 and a slot 4

NULL	No fixed interface
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LAN/CES/E1	One Ethernet/Fast Ethernet port (RJ-45) and one balanced E1 CES port (RJ-45)
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LAN/CES/T1	One Ethernet/Fast Ethernet port (RJ-45) and one T1 CES port (RJ-45)
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IMA-UNI/E1	Four E1 IMA/UNI ports (RJ-45)
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*Note: Two additional plug-in modules can be ordered separately.**Supplied Accessories*

AC power cord or DC power connection kit

RM-34

Hardware kit for mounting one ACE-202 unit in a 19" rack

Optional Accessories

CBL-DB9F-DB9M-STR

DB-9 to DB-9 control port cable

ACE-2002/2002E/202 Modules

ACE-M/+

+ **ATM** STM-1, STM-4, IMA and ATM UNI Modules

E1	E1 balanced G.703
T1	Electrical G.703
E3	E3 UNI
T3	T3 UNI
UTP/25	25.6 Mbps, UTP
CX/BNC/155	155 Mbps, electrical, unbalanced (G.703)
IMA-UNI/4E1	4 balanced IMA/UNI E1
IMA-UNI/4E1/UNBAL	4 unbalanced IMA/UNI E1
IMA-UNI/4T1	4 IMA/UNI T1
IMA-UNI/8E1	8 balanced IMA/UNI E1 (ACE-2002E only)
IMA-UNI/8E1/UNBAL	8 unbalanced IMA/UNI E1 (ACE-2002E only)
IMA-UNI/8T1	8 IMA/UNI T1 (ACE-2002E only)
FC13L/155	155 Mbps, single mode, 1310 nm, short-haul laser, FC

+ **CES**

TDM Interworking Modules

CES/E1	Single balanced E1 CES port, RJ-45 connector
CES/E1/UNBAL	Single unbalanced E1 CES port, BNC 75 Ω connector
AL	

FC13L/155R	Dual port APS redundancy, single mode, 1310 nm, short-haul laser, STM-1/OC-3, FC
FC13LH/155	155 Mbps, single mode, 1310 nm, long-haul laser, FC
FC13LH/155D	Dual port, single mode, 1310 nm, long-haul laser, STM-1/OC-3, FC (ACE-2002 and ACE-2002E only)
FC15LH/155	155 Mbps, single mode, 1550 nm, long-haul laser, FC
SC13L/155	155 Mbps, single mode, 1310 nm, short-haul laser, SC
SC13L/155D	Dual port, single mode, 1310 nm, short-haul laser, STM-1/OC-3, SC (ACE-2002 and ACE-2002E only)
SC13L/155R	Dual port APS redundancy, single mode, 1310 nm, short-haul laser, STM-1/OC-3, SC
SC13L/155J	155 Mbps, single mode, 1310 nm, short-haul laser, SC for the Japanese market
SC13L/622	622 Mbps, single mode, 1310 nm, short-haul laser, SC (ACE-2002 and ACE-2002E only)
SC13LH/155	155 Mbps, single mode, 1310 nm, long-haul laser, SC
SC13LH/155D	Dual port, single mode, 1310 nm, long-haul laser, STM-1/OC-3, SC (ACE-2002 and ACE-2002E only)
SC13LH/155R	Dual port APS redundancy, single mode, 1310 nm, long-haul laser, STM-1/OC-3, SC
SC13LH/622	622 Mbps, single mode, 1310 nm, long-haul laser, SC (ACE-2002 and ACE-2002E only)
SC13M/155	155 Mbps, multimode, 1310 nm, SC
SC13M/155D	Dual port, multimode, 1310 nm, SC (ACE-2002 and ACE-2002E only)
SC13M/155R	Dual port APS redundancy, multimode, 1310 nm, SC
SC13M/622	622 Mbps, multimode, 1310 nm, SC (ACE-2002 and ACE-2002E only)
SC15LH/155	155 Mbps, single mode, 1550 nm, long-haul laser, SC
SC15LH/155J	155 Mbps, single mode, 1550 nm, long-haul laser, SC for the Japanese market
SC15LH/622	622 Mbps, single mode, 1550 nm, long-haul laser, SC (ACE-2002 and ACE-2002E only)
ST13L/155	155 Mbps, single mode, 1310 nm short-haul laser, ST
ST13L/155D	Dual port, single mode, 1310 nm, short-haul laser, STM-1/OC-3, ST (ACE-2002 and ACE-2002E only)
ST13L/155R	Dual port APS redundancy, single mode, 1310 nm, short-haul laser, STM-1/OC-3, ST
ST13LH/155D	Dual port, single mode, 1310 nm, long-haul laser, STM-1/OC-3, ST (ACE-2002 and ACE-2002E only)
ST13LH/155R	Dual port APS redundancy, single mode, 1310 nm, long-haul laser, STM-1/OC-3, ST

Notes:

- *Unbalanced E1 is provided via an adapter cable (see Supplied Accessories).*
- *FC, SC and ST are fiber optic connectors*

Supplied Accessories

CBL-RJ45/2BNC/E1/X

Interface adapter cable for converting a balanced E1 RJ-45 connector to a pair of unbalanced BNC connectors (only if unbalanced E1 interface is ordered)



CES/T1	Single T1 CES port, RJ-45 connector
CES/4E1	Four balanced E1 CES ports, RJ-45 connector
CES/4E1/UNBAL	Four unbalanced E1 CES ports, BNC 75Ω connector
CES/4T1	Four T1 CES ports, RJ-45 connector
CES/8E1	Eight balanced E1 CES ports, RJ-45 connector (ACE-2002E only)
CES/8E1/UNBAL	Eight unbalanced E1 CES ports, BNC 75Ω connector (ACE-2002E only)
CES/8T1	Eight T1 CES ports, RJ-45 connector (ACE-2002E only)

Supplied Accessory

CBL-RJ45/2BNC/E1/X	Interface adapter for converting a balanced E1 RJ-45 connector to a pair of BNC unbalanced connectors (if unbalanced E1 interface is ordered)
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+ LAN

Ethernet/Fast Ethernet Modules	
LAN-UTP	Ethernet/Fast Ethernet port, RJ-45 connector
LAN-UTP/E	Enhanced performance Ethernet/Fast Ethernet port, RJ-45 connector
LAN-LC13L	Fast ETH port, 1310 nm single mode, LC
LAN-LC13L/E	Enhanced performance Fast ETH port, 1310 nm single mode, LC
LAN-LC13M	Fast ETH port, 1310 nm multimode, LC
LAN-LC13M/E	Enhanced performance Fast ETH port, 1310 nm multimode, LC

+ HDLC

Interworking Modules	
4HDLC/V35	V.35 interface, supporting 4 ports
4HDLC/X21	X.21 interface, supporting 4 ports
4HDLC/RS530	RS-530 interface, supporting 4 ports

Supplied Accessory

For DCE mode, the module is supplied with an octopus cable, which provides 4 DCE ports. For DTE mode, a cross-cable should be ordered separately.

Optional Adapter Cables for HDLC Modules

CBL-X.21-DTE/HDLC	X.21 cross-cable for DTE mode
CBL-RS-530-DTE/HDLC	RS-530 cross-cable for DTE mode
CBL-V.35-DTE/HDLC	V.35 cross-cable for DTE mode

ACE-3100

Multigeneration Cell-Site Gateway

ACE-3100/#/@/\$/&/*/~

Power supply:

AC	100 to 240 VAC
DC	-48/-60 VDC

@ Number of STM-1/OC-3c ports

S1	One STM-1/OC-3c port
S2	Two STM-1/OC-3c ports

Notes: For interface redundancy (APS), order two ports. S1 is available only if no E1/T1 ports are ordered (see below). S2 is available only if four E1/T1 ports are ordered.

SFP transceivers for the STM-1/OC-3c ports are ordered separately. For more information, refer to *Optional Accessories*.

\$ Number of E1/T1 ports (leave empty for no E1/T1 ports)

4E1	Four E1 ports
4T1	Four T1 ports

Note: Unbalanced E1 interface is provided via an adapter cable, which can be ordered separately (see CBL-RJ45/2BNC/E1/X in *Optional Accessories*).

& Ethernet ports (Default=two built-in electrical RJ-45 ports)

SE	Two empty SFP cages
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Note: Fiber optic Ethernet ports require SFP transceivers that are fitted into the empty cages.

* Software license pack (Default=ATM network functionality)	
P1	ATM and packet-switched network functionality, not including clock recovery over packet
P2	Complete functionality, including clock recovery over packet
~ Optional clock recovery hardware component	
A	Clock recovery hardware component <i>Note: For activating the clock recovery hardware, the PACK2 software license pack is required. It is possible, however, to order the hardware only, for future software upgrade.</i>
? Enclosure type (Default=regular enclosure)	
H	Industrially hardened enclosure

Supplied Accessories

AC power cord	For AC unit
DC adapter kit	For DC unit

Optional Accessories

SFP Transceivers

SFP-1	Fast Ethernet/STM-1, 1310 nm, multimode, LED, 2 km (1.2 mi)
SFP-2	Fast Ethernet/STM-1, 1310 nm, single mode, laser, 15 km (9.3 mi)
SFP-3	Fast Ethernet/STM-1, 1310 nm, single mode, laser, 40 km (24.8 mi)
SFP-4	Fast Ethernet/STM-1, 1550 nm, single mode, laser, 80 km (49.7 mi)
CBL-LC/#/&	LC to SC/ST/FC fiber optic converter cable for operation with multimode or single mode fibers. The cable is 2 meters (6.5 ft) long.

Connector

SC	SC connector
ST	ST connector
FC	FC connector

& Fiber

MM	Multimode fiber
SM	Single mode fiber

CBL-DB9F-DB9M-STR

Standard DB-9 to DB-9 control port cable

CBL-RJ45/2BNC/E1/X

Interface adapter for converting a balanced E1 RJ-45 connector to a pair of BNC unbalanced connectors (if unbalanced E1 interface is ordered)

RM-35/@

Hardware kit for mounting one or two ACE-3100 units into a 19" rack

@ Mounting kit

P1	For mounting one unit
P2	For mounting two units
WM-35	A hardware kit for mounting one ACE-3100 unit on a wall
ACE-3100-SW/!	Software upgrade pack

! Software pack

PACK1	PW over PSN functionality
PACK2	Clock recovery functionality
LDP	LDP functionality

ACE-3105

Cell-Site Gateway

ACE-3105/#/%/\$/*/~/?

Power supply (Default= wide range AC/DC)

24	Single 20 to 36 VDC
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% DSL ports

SH	Four SHDSL ports
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\$ Ethernet ports (Default= 2 x UTP ports):

4E1	Four E1 ports
4T1	Four T1 ports

* Software license pack (Default=ATM network functionality)



P1	ATM and packet-switched network functionality, not including clock recovery over packet	S2	Two STM-1/OC-3c ports (two SFP cages) <i>Note: SFP transceivers for the STM-1/OC-3c ports are ordered separately. For more information, refer to Optional Accessories.</i>
P2	Complete functionality, including clock recovery over packet	\$	UNI/IMA/CES ports
P3	ATM and PSN uplink <u>including</u> software support for synchronization over packet, and MPLS LDP software functionality	8E1	8 E1 UNI/IMA/CES ports
P4	ATM and PSN uplink, <u>including</u> MPLS LDP software functionality, <u>not including</u> clock recovery over packet	8T1	8 T1 UNI/IMA/CES ports
~	Optional clock recovery hardware component	16E1	16 E1 UNI/IMA/CES ports
A	Clock recovery hardware component <i>Note: For activating the clock recovery hardware, the PACK2 software license pack is required. It is possible, however, to order the hardware only, for future software upgrade.</i>	16T1	16 T1 UNI/IMA/CES ports
?	Enclosure type (Default=regular enclosure)	<i>Note: Unbalanced E1 interface is provided via an adapter cable, which can be ordered separately (see CBL-RJ45/2BNC/E1 in Optional Accessories).</i>	
H	Industrially hardened enclosure	&	Ethernet (Default=two empty electrical RJ-45 ports)
<i>Supplied Accessories</i>		SE	Two empty SFP cages
AC power cord	For AC unit	<i>Note: Fiber optic Ethernet ports require SFP transceivers fitted into the empty cages.</i>	
AC/DC adapter plug (for wide range only)	AC/DC adapter plug (for wide range only)	*	Software license pack (Default=ATM)
DC adapter kit	For 24 VDC unit only	PACK1	ATM and packet-switched network functionality, not including clock recovery over packet
<i>Optional Accessories</i>		PACK2	Complete functionality, including clock recovery over packet
CBL-LC/#/&	LC to SC/ST/FC fiber optic converter cable for operation with multimode or single mode fibers. The cable is 2 meters (6.5 ft) long.	~	Clock recovery hardware component
#	Connector	A	Clock recovery hardware component
SC	SC connector	<i>Note: For activating the clock recovery hardware, the PACK2 software license pack is required.</i>	
ST	ST connector	?	Enclosure type (Default=regular enclosure)
FC	FC connector	H	Industrially hardened enclosure
&	Fiber	<i>Supplied Accessories</i>	
MM	Multimode fiber	AC power cord	For AC unit
SM	Single mode fiber	DC adapter kit	For DC unit
CBL-DB9F-DB9M-STR	Standard DB-9 to DB-9 control port cable	RM-34	Hardware kit for mounting one ACE-3200 unit into a 19" rack
CBL-RJ45/2BNC/E1/X	Interface adapter for converting a balanced E1 RJ-45 connector to a pair of BNC unbalanced connectors (if unbalanced E1 interface is ordered)	<i>Optional Accessories</i>	
RM-35/@	Hardware kit for mounting one or two ACE-3100 units into a 19" rack	<i>SFP Transceivers</i>	
@	Mounting kit	SFP-1	Fast Ethernet/STM-1, 1310 nm, multimode, LED, 2 km (1.2 mi)
P1	For mounting one unit	SFP-2	Fast Ethernet/STM-1, 1310 nm, single mode, laser, 15 km (9.3 mi)
P2	For mounting two units	SFP-3	Fast Ethernet/STM-1, 1310 nm, single mode, laser, 40 km (24.8 mi)
WM-35	A hardware kit for mounting one ACE-3100 unit on a wall	SFP-4	Fast Ethernet/STM-1, 1550 nm, single mode, laser, 80 km (49.7 mi)
ACE-3105-SW/!	Software upgrade pack	CBL-LC/#/&	LC to SC/ST/FC fiber optic converter cable for operation with multimode or single mode fibers. The cable is 2 meters (6.5 ft) long.
!	Software pack	#	Connector
P1	PW over PSN functionality	SC	SC connector
P2	Clock recovery functionality	ST	ST connector
LDP	LDP functionality	FC	FC connector
ACE-3200	Cell-Site Gateway	&	Fiber
ACE-3200/#/@/\$/&*/~/?/		MM	Multimode fiber
#	Power supply and redundancy	SM	Single mode fiber
AC	Single 100 to 240 VAC	CBL-RJ45/2BNC/E1/X	Interface adapter for converting a balanced E1 RJ-45 connector to a pair of BNC unbalanced coaxial connectors (if unbalanced E1 interface is ordered)
DC	Single -48 VDC	CBL-DB9F-DB9M-STR	Standard DB-9 to DB-9 control port cable
ACR	Dual 100 to 240 VAC	WM-34	Hardware kit for mounting one ACE-3200 unit on a wall.
DCR	Dual -48 VDC	ACE-3200-8-SW/!	Software upgrade pack for a unit with 8 or 16 E1/T1 ports
24DC	Single 20 to 36 VDC	ACE-3200-16-SW/!	
24DCR	Dual 20 to 36 VDC	!	Software pack
@	Number of STM-1/OC-3c ports	Pack1	PW over PSN functionality
S0	Without STM-1/OC-3c ports	Pack2	Clock recovery functionality
		LDP	LDP functionality



ACE-3220 Cell-Site Gateway
 /!/#/\$/+2/@/~/?
 ! Power supply
 AC Single 100 to 240 VAC
 DC Single -48 VDC
 ACR Dual 100 to 240 VAC
 DCR Dual -48 VDC
 24DC Single 24 VDC
 24DCR Dual 24 VDC
 # SDH/SONET ports (default=none)
 S1 1xOC-3c/STM1-UNI
 \$ E1/T1 ports (Default=8E1/T1)
 8E1 8 E1 ports
 8T1 8 T1 ports
 16E1 16 E1 ports
 16T1 16 T1 ports
 +2 FE ports (Default= RJ-45 slots)
 4SE 4 SFP slots
 @ Software license pack (Default=ATM)
 P1 ATM and PSN functionality, not including clock recovery over packet
 P2 Complete functionality, including clock recovery over packet
 P3 ATM and PSN uplink including software support for synchronization over packet, and MPLS LDP software functionality
 P4 ATM and PSN uplink, including MPLS LDP software functionality, not including clock recovery over packet
 ~ Clock recovery hardware component
 A Clock recovery hardware component
 AS Synchronization over Packet hardware component & Synchronous Ethernet hardware component
 S Synchronous Ethernet hardware component
Note: For activating the clock recovery hardware, the P2 or P3 software license pack is required. It is possible, however, to order the hardware only, for future software upgrade.
 ? Enclosure
 H Industrially hardened enclosure
Optional Accessories
ACE-CSG-IF/C1 Modular interfaces and peripherals
 C1 Interface
 2AV-A 2 ADSL2+ ports (Annex A)
 2AV-B 2 ADSL2+ ports (Annex B)
 4SH 4 SHDSL.bis ports
 AV-A 1 ADSL2+ port (Annex A)
 GBE Gigabit Ethernet port

SFP Transceivers
 SFP-1 Fast Ethernet/STM-1, 1310 nm, multimode, LED, 2 km (1.2 mi)
 SFP-2 Fast Ethernet/STM-1, 1310 nm, single mode, laser, 15 km (9.3 mi)
 SFP-3 Fast Ethernet/STM-1, 1310 nm, single mode, laser, 40 km (24.8 mi)
 SFP-4 Fast Ethernet/STM-1, 1550 nm, single mode, laser, 80 km (49.7 mi)
 SFP-5 Gigabit Ethernet, 850 nm, multimode, VCSEL, 0.55 km (0.3 mi)
 SFP-6 Gigabit Ethernet, 1310 nm, single mode, laser, 10.0 km (6.2 mi)
 SFP-9F Fast Ethernet, RJ-45, 100 BaseT, 100 m (328 ft)
 SFP-9G Gigabit Ethernet, RJ-45, 100 BaseT, 100 m (328 ft)
 CBL-LC/#/& LC to SC/ST/FC fiber optic converter cable for operation with multimode or single mode fibers. The cable is 2 meters (6.5 ft) long.
 # Connector
 SC SC connector
 ST ST connector
 FC FC connector
 & Fiber
 MM Multimode fiber
 SM Single mode fiber
 CBL-RJ45/2BNC/E1/X Interface adapter for converting a balanced E1 RJ-45 connector to a pair of BNC unbalanced coaxial connectors (if unbalanced E1 interface is ordered)
 CBL-DB9F-DB9M-STR Standard DB-9 to DB-9 control port cable
 RM-34 Hardware kit for mounting one ACE-3200 unit into a 19" rack
 WM-34 Hardware kit for mounting one ACE-3200 unit on a wall.
 ACE-3200-8-SW/! Software upgrade pack for a unit with 8 or 16 E1/T1 ports
 ACE-3200-16-SW/!
 ! Software pack
 P1 PW over PSN functionality
 P2 Clock recovery functionality
 LDP LDP functionality
ACE-3400 Cellular Backhaul Aggregation Unit
ACE-3400/#
 # Power supply and redundancy
 AC Single 100 to 240 VAC
 DC Single -48 VDC
 ACR Dual 100 to 240 VAC
 DCR Dual -48 VDC
 ACE-MC/*/~ ACE-3400 main card
 * Main card
 155 STM-1/OC-3c to GbE
 155-CH Channelized STM-1/OC-3 to ATM STM-1/OC-3c with redundancy
 32E1B 32 balanced E1s
 32E1U 32 unbalanced E1s
 32T1 32 T1s
 63E1B 63 balanced E1s
 63E1U 63 unbalanced E1s
 63T1 63 T1s
 ~ Optional software license pack
 PACK1 Pseudowire functionality
 ACE-IF-155/^/& ACE-3400 ATM interface module
 ^ Fiber



13L	Single mode, 1310 nm
13LH	SM, 1310 nm, long haul
13M	Multimode, 1310 nm
& Connector	
SC	SC connector
ACE-IF-GbE/@	ACE-3400 GbE interface module
@ Port	
SFP	SFP cage (empty)
UTP	1000BaseT, electrical
<i>Note: Fiber optic Gigabit Ethernet modules require SFP transceivers that are fitted into the empty cage. For technical specifications refer to the SFP Transceivers data sheet, available on RAD's Web site and for ordering information see the SFP transceiver options in this document.</i>	
<i>Supplied Accessories</i>	
AC power cord	For AC unit
DC adapter kit	For DC unit
RM-39	Hardware kit for mounting one ACE-3400 unit into a 19" rack
CBL-RJ45/D9/F/STR	RJ-45 to DB-9 control port adapter cable
<i>Optional Accessories</i>	
ACE-PPANEL/BNC/21	Patch panel adapter with 21 unbalanced BNC connectors
ACE-PPANEL/RJ45/28	Patch panel adapter with 28 balanced RJ-45 connectors
<i>Note: For more information about the supplied Patch Panel kit, refer to the Patch Pane Adapters data sheet, available on RAD's Web site.</i>	
CBL-RJ45/2BNC/E1/X	Interface adapter for converting a balanced E1 RJ-45 station clock connector to a pair of BNC unbalanced coaxial connectors (if unbalanced E1 station clock source is used)
ACE-PS/*!	ACE hot-swappable power supply unit
* Power supply	
AC	100 to 240 VAC
DC	-48 VDC
ACE-FTC/ACE-3400	Fan tray card (for replacement)
ACE-MC-SW/!	Software upgrade pack
! Software pack	
Pack1	PW over PSN functionality
LDP	LDP functionality
ACE-3402	Cellular Backhaul Aggregation Unit
ACE-3402/#	
# Power supply	
AC	Single 100-240 VAC
DC	Single -48 VDC
ACR	Dual 100-240 VAC
DCR	Dual -48 VDC
ACE-MC/*/~	ACE-3402 main card
* Main card	
155	STM-1/OC-3 to GbE
155-CH	Channelized STM-1/OC-3 to ATM STM-1/OC-3c with redundancy
~ Software license pack (Default=ATM network functionality)	
PACK1	Pseudowire functionality
ACE-IF-155/^/&	ACE-3402 ATM interface module
^ Fiber	
13L	Single mode, 1310 nm
13LH	SM, 1310 nm long haul
13M	Multimode, 1310 nm
& Connector	
SC	SC connector
ACE-IF-GbE/@	ACE-3402 GbE interface module
@ Port	
SFP	SFP cage (empty)

UTP	1000BaseT, electrical
<i>Note: Fiber optic Gigabit Ethernet modules require SFP transceivers that are fitted into the empty cage. For technical specifications refer to the SFP Transceivers data sheet, available on RAD's Web site and for ordering information see the SFP transceiver options in this document.</i>	
<i>Supplied Accessories</i>	
AC power cord	For AC unit
DC adapter kit	For DC unit
RM-36	Hardware kit for mounting one ACE-3402 unit into a 19" rack
CBL-RJ45/D9/F/STR	Control port adapter cable (RJ-45 to DB-9)
<i>Optional Accessories</i>	
<i>SFP Transceivers</i>	
SFP-1	Fast Ethernet/STM-1, 1310 nm, multimode, LED, 2 km (1.2 mi)
SFP-2	Fast Ethernet/STM-1, 1310 nm, single mode, laser, 15 km (9.3 mi)
SFP-3	Fast Ethernet/STM-1, 1310 nm, single mode, laser, 40 km (24.8 mi)
SFP-4	Fast Ethernet/STM-1, 1550 nm, single mode, laser, 80 km (49.7 mi)
SFP-5	Gigabit Ethernet, 850 nm, multimode, VCSEL, 0.55 km (0.3 mi)
SFP-6	Gigabit Ethernet, 1310 nm, single mode, laser, 10.0 km (6.2 mi)
SFP-9G	GbE interface, RJ-45 connector, 100m (238 ft)
CBL-RJ45/2BNC/E1/X	Interface adapter for converting a balanced E1 RJ-45 station clock connector to a pair of BNC unbalanced coaxial connectors (if unbalanced E1 station clock source is used)
ACE-PS/*!	ACE hot-swappable power supply unit
* Power supply	
AC	100 to 240 VAC
DC	-48 VDC
ACE-FTC/ACE-3402	Fan tray card (for replacement)
ACE-MC-SW/!	Software upgrade pack
! Software pack	
Pack1	PW over PSN functionality
LDP	LDP functionality
ACE-3600	Cellular Backhaul Aggregation Unit
ACE-3600/#	
# Power supply and redundancy	
AC	Single 100 to 240 VAC
DC	Single -48 VDC
ACR	Dual 100 to 240 VAC
DCR	Dual -48 VDC
ACE-MC/*	ACE-3400 main card
* Main card	
155-4/PACK-1	STM-1/OC-3c to GbE
<i>Note: For full system redundancy, order two main module units.</i>	
~ Optional software license pack	
PACK1	Pseudowire functionality
ACE-IF-GbE/+/@	ACE-3600 ATM interface module
+ STM-1/OC-3c ports	
S4	Four STM-1/OC-3c ports (four empty SFP cages)
@ GbE port	
SFP	SFP cage (empty)
ACE-IF-GbE/@	ACE-3400 GbE interface module
<i>Note: Fiber optic Gigabit Ethernet modules require SFP transceivers that are fitted into the empty cage. For technical specifications refer to the SFP Transceivers data sheet, available on RAD's Web site and for ordering information see the SFP transceiver options in this document.</i>	
<i>Supplied Accessories</i>	
AC power cord	For AC unit
DC adapter kit	For DC unit



RM-36	Hardware kit for mounting one ACE-3600 unit into a 19" rack	<i>Supplied Accessories</i>	
CBL-RJ45/D9/F/STR	RJ-45 to DB-9 control port adapter cable	AC power cord	For AC unit
<i>Optional Accessories</i>		DC adapter kit	For DC unit
<i>SFP Transceivers</i>		CBL-RJ45/2BNC/E1	Interface adapter for converting a balanced E1 RJ-45 connector to a pair of BNC unbalanced connectors (if unbalanced E1 interface is ordered)
SFP-1	Fast Ethernet/STM-1, 1310 nm, multimode, LED, 2 km (1.2 mi)	CBL-DB9F-DB9M-STR	DB-9 to DB-9 control port cable
SFP-2	Fast Ethernet/STM-1, 1310 nm, single mode, laser, 15 km (9.3 mi)	RM-35/@	Hardware kit for mounting one or two ACE-52 units into a 19" rack
SFP-3	Fast Ethernet/STM-1, 1310 nm, single mode, laser, 40 km (24.8 mi)	@ Mounting kit	
SFP-4	Fast Ethernet/STM-1, 1550 nm, single mode, laser, 80 km (49.7 mi)	P1	For mounting one unit
SFP-5	Gigabit Ethernet, 850 nm, multimode, VCSEL, 0.55 km (0.3 mi)	P2	For mounting two units
SFP-6	Gigabit Ethernet, 1310 nm, single mode, laser, 10.0 km (6.2 mi)	Airmux-400	See Airmux-400 Data Sheet
SFP-9G	GbE interface, RJ-45 connector, 100m (238 ft)	Airmux-5000	See Airmux-5000 Data Sheet
CBL-LC/#/&	LC to SC/ST/FC fiber optic converter cable for operation with multimode or single mode fibers. The cable is 2 meters (6.5 ft) long.	ASM-10/8	Sync/Async Short Range Modem
# Connector		ASM-10/8/SA/*/+	Standalone with internal power supply
SC	SC connector	* Standalone power supply	
ST	ST connector	115	115 VAC
FC	FC connector	230	230 VAC
& Fiber		+ Remote power fail indication (Default: without RPF indication)	
MM	Multimode fiber	RPF	Remote power fail indication
SM	Single mode fiber	ASM-31	
CBL-RJ45/2BNC/E1/X	Interface adapter for converting a balanced E1 RJ-45 station clock connector to a pair of BNC unbalanced coaxial connectors (if unbalanced E1 station clock source is used)	ASM-31/~/+	2-wire multirate short range modem
ACE-PS/*	ACE hot-swappable power supply unit	ASM-31R/+	Card for the ASM-MN-214 19" rack
* Power supply		~ Power supply	
AC	100 to 240 VAC	115	115 VAC
DC	-48 VDC	230	230 VAC
ACE-FTC/ACE-3600	Fan tray card (for replacement)	48	-48 VDC
ACE-MC-SW/!	Software upgrade pack	24	24 VDC
! Software pack		+ Interface	
LDP	LDP functionality	V24	V.24/RS-232 (up to 64 kbps)
ACE-52	Multiservice Network Termination Unit	V35	V.35
ACE-52/#/&/*/%		V36	V.36/RS-449
# Power supply		530	RS-530
AC	100-230 VAC	X21	X.21
DC	-48 VDC	703/TB	G.703 Codirectional (64 kbps) interface with terminal block connector
& ATM interface		703/RJ	G.703 Codirectional (64 kbps) interface with RJ-45 connector
SC13L-155	155 Mbps, single mode, 1310 nm, short haul laser S1.1, SC connector	UTP	IR-ETH module with RJ-45 connector
SC13LH-155	155 Mbps, single mode, 1310 nm, long haul laser L1.1, SC connector	IP	IR-IP module
SC13M-155	155 Mbps, multimode 1310 nm, SC connector	<i>Supplied Accessories</i>	
ST13L-155	155 Mbps, single mode, 1310 nm, short haul laser S1.1, ST connector	AC power cord (when AC power supply is ordered)	
ST13LH-155	155 Mbps, single mode, 1310 nm, long haul laser L1.1, SC connector	DC adapter (when DC power supply is ordered)	
UTP-25	25.6 Mbps ATM	<i>Optional Accessories</i>	
* Ethernet interface		RM-17	Hardware for mounting one or two standalone units in a 19" rack
ETH	Single 10/100BaseT	CIA/&	Connector Interface Adapter for the ASM-MN-214 19" rack
2ETH	Dual 10/100BaseT	& Adapter for ASM-31 card version	
% Optional CES port:		V35/1	Adapting one modem card's 25-pin connector into one V.35, 34-pin connector
CESE1	Single balanced E1 CES port, RJ-45 connector	X21	Adapting two adjacent modem cards' 25-pin connectors to two X.21, 15-pin connectors
CESE1-UNBAL	Single unbalanced E1 CES port, RJ-45 connector (via an adapter cable)	ASM-61	2-Wire Symmetrical VDSL-Based Modem
CEST1	Single balanced T1 CES port, RJ-45 connector	ASM-61/AC/CO	Central office installation
		ASM-61/AC/CPE	Customer premises installation
		<i>Supplied Accessories</i>	
		AC power cord	For AC unit
		DC adapter kit	For DC unit



Optional Accessories

RM-33-2 Hardware kit for mounting one or two ASM-61 units into a 19" rack

ASM-MN-214

Hub for Short Range Modems

ASM-MN-214/*/#/& 19" hub

ASM-214-PS/* Power supply

* Power supply

115 115 VAC supply

230 230 VAC supply

48 48 VDC supply

24 24 VDC supply

Redundant power supply

115 115 VAC supply

230 230 VAC supply

48 -48 VDC supply

24 24 VDC supply

& Line connector (Default=terminal block)

RJ RJ-45

BNC 2 BNC

Supplied Accessories

AC power cord For AC unit

DC adapter kit For DC unit

Optional Accessories

CIA/+ Mechanical adapter converting DB-25 connectors into standard connectors

+ CIA connector

X21/1 D-type, 15-pin connector for single modem card

V35 V.35 34-pin connector for one modem card

ASM-MN-114-BP Blank panel for ASM-MN-214

ASM-MN-214 Modules

See the module option of:

ASM-10/8 FCD-1L FOM-E1/T1

ASM-31 FCD-2L RIC-E1, RIC-T1

ASM-40 FOM-40 SPD-703-1

ASMi-31

Sync/Async 2-Wire Manageable IDSL Modem

ASMi-31-2/M/*/# Master

ASMi-31-2/S/*/# Slave

* Power supply

115 115 VAC

230 230 VAC

48 -48 VDC

24 24 VDC

DTE interface

V24 V.24/RS-232 interface

V35 V.35 interface

V36 V.36/RS-449 interface

530 RS-530 interface

X21 X.21 interface

G703TB G.703 Codirectional (64 kbps) interface with terminal block connector

G703RJ G.703 Codirectional (64 kbps) interface with RJ-45 connector

UTP IR-ETH module with RJ-45 connector

IP IR-IP module

Supplied Accessories

AC power cord For AC unit

DC adapter kit For DC unit

Optional Accessories

PCU Portable control unit with protective casing for the slave ASMi-31 unit

RM-28 Hardware kit for mounting one or two units in a 19" rack

ASMi-52 2/4-Wire SHDSL Standalone Modem

ASMi-52/@/*/#/%/\$/?/+

@ 24 VDC Power Supply (Default= wide-range AC/DC power supply):
24V 24 VDC option

* DTE interface

X21 X.21 interface

V35 V.35 interface

E1 E1 interface (standalone only)

Note: For E1 unbalanced, order cable CBL-RJ45/2BNC/E1/X.

RS530 RS-530 interface

ETH 10/100BaseT interface (for ASMi-52CD only)

T1 T1 interface

Line interface

2W 2-wire interface

4W 4-wire interface

% Second interface

ETH 10/100BaseT interface (Standalone with E1 or serial DTE interfaces only)

V.35 V.35 interface (Standalone with E1 interfaces only)

\$ AR 6-pin alarm relay port

? ME Metal enclosure

+ Extended Temperature (Default=0°-50°C/ 32°-122°F)

ETR -20° to 70°C (-4° to 158°F)

ASMi-52/24/ETH/4W/ME/AR/RAIL

4-wire SHDSL rail-mount modem 24 VDC version

ASMi-52/ETH/4W/ME/AR/RAIL

4-wire SHDSL rail-mount modem, wide-range AC/DC power supply

Note: The line interface is TB for rail-mount versions.

Supplied Accessories

AC/DC adaptor plug

For -48 VDC unit

PLUG-DC/TB-s

DC adaptor plug (default wide-range power supply)

Optional Accessories

CBL-RJ45/2BNC/E1

Interface adapter for converting balanced E1 RJ-45 connector into a pair of BNC unbalanced coaxial connectors

CBL-DB9F-DB9M-STR

Control port cable

RM-33-2

Kit for mounting 1 or 2 dual-interface unit/s (plastic enclosure) in a 19" rack

RM-35/@

Kit for mounting 1 or 2 unit/s (metal enclosure) in a 19" rack

@ Rack mounting kit

P1 For mounting one unit

P2 For mounting two units

WM-35-TYPE4

Hardware kit for wall mounting 8.5" units in metal enclosure

ASMi-52L

2/4-Wire SHDSL Modem

ASMi-52L/*/#

Standalone

ASMi-52L/24V/4ETH#/RAIL/ETR

2/4-wire SHDSL rail-mount modem (TB interface) with 4ETH user interface, 24 VDC power supply and extended temperature support

* DTE interface

X.21 X.21 interface

V.35 V.35 interface

E1 G.703 E1

ETH 10/100BaseT port

4ETH 4 10/100BaseT with integrated switch



#	Line interface		
	2W	2-wire interface	
	4W	4-wire interface	
<i>Supplied Accessories</i>			
	Power cord	For AC unit	
	AC/DC adapter	-48 VDC	
<i>Optional Accessories</i>			
	CBL-DB9F-DB9M-STR	Control port cable	
	CBL-RJ45/2BNC/E1	Interface adaptor for converting a balanced E1 RJ-45 connector into a pair of BNC unbalanced coaxial connectors	
	RM-33-2	Hardware kit for mounting one or two ASMi-52L units in a 19" rack.	
ASMi-53 SHDSL.bis CPE Modem			
ASMi-53/\$/*/@			
\$	Power supply		
	AC	External, 100-240 VAC	
	DC	External, 40 to 72 VDC	
*	SHDSL interface		
	2W	2-wire (one pair)	
	4W	4-wire (two pairs)	
@	Additional user interface		
	V35	V.35	
	E1	E1	
	ASMi-53/RPF/ETH/E1UB/4W	SHDSL.bis CPE Modem, Type 2, remote power feeding, Ethernet (RJ45) and unbalanced E1 (BNC), 4W	
	ASMi-53/RPF/E1UB/V35DB/4W	SHDSL.bis CPE Modem, Type 2, remote power feeding, unbalanced E1 (BNC) and V.35 (DB-25) serial interface, 4W	
<i>Supplied Accessories</i>			
	P/S-AC/5/1000/US-W/LOCK	AC power supply with US plug	
	P/S-AC/5/1000/EU-W/LOCK	AC power supply with European plug	
<i>Optional Accessories</i>			
	RM-47	Hardware kit for mounting one or two plastic ASMi-53 units in a 19-inch rack	
	CBL-DB9F-DB9M-STR	Standard 9-pin male to female RS-232 control port cable	
ASMi-54 SHDSL.bis Modem			
ASMi-54/\$/@/#/^/*/%/~			
		Standalone	
	ASMi-54C	See LRS-102 modules	
\$	DC Power Supply (Default=wide-range AC/DC)		
	24V	24 VDC	
@	User interface (Default=no E1 interface)		
	4E1	Four E1 ports	
#	Ethernet interface (mandatory; default=4 x RJ-45 connectors)		
	4ETH	Four-port ETH module	
^	Extended temperature		
		Extended temperature for device with 4 ETH interface: (Default=0°-50°C/32°-122°F)	
	ETR	-20° to 65°C (-4° to 1498°F) range	
*	SHDSL interface		
	8W	8-wire ((For plastic enclosure with (4ETH + 4E1) option or metal enclosure only)	
	8W/D	8-wire with daisy-chain/ring capabilities (4W on each side)	
	8W/M	8-wire with multipoint capabilities	
%	Enclosure		

	ME	8.5-inch metal enclosure (For 8W/D or 8W/M options only)
	RAIL	Rail-mount enclosure (For 8W with Ethernet port, 8W/D and 8W/M options only)
<i>Supplied Accessories</i>		
	Power cord	AC/DC
	AD/DC adapter for -48 VDC	
	RM-34 mounting kit for installation of one ASMi-54/4ETH/8W/D/R in a 19-inch rack	
<i>Optional Accessories</i>		
	RM-33-2	Hardware kit for mounting one or two plastic ASMi-54 units in a 19" rack.
	RM-35/@	Hardware kit for mounting one or two metal ASMi-54 units in a 19" rack.
@	Rack mount kit	
	P1	One unit
	P2	Two units
	WM-35-TYPE4	Wall mounting kit for 8.5-inch units with metal enclosure.
	CBL-DB9F-DB9M-STR	Control cable
	CBL-RJ45/2BNC/E1	Interface adapter for converting a balanced E1 RJ-45 connector into a pair of BNC unbalanced coaxial connectors
ASMi-54L		
ASMi-54L/\$/#/*/@/^/&!		
\$	DC power supply (Default=wide-range AC/DC power supply)	
	24V	24 VDC
#	Ethernet interface (mandatory)	
	4ETH	Four-port ETH module with 4 RJ-45 connectors
*	SHDSL interface	
	2W	2-wire interface
	4W	4-wire interface
@	User interface (Default=no E1 interface):	
	E1	E1
^	Extended temperature for device with 4 X ETH interface (Default=	
	0°-50°C/32°-122°F)	
	ETR	-20° to 70°C (-4° to 158°F) range (according to special request)
&	License key for high data rate (Default=no key)	
	HR	License key for 11.4 Mbps data rate per pair)
!	Enclosure (Default=plastic enclosure)	
	ME	Metal enclosure
<i>Supplied Accessories</i>		
	Power cord	For AC unit
	AC/DC adapter	-48 VDC
<i>Optional Accessories</i>		
	CBL-DB9F-DB9M-STR	Standard 9-pin male to female RS-232 control port cable
	CBL-RJ45/2BNC/E1	Interface adapter for converting a balanced E1 RJ-45 connector into a pair of BNC unbalanced coaxial connectors
	RM-33-2	Hardware kit for mounting one or two plastic ASMi-54L units in a 19-inch rack
	RM-35/@	Hardware kit for mounting one or two metal ASMi-54L units in a 19-inch rack
@	Mounting kit (Default=both kits)	
	P1	For mounting one unit
	P2	For mounting two units
	ASMi-54L-LIC/HR	License key for extended data rate



ASMi-54LRT SHDSL.bis Modem with Integrated Router
 ASMi-54LRT/\$/#/*/@/^

\$ DC power supply (Default=wide-range AC/DC power supply)
 24V 24 VDC

Ethernet interface (mandatory)
 4ETH Four-port ETH module with 4 RJ-45 connectors

* SHDSL interface
 2W 2-wire interface
 4W 4-wire interface
 8W 8-wire interface

@ User interface (Default=no E1 interface):
 E1 E1

^ Extended temperature for device with 4 X ETH interface (Default=0°-50°C/32°-122°F)
 ETR -20° to 70°C (-4° to 158°F) range (according to special request)

Supplied Accessories

Power cord For AC unit
 AC/DC adapter -48 VDC

Optional Accessories

RM-33-2 Hardware kit for mounting one or two ASMi-54L units in a 19" rack.

CBL-DB9F-DB9M-STR Standard 9-pin male to female RS-232 control port cable

CBL-RJ45/2BNC/E1 Interface adaptor for converting a balanced E1 RJ-45 connector into a pair of BNC unbalanced coaxial connectors

BE-1 Coax to Twisted Pair Converter for E1
 BE-1/M BNC male connectors
 BE-1/F BNC female connectors

DXC-4 E1/T1 Grooming Device

DXC-4/#/&

Number of link channels
 4 4 E1/T1 ports
 8 8 E1/T1 ports

& Redundant power supply
 R Redundant power supply

Supplied Accessories

AC power cord For AC unit
 DC adapter kit For DC unit

Optional Accessories

RM-35/@ Hardware kit for mounting one or two units in a 19" rack

@ Mounting kit
 P1 For mounting one unit
 P2 For mounting two units

DXC-8R/10A/30

Basic units, additional system modules, and I/O modules are ordered separately. When ordering I/O modules, see module data sheets.

DXC-30-3/UTP/*/~ Includes 3U-high chassis with 15 I/O slots, one power supply, and one common logic module
 DXC-10A-3/UTP/~ Includes 1U-high chassis with 5 I/O slots, one power supply, and common logic module
 DXC-8R-3/UTP/~ Includes 1U-high chassis with 4 I/O slots, two power supplies, and two common logic modules

System modules

DXC-30M-CL.3/UTP Common Logic modules for DXC-8R, DXC-10A or DXC-30
 DXC-30M-PS/~ Power supply module for DXC-30
 DXC-8RM-PS/48 DC power supply module for DXC-8R
 * R Power supply and common logic redundancy
 ~ Power supply
 AC 100 to 240 VAC operation
 48 -48 VDC operation
 48HP DXC-30 high-power chassis only (A fan tray must be used for this unit.)

Supplied Accessories

AC power cord For AC unit
 DC adapter kit For DC unit
 RM-DXC8R 19" mounting kit for DXC-8R
 RM-DXC10A 19" mounting kit for DXC-10A
 RM-DXC30 19" mounting kit for DXC-30

Optional Accessories

CBL-DB9F-DB9M-STR Control port cable
 DXC-30M-FT/# Fan tray for DXC-30
 # Power supply for fan tray
 AC 100 to 240 VAC operation
 48 -48 VDC operation

DXC-8R/10A/30 Modules

D4E1, D8E1
 DXC-M-4E1 4-Port E1 Interface Module
 DXC-M-8E1 8-Port E1 Interface Module

Optional Accessories

CBL-G703-8/RJ45/ST Splitter cable with station clock for splitting the 44-pin module connector to 8 E1 balanced RJ-45 connectors (D8E1 only)
 CBL-G703-8/RJ45/X Splitter cross-cable for splitting the 44-pin module connector to 8 E1 balanced RJ-45 connectors (D8E1 only)
 CBL- G703-8/COAX Adapter cable for converting the DB-44 connector to 8 pairs of BNC unbalanced connectors (D8E1 only)
 CBL-RJ45/2BNC/E1/X Adapter cable for converting the RJ-45 connector to BNC unbalanced connectors

D4SL, D8SL

DXC-M-8SL-E1 Eight-port, 2-wire SHDSL E1 link module
 DXC-M-4SL-E1/\$ Four-port, 2-wire SHDSL E1 link module
 \$ Line interface
 STUC Central site module
 STUR Remote site module

*Optional Accessories*

CBL-D4SL-STUC	Adapter cable for D4SL (central site module), splits a single DB-25 connector into 4 × RJ-45 balanced connectors
CBL-D4SL-STUR	Adapter cable for D4SL (remote site module), splits a single DB-25 connector into 4 × RJ-45 balanced connectors
CBL-D8SL-RJ45/X	Adapter cable for D8SL, splits a single DB-25 connector into 8 × RJ-45 balanced connectors
DXC-30M-FT/~	Fan tray (for the DXC-30 chassis only)
~ Fan tray power supply	
AC	100 to 240 VAC
48	-48 VDC

D4T1, D8T1

DXC-M-4T1L	Four-port framed T1 interface module
DXC-M-8T1L	Eight-port framed T1 interface module
DXC-M-4T1	Four-port framed and unframed T1 interface module
DXC-M-8T1	Eight-port framed and unframed T1 interface module

Optional Accessories

CBL-D8T1-RJ45/X	Adapter cable for converting the DB-25 connectors to 8 RJ-45 connectors (D8T1 only)
CBL-G703-8/RJ45/ST	Splitter cross-cable with station clock for splitting the 44-pin module connector to 8 RJ-45 connectors (D8T1L only)
CBL-G703-8/RJ45	Adapter cable for converting the DB-44 connector to 8 RJ-45 connectors (D8T1L only)

D8HS

DXC-M-8HS	8-Channel High-Speed Data Module
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Optional Accessories

CBL-D8HS-RS530	Splitter cable to convert the 200-pin D8HS connector to eight DB-25 RS-4530 connectors
CBL-D8HS-V35/M	Splitter cable to convert the 200-pin D8HS connector to eight 34-pin male V.35 connectors
CBL-D8HS-V35/F	Splitter cable to convert the 200-pin D8HS connector to eight 34-pin female V.35 connectors
CBL-D8HS-X21	Splitter cable to convert the 200-pin D8HS connector to eight DB-15 X.21 connectors

DE1B

DXC-M-E1B/\$/#/+	Two-port E1 Link Module
\$ Link interface	
C	Built-in LTU (copper interface only)
BP	Port bypass
BP/C	Built-in LTU and optional port bypass (copper interface only)
# Link connector (Default=copper interface with coaxial BNC connectors)	
ST	ST connectors
FC	FC/PC connectors
SC	SC connectors
+ Laser optical interface wavelength and transmitter (not relevant with copper interface)	
85L	850 nm, multimode
13L	1310 nm, single mode
15L	1550 nm, single mode

Optional Accessories

CBL-RJ45-Y/CROSS	Cross-cable for providing Y-cable redundancy. Includes four RJ-45 connectors.
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DE3

DXC-M-E3/#+	E3 Multiplexer Module
# Link connector (Default=electrical interface with coaxial BNC connectors)	
ST	ST fiber connectors
FC	FC/PC fiber connectors
SC	SC fiber connectors
+ Optical interface wavelength and transmitter (not relevant with electrical interface)	
85L	850 nm, multimode, laser, VCSEL
13L	1310 nm, single mode, laser diode
15L	1550 nm, single mode, laser diode

DFSTM-1

DXC-M-FSTM1/#/+/*	STM-1 Multiplexer Module
# Link connector (Default=electrical interface with coaxial BNC connectors)	
ST	ST fiber connectors
FC	FC/PC fiber connectors
SC	SC fiber connectors
+ Optical interface wavelength and transmitter (not relevant with copper interface)	
13L	1310 nm, single mode, laser
15L	1550 nm, single mode, laser
* Interface for a second port (Default=one port)	
R	Identical to the first port
R/CX	Coax interface
R/#/+	Fiber-optic interface (see above)

Optional Accessories

DXC-30M-FT/~	Fan tray for the DXC-30 chassis
~ Fan tray power supply	
AC	100 to 240 VAC operation
48	-48 VDC operation

DHS

DXC-M-HS/^	Dual-channel high speed data module
^ User ports	
V35	V.35
530	V.11/RS-422 interface with RS-530 connector (adaptable to V.36/RS-449 via cable)
X21	X.21
V24	V.24
ETUB	Ethernet bridge port with 10/100BaseT (UTP) interface
ETUR	Ethernet router port with 10BaseT (UTP) interface

Optional Accessories

The following cables adapt the DHS 25-pin connector to the specified applications. Cable length is 2m (6 ft). A separate cable is required for each channel.

CBL-HS2/V/1/@	Connecting a V.35 DTE using DCE clock mode
CBL-HS2/V/2/@	Connecting a V.35 DCE using DTE1 clock mode
CBL-HS2/V/3/@	Connecting a V.35 DCE using DTE2 clock mode
CBL-HS2/R/1/@	Connecting a V.36/RS-449 DTE using DCE clock mode
CBL-HS2/R/2/@	Connecting a V.36/RS-449 DCE using DTE1 clock mode
CBL-HS2/R/3/@	Connecting a V.36/RS-449 DCE using DTE2 clock mode
@ Connector	
F	Female connector
M	Male connector

DIM

DXC-M-DIM/^	Digital Inverse Multiplexer Module
^ User port interface	



V35	V.35 interface
530	RS-530 interface
X21	X.21 interface
HSS1	High Speed Serial Interface
E1	E1 interface (E1 over two T1 links)
ETUB	Ethernet bridge port with 10/100BaseT (UTP) interface

Optional Accessories

The following cables adapt the DIM V.35 user ports DB-25 connectors to the specified applications. Cable length is 2m (6 ft).

CBL-HS2/V/1/@ Adaptor cable for connecting a V.35 DTE using DCE clock mode

CBL-HS2/V/2/@ Adaptor cable for connecting a V.35 DCE using external DCE clock mode

@ Connector

F	Female connector
M	Male connector

DT1B

DXC-M-T1B/\$/#+ Two-port T1 link module

\$ CSU option

C	Built-in CSU option (copper interface only)
BP	Port bypass
BP/C	Built-in CSU and optional port bypass (copper interface only)

Link connector (Default=copper interface with coaxial BNC connectors)

ST	ST connectors
FC	FC/PC connectors
SC	SC connectors

+ Optical interface wavelength (not relevant with copper interface)

85L	850 nm, multimode, laser, VCSEL
13L	1310 nm, single mode, laser
15L	1550 nm, single mode, laser

Optional Accessories

CBL-MP-RJ45/STR Straight cable for balanced T1 connection

CBL-MP-RJ45/CROSS Cross-cable for balanced T1 connection

CBL-RJ45-Y/CROSS Cross-cable for providing Y-cable redundancy. Includes four RJ-45 connectors, two on each side.

DT3

DXC-M/T3/#+ T3 Multiplexer Module

Link connector (Default=electrical interface with coaxial BNC connectors)

ST	ST fiber connectors
FC	FC/PC fiber connectors
SC	SC fiber connectors

+ Optical interface wavelength and transmitter (not relevant with electrical interface)

85L	850 nm, multimode, laser, VCSEL
13L	1310 nm, single mode, laser diode
15L	1550 nm, single mode, laser diode

Egate-100

Egate-100-T3!/+/+/TR

Channelized Ethernet gateway with SFP slots for STM-1/OC-3 interfaces

Egate-100!/+/+/TR/S Channelized Ethernet gateway with SFP slots for STM-1/OC-3 interfaces

! Power supply (PS)

AC	100 to 230 VAC
ACR	Dual 100 to 230 VAC
48	48 VDC
48R	Dual 48 VDC

TDM Interface

SFP1	Fast Ethernet/STM-1, 1310 nm, multimode, LED, 2 km (1.2 mi)
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SFP2	Fast Ethernet/STM-1, 1310 nm, single mode, laser, 15 km (9.3 mi)
SFP3	Fast Ethernet/STM-1, 1310 nm, single mode, laser, 40 km (24.8 mi)
2XSFP1	Two SFP-1 (see above for specifications)
2XSFP2	Two SFP-2 (see above for specifications)
2XSFP3	Two SFP-3 (see above for specifications)
NULL	Two empty SFP slots

+ Ethernet Port

SFP5	Gigabit Ethernet, 850 nm, multimode, VCSEL, 0.55 km (0.3 mi)
SFP6	Gigabit Ethernet, 1310 nm, single mode, laser, 10.0 km (6.2 mi)
SFP7	Gigabit Ethernet, 1550 nm, single mode, laser, 80.0 km (49.7 mi)
SFP8	Gigabit Ethernet, 1310 nm, single mode, laser, 40.0 km (24.8 mi)
UTP	Built-in 10/100/1000BaseT, RJ-45 connector
NULL	Empty SFP slot

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.

TR Tributary Ports

T3 Option

1T3	One T3 port (ports 2 and 3 are disabled)
3T3	Three T3 ports

STM-1/OC-3 option

DIS	Activation of 30 E1 and 42 T1 ports
FULL	Activation of 63 E1 and 84 T1 ports

S NEBS compliancy

N3	NEBS level 3, 2 and 4 compliant
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Supplied Accessories

AC power cord	For AC unit
DC adapter kit	For DC unit
RM-34	Hardware kit for mounting one Egate-100 unit into a 19" rack
CBL-DB9F-DB9M-STR	Control port cable

Optional Accessories

WM-34	Hardware kit for mounting one Egate-100 unit on a wall
-------	--

Egate-20

Egate-20/C/\$ Channelized Ethernet Gateway

C Interface

CH Channelized

\$ Port

E1	Balanced E1 port
E1U	Unbalanced E1 port
T1	T1 port

Note: Unbalanced E1 interface is provided via an adapter cable (CBL-RJ45/2BNC/E1, see Supplied Accessories).

Supplied Accessories

AC power cord	For AC unit
DC adapter kit	For DC unit
CBL-RJ45/2BNC/E1	Interface adapter for converting a balanced E1 RJ-45 connector to a pair of BNC unbalanced coaxial connectors (if an unbalanced E1 interface is ordered)

Optional Accessories

RM-35/@	Hardware kit for mounting one or two Egate-20 units into a 19" rack
---------	---

@ Mounting kit (Default=Both kits):

P1	Kit for mounting one unit
P2	Kit for mounting two units



WM-35 A hardware kit for mounting one Egate-20 unit on a wall

CBL-DB9F-DB9M-STR DB-9 to DB-9 control port cable

Egate-2000

Carrier Ethernet Aggregator for PDH and SDH/SONET

Egate 2000 /*/&/\$ Chassis with 2 power supplies, 1 management module, 1 fan un

* Power supply
48R Dual DC power supply

& Main Module
MAIN Single main module
MAINR Dual main module

\$ Ethernet Module
8GBE Single 8-port GbE module
8GBER Dual 8-port GbE module

Modules

Egate 2000M-MAIN SDH/SONET module with STM-16/OC-48, STM-4/OC-12 and STM-1/OC-3 interfaces

Egate 2000M-8GBE Ethernet module with 8 GbE interfaces

Egate 2000M-MNG Management module for local configuration, out-of-band management and alarm output

Egate 2000M-PS/DC -48 VDC power supply module

Egate 2000M-FAN Fan unit

Supplied Accessories

Two DC power cables

Grounding cable

Management cable

Clock cable

Alarm cable

Fasteners for installing Egate 2000 in 19", 21" or 23" racks

ETX-1

Ethernet Demarcation Switch

ETX-36/!/+/1/4UTP/~/?

! Power supply
AC Internal 100-240 VAC
DC Internal -48 VDC
ACEX External 100-240 VAC
DCEX External -48 VDC

+1 Ethernet network port
2UTP 2 UTP Ethernet ports
2SFP 2 SFP slots
1SFP1TUP 1 SFP slot + 1 UTP

~ Synchronous Ethernet capability
SYC Sync-E

? Enclosure
H Temperature range
(Default=Regular temperature range):

Note: ETX-1 is supplied in a plastic enclosure when ordered with an external AC power supply.

ETX-102

Carrier Ethernet Demarcation Device

ETX-102/?/!/+/1/+2/+3

? Power supply (Default=wide range AC/DC power supply)
WRDC 24 to -48V Wide range DC power supply (for temperature-hardened enclosure only)

! Temperature range
H Temperature range (Default=regular enclosure)
Temperature-Hardened enclosure (requires temperature-hardened SFP transceivers)

+1 Port 1 (network) interface
NULL Empty SFP slot
UTP 1 UTP

+2 Port 2 (network/user) interface (see +1 options above)

+3 See +1 (Port 1) abovePort 3-6 (user) interface and combination

+3 Port 3-6 (user) interface

1UTP 1 UTP (port 3)4 10/100BaseT ports
4UTP Four built-in 10/100/1000BT, RJ-45 connectors

Supplied Accessories

AC power cord For AC unit
DC adapter kit For DC unit

Optional Accessories

RM-33-2 Hardware kit for mounting one or two ETX-102 units into a 19" rack

RM-35/@ Hardware kit for mounting one or two ETX-102/H units into a 19" rack

@ Mounting kit (Default=Both kits):
P1 Kit for mounting one unit
P2 Kit for mounting two units

WM-35-TYPE4 Hardware kit for mounting one /H unit with metal enclosure on a wall

CBL-DB9F-DB9M-STR

Control port cable

ETX-1002

10GbE Carrier Ethernet Aggregation Switch

ETX-1002/!

! Power supply
AC Single AC
DC Single DC

Supplied Accessories

AC power cord For AC unit
DC adapter kit For DC unit

Terminal port cable

ETX-1002-FAN Fan tray
ETX-1002-SBRKT Side brackets kit

Optional Accessories

ETX-1002-SW10G Software license for activating 10 GbE ports

ETX-1002-2x10G Plug-in module with 2 10-GbE XFP ports (requires ETX-1002-SW10G)

ETX-1002-2x10G Plug-in module with 2 10-GbE XFP ports (requires ETX-1002-SW10G)

ETX-1002-PS/@ Spare power supply

@ Mounting kit (Default=Both kits):
AC AC power supply with power cord
DC DC power supply (-48 VDC) with DC feed

RAD SFPs and XFPs See [SFP Transceivers](#)

ETX-1300

Gigabit Ethernet Aggregation Switch

ETX-1300/!/+/3

! Power supply:
48HPR Redundant -48 VDC high-power power supply
48R Redundant -48 VDC power supply
ACHPR Redundant AC high-power power supply
ACR Redundant AC power supply

+3 Ethernet ports:
32N 32 empty SFP slots
32UTP 32 10/100BaseT UTP ports

Supplied Accessories

Power cord

DC power connection kit

RM-34 Hardware kit for mounting one unit into a 19-inch rack

Optional Accessories

ETX 1300-PS/@ Power supply and fan module

@ AC 100 to 240 VAC
48 -48 VDC

CBL-DB9F-DB9M-STR Control port cable



ETX-2 Carrier Ethernet Demarcation Devices
ETX-203AM Universal Carrier Ethernet Demarcation Device
 ETX-203AM/?/!/NP/MA/+3
 ? Enclosure type (Default=Regular enclosure)
 H Industrially-hardened enclosure
 ! Power supply
 AC AC power supply
 DC DC power supply
 NP Software package (Default=100 Mbps per port)
 MA Network port module (Default= no network port module)
 2ETH 2 Ethernet combo ports
 SH4W 2 SHDSL ports (4-wire)
 SH8W 4 SHDSL ports (8-wire)
 4E1T1 4 E1/T1 ports
 8E1T1 8 E1/T1 ports
 1T3 1 T3 port
 2T3 2 T3 ports
 RTR 1 Gbps router
 +3 Ethernet user ports
 4UTP 4 copper Ethernet ports
 4SFP 4 SFP Ethernet ports
 2SFP2UTP 2 SFP Ethernet ports + 2 copper slots

License Packages
 ETX 203AM-SW/GE30 Software license for 1 Gbps per port, and up to 64 shaped EVCs per port
 ETX 203AM-SW/GE Software license for 1 Gbps per port

Supplied Accessories
 AC power cord (if AC power supply is ordered)
 DC connector kit (if DC power supply is ordered)
 CBL RJ45/D9/F/6FT Control port cable with male RJ-45 and female DB-9 connector
 CBL-E1-SPLT Cable to extract 2 E1/T1 ports from one RJ-45 connector of E1/T1 network module (four cables are supplied if 8 E1T1 option is ordered)

Optional Accessories
 CBL-RJ45/2BNC/E1/X Balanced E1 (RJ 45) to unbalanced E1 (2 BNC) adapter cable
 RM-35/@ Hardware kit for mounting one or two ETX 203AM units in a 19" rack
 @ Rack mount kit (Default=Both kits):
 P1 Kit for mounting one unit
 P2 Kit for mounting two units
 RM-35/23-TYPE1-NEBS Hardware kit for mounting one or two NEBS-compliant ETX-203AM or ETX-203AX units in a 19" rack

WM-35 Wall mount hardware kit for one unit
 ETX-M/2ETH Ethernet uplink module with two combo ports
 ETX-M/SH4W EFM bonded uplink module with 2 SHDSL ports (4-wire)
 ETX-M/SH8W EFM bonded uplink module with 4 SHDSL ports (8-wire)
 ETX-M/4E1T1 Ethernet uplink module with 4 E1/T1 ports
 ETX-M/8E1T1 Ethernet uplink module with 8 E1/T1 ports
Note: The CBL-E1-SPLT cables must be ordered separately when ordering the 8E1T1 module.
 ETX-M/1T3 Ethernet uplink module with 1 T3 port
 ETX-M/2T3 Ethernet uplink module with 2 T3 ports
 ETX-M/RTR Ethernet module with integrated 1 Gbps router (provided only with temperature-hardened enclosure)

ETX-203AX Carrier Ethernet Demarcation Device
 ETX-203AX/NP/+2/+3
 ? Enclosure type (Default=Regular enclosure)
 H Industrially-hardened enclosure
 NP Software package (Default= 100 Mbps per port):
 GE Software license for 1 Gbps per port

GE30 Software license for 1 Gbps per port, and up to 64 shaped EVCs per port
 +2 Two Ethernet network ports or network and user port
 1SFP1UTP 1 SFP slot + 1 UTP Ethernet port
 2SFP 2 SFP Ethernet ports
 2UTP 2 UTP Ethernet ports
 +3 Ethernet user ports
 4SFP 4 SFP slots
 4UTP 4 UTP Ethernet ports
 2SFP2UTP 2 SFP slots + 2 UTP Ethernet ports

Supplied Accessories
 AC Power Cord
 CBL-RJ45/D9/F/6FT Control port cable with male RJ-45 and female DB-9 connector

Optional Accessories
 DC connection kit
 RM-33-2 Hardware kit for mounting one or two X units in a 19" rack
 RM-35/23-TYPE1-NEBS Hardware kit for mounting one or two NEBS-compliant ETX-203AM or ETX-203AX units in a 19" rack

ETX-205A Carrier Ethernet Demarcation Device
 ETX 205A/?/!/^/\$/&/}/~
 ? Enclosure type (Default=Regular enclosure)
 HN Temperature-hardened NEBS-certified enclosure
 ! Power supply (swappable)
 AC Single AC power supply
 ACDC Single AC power supply and single DC power supply
 ACR Dual AC power supply
 DC Single DC power supply
 DCR Dual DC power supply
 ^ Enclosure size (Default = regular 8.5" enclosure)
 19 19" enclosure
 \$ E1/T1 ports (Default=No E1/T1 ports)
 4E1T1 Four E1/T1 ports
 8E1T1 Eight E1/T1 ports
 & Router (Default = no router)
 RTR Integrated 1 Gbps router
 } Enclosure type (Default = no GPS)
 GPS Integrated grandmaster and GNSS receiver
 ~ Timing:
 SYE SyncE full support
 PTP SyncE and 1588v2 clock recovery support

Supplied Accessories
 Power cord (one per power supply)
 RM-34 Hardware kit for mounting one unit in a 19" rack
 CBL-RJ45/D9/F/6FT Control port cable with male RJ-45 and female DB-9 connector

Optional Accessories
 WM-34 Wall mount hardware kit for one 19" unit
 WM-35 Wall mount hardware kit for one 8.5" unit
 CBL-RJ45/2BNC/E1/X Balanced E1 (RJ-45) to unbalanced E1 (2 BNC) adaptor cable
 RM-35/@ Hardware kit for mounting one or two 8.5" units in a 19" rack

@ Power supply
 P1 Kit for mounting one unit
 P2 Kit for mounting two units
 ETX-205A-PS/?/!
 ? NEBS
 NULL International
 N NEBS3



!	Power supply	
	AC	Single AC power supply
	DC	Single DC power supply
ETX-205A-DNFV/!/~/^/&/P		
!	Power supply	
	AC	Single AC power supply
?	Voltage	
	19V	
^	X86 processor	
	DC2X	Dual core 2.5 GHz x86 processor
	QC18	1.8 GHz x86 processor
&	Disk type	
	128S	128 GB solid state disk (SSD)
P	Controller application	
	HST	High-scale PM controller application

ETX-220A 10GbE Carrier Ethernet Demarcation Device

ETX-220A/?!/C/C2/~NP

?	Enclosure type (Default=Regular enclosure)	
	H	Industrially-hardened enclosure
!	Power supply (swappable)	
	AC	Single AC power supply
	ACR	Dual AC power supply
	DC	Single DC power supply
	DCR	Dual DC power supply
C	10GbE interfaces	
	2XFP	2 XFP slots
	3XFP	3 XFP slots
	4XFP	4 XFP slots
C2	GbE interfaces	
	10S	10 SFP slots
	10U	10 UTP Ethernet ports
	10U10S	10 UTP Ethernet ports + 10 SFP slots
	20S	20 SFP slots
	20U	20 UTP Ethernet ports
~	Timing (Default=No timing)	
	SYE	SyncE full support
	PTP	SyncE and 1588v2 clock recovery support
NP	Software package (Default= basic software key):	
	ESK	Enhanced software key providing all features
	BSK	Basic software key providing all ESK features except there is one level of QoS (8x2CoS and two shapers per NNI port)

Supplied Accessories

Power cord (one per power supply)	
RM-34	Hardware kit for mounting one unit in a 19" rack
CBL-RJ45/D9/F/6FT	Control port cable with male RJ-45 and female DB-9 connector

Optional Accessories

RM-34-23	Hardware kit for mounting one unit in a 23" rack
WM-34	Wall mount hardware kit for one unit

ETX-220A_PS/!

!	Power supply	
	AC	Single AC power supply
	DC	Single DC power supply

ETX-2i Carrier Ethernet Demarcation Device

ETX-2i/?!/~/M/~

?	Enclosure type (Default = regular enclosure)	
	H	Temperature-hardened enclosure
	N	NEBS-certified enclosure
	HN	Temperature-hardened NEBS-certified enclosure
!	Power supply (swappable)	
	AC	Single AC power supply

ACDC	Single AC power supply and single DC power supply	
ACR	Dual AC power supply	
ACHP	High power AC power supply for D-NFV	
DC	Single DC power supply	
DDC	Dual DC feed power supply	
^	Enclosure size (Default = regular 8.5" enclosure; four fixed GbE SFP/copper combo ports)	
	19	19" enclosure; eight fixed GbE SFP/copper combo ports
M	Modular uplink (Default=No modular uplink)	
	M	Modular uplink
~	Timing	
	SYE	SyncE full support
	PTP	SyncE and 1588v2 clock recovery support

Supplied Accessories

AC Power cord	
CBL-RJ45/D9/F/6FT	Control port cable with male RJ-45 and female DB-9 connector

Optional Accessories

DC connection kit		
RM-34	Hardware kit for mounting one 19" unit in a 19" rack	
RM-35/@	Hardware kit for mounting one or two 8.5" units in a 19" rack	
@	Rack mount kit (Default=Both kits):	
	P1	Kit for mounting one unit
	P2	Kit for mounting two units
WM-35	Wall mount hardware kit for one 8.5" unit	

ETX-2i-PS/?!/

?	NEBS	
	NULL	International
	N	NEBS3
!	Power supply	
	AC	Single AC power supply
	DCHP	High power DC power supply for D-NFV

	ACHP	High power AC power supply for D-NFV
	ETX-M/MA	Network interface modules

M	Network port module (Default= no network port module)
A	

	2ETH	2 Ethernet combo ports
	SH4W	2 SHDSL ports (4-wire)
	SH8W	4 SHDSL ports (8-wire)
	4E1T1	4 E1/T1 ports
	8E1T1	8 E1/T1 ports
	1T3	1 T3 port
	2T3	2 T3 ports

ETX-DNFV-M/~/^/&/S

		Network interface modules
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^	Processor	
	i7	Quad core i7
&	Disk type	
	128 GB	128 GB solid state disk (SSD)
S	RAM size	
	8 GB	8 GB RAM

ETX-201 Carrier Ethernet Demarcation Device

ETX-201/?!/+1/+2/+3

?	Power supply (Default=wide range AC/DC power supply)	
	WRDC	24 to -48 V Wide range DC power supply (for temperature-hardened enclosure only)
!	Temperature range (Default=regular enclosure)	
	H	Temperature-Hardened enclosure (requires temperature-hardened SFP transceivers)
+1	Port 1 (network) interface	



NULL	Empty SFPport slot	SFP-6H	Gigabit Ethernet, industrially hardened, 1310 nm, single mode, laser, 10.0 km (6.2 mi)
UTP	Built-in 10/100/1000BaseT	SFP-7	Gigabit Ethernet, 1550 nm, single mode, laser, 80.0 km (49.7 mi)
+2	Port 2 (network/user) interface (see +1 options above)	SFP-7D	Gigabit Ethernet, DDM, internal calibration, 1550 nm, single mode, laser, 80.0 km (49.7 mi)
+3	Port 3-6 (user) interface1SFP-1-3UTP	SFP-8	Gigabit Ethernet, 1310 nm, single mode, laser, 40.0 km (24.8 mi)
1Null-3UTP	Port 3-4 with SFP-8, Port 5-6 with UTPEmpty SFP slot	SFP-8D	Gigabit Ethernet, DDM, internal calibration, 1310 nm, single mode (single fiber), laser, 40.0 km (24.8 mi)
1UTP	1 UTP port (port 3)	SFP-8H	Gigabit Ethernet, industrially hardened, 1310 nm, single mode, laser, 40.0 km (24.8 mi)
4UTP	Four built-in 10/100/1000BT, RJ-45 connectors4 UTP ports	SFP-8DH	Gigabit Ethernet, DDM, internal calibration, industrially hardened, 1310 nm, single mode (single fiber), laser, 40.0 km (24.8 mi)
<i>Supplied Accessories</i>		SFP-10A	Fast Ethernet/STM-1, Tx - 1310 nm, Rx - 1550 nm, single mode (single fiber), laser (WDM) , 20 km (12.4 mi)
AC power cord	For AC unit	SFP-10B	Fast Ethernet/STM-1, Tx - 1550 nm, Rx - 1310 nm, single mode (single fiber), laser (WDM) , 20 km (12.4 mi)
DC adapter kit	For DC unit	SFP-17A	Gigabit Ethernet, Tx -1310 nm, Rx -1490 nm, single mode (single fiber), laser (WDM), 10.0 km (6.2 mi)
<i>Optional Accessories</i>		SFP-17AD	Gigabit Ethernet, DDM, internal calibration, Tx - 1310 nm, Rx - 1490 nm, single mode (single fiber), laser (WDM), 10.0 km (6.2 mi)
RM-33-2	Hardware kit for mounting one or two ETX-102 units into a 19" rack	SFP-17B	Gigabit Ethernet, Tx -1490 nm, Rx -1310 nm, single mode (single fiber), laser (WDM), 10.0 km (6.2 mi)
RM-35/@	Hardware kit for mounting one or two ETX-102/H units into a 19" rack	SFP-17B	Gigabit Ethernet, Tx - 1490 nm, Rx - 1310 nm, single mode (single fiber), laser (WDM), 10.0 km (6.2 mi)
@	Mounting kit (Default=Both kits):	SFP-17BD	Gigabit Ethernet, DDM, internal calibration, Tx - 1490 nm, Rx - 1310 nm, single mode (single fiber), laser (WDM), 10.0 km (6.2 mi)
P1	Kit for mounting one unit	SFP-18A	Fast Ethernet/STM-1, Tx - 1310 nm, Rx - 1550 nm, 9/25 single mode (single fiber), laser (WDM), 40 km (24.8 mi)
P2	Kit for mounting two units	SFP-18AED	Fast Ethernet/ STM-1, DDM, external calibration, Tx - 1310 nm, Rx - 1550 nm, 9/25 single mode (single fiber), laser (WDM), 40 km (24.8 mi)
WM-35-TYPE4	Hardware kit for mounting one /H unit with metal enclosure on a wall	SFP-18B	Fast Ethernet/STM-1, Tx - 1550 nm, Rx - 1310 nm, 9/25 single mode (single fiber), laser (WDM), 40 km (24.8 mi)
CBL-DB9F-DB9M-STR	Control port cable	SFP-18BED	Fast Ethernet/ STM-1, DDM, external calibration, Tx - 1550 nm, Rx - 1310 nm, 9/25 single mode (single fiber), laser (WDM), 40 km (24.8 mi)
ETX-201A	Carrier Ethernet Demarcation Device	SFP-20	Gigabit Ethernet, 1550 nm, single mode, laser, 120.0 km (74.5 mi)
ETX-201/!/+/+1/+2/+3	(Default for units with 3 ports=built-in AC/DC power supply, default for units with 4-6 ports=built-in AC power supply)	SFP-21AED	Gigabit Ethernet, DDM, external calibration, Tx - 1310 nm, Rx - 1490 nm, single mode (single fiber), laser (WDM), 40.0 km (24.8 mi)
! Power supply	24 to -48 V Wide range DC power	SFP-21BED	Gigabit Ethernet, DDM, external calibration, Tx - 1490 nm, Rx - 1310 nm, single mode (single fiber), laser (WDM), 40.0 km (24.8 mi)
WRDC	24 to -48 V Wide range DC power	SFP-22A	Gigabit Ethernet, Tx -1490 nm, Rx -1570 nm, single mode (single fiber), laser (WDM), 80.0 km (49.7 mi)
+1	Port 1 (network) interface	SFP-22B	Gigabit Ethernet, Tx -1570 nm, Rx -1490 nm, single mode (single fiber), laser (WDM), 80.0 km (49.7 mi)
UTP	UTP Ethernet port (RJ-45-connector)	SFP-23A	Gigabit Ethernet, Tx - 1310 nm, Rx - 1550 nm, single mode (single fiber), laser (WDM), 40.0 km (24.8 mi)
SFP-1	Fast Ethernet/STM-1, 1310 nm, multimode, LED, 2 km (1.2 mi)		
SFP-1D	Fast Ethernet/STM-1, DDM, internal calibration, 1310 nm, multimode, LED, 2 km (1.2 mi)		
SFP-2	Fast Ethernet/STM-1, 1310 nm, single mode, laser, 15 km (9.3 mi)		
SFP-2D	Fast Ethernet/STM-1, DDM, internal calibration, 1310 nm, single mode, laser, 15 km (9.3 mi)		
SFP-2H	Fast Ethernet/ STM-1, industrially hardened, 1310 nm, single mode, laser, 15 km (9.3 mi)		
SFP-3	Fast Ethernet/STM-1, 1310 nm, single mode, laser, 40 km (24.8 mi)		
SFP-3D	Fast Ethernet/STM-1, DDM, internal calibration, 1310 nm, single mode, laser, 40 km (24.8 mi)		
SFP-3H	Fast Ethernet/ STM-1, industrially hardened, 1310 nm, single mode, laser, 40 km (24.8 mi)		
SFP-4	Fast Ethernet/STM-1, 1550 nm, single mode, laser, 80 km (49.7 mi)		
SFP-4D	Fast Ethernet/STM-1, DDM, internal calibration, 1550 nm, single mode, laser, 80 km (49.7 mi)		
SFP-5	Gigabit Ethernet, 850 nm, multimode, VCSEL, 0.55 km (0.3 mi)		
SFP-5D	Gigabit Ethernet, DDM, internal calibration, 850 nm, multimode, VCSEL, 0.55 km (0.3 mi)		
SFP-5H	Gigabit Ethernet, industrially hardened, 850 nm, multimode, VCSEL, 0.55 km (0.3 mi)		
SFP-5DH	Gigabit Ethernet, DDM, internal calibration, industrially hardened, 850 nm, multimode, VCSEL, 0.55 km (0.3 mi)		
SFP-6	Gigabit Ethernet, 1310 nm, single mode, laser, 10.0 km (6.2 mi)		
SFP-6D	Gigabit Ethernet, DDM, internal calibration, 1310 nm, single mode, laser, 10.0 km (6.2 mi)		



SFP-23AED	Gigabit Ethernet, DDM, external calibration, Tx - 1310 nm, Rx - 1550 nm, single mode (single fiber), laser (WDM), 40.0 km (24.8 mi)
SFP-23B	Gigabit Ethernet, Tx - 1550 nm, Rx - 1310 nm, single mode (single fiber), laser (WDM), 40.0 km (24.8 mi)
SFP-23BED	Gigabit Ethernet, DDM, external calibration, Tx - 1550 nm, Rx - 1310 nm, single mode (single fiber), laser (WDM), 40.0 km (24.8 mi)
SFP-30	10/100/1000BaseT (with SGMII), RJ-45 connector, 100 m (238 ft)
NULL	Empty SFPport slot
+2	Port 2 (network/user) interface: Refer to the network port 1 options above
+3	Ports 3-6 (user) interfaces and combinations:
1NULL	Port 3: 1 empty SFP slot
1UTP	Port 3: 1 10/100BaseT UTP port (RJ-45 connector)
1NULL3UTP	Port 3: 1 empty SFP slot Ports 4-6: 3 built-in 10/100BaseT ports (RJ-45 connector)
2NULL2UTP	Ports 3-4: 1 empty SFP slot Ports 5-6: 2 built-in 10/100BaseT ports (RJ-45 connector)
4NULL	4 empty SFP slots
4UTP	4 10/100BaseT UTP ports (RJ-45 connector)

Supplied Accessories

AC power cord	For AC unit
DC adapter kit	For DC unit

Optional Accessories

RM-35/+	Hardware kit for mounting one or two units into a 19" rack
+ P1	Kit for mounting one unit
P2	Kit for mounting two units
WM-35	Hardware kit for mounting one unit on a wall
CBL-DB9F-DB9M-STR	Control port cable

ETX-202 Carrier Ethernet Demarcation Device

ETX-202/?/!/+/1/+2/+3

?	Power supply (Default=AC/DC wide range)
WRDC	24 to -48 VWide range DC power supply (for temperature-hardened enclosure only)
!	Temperature range (Default=regular enclosure)
H	Temperature-Hardened enclosure (requires temperature-hardened SFP transceivers)
+1	Port 1 (network) interface
Null	Empty SFP slot
UTP	Built-in 10/100/1000BaseT
+2	Port 2 (network/user) interface (see +1 options above)
+3	Port 3 or 3-6 (user) interface
1UTP	Port 3: 1 built-in 10/100/1000BaseT port (RJ-45 connector)
1NULL	Port 3: empty SFP slot
1NullUTP	Port 3: Empty SFP slot Port 4: 1 built-in 10/100/1000BaseT port (RJ-45 connector)
2Null-2UTP	Ports 3-4: Empty SFP slots Ports 5-6: 2 built-in 10/100/1000BaseT ports (RJ-45 connector)
4UTP	4 built-in 10/100/1000BaseT ports (RJ-45 connector)
4NULL	Ports 3-6: Empty SFP slots

Supplied Accessories

AC power cord	For AC unit
DC adapter kit	For DC unit

Optional Accessories

RM-35/@	Hardware kit for mounting one or two units into a 19" rack
@	Rack mounting kit
P1	Kit for mounting 1 unit
P2	Kit for mounting 2 units
WM-35-TYPE4	Hardware kit for mounting one unit on a wall
CBL-DB9F-DB9M-STR	Control port cable

ETX-202A

ETX-202A/?/+/1/+2/+3

	Carrier Ethernet Demarcation Device
	Hardened version
	<i>Note: requires industrially-hardened SFP transceivers. The temperature-hardened version is available only with six ports.</i>
?	Power supply (Default= Single AC power supply in 1U 8.4" enclosure)
WRDC	Single wide-range DC power supply in 1U 8.4" enclosure
!	Power supply for temperature-hardened enclosure
ACR	Dual AC power supply in 1U 17.4" enclosure
DCR	Dual wide-range DC power supply in 1U 17.4" enclosure
+1	Port 1 (network) interface
UTP	Built-in 10/100/1000BaseT
SFP-1	Fast Ethernet/STM-1, 1310 nm, multimode, LED, 2 km (1.2 mi)
SFP-1D	Fast Ethernet/ STM-1, DDM, internal calibration, 1310 nm, multimode, LED, 2 km (1.2 mi)
SFP-2	Fast Ethernet/ STM-1, 1310 nm, single mode, laser, 15 km (9.3 mi)
SFP-2D	Fast Ethernet/ STM-1, DDM, internal calibration, 1310 nm, single mode, laser, 15 km (9.3 mi)
SFP-2H	Fast Ethernet/ STM-1, industrially hardened, 1310 nm, single mode, laser, 15 km (9.3 mi)
SFP-3	Fast Ethernet/ STM-1, 1310 nm, single mode, laser, 40 km (24.8 mi)
SFP-3D	Fast Ethernet/ STM-1, DDM, internal calibration, 1310 nm, single mode, laser, 40 km (24.8 mi)
SFP-3H	Fast Ethernet/ STM-1, industrially hardened, 1310 nm, single mode, laser, 40 km (24.8 mi)
SFP-4	Fast Ethernet/ STM-1, 1310 nm, single mode, laser, 80 km (49.7 mi)
SFP-4D	Fast Ethernet/ STM-1, DDM, internal calibration, 1310 nm, single mode, laser, 80 km (49.7 mi)
SFP-5	Gigabit Ethernet, 850 nm, multimode, VCSEL, 0.55 km (0.3 mi)
SFP-5D	Gigabit Ethernet, DDM, internal calibration, 850 nm, multimode, VCSEL, 0.55 km (0.3 mi)
SFP-5H	Gigabit Ethernet, industrially hardened, 850 nm, multimode, VCSEL, 0.55 km (0.3 mi)
SFP-5DH	Gigabit Ethernet, DDM, internal calibration, industrially hardened, 850 nm, multimode, VCSEL, 0.55 km (0.3 mi)
SFP-6	Gigabit Ethernet, 1310 nm, single mode, laser, 10.0 km (6.2 mi)
SFP-6D	Gigabit Ethernet, DDM, internal calibration, 1310 nm, single mode, laser, 10.0 km (6.2 mi)
SFP-6H	Gigabit Ethernet, industrially hardened, 1310 nm, single mode, laser, 10.0 km (6.2 mi)
SFP-7	Gigabit Ethernet, 1550 nm, single mode, laser, 80.0 km (49.7 mi)
SFP-7D	Gigabit Ethernet, DDM, internal calibration, 1550 nm, single mode, laser, 80.0 km (49.7 mi)



SFP-8	Gigabit Ethernet, 1310 nm, single mode, laser, 40.0 km (24.8 mi)	NULL	Empty SFP slot
SFP-8D	Gigabit Ethernet, DDM, internal calibration, 1310 nm, single mode (single fiber), laser, 40.0 km (24.8 mi)	+2 Port 2 (network/user) interface (see +1 options above)	
SFP-8H	Gigabit Ethernet, industrially hardened, 1310 nm, single mode, laser, 40.0 km (24.8 mi)	+3 Port 3 or 3-6 (user) interface1UTP	Port 3 with UTP (built-in 10/100/1000BaseT)
SFP-8DH	Gigabit Ethernet, DDM, internal calibration, industrially hardened, 1310 nm, single mode (single fiber), laser, 40.0 km (24.8 mi)	1NULL	Port 3: 1 empty SFP slot
SFP-10A	Fast Ethernet/ STM-1, Tx - 1310 nm, Rx - 1550 nm, single mode (single fiber), laser (WDM), 20 km (12.4 mi)	1UTP	Port 3: 1 built-in 10/100/1000BaseT port (RJ-45 connector)
SFP-10B	Fast Ethernet/ STM-1, Tx - 1550 nm, Rx - 1310 nm, single mode (single fiber), laser (WDM), 20 km (12.4 mi)	1NULL3UTP	Port 3: 1 empty SFP slot Ports 4-6: 3 built-in 10/100/1000BaseT ports (RJ-45 connector)
SFP-17A	Gigabit Ethernet, Tx -1310 nm, Rx -1490 nm, single mode (single fiber), laser (WDM), 10.0 km (6.2 mi)	2NULL2UTP	Ports 3-4: 1 empty SFP slot Ports 5-6: 2 built-in 10/100/1000BaseT ports (RJ-45 connector)
SFP-17AD	Gigabit Ethernet, DDM, internal calibration, Tx - 1310 nm, Rx - 1490 nm, single mode (single fiber), laser (WDM), 10.0 km (6.2 mi)	4NULL	4 empty SFP slots
SFP-17B	Gigabit Ethernet, Tx -1490 nm, Rx -1310 nm, single mode (single fiber), laser (WDM), 10.0 km (6.2 mi)	4UTP	4 built-in 10/100/1000BaseT ports (RJ-45 connector)
SFP-17BD	Gigabit Ethernet, DDM, internal calibration, Tx - 1490 nm, Rx - 1310 nm, single mode (single fiber), laser (WDM), 10.0 km (6.2 mi)		
SFP-18A	Fast Ethernet/ STM-1, Tx - 1310 nm, Rx - 1550 nm, 9/25 single mode (single fiber), laser (WDM), 40 km (24.8 mi)		
SFP-18AED	Fast Ethernet/ STM-1, DDM, external calibration, Tx - 1310 nm, Rx - 1550 nm, 9/25 single mode (single fiber), laser (WDM), 40 km (24.8 mi)		
SFP-18B	Fast Ethernet/ STM-1, Tx - 1550 nm, Rx - 1310 nm, 9/25 single mode (single fiber), laser (WDM), 40 km (24.8 mi)		
SFP-18BED	Fast Ethernet/ STM-1, DDM, external calibration, Tx - 1550 nm, Rx - 1310 nm, 9/25 single mode (single fiber), laser (WDM), 40 km (24.8 mi)		
SFP-20	Gigabit Ethernet, 1550 nm, single mode, laser, 120.0 km (74.5 mi)		
SFP-21AED	Gigabit Ethernet, DDM, external calibration, Tx - 1310 nm, Rx - 1490 nm, single mode (single fiber), laser (WDM), 40.0 km (24.8 mi)		
SFP-21BED	Gigabit Ethernet, DDM, external calibration, Tx - 1490 nm, Rx - 1310 nm, single mode (single fiber), laser (WDM), 40.0 km (24.8 mi)		
SFP-22A	Gigabit Ethernet, Tx -1490 nm, Rx -1570 nm, single mode (single fiber), laser (WDM), 80.0 km (49.7 mi)		
SFP-22B	Gigabit Ethernet, Tx -1570 nm, Rx -1490 nm, single mode (single fiber), laser (WDM), 80.0 km (49.7 mi)		
SFP-23A	Gigabit Ethernet, Tx - 1310 nm, Rx - 1550 nm, single mode (single fiber), laser (WDM), 40.0 km (24.8 mi)		
SFP-23AED	Gigabit Ethernet, DDM, external calibration, Tx - 1310 nm, Rx - 1550 nm, single mode (single fiber), laser (WDM), 40.0 km (24.8 mi)		
SFP-23B	Gigabit Ethernet, Tx - 1550 nm, Rx - 1310 nm, single mode (single fiber), laser (WDM), 40.0 km (24.8 mi)		
SFP-23BED	Gigabit Ethernet, DDM, external calibration, Tx - 1550 nm, Rx - 1310 nm, single mode (single fiber), laser (WDM), 40.0 km (24.8 mi)		
SFP-30	10/100/1000BaseT (with SGMII), RJ-45 connector, 100 m (238 ft)		
		<i>Supplied Accessories</i>	
		AC power cord	For AC unit
		DC adapter kit	For DC unit
		<i>Optional Accessories</i>	
		RM-34	Hardware kit for mounting one unit with 17.4" enclosure in a 19" rack
		RM-35/+	Hardware kit for mounting one or two units with 8.4" enclosure in a 19" rack
		+ Rack mount kit (Default=both kits)	
		P1	Kit for mounting 1 unit
		P2	Kit for mounting 2 units
		WM-34	Hardware kit for mounting one unit with 17.4" enclosure on a wall
		WM-35	Hardware kit for mounting one unit with 8.4" enclosure on a wall
		CBL-DB9F-DB9M-STR	Control port cable
		ETX-203A	
		ETX-203A/NP/+2/+3	Carrier Ethernet Demarcation Device in a 19" enclosure (swappable power supplies)
		NP Software package (Default= 100 Mbps per port and 2 shaped EVCs):	
		GE	1 Gbps per port
		GE30	1 Gbps per port, 30 shaped EVCs
		+2 Two Ethernet network ports or network and user port	
		1SFP1UTP	1 SFP slot + 1 UTP Ethernet port
		2SFP	2 SFP Ethernet ports
		+3 Two UTP Ethernet ports	
		2UTP	2 UTP Ethernet ports
		2SFP	2 SFP Ethernet ports
		<i>Supplied Accessories</i>	
		AC Power Cord	
		CBL-RJ45/D9/F/6FT	Control port cable with male RJ-45 and female DB-9 connector
		<i>Optional Accessories</i>	
		DC connection kit	
		RM-33-2	Hardware kit for mounting one or two units in a 19" rack
		ETX-204A	
		ETX 204A /?/!/BT/B/_	Carrier Ethernet Demarcation Device
		? Temperature range (Default=Regular enclosure):	
		H	Temperature-hardened enclosure
		! Power supply (Default=Single AC power supply in 1U 8.5" enclosure)	
		AC	Single AC power supply
		DC	Single DC power supply (-48DC)
		24DC	Single DC power supply (24DC)
		ACR	Dual AC power supply in 1U 19" enclosure



DCR	Dual DC power supply (-48DC) in 1U 19" enclosure
24DCR	Dual DC power supply (24DC) in 1U 19" enclosure
BT	Enclosure (Default=19" metal enclosure if ACR/DCR ordered, otherwise default=8.5" metal enclosure if AC/DC ordered)
19	19" metal enclosure
B	Number of user ports (Default=2 user ports):
4	4 user ports
-	Timing (Default=No hardware support for synchronization over packet):
SYE	SyncE full support
<i>Supplied Accessories</i>	
AC Power Cord	
DC connection kit	(if DC power supply is ordered)
<i>Optional Accessories</i>	
!	Power supply (Default=Single AC power supply in 1U 8.5" enclosure)
AC	Single AC power supply
DC	Single DC power supply (-48DC)
24DC	Single DC power supply (24DC)
RM-34	Hardware kit for mounting one unit with 19" enclosure in a 19" rack
RM-35/+	Hardware kit for mounting one or two units with 8.5" enclosure in a 19" rack
+	Rack mount kit (Default=Both kits):
P1	Kit for mounting one unit
P2	Kit for mounting two units
WM-34	Hardware kit for mounting one unit with 19" enclosure on a wall
WM-35	Hardware kit for mounting one unit with 8.5" enclosure on a wall
CBL-DB9F-DB9M-STR	Control port cable
CBL-RJ45/2BNC/E1/X	Adaptor cable for converting a balanced E1 interface to an unbalanced E1 interface, with an RJ-45 balanced connector and two unbalanced BNC coaxial connectors

ETX-26

ETX 26/!/+1/+2/WIRC/?	
	Ethernet Access Switch
!	Power supply (Default=AC/DC wide range power supply):
48	-48V DC power supply
+1	Gigabit Ethernet port
GEUTP	Gigabit Ethernet port with electrical UTP interface
GESFP	Gigabit Ethernet port with SFP interface
+2	2 Gigabit Ethernet ports
2GEUTP	Two Gigabit Ethernet ports with electrical UTP interface
2GESFP	Two Gigabit Ethernet ports with SFP interface
WIRC	Wireless components
POE	Power over Ethernet
?	Temperature range (Default=Regular temperature range):
H	Temperature-hardened

Supplied Accessories

DC adapter plug	
DC terminal block (supplied with option ETX 26/48/GEUTP/2GESFP/POE/H or ETX 26/48/GEUTP/2GESFP/POE/H)	
RM-34	Rack mount hardware kit for one unit
CBL-RJ45/D9/F/6FT	Control port cable with male RJ-45 and female DB-9 connector

Optional Accessories

RM-35/@	Rack mount kit (Default=Both kits):
!	Power supply

P1	Kit for mounting one unit
P2	Kit for mounting two units
CBL- DB9F-DB9M-STR	Control port cable

ETX-5

<i>Chassis</i>	
ETX-5300A/AC	Chassis with fan unit, AC power supply and AC power inlet
ETX-5300A/ACDC	Chassis with fan unit, AC and DC power supplies, AC and DC power inlets
ETX-5300A/ACR	Chassis with fan unit, two AC power supplies and two AC power inlets
ETX-5300A/DC	Chassis with fan unit, DC power supply and DC power inlet
ETX-5300A/DCR	Chassis with fan unit, two DC power supplies and two DC power inlets
ETX-5300A/NB/DC	NEBS-compliant chassis with fan unit, DC power supply and DC power inlet
ETX-5300A/NB/DCR	NEBS-compliant chassis with fan unit, two DC power supplies and two DC power inlets

Notes: NEBS-compliant chassis must be ordered with air filter (ETX-5300A-AF), see the Service Card section below.

Main and I/O Cards

ETX-5300A-MC/4 XFP/AT	Main card with four 10GbE ports, XFP slots, advanced timing capabilities
ETX-5300A-ETH/20XGE/SFP	GbE card with 20 GbE ports, SFP slots
ETX-5300A-ETH/20XGE/UTP	GbE card with 20 GbE ports, UTP
ETX-5300A-ETH/2X10GE/XFP	10GbE card with two 10GbE ports, XFP slots
ETX-5300A-MS/CH/S4	SDH/SONET card with four channelized STM-1/OC-3 ports, SFP slots
ETX-5300A-MS/CH/STM4	SDH/SONET card with an STM-4/OC-12 port (1+1 redundant), SFP slots

Service Cards

ETX-5300A-FAN	Fan unit
ETX-5300A-FAN/NB	NEBS-compliant fan unit
ETX-5300A-AF	Air filter, required for NEBS-complaint chassis
ETX-5300A-PS/AC	AC power supply
ETX-5300A-PS/DC	DC power supply
ETX-5300A-PSI	AC power inlet

Supplied Accessories

RM-ETX-5300-3U-19-FRONT	Hardware kit for front-edge mounting of ETX-5 into a 19" rack
RM-ETX-5300-AC-3U-19-FRONT	Hardware kit for front-edge mounting and rear-end fastening of ETX-5 into a 19" rack

Optional Accessories

RM-ETX-5300-3U-23-FRONT	Hardware kit for front-edge mounting of ETX-5 into a 23" rack
RM-ETX-5300-3U-23-FRAME	Hardware kit for mid-chassis mounting of ETX-5 into a 23" rack

FCD-155

STM-1/OC-3 Terminal Multiplexer

FCD-155/*/&/\$

Note: SFP transceivers are not included in the chassis for the uplink and/or the fiber GBE interfaces (see SFP Transceivers).

*	Power supply	
AC		100 to 240 VAC
48		-48 VDC
&	LAN interface	



2U	2 bridging 10/100BaseT ports	FCD-155E	STM-1/OC-3 Add/Drop Multiplexer
6U	2 bridging and 4 transparent 10/100BaseT ports	FCD-155E/*/&/&/&	
GE	1 10/100/1000BaseT (GbE) port, copper interface and SFP socket		<i>Note: SFP transceivers are not included in the chassis for the uplink and/or the fiber GbE interfaces (see SFP Transceivers).</i>
\$ PDH interface		* Power supply	
4E1	4 × E1 G.703 ports	AC	100 to 240 VAC
4T1	4 × T1 G.703 ports	AD	Redundant 100 to 240 VAC and -48 VDC power supply
8E1	8 × E1 G.703 ports	48	-48 VDC
8T1	8 × T1 G.703 ports	ACR	Redundant AC power supply
E3	1 × E3 G.703 ports	48R	Redundant DC power supply
T3	1 × T3 G.703 ports	24R	+24 VDC
FCD-155-PACK1	Software key for activity IP tunneling management option	& LAN interface	
<i>Notes: The 4 x E1 port option is delivered with a balanced E1 interface. To convert the interface from balanced to unbalanced, use converter cable CBL-RJ45/2BNC/E1/X.</i>			
SFP Transceivers	For redundancy, order two SFP transceivers	2U	2 bridging 10/100BaseT ports
* STM-1/OC-3 Uplink		6U	2 bridging and 4 transparent 10/100BaseT ports
SFP-1	Fast Ethernet/STM-1, 1310 nm, multimode, LED, 2 km (1.2 mi)	GE	1 10/100/1000BaseT (GbE) port, copper interface and SFPsocket
SFP-2	Fast Ethernet/STM-1, 1310 nm, single mode, laser, 15 km (9.3 mi)	\$ PDH interface	
SFP-3	Fast Ethernet/STM-1, 1310 nm, single mode, laser, 40 km (24.8 mi)	8E1	8 × E1 G.703 ports
SFP-4	Fast Ethernet/STM-1, 1550 nm, single mode, laser, 80 km (49.7 mi)	8T1	8 × T1 G.703 ports
SFP-11	STM-1E, mini-BNC connector, DIN 1.0/2.3, 135m (442 ft)	21E1	21 × E1 G.703 ports
SFP-18a	STM-1/OC-3, Tx – 1310, Rx – 1550, 9/125 single mode (single fiber), laser (WDM), LC connector	28T1	28 × T1 G.703 ports
SFP-18b	STM-1/OC-3, Tx – 1550 Rx – 1310, 9/125 single mode (single fiber), laser (WDM), LC connector	E3	1 × E3 G.703 ports
# GbE User		T3	1 × T3 G.703 ports
SFP-5	GbE, 850 nm multimode VCSEL	21E1E3	1 × E3 ports and 21 × E1 ports
SFP-6	GbE, 1310 nm single mode laser (LX-SM)	21E1T3	1 × T3 ports and 21 × E1 ports
SFP-7	GbE, 1550 nm single mode laser, long haul LX-H (ZX)	28T1T3	1 × T3 ports and 28 × T1 ports
SFP-8D	GbE, 1310 nm single mode laser, long haul (LX-H)	FCD-155-PACK1	Software key for activity IP tunneling management option
<i>Supplied Accessories</i>			
AC power cord	For AC unit	SFP TRANSCEIVERS	For redundancy, order two SFP transceivers
DC adapter kit	For DC unit	<i>STM-1/OC-3 Uplink</i>	
CBL-DB9F-DB9M-STR	Control port cable	SFP-1	Fast Ethernet/STM-1, 1310 nm, multimode, LED, 2 km (1.2 mi)
<i>Optional Accessories</i>			
CBL-RJ45/2BNC/E1/X	Cable for converting a balanced E1 interface to an unbalanced E1 interface. Contains one RJ-45 balanced connector and two unbalanced BNC coaxial connectors.	SFP-2	Fast Ethernet/STM-1, 1310 nm, single mode, laser, 15 km (9.3 mi)
CBL-MINIBNC-BNC	Cable for adapting two mini-BNC connectors to two full-sized BNC connectors (for SFP-11)	SFP-3	Fast Ethernet/STM-1, 1310 nm, single mode, laser, 40 km (24.8 mi)
CBL-G703-8/^	8E1/8T1 interface cables for the DB-44 port connector (one cable required per interface):	SFP-4	Fast Ethernet/STM-1, 1550 nm, single mode, laser, 80 km (49.7 mi)
^ Connector		SFP-11	STM-1E, mini-BNC connector, DIN 1.0/2.3, 135m (442 ft)
RJ45	Splits into 8 E1/T1 balanced RJ-45 connectors	SFP-18A	Fast Ethernet/STM-1, Tx - 1310 nm, Rx - 1550 nm, 9/25 single mode (single fiber), laser (WDM), 40 km (24.8 mi)
RJ45/X	Splits into 8 E1/T1 balanced RJ-45 connectors (cross-cable)	SFP-18B	Fast Ethernet/STM-1, Tx - 1550 nm, Rx - 1310 nm, 9/25 single mode (single fiber), laser (WDM), 40 km (24.8 mi)
COAX	splits into 8 pairs of E1 unbalanced BNC male connectors	<i>GbE</i>	
OPEN	8 × 4 unterminated free leads 2m (6.6 ft)	SFP-5	Gigabit Ethernet, 850 nm, multimode, VCSEL, 0.55 km (0.3 mi)
RM-35/@	Hardware kit for mounting one or two units in a 19" rack	SFP-6	Gigabit Ethernet, 1310 nm, single mode, laser, 10.0 km (6.2 mi)
@ Mounting kit		SFP-7	Gigabit Ethernet, 1550 nm, single mode, laser, 80.0 km (49.7 mi)
P1	Mounting one unit	SFP-8D	Gigabit Ethernet, DDM, internal calibration, 1310 nm, single mode (single fiber), laser, 40.0 km (24.8 mi)
P2	Mounting two units	<i>Supplied Accessories</i>	
WM-35	Hardware for mounting one unit on the wall	AC power cord	
		DC power cord	
		RM-34	Hardware for mounting one unit in a 19" rack
		CBL-MINIBNC-BNC	Cable for adapting two mini-BNC connectors to full sized BNC connectors (supplied with SFP-11)

*Optional Accessories*

CBL-DB9F-DB9M-STR	Control port cable
FCD-155E-PS/AC	100-240 VAC power supply module
FCD-155E-PS/48	-48 VDC power supply module
CBL-G703-8/^	8E1/T1 interface cables for the DB-44 port connector (one cable required per interface)
^ Connector	
RJ45	Splitting into 8 E1/T1 balanced RJ-45 connectors
RJ45/X	Splitting into 8 E1/T1 balanced RJ-45 connectors (cross-cable)
COAX	Splitting into 8 pairs of E1 unbalanced BNC male connectors
OPEN	8 x 4 unterminated free leads 2m (6.6 ft)
CBL-G703-14/#	14E1/14T1 interface cable for the DB-62 port connector
CBL-G703-28/#	Two CBL-G703-14/# interface cables for the DB-62 port connector, to provide 21E1/28T1 capacity
# Connector	
RJ45	Splitting into 14 E1/T1 balanced RJ-45 connectors
COAX	Splitting into 14 E1 unbalanced BNC male connectors
OPEN	14 x 4 unterminated free leads 2m (6.6 ft)
PATCH	Connection to 2 Telco connectors 2m (6.6 ft)
OP-A-ADAPTOR-28RJ	Patch panel, two CBL-G703-14/Patch cables are not included
OP-A-ADAPTOR-21BNC-FCD155E	Patch panel, includes two CBL-G703-14/Patch cables

FCD-E1

E1 or Fractional E1 Access Unit

FCD-E1/*/~/&/%

* Sublink	
S1	Drop-and-insert copper E1/T1 sublink
~ Power supply	
AC	100 to 240 VAC
& Data port interface	
530	RS-530
V35	V.35
X21	X.21
V36	V.36/RS-449
% Second data port interface (optional)	
530	RS-530
V35	V.35
X21	X.21
V36	V.36/RS-449

Supplied Accessories

AC power cord	For AC unit
CBL-HS2/V/1	For 34-pin V.35
CBL-HS2/R/1	For 37-pin V.36/RS-449
CBL-HS2/X/1	For 15-pin X.21

Optional Accessories

CBL-HS2/*/#	
* Interface, clock mode	
V/2	34-pin V.35, DTE1
V/3	34-pin V.35, DTE2
R/2	37-pin V.36/RS-449, DTE1
R/3	37-pin V.36/RS-449, DTE2
# Cable connector	
F	Female
M	Male

CBL-DB9F-DB9M-STR	Control port cable
RM-17	Kit for mounting one or two FCD-E1 or FCD-T1 units into a 19" rack

FCD-E1E**/@/+/&/***

@ TDM interface:	
1E1	1 balanced E1 as uplink
1E1CX	1 unbalanced E1 as uplink
2E1	Balanced E1 and sub E1
2E1CX	Unbalanced E1 and sub E1
+ Ethernet interface (Default=no Ethernet):	
UTP	10/100BaseT Ethernet port (bridge and management)
UTPM	10/100BaseT Ethernet port (management only)
& Data port interface	
V35	V.35
V36	V.36/RS-449
530	RS-530
X21	X.21
V24	V.24/RS-232 (asynchronous)
* Enclosure (Default=plastic):	
L	Metal, with LCD
/SW/\$	Software upgrade pack for enabling bridge and management services on the Ethernet port

Supplied Accessories

AC/DC adapter plug

CBL-HS2/*/#

* Interface, clock mode	
V/1	34-pin V.35, DCE
V/2	34-pin V.35, DTE1
V/3	34-pin V.35, DTE2
R/1	37-pin V.36/RS-449, DCE
R/2	37-pin V.36/RS-449, DTE1
R/3	37-pin V.36/RS-449, DTE2
X/1	15-pin X.21, DCE

Connector

F	Female
M	Male

Optional Accessories

CBL-DB9F-DB9M-STR	Control port cable
CBL-RJ45/2BNC/E1	RJ-45 to BNC adaptor cable
RM-33-2	Hardware kit for mounting one or two units into a 19-inch rack
RM-35/@	Kit for mounting 1 or 2 /L units (metal enclosure) in a 19-inch rack
@ Rack mount kit:	
P1	Mounting one unit
P2	Mounting two units

FCD-E1L

E1/T1 or Fractional E1/T1 Managed Access Units

FCD-E1L/*/~/&/%

E1/fractional E1

* E1 main link interface	
B	Balanced with RJ-45 connector
U	Unbalanced with BNC connector
~ Power supply voltage	
AC	110 VAC to 240 VAC
48	-48 VDC
& Data port interface	
530	RS-530
V35	V.35
X21	X.21
V36	RS-449
% Second data port interface (optional)	
530	RS-530 interface
V35	V.35 interface
X21	X.21 interface



V36 RS-449 interface
 ETQN IR-ETH/QN Ethernet bridge VLAN (10/100BaseT)

Supplied Accessories

AC power cord
 DC adapter plug
 CBL-HS2/* Adapter cables for DB-25 channel connectors for use in DCE clock mode only. Cable length is 2m (6 ft).

*** Data port interface**

V/1 34-pin V.35, DTE1
 R/1 34-pin V.35, DTE2
 X/1 37-pin V.36/RS-449, DTE1

CBL-HS2/^/# Adapter cables for DB-25 channel connectors for use in DTE clock mode only. Cable length is 2m (6 ft).

^ Interface, clock mode

V/2 34-pin V.35, DTE1
 V/3 34-pin V.35, DTE2
 R/2 37-pin V.36/RS-449, DTE1
 R/3 37-pin V.36/RS-449, DTE2

Connector

F Female
 M Male

Optional Accessories

CBL-DB9F-DB9M-STR Control port cable
 RM-28 Hardware for mounting one or two units in a 19" rack

FCD-E1LC, FCD-T1LC

E1/T1 or Fractional E1/T1 Access Units

FCD-E1LC/&/*/% E1 or fractional E1

FCD-T1LC/&/*/% T1 or fractional T1

& Data port interface

530 RS-530
 V35 V.35
 X21 X.21
 V36 RS-449

*** Sub-E1/T1 port (optional)**

S Drop-and-insert E1/T1 sublink

% Second data port interface

530 RS-530
 V35 V.35
 X21 X.21
 V36 RS-449
 V24 V.24
 ETQN IR-ETH/QN Ethernet bridge VLAN (10/100BaseT)

Supplied Accessories

Power cord
 AC/DC adapter plug
 CBL-HS2/V/1 34-pin V.35
 CBL-HS2/R/1 37-pin V.36/RS-449
 CBL-HS2/X/1 15-pin X.21

Optional Accessories

RM-33-2 Hardware for mounting one or two units in a 19" rack

CBL-DB9F-DB9M-STR Control port cable

CBL-RJ45/2BNC/E1/X RJ-45 to BNC adaptor cable (for unbalanced main link interface)

CBL-RJ45/2BNC/E1 RJ-45 to BNC adaptor cable (for unbalanced sublink interface)

CBL-HS2/*/# Adaptor cables for DB-25 channel connectors, for operation in the DTE1 and DTE2 clock modes

*** Interface, clock mode:**

V/2 34-pin V.35, DTE1
 V/3 34-pin V.35, DTE2
 R/2 37-pin V.36/RS-449, DTE1
 R/3 37-pin V.36/RS-449, DTE2

Cable connector type

F female
 M male

FCD-IP E1/T1 or Fractional E1/T1 access unit with integrated router

FCD-

IPM/~/\$/#/?/!/+/*

~ DC power supply (Default=AC power supply)

DC 24/48 VDC

\$ Primary WAN interface with optional second data port

E1/# E1 or fractional E1

T1/# T1 or fractional T1

E1/?/!//# E1 or fractional E1 with built-in fiber optic modem

T1/?/!//# T1 or fractional T1 with built-in fiber optic modem

Second WAN interface (optional)

V24T V.24/RS-232 DTE

V35T V.35 DTE

530T RS-530 DTE

V36T V.36 DTE

X21T X.21 DTE

Or Serial Port interface

V24C V.24/RS-232 (DCE)

V35C V.35 (DCE)

530C RS-530 (DCE)

V36C V.36/RS-422/RS-449 (DCE)

X21C X.21 (DCE)

? Fiber optic connector

ST ST connector

FC FC/PC connector

SC SC connector

! Wavelength and type:

85 850 nm, multimode, VCSEL

13L 1310 nm, single mode laser diode

15L 1550 nm, single mode laser diode

+ LAN interface

U 10/100BaseT (UTP)

2U 2 × 10BaseT (UTP)

4U 4 × 10/100BaseT (UTP) built-in switch

*** Sub-E1/T1, analog voice or ISDN backup interfaces for E1/T1**

S Sub-E1/T1

2S 2 sub-E1/T1 ports (RJ-45 only)

3S 3 sub-E1/T1 ports (RJ-45 only)

FXS 4 built-in FXS voice ports

FXO 4 built-in FXO voice ports

E&M 4 built-in E&M voice ports

IBE ISDN "S" interface

IBU ISDN "U" interface

FXS/S 4 FXS voice channels and one sub-E1/T1 port



FXO/S	4 FXO voice channels and one sub-E1/T1 port	* Sub-E1/T1, analog voice or ISDN backup interfaces for E1/T1	
E&M/S	4 E&M voice channels and one sub-E1/T1 port	S	Sub-E1/T1
IBE/S	ISDN "S" interface and one sub-E1/T1 port	FXS	4 built-in FXS voice ports
IBU/S	ISDN "U" interface and one sub-E1/T1 port	FXO	4 built-in FXO voice ports
Supplied Accessories		E&M	4 built-in E&M voice ports
Power cord		IBE	ISDN "S" interface
DC power kit		IBU	ISDN "U" interface
Adaptor cables		FCD-IPM-M/&/@/^	FCD-IPM module
CBL-RJ45/D9/F/6FT	Control port cable	& I/O module	
CBL-530/V35/F	One male DB-25 to one female 34-pin (V.35) connector	S-E1	Sub-E1 module
CBL-530/449/F	One male DB-25 to one female DB-37 (V.36) connector	S-T1	Sub-T1 module
CBL-530T/21C/F	One male DB-25 to one female DB-15 (X.21) connector	S-2E1	2-port sub-E1 module
Optional Accessories		S-2T1	2-port sub-T1 module
CBL-RJ45/2BNC/E1	Interface cable for converting a balanced E1 RJ-45 connector into a pair of BNC unbalanced coaxial connectors	VC4	Four analog voice ports module
RM-17	Hardware kit for mounting one or two FCD-IP units into a 19-inch rack	VC8	Eight analog voice ports module
FCD-IPL	E1 or Fractional E1 Access Unit with IP Router	Vxx	Universal data module
FCD-IPL/E1/U/*	E1 or fractional E1 access unit with IP router	SWITCH	5-port 10/100 BaseT Ethernet switch
FCD-IPL/SW/*	Software upgrade for FCD-IPL	@ DCE port interface	
<i>Note: When a software upgrade is ordered, RAD sends a code used for activating a required feature.</i>		V24C	V.24 interface
* Pack 1	Enabling QoS functionality	V35C	V.35 interface
Optional Accessories		530C	RS-530 interface
RM-33-2	Hardware kit for mounting one or two FCD-IPL units into a 19" rack	V36C	V.36 interface
CBL-DB9F-DB9M-STR	Control port cable	X21C	X.21 interface
FCD-IPM	E1/T1 or Fractional E1/T1 Modular Access Device with Integrated Router	^ Analog voice module	
FCD-IPM/~/\$/+/*		FXS	FXS voice module
~ DC power supply (Default=AC power supply)		FXO	FXO voice module
DC	24/48 VDC	E&M	E&M voice module
\$ Primary WAN interface with optional second data port		<i>Notes:</i>	
E1/#	E1 or fractional E1	1. The second WAN option is not available when configuring E1/T1 with an ISDN backup.	
T1/#	T1 or fractional T1	2. The dual LAN configuration is not available when configuring E1/T1 with an ISDN backup.	
E1/?/!/#	E1 or fractional E1 with built-in fiber optic modem	3. The 2-port sub-E1/T1 and 8-port analog voice modules occupy both slots.	
T1/?/!/#	T1 or fractional T1 with built-in fiber optic modem	Optional Accessories	
? Fiber optic connector		RM-34	Hardware for mounting one FCD-IPM unit in a 19" rack
ST	ST connector	Cables	Adapter cables for DB-25 synchronous data interface connectors
FC	FC connector	CBL-530/V35/F	One male DB-25 to one female 34-pin (V.35) connector
SC	SC connector	CBL-530/449/F	One male DB-25 to one female DB-37 (V.36) connector
! Optical interface wavelength		CBL-530T/21C/F	One male DB-25 to one female DB-15 (X.21) connector
85	850 nm, multimode	FOM-20	Fiber Optic Modem
13L	1310 nm, single mode laser	FOM-20/~/#/^	Async/sync 19.2-256 kbps
15L	1550 nm, single mode laser	FOM-20R/#/^	Async/sync 19.2-256 kbps card for ASM-MN-214
# Second WAN interface (optional)		~ Standalone power supply	
V24T	V.24/RS-232 DTE	115	115 VAC
V35T	V.35 DTE	230	230 VAC
530T	RS-530 DTE	48	48 VDC
V36T	V.36 DTE	24	24 VDC
X21T	X.21 DTE	# Optical interface	
+ LAN interface		SC85	850 nm multimode, SC connector
B	10Base2 (BNC)	ST85	850 nm multimode, ST connector
U	10/100BaseT (UTP)	FC85	850 nm multimode, FC-PC connector
2B	2 x 10Base2 (BNC)	SC13L	1310 nm laser diode, SC connector
2U	2 x 10BaseT (UTP)	FC13L	1310 nm laser diode, FC-PC connector
UB	1 x 10BaseT (UTP)	ST13L	1310 nm laser diode, ST connector
	1 x 10Base2 (BNC)	FC15L	1550 nm laser diode, FC-PC connector
4U	4 x 10/100BaseT (UTP) built-in switch	SC15L	1550 nm laser diode, SC connector
		ST15L	1550 nm laser diode, ST connector
		^ DTE interface	
		V24	V.24/RS-232
		530	RS-530
		X21	X.21
		V35	V.35



V36	V.36/RS-449
UTP	Built-in 10BaseT Ethernet bridge
703/%	G.703 codirectional (64 kbps)
%	G.703 interface connector
TB	Terminal block
RJ	RJ-45
<i>Supplied Accessories</i>	
AC power cord	For AC unit (for standalone units)
DC adapter kit	For DC unit (for standalone units)
<i>Optional Accessories</i>	
RM-9	Hardware kit for mounting one or two FOM-20 units in a 19" rack
CIA/&	Connector interface adapter for FOM-40R (card version only) in an ASM-MN-214
&	Adapter
V35/1	One 25-pin rack DTE connector to one V.35 34-pin connector
X21/1	One 25-pin rack DTE connector to one X.21 15-pin connector
ETH	One 25-pin rack DTE connector to one RJ-45 connector
FOM-40 Fiber Optic Modem	
FOM-40/~/#/^	Standalone Unit
~	Power supply
AC	100-240 VAC
48	-48 VDC
24	24 VDC
#	Optical interface
FC85	850 nm multimode, FC connector
SC85	850 nm multimode, SC connector
ST85	850 nm multimode, ST connector
FC13L	1310 nm single mode, FC connector
SC13L	1310 nm single mode, SC connector
ST13L	1310 nm single mode, ST connector
FC15L	1550 nm single mode, FC connector
SC15L	1550 nm single mode, SC connector
ST15L	1550 nm single mode, ST connector
^	DTE interface
V24	V.24/RS-232
V35	V.35
530	RS-530
X21	X.21
V36	V.36/RS-449
703/%	G.703 codirectional (64 kbps) (standalone only)
UTP/QV	For built-in Ethernet/802.3 bridge with RJ-45 connector
%	Connector of G.703 interface (standalone only)
TB	Terminal block
RJ	RJ-45
<i>Supplied Accessories</i>	
AC power cord	For AC unit (for standalone units)
DC adapter kit	For DC unit (for standalone units)
CBL-530/449	Adapter cable (supplied with V.36 interface only)
<i>Optional Accessories</i>	
RM-29	Hardware kit for mounting one or two FOM-40 standalone units in a 19" rack
FOM-E1/T1 E1/T1 Fiber Optic Modem	
FOM-E1/T1/*/#/&	Standalone
FOM-E1/T1/R/#/&	Card for ASM-MN-214 modem rack
*	Power supply
AC	100 to 240 VAC
48V	-40 to -60 VDC
24V	24 VDC
#	Fiber optic connector

ST	ST connector
SC	SC connector
FC	FC connector
&	Optical wavelength, fiber and transmitter
85	850 nm, multimode, VCSEL
13MM	1310 nm, multimode, LED (standalone only)
13L	1310 nm, single mode, laser diode
13LH	1310 nm, single mode, laser diode, long haul (standalone only)
15L	1550 nm, single mode, laser diode
15LH	1550 nm, single mode, laser diode, long haul (standalone only)
SF1	WDM single fiber, 1310 nm Tx (standalone only)
SF2	WDM single fiber, 1550 nm Tx (standalone only)
SF3	Single fiber, 1310 nm Tx/Rx (standalone only)

Note: When ordering SFx options, do not specify fiber optic connector #.

Optional Accessory

RM-33-2	Hardware for mounting one or two FOM E1/T1 units in a 19" rack
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FOM-E3, FOM-T3 E3/T3 Fiber Optic Modems

FOM-E3/~ /ab	E3
FOM-T3/~ /ab	T3
~	Power supply
AC	100 to 240 VAC
48	-20 to -72 VDC

a Connector

ST	ST connector
SC	SC connector
FC	FC connector
SC-APC	SC-APC connector

Note: SC-APC connector can only be ordered with SG3 transmitter

b Optical wavelength and transmitter

85	850 nm, multimode, VCSEL
13MM	1310 nm, multimode, LED
13L	1310 nm, single mode, laser
15L	1550 nm, single mode, laser
13LH	1310 nm, single mode, long-haul laser
15LH	1550 nm, single mode, long-haul laser
SF1	Tx 1310 nm, Rx 1550 nm, WDM laser
SF2	Tx 1550 nm, Rx 310 nm, WDM laser
SF3	Tx/Rx 1310 nm, WDM laser

Note: SF1 and SF2 transmitters can only be ordered with SC connector and SF3 transmitter can only be ordered with SC-APC connector

Supplied Accessories

AC power cord	For AC unit
DC adapter kit	For DC unit

Optional Accessories

RM-9	Hardware kit for mounting one or two FOM-E3 or FOM-T3 units in a 19" rack
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FOM-E3/ETH, FOM-T3/ETH

10/100BaseT over E3/T3 Fiber Optic Modems

FOM-E3/ETH/ab/q	E3
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FOM-T3/ETH/ab/q	T3
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a Fiber optic interface

ST	ST connector
SC	SC connector
FC	FC connector

b Optical wavelength, fiber and transmitter

85	850 nm, multimode VCSEL
13MM	1310 nm, multimode, laser
13L	1310 nm, single mode, laser
15L	1550 nm, single mode, laser
13LH	1310 nm, single mode, long haul laser
15LH	1550 nm, single mode, long haul laser



CT3-PW-1	Pseudowire Channelized T3 Circuit Emulation Module with External Interface
GMUX-M-CT3-PW-1	
E1-PW/28, T1-PW/28	
GMUX-M-E1-PW-28/@	Pseudowire E1 Circuit Emulation Module with External Interface
GMUX-M-T1-PW-28	Pseudowire T1 Circuit Emulation Module with External Interface
@	E1 Interface
BAL	Balanced E1 interface
UNBAL	Unbalanced E1 interface
<i>Optional Accessories</i>	
GMUX-PPANEL-28-PW/#	Patch panel and cable assembly, 28 connectors
#	Interface
BAL	Balanced interface, RJ-45 connector
UNBAL	Unbalanced interface, BNC connector
CBL-G703-14-PATCH	Cable for connecting E1-PW/28 to a patch panel

GbE/2	
GMUX-M-GBE-N/\$/	PSN Gigabit Ethernet interface module
\$	SFP
SFP-5	Gigabit Ethernet, 850 nm, multimode, VCSEL, 0.55 km (0.3 mi)
SFP-6	Gigabit Ethernet, 1310 nm, single mode, laser, 10.0 km (6.2 mi)
SFP-7	Gigabit Ethernet, 1550 nm, single mode, laser, 80.0 km (49.7 mi)
SFP-8	Gigabit Ethernet, 1310 nm, single mode, laser, 40.0 km (24.8 mi)
SFP-9G	GbE interface, RJ-45 connector, 100m (238 ft)
Null	SFP-ready slot
UTP	10/100/100BaseT interface

STM1, OC3	
GMUX-M/STM1/&	Dual-port STM-1 interface module
GMUX-M/OC3/&	Dual-port OC-3 interface module
&	Interface
CX	Unbalanced coax BNC connectors
SM13SC	Single mode fiber 1310 nm, SC connectors
SM13LHSC	Single mode fiber 1310 nm, long haul, SC connectors
SFP-1	Fast Ethernet/STM-1, 1310 nm, multimode, LED, 2 km (1.2 mi)
SFP-2	Fast Ethernet/STM-1, 1310 nm, single mode, laser, 15 km (9.3 mi)
SFP-3	Fast Ethernet/STM-1, 1310 nm, single mode, laser, 40 km (24.8 mi)
SFP-4	Fast Ethernet/STM-1, 1550 nm, single mode, laser, 80 km (49.7 mi)
SFP-10A	Fast Ethernet/STM-1, Tx - 1310 nm, Rx - 1550 nm, single mode (single fiber), laser (WDM), 20 km (12.4 mi)
SFP-10B	Fast Ethernet/STM-1, Tx - 1550 nm, Rx - 1310 nm, single mode (single fiber), laser (WDM), 20 km (12.4 mi)
SFP-18A	Fast Ethernet/STM-1, Tx - 1310 nm, Rx - 1550 nm, 9/25 single mode (single fiber), laser (WDM), 40 km (24.8 mi)
SFP-18B	Fast Ethernet/STM-1, Tx - 1550 nm, Rx - 1310 nm, 9/25 single mode (single fiber), laser (WDM), 40 km (24.8 mi)
Null	Empty SFP slots

VCA-E1/16/12, VC-T1/16/12	
GMUX-M/VCA-E1/*	E1 voice compression module
GMUX-M/VCA-T1/*	T1 voice compression module
*	Number of user interfaces
12	12 user interfaces
16	16 user interfaces
<i>Optional Accessories</i>	
CBL-TELCO-RJ45/16E1	Adapter cable for connecting a Telco-64 port to 16 RJ-45 balanced E1 or T1 connectors
CBL-TELCO-OPEN/@	Open-ended cable for connecting Telco-64 port to E1/T1 equipment
@	Cable length
2m	2m (6.5 ft) cable
10m	10m (32.8 ft) cable
CBL-RJ-45/2BNC/E1	Adapter cable for the main link E1 interface. The cable converts balanced RJ-45 connector into a pair of unbalanced BNC coaxial connectors.
IPmux-155L Hub-Site Pseudowire Access Gateway	
IPmux-155L/!/#/C/\$/+1/+3	
!	Power supply
ACR	Dual 100 to 240 VAC
48R	Dual -48 VDC
ACHPR	Dual high-power 100–240 VAC
48HPR	Dual high-power -48 VDC
#	STM-1 interface
N	2 × SFP-ready slots
2	2 × SFP-2: 1310 nm, single mode, laser, 15 km (9.3 mi)
NULL	STM-1 interfaces are not assembled. Use the \$ option below to order E1 enclosure.
C	VC-12 type
FR	Framed
UNFR	Unframed
\$	E1 interface
32E1	32 E1 interfaces via RJ-45 connectors
32E1HD	32 E1 interfaces via high-density 160-pin connector
NULL	No E1 interfaces
+1	Gigabit Ethernet network interface:
4N	Four SFP-ready slots
+3	Fast Ethernet user interface (Default=no FE user interface)
32N	32 SFP-ready slots
32UTP	32 built-in 10/100BaseT
<i>Supplied Accessories</i>	
Power cord	For AC unit
DC power connection kit	For DC unit
RM-34	Hardware kit for mounting one IPmux-155L unit with STM-1 interfaces into a 19-inch rack
RM-42	Hardware kit for mounting one IPmux-155L unit with E1 interfaces into a 19-inch rack
<i>Optional Accessories</i>	
IPMUX-155L-PS/@	Spare power supply and fan module
@	Power supply:
AC	100 to 240 VAC
48	-48 VDC
CBL-DB9F-DB9M-STR	Control port cable
PANEL-32/^	Patch panel/cable assembly for IPmux 155L with 32 E1 interfaces terminating in 160-pin connector (IPmux 155L/!/#/C/32E1HD/+1/+3 option)
^	BAL
	Balanced RJ-45 patch panel



UNBAL	Unbalanced BNC patch panel
IPmux-16L	Hub-Site Pseudowire Access Gateway
IPMUX-16L/!/~/\$/+1/+2	
! Power supply	
AC	100 to 240 VAC
DC	-48 VDC
~ Timing (Default=Standard clock recovery):	
A	Hardware support for accurate clock recovery over packet
\$ TDM interface	
8E1	8 balanced E1 interfaces
16E1	16 balanced E1 interfaces
+1 Ethernet network/user port:	
3XGESFP	3 GbE SFP ports
3XGEUTP	3 GbE UTP ports
+2 Ethernet network/user port:	
3XFESFP	3 Fast Ethernet SFP ports
3XFEUTP	3 10/100BaseT UTP ports
<i>Supplied Accessories</i>	
Power cord	
DC adapter kit	For DC unit
RM-34	Hardware kit for mounting one IPmux-16L unit into a 19" rack
<i>Optional Accessories</i>	
CBL-DB9F-DB9M-STR	Control port cable
IPmux-1E	TDMoIP Gateway
IPmux-1E/#/+/&/*	
# Power supply	
AC	100 to 240 VAC
DC	-48 VDC
+ TDM user port	
4BRI	4 ISDN S0 interfaces
4FXS	4 analog FXS interfaces
4FXO	4 analog FXO interfaces
4E&M	4 analog E&M interfaces
4FXS-EC	4 analog FXS interfaces and echo canceller
4FXO-EC	4 analog FXO Interfaces and echo canceller
4E&M-EC	4 analog E&M interfaces and echo canceller
E1-EC	Balanced E1 interface and echo canceller
E1CX-EC	Unbalanced E1 interface, RJ-45 and echo canceller (RJ-45 to BNC adapter cable is supplied)
T1-EC	Balanced T1 interface, RJ-45 and echo canceller
& Ethernet port	
UTP	10/100BaseT network port, RJ-45
MM-SC	100BaseFX network port, 850 nm, multimode, SC
SM-LC	100BaseFX network port, 1310 nm, single mode, LC
UTP/UTP	10/100BaseT network port, RJ-45 and 10/100BaseT user port, RJ-45
MM-LC/UTP	100BaseFX network port, 850 nm, multimode, LC and 10/100BaseT user port, RJ-45
SM-LC/UTP	100BaseFx network port, 1310 nm, single mode, LC and 10/100BaseT user port, RJ-45 (Optional)
* Station clock port	
STC-E1	2.048-Mbps balanced, RJ-45
STC-E1CX	2.048-Mbps, unbalanced, mini BNC (mini BNC to BNC adapter cable is supplied)
STC-T1	1.544-Mbps balanced, RJ-45

Note: Station clock port is available for the units with E1 or T1 TDM user ports only.

<i>Supplied Accessories</i>	
AC power cord	For AC unit
DC adapter kit	For DC unit
CBL-RJ45/2BNC/E1/X	RJ-45 to BNC adapter cable (if an unbalanced E1 interface is ordered)
CBL-MINIBNC-BNC	Mini BNC to BNC adapter cable (if a station clock module with unbalanced E1 interface is ordered)
RM-34	Hardware kit for mounting one IPmux-1E unit into a 19" rack

<i>Optional Accessories</i>	
CBL-DB9F-DB9M-STR	Control port cable

IPmux-2L TDM Pseudowire Access Gateway

IPmux-4L

IPmux-2L/\$/!/+/+1

IPmux-4L/\$/+/+1/~

\$ TDM Interface	
N	No E1 interface
1E1	1 balanced E1
1E1CX	1 unbalanced E1
2E1	2 balanced E1
2E1CX	2 unbalanced E1
4E1	4 balanced E1 (IPmux-4L only)
4E1CX	4 unbalanced E1 (IPmux-4L only)
{	Serial interface type (Default=no serial interface):
V35	V.35 interface
V36	V.36/RS-449 interface
RS530	RS-530 interface
X21	X.21 interface
RS232	RS-232 interface
+1	Fiber optic Ethernet interface type (Default=two 10/100BaseT ports)

N	SFP-ready slot
1	Fast Ethernet/STM-1, 1310 nm, multimode, LED, 2 km (1.2 mi)
2	Fast Ethernet/STM-1, 1310 nm, single mode, laser, 15 km (9.3 mi)
3	Fast Ethernet/STM-1, 1310 nm, single mode, laser, 40 km (24.8 mi)
4	Fast Ethernet/STM-1, 1310 nm, single mode, laser, 80 km (49.7 mi)
10A	Fast Ethernet/STM-1, Tx - 1310 nm, Rx - 1550 nm, single mode (single fiber), laser (WDM), 20 km (12.4 mi)
10B	Fast Ethernet/STM-1, Tx - 1550 nm, Rx - 1310 nm, single mode (single fiber), laser (WDM), 20 km (12.4 mi)
UTP	10/100BaseT (IPmux-4L only)

Note: For single-fiber applications, a device with the SFP-10A interface should always be used opposite a device with the SFP-10B interface, and vice versa.

~	Clock recovery (Default=standard clock recovery):
A	Advanced clock recovery mechanism (per E1 port)

<i>Supplied Accessories</i>	
Power cord	
AC/DC adapter plug	For DC unit



<i>Optional Accessories</i>	<i>The following cables convert the IPmux-2L 25-pin serial data port connector into the respective interface. Cable length is 2m (6 ft).</i>	~	Clock recovery (Default=standard clock recovery)
CBL-HS2/V/1/\$	Adapter cable for connecting a data port in DCE timing mode to V.35 equipment	A	Advanced clock recovery mechanism
CBL-HS2/V/2/\$	Adapter cable for connecting a data port in DTE1 timing mode to V.35 equipment	\$	TDM interface
CBL-HS2/V/3/\$	Adapter cable for connecting a data port in DTE2 timing mode to V.35 equipment	8E1	8 balanced E1 interfaces
CBL-HS2/R/1/\$	Adapter cable for connecting a data port in DCE timing mode to V.36/RS 449 equipment	8E1CX	8 unbalanced E1 interfaces
CBL-HS2/R/2/\$	Adapter cable for connecting a data port in DTE1 timing mode to V.36/RS-449 equipment	8T1	8 T1 interfaced
CBL-HS2/R/3/\$	Adapter cable for connecting a data port in DTE2 timing mode to V.36/RS-449 equipment	16E1	16 balanced E1 interfaces
CBL-HS2/X/1/\$	Adapter cable for connecting a data port in DCE timing mode to X.21 equipment	16E1CX	16 unbalanced E1 interfaces
\$ Cable connector		16T1	16 T1 interfaces
F Female	Female		<i>Note: Unbalanced E1 interfaces are provided via RJ-45 to BNC adapter cables supplied with the product.</i>
M Male	Male	+	Network interface
CBL-DB9F-DB9M-STR	Control port cable	1	N Empty SFP enclosure
RM-33-2	Hardware kit for mounting one or two units on a wall	1	1 SFP-1 transceiver, Fast Ethernet/STM-1, 1310 nm, multimode, LED, 2 km (1.2 mi)
IPmux-4LGE	TDM Pseudowire Access Gateway	2	2 SFP-2 transceiver, Fast Ethernet/STM-1, 1310 nm, single mode, laser, 15 km (9.3 mi)
IPMUX-4LGE/\$/+1/~		2H	2H Fast Ethernet/STM-1, industrially hardened, 1310 nm, single mode, laser, 15 km (9.3 mi)
\$ TDM Interface		3	3 SFP-3 transceiver, Fast Ethernet/STM-1, 1310 nm, single mode, laser, 40 km (24.8 mi)
4E1 4 balanced E1		3H	3H Fast Ethernet/STM-1, industrially hardened, 1310 nm, single mode, laser, 40 km (24.8 mi)
4E1CX 4 unbalanced E1		4	4 SFP-4 transceiver, Fast Ethernet/STM-1, 1550 nm, single mode, laser, 80 km (49.7 mi)
+1 Network/user GbE interface (in addition to default 4 FE UTP ports):		5	5 SFP-5 transceiver, Gigabit Ethernet, 850 nm, multimode, VCSEL, 0.55 km (0.3 mi)
1XGESFP 1 SFP GbE port		5H	5H Gigabit Ethernet, industrially hardened, 850 nm, multimode, VCSEL, 0.55 km (0.3 mi)
3XGESFP 3 SFP GbE ports		6	6 SFP-6 transceiver, Gigabit Ethernet, 1310 nm, single mode, laser, 10.0 km (6.2 mi)
1XGEUTP 1 UTP GbE port		6H	6H Gigabit Ethernet, industrially hardened, 1310 nm, single mode, laser, 10.0 km (6.2 mi)
3XGEUTP 3 UTP GbE ports		7	7 SFP-7 transceiver, Gigabit Ethernet, 1550 nm, single mode, laser, 80.0 km (49.7 mi)
3GE1UTP2SFP (1 UTP and 2 SFPs)		8	8 SFP-8 transceiver, Gigabit Ethernet, 1310 nm, single mode, laser, 40.0 km (24.8 mi)
3GE2UTP1SFP 3 GbE ports		8H	8H Gigabit Ethernet, industrially hardened, 1310 nm, single mode, laser, 40.0 km (24.8 mi)
(2 UTPs and 1 SFP)		10A	10A SFP-10A transceiver, Fast Ethernet/STM-1, Tx - 1310 nm, Rx - 1550 nm, single mode (single fiber), laser (WDM) , 20 km (12.4 mi)
~ Clock recovery (Default=standard clock recovery):		10B	10B SFP-10B transceiver, Fast Ethernet/STM-1, Tx - 1550 nm, Rx - 1310 nm, single mode (single fiber), laser (WDM) , 20 km (12.4 mi)
A Advanced clock recovery mechanism (per E1 port)		18A	18A SFP-18A transceiver, Fast Ethernet/STM-1, Tx - 1310 nm, Rx - 1550 nm, 9/25 single mode (single fiber), laser (WDM) , 40 km (24.8 mi)
<i>Supplied Accessories</i>		18B	18B SFP-18B transceiver, Fast Ethernet/STM-1, Tx - 1550 nm, Rx - 1310 nm, 9/25 single mode (single fiber), laser (WDM) , 40 km (24.8 mi)
Power cord		17A	17A SFP-17A transceiver, Gigabit Ethernet, Tx - 1310 nm, Rx -1490 nm, single mode (single fiber), laser (WDM), 10.0 km (6.2 mi)
AC/DC adapter plug For DC unit		17B	17B SFP-17B transceiver, Gigabit Ethernet, Tx - 1490 nm, Rx -1310 nm, single mode (single fiber), laser (WDM), 10.0 km (6.2 mi)
<i>Optional Accessories</i>		20	20 SFP-20 transceiver, Gigabit Ethernet, 1550 nm, single mode, laser, 120.0 km (74.5 mi)
CBL-DB9F-DB9M-STR Control port cable		22A	22A SFP-22A transceiver, Gigabit Ethernet, Tx - 1490 nm, Rx -1570 nm, single mode (single fiber), laser (WDM), 80.0 km (49.7 mi)
RM-35/@ Hardware kit for mounting one or two units into a 19-inch rack		22B	22B SFP-22B transceiver, Gigabit Ethernet, Tx - 1570 nm, Rx -1490 nm, single mode (single fiber), laser (WDM), 80.0 km (49.7 mi)
@ Rack mounting kit (Default=both kits):			
P1 Kit for mounting one unit			
P2 Kit for mounting two units			
IPmux-216	TDM Pseudowire Access Gateway		
IPMUX-216/@/?/~/\$/+1/+2/+3			
@ Power supply			
AC Single 100 to 240 VAC			
24 Single 24 VDC			
48 Single -48 VDC			
ACR Dual 100 to 240 VAC			
24R Dual 24 VDC			
48R Dual -48 VDC			
AC24 One 100 to 240 VAC and one 24 VDC			
AC48 One 100 to 240 VAC and one -48 VDC			
? Enclosure (Default=regular device)			
H Environmentally hardened device			



9F	SFP-9F transceiver, Fast Ethernet, RJ-45 connector, 100m (238 ft)	5	Gigabit Ethernet, 850 nm, multimode, VCSEL, 0.55 km (0.3 mi)
30	10/100/1000BaseT (with SGMII), RJ-45 connector, 100m (328 ft)	5H	Gigabit Ethernet, industrially hardened, 850 nm, multimode, VCSEL, 0.55 km (0.3 mi)
9G	SFP-9G transceiver, GbE interface, RJ-45 connector, 100m (238 ft)	6	Gigabit Ethernet, 1310 nm, single mode, laser, 10.0 km (6.2 mi)
UTP	10/100BaseT	6H	Gigabit Ethernet, industrially hardened, 1310 nm, single mode, laser, 10.0 km (6.2 mi)
+ Network/user interface - see above		7	Gigabit Ethernet, 1550 nm, single mode, laser, 80.0 km (49.7 mi)
2		8	Gigabit Ethernet, 1310 nm, single mode, laser, 40.0 km (24.8 mi)
+ User interface - see above		8H	Gigabit Ethernet, industrially hardened, 1310 nm, single mode, laser, 40.0 km (24.8 mi)
3		10A	Fast Ethernet/STM-1, Tx - 1310 nm, Rx - 1550 nm, single mode (single fiber), laser (WDM), 20 km (12.4 mi)
<i>Note: See Data Sheet for valid port combinations.</i>			
<i>Supplied Accessories</i>			
Power cord			
DC power connection kit			
CBL-RJ45/2BNC/E1/X	RJ-45 to BNC adapter cable (if an unbalanced E1 interface is ordered)	10B	Fast Ethernet/STM-1, Tx - 1550 nm, Rx - 1310 nm, single mode (single fiber), laser (WDM), 20 km (12.4 mi)
RM-34	Hardware kit for mounting one IPmux-216 unit into a 19" rack	17A	Gigabit Ethernet, Tx -1310 nm, Rx -1490 nm, single mode (single fiber), laser (WDM), 10.0 km (6.2 mi)
<i>Optional Accessories</i>			
IPMUX-216-M/@	Spare power supply module	17B	Gigabit Ethernet, Tx -1490 nm, Rx -1310 nm, single mode (single fiber), laser (WDM), 10.0 km (6.2 mi)
@ Power supply		18A	Fast Ethernet/STM-1, Tx - 1310 nm, Rx - 1550 nm, 9/25 single mode (single fiber), laser (WDM), 40 km (24.8 mi)
AC	100 to 240 VAC	18B	Fast Ethernet/STM-1, Tx - 1550 nm, Rx - 1310 nm, 9/25 single mode (single fiber), laser (WDM), 40 km (24.8 mi)
24	24 VDC	20	Gigabit Ethernet, 1550 nm, single mode, laser, 120.0 km (74.5 mi)
48	-48 VDC	22A	Gigabit Ethernet, Tx -1490 nm, Rx -1570 nm, single mode (single fiber), laser (WDM), 80.0 km (49.7 mi)
WM-34	Hardware kit for mounting one IPmux-216 unit on a wall	22B	Gigabit Ethernet, Tx -1570 nm, Rx -1490 nm, single mode (single fiber), laser (WDM), 80.0 km (49.7 mi)
CBL-DB9F-DB9M-STR	Control port cable	9F	Fast Ethernet, RJ-45 connector, 100m (238 ft)
IPmux-24	TDM Pseudowire Access Gateway	9G	GbE interface, RJ-45 connector, 100m (238 ft)
IPMUX-24/+!/~/~/CC/\$/+1/+2/+3/BT		UTP	10/100BaseT
+ Ethernet interface (Default=Fast and Gigabit Ethernet)		+2 Network/user interface - see above	
FE	Fast Ethernet interface only	+3 User interface - see above	
! Power supply (Default=wide range AC/DC)		BT Mechanical Box Type:	
WRDC	Wide range DC power supply only	PE	Plastic Enclosure
? Temperature range (Default=regular enclosure)		<i>Supplied Accessories</i>	
H	Environmentally hardened enclosure	Power cord	For AC unit
~ Clock recovery (Default=standard clock recovery mechanism)		DC connection kit	For DC unit
A	Advanced clock recovery mechanism per TDM port	CBL-RJ45/2BNC/E1/X	RJ-45 to BNC adapter cable (if an unbalanced E1 interface is ordered)
CC Carrier-class package (Default=without)		<i>Optional Accessories</i>	
C	Carrier-class package	RM-35	Hardware kit for mounting one or two IPmux-24 units into a 19-inch rack
\$ TDM interface		RM-33-2	Hardware kit for mounting one or two IPmux-24 units with plastic enclosure in a 19-inch rack
1E1	Single balanced E1 interface	CBL-DB9F-DB9M-STR	Standard 9-pin male to female RS-232 control port cable
1E1CX	Single unbalanced E1 interface	AC/DC Power adapter	AC (100 to 240 VAC) to DC (48 VDC) external power adapter for ASMI-53/Type2
1T1	Single T1 interface		
2E1	2 balanced E1 interfaces		
2E1CX	2 unbalanced E1 interfaces		
2T1	2 T1 interfaces		
4E1	4 balanced E1 interfaces		
4E1CX	4 unbalanced E1 interfaces		
4T1	4 T1 interfaces		
+1 Network interface			
N	SFP-ready slot		
1	Fast Ethernet/STM-1, 1310 nm, multimode, LED, 2 km (1.2 mi)		
2	Fast Ethernet/STM-1, 1310 nm, single mode, laser, 15 km (9.3 mi)		
2H	Fast Ethernet/STM-1, industrially hardened, 1310 nm, single mode, laser, 15 km (9.3 mi)		
3	Fast Ethernet/STM-1, 1310 nm, single mode, laser, 40 km (24.8 mi)		
3H	Fast Ethernet/STM-1, industrially hardened, 1310 nm, single mode, laser, 40 km (24.8 mi)		
4	Fast Ethernet/STM-1, 1310 nm, single mode, laser, 80 km (49.7 mi)		



Kilomux-2100/2104 Data, Voice, Fax and LAN Integrating Modular Multiplexer

Basic units include: chassis, single power supply, single main link and common logic. (All I/O modules, as well as additional system, main link and power supply modules, are ordered separately).

- KM- 12-I/O slot Modular Multiplexer
- 2100/~/*/?/&/% 4-I/O slot Modular Multiplexer
- KM-2104/~/*/? 4-I/O slot Modular Multiplexer
- ~ Power supply
 - 24 24 VDC (KM-2100 only)
 - 48 -48 VDC
 - 48HP -48 VDC high power (56W) (KM-2100 only)
 - AC 100-240 VAC
- * Management interface (in addition to supervisory port; Default=V.24/RS-232 dial port)
 - EU Ethernet 10BaseT (UTP)
- ? Main link interface
 - V35 V.35
 - V24 V.24/RS-232
 - V36 V.36/RS-422/RS-530
 - X21 X.21
 - 703 G.703, co-directional
 - DDS Standard DDS
 - T1 Fractional T1, G.703/G.704
 - E1 Fractional E1, G.703/G.704
 - S ISDN "S" interface
 - IP TDMoIP main link with Ethernet 10/100BaseTX UTP interface
- & Fiber optic interface connector (KM-2100 only)
 - ST ST connector
 - FC FC/PC connector
- % Fiber optic interface wavelength and transmitter
 - 85 850 nm, multimode, LED
 - 13L 1310 nm, single mode, laser diode
 - 15L 1550 nm, single mode, laser diode
- + CSU for long haul links (T1 main link interface only), (Default=without CSU):
 - CSU With CSU

System Modules (for KM-2100 chassis only)

- KM-2100M-KCL.2/* Common Logic module
- * Management interface (Default=serial RS-232)
 - EU Ethernet 10BaseT UTP
- KM-2000M-KPS.# Power Supply module
- # Input voltage and power
 - 3 -48 VDC, 25W
 - 5 24 VDC, 25W
 - 7 -48 VDC, 56W
- KM-2100M-KPS.8 Power Supply module 100-240 VAC, 130W

Supplied Accessories

- CBL-530/V35/F Adapter cable for converting 25-pin RS-530RS-530 interface to 34-pin V.35 interface (supplied with KM-2104/~/*/V35)
- CBL-530/449/F Adapter cable for converting 25-pin RS-530RS-530 interface to 37-pin RS-449 interface (supplied with KM-2100/~/*/V36KM-2100/~/*/V36 and KM-2104/~/*/V36KM-2104/~/*/V36 main links)
- CBL-KVF6/8-DL Cable for downloading software upgrades from a PC into the KVF.6/KVF.8/KML.11 3-pin terminal block DL connector (supplied with KVF.6, KVF.8 and kmL.11 modules, as well as with KM-2100/2104KM-2100/2104 chassis with IP main link)
- PLUG-DC Open connector plug for DC power inlet (supplied with KM-2104/48)

PLUG-DC/TB Open terminal block connector plug for DC power inlet (supplied with KM-2100/24 and KM-2100/48 options)

PLUG-DC/TBRM-DXC10A Open terminal block connector plug for DC power inlet (supplied with KM-2100/24 and KM-2100/48 options)19-inch rack mount kit for KM-2104
RM-DXC10A 19-inch rack mount kit for KM-2104
RM-DXC30 19-inch rack mount kit for KM-2100

Optional Accessories

- CBL-SP-9 Straight cable with one male and two female DB-9 connectors
- CBL-FANI Cable for an external fan connection
- CBL-ETH/UTP/STR Straight cable for LAN connection
- CBL-ETH/UTP/CROSS Cross cable for LAN connection

Kilomux-2100/2104 Modules

KAI

KM-2100M-KAI Alarm Indication Module for the Kilomux-2100 enclosure.

KDI

Bypass Module

KM-2000M-KDI/*

* Multidrop (Default=without multidrop):
M V.24/RS-232 connector for multidrop/polling

KHS.1

KM-2000M-KHS.1 2-Channel High Speed Data Module
For cables see below

KHS.2

KM-2000M-KHS.2 2-Channel Synchronous Data Module

Optional Cables for KM-2000M-KHS.1 and KM-2000M-KHS.2:

CBL-HS2/*/# Adapter cable for KHS.2's DB-25 channel connectors. Converts to connector of specified (separate Cable is needed for each connector). Cable must be chosen to match the desired clock mode. Cable length is 2 m (6 ft).

* Interface, clock mode

- V1 34-pin V.35, DCE
- V2 34-pin V.35, DTE1
- V3 34-pin V.35, DTE2
- R1 37-pin V.36/RS-449, DCE
- R2 37-pin V.36/RS-449, DTE1
- R3 37-pin V.36/RS-449, DTE2
- X1 15-pin X.21, DCE (30 cm/1ft long)

Connector (on user side)

- F Female
- M Male

KHS.703

KM-2100M-KHS.703 2-Channel, G.703 Codirectional Module for Kilomux-2100/2104

KLS.1/N

KM-2000M-KLS.1 2 Channel Low Speed Data Module

KM-Ringer, Ringer-2000, Ringer-2200N

KM-RINGER/^ Power supply module for Kilomux chassis, supports up to 32 voice channels

^ Operating (input) voltage:

- 48 -48 VDC
- 24 -24 VDC

RINGER-2000/48/72/* Standalone power supply unit, supports up to 60 voice channels

* Operating (input) voltage:

- 115 115 VAC
- 230 230 VAC
- 48 -48 VDC



RINGER-2200N/&/~ Standalone power supply unit, supports up to 120 voice channels.

& Operating (input) voltage:

115 115 VAC
230 230 VAC

~ VDC output:

ISDN Both +48 VDC and -48 VDC outputs (Default=-48 VDC only)

Supplied Accessories

CBL-RINGER-2 Splitter cable for connecting a Ringer 3-pin DC-output connector to up to two modules
Note: Supplied with KM-Ringer

CBL-RINGER2200N-1/OPEN Cable with stripped ends (no connector) for connecting a Ringer-2200N 3-pin TB DC-output to a consumer
Note: Supplied with Ringer-2200N

Optional Accessories (for KM-RINGER and RINGER-2000 only)

CBL-RINGER-1 Cable for connecting a Ringer 3-pin DC output connector to a single module

CBL-RINGER-4 Splitter cable for connecting a Ringer 3-pin DC output connector to up to four modules

CBL-RINGER-6 Splitter cable for connecting a Ringer 3-pin DC output connector to up to six modules

KMBE

KM-2100M-KMBE/UTP Enhanced 10BaseT Ethernet Router/Bridge Module for KM-2100/2104

KML.1-5

KM-2000M-KML.1/N Main Link Modules
KM-2000M-KML.2/N
KM-2000M-KML.3/N
KM-2000M-KML.4/N
KM-2000M-KML.5/N

KML.10

KM-2000M-KML.10 ISDN "S" interface Leased/Switched Line Main Link Module

KML.11

KM-2100M-KML.11 IP main link module for KM-2100/2104

Supplied Accessories

CBL-KVF6/8-DL Cable, with an RS-232 DB-9 connector for downloading software upgrades from a PC to KML.11 using the 3-pin DL connector

Fractional T1 Interface Main Link Module

KML.7

KM-2000M-7/*

* CSU (Default=No CSU)
CSU With CSU

KML.8 Fractional E1 Interface Main Link Module (without LTU)

KM-2000M-/*

* LTU (Default=No LTU)
LTU With LTU

KML.F

KM-2000M- Fiber Optic Interface Main Link Module

KML.F/*/#

* Connector
ST ST connector
FC FC/PC connector

Optical wavelength
85 850 nm, multimode, LED
13 1310 nm, single mode, LED
13L 1310 nm, single mode, laser diode
15L 1550 nm, single mode, laser diode

KVC.1M

KM-2000M-KVC.1M/*

2-Channel PCM/ADPCM Voice Module

Echo Cancellor (Default=no EC)
EC Echo Cancellation

* Analog interface

E&M 2/4-wire E&M, -12V
E&M48 2/4-wire E&M, -48V
E&M/POS 2/4-wire E&M, -12V, positive E&M signaling
E&M/PML 2/4-wire E&M, -12V, positive M-lead signaling
FXS 2-wire FXS
FXSP FXS with internal ringer (23 VRMS)
FXO 2-wire FXO

Note: KM-Ringer or Ringer-2000 is required to support the FXS and the E&M/48 interfaces.

KVF.8

KM-2100M-KVF.8/* 8-Channel Analog Voice Compression Module for KM-2100/2104

* Voice interface

E&M 2-wire or 4-wire E&M interface
FXS 2-wire FXS interface
FXO 2-wire FXO interface

Supplied Accessories

CBL-KVF8/E&M Octopus cable for splitting the E&M module SCSI 68-pin connector into 8 x RJ-45 connectors, for direct connection to user equipment. Cable length is 2m (6 ft).

CBL-KVF8/FXOS Octopus cable for splitting the FXS/FXO module DB-25 connector into 8 x RJ-11 connectors, for direct connection to user equipment. Cable length is 2m (6 ft).

CBL-Ringer-1 Cable with a Ringer 3-pin DC output connector applying power to KVF.8 DC PWR-IN connector

CBL-KVF6/8-DL Cable with an RS-232 DB-9 connector for downloading software upgrades from a PC to KVF.8 using the 3-pin DL connector.

Optional Accessories

KM-Ringer, or Ringer-2000, or Ringer-2200N Used as source for feed and ring voltages to FXS modules and certain E&M applications. See Ringer ordering options.

LA-110

Advanced Integrated Access Device

LA-110/~/\$/*/#/@

~ Power supply (Default=an AC power supply)
DC DC power supply

\$ Network interface

SHDSL 2-wire SHDSL
SHDSL/4W 4-wire SHDSL
SHDSL/IMA IMA over 4 x 2-wire SHDSL
ADSLA ADSL Annex A
E1 Balanced E1

* Optional ADPCM compression

VC4 ADPCM FXS, 4 TS
VC8 ADPCM ISDN, 8 TS
VC30 ADPCM E1, 30 TS

Note: ADPCM compression is not available for units with IMA over SHDSL network interfaces.

Voice interface

E1 E1
T1 T1
FXS 4-port FXS (units with single SHDSL or ADSL network interfaces only)

ISDN 4-port ISDN (units with single SHDSL or ADSL network interfaces only)

Note: E1 and T1 user ports are not available for units with ADSL network interfaces



@ Serial data interface
 V35 V.35 interface
 X21 X.21 interface
Note: V.35 and X.21 serial data ports are not available for units with ISDN, FXS user or ADSL network interfaces.

Supplied Accessories
 AC power cord For AC unit
 DC adapter kit For DC unit

Optional Accessories
 RM-33-2 Hardware kit for mounting one or two LA-110 units into a 19" rack
 CBL-RJ45/2BNC/E1 RJ-45 to BNC adapter cable for unbalanced E1 network or user interface
 CBL-DB9F-DB9M-STR Control port cable

LA-210 EFM DSL Network Termination Unit

LA-210/&!/!/\$/*/@/{/~

& DSL technology:
 ESHDSL SHDSL.bis
 VDSL2 VDSL2
 ! SHDSL interface
 2W 2-wire SHDSL interface
 4W 4-wire SHDSL interface
 8W 8-wire SHDSL interface
 \$ Operation mode (Default=Bridge mode)
 EVPL Ethernet Virtual Private Line services using Ethernet flows
 * Number of Ethernet ports:
 ETH One Ethernet port
 4ETH Four Ethernet ports
 @ TDM port
 E1 One E1 port
 { Serial data port
 V35 V.35 port
 X21 X.21 port
 ~ Timing
 DR Differential Clock Recovery

License Packages
 LA-210-2W-EVPL Software license for 2-wire SHDSL interface
 LA-210-4W-EVPL Software license for 4-wire SHDSL interface
 LA-210-8W-EVPL Software license for 8-wire SHDSL interface

Supplied Accessories
 AC power cord
 DC connection kit

Optional Accessories
 CBL-DB9F-DB9M-STR Control port cable
 RM-33-2 Hardware kit for mounting one or two units into a 19" rack

LRS-102 Modular Converter Rack

LRS-102/@/\$/#

@ E1 connector (for OP-108C):
 UNBAL Unbalanced
 \$ Power supply
 AC One standard AC
 ACR Dual standard AC
 DC One standard DC
 DCR Dual standard DC
 AD One standard AC + one standard DC
 # Number of common logic cards:
 CL1 Single CL.1
 CL1R Dual CL.1
 CLS1 Single CL.1 with station clock
 CLS1R Dual CL.1 with station clock

For ordering modem cards, see individual data sheets.

Supplied Accessories

AC power cord
 DC adapter plug
 RM-MP-MX-23/19 Hardware kit for mounting one LRS-102 unit into both 19-inch and 23-inch racks
 MP-2100-RM-ETS/19 Hardware kit for mounting one LRS-102 unit into an ETSI rack (fits also 19-inch rack)

Optional Accessories

LRS-102-PS/~ Additional power supply module
 ~ Power supply
 AC 100 to 240 VAC, 200W
 DC -48 VDC, 250W
 LRS-102-CL/# Additional common logic card
 CBL-SP-9 Control port cable

LRS-102 Modules

ASMi-54C

ASMi-54C/ETH/#

Interface and Connectors
 UTP 2 UTP (RJ-45 connectors)
 SFP\$ 2 SFP sockets including SFP transceivers (see SFP Transceivers data sheet for \$)

Optional Accessories

CBL-DB26-8SHDSL Cable for splitting a single 26-pin connector into 8 x RJ-45 connectors

ASMi-54C/N

ASMi-54C/E1/N

ASMi-54C/E1/ETH/#/N E1 and Ethernet over SHDSL/SHDSL.bis 8-Port Module
 E1 over SHDSL 8-Port Module
 E1 and Ethernet over SHDSL/SHDSL.bis 8-port module

Interface and Connectors

UTP 2 UTP (RJ-45 connectors)
 SFP& 2 SFP sockets including SFP transceivers (see below for &)

& SFP transceivers for Ethernet 100BaseFx Interface

1 Fast Ethernet/STM-1, 1310 nm, multimode, LED, 2 km (1.2 mi)
 1D Fast Ethernet/STM-1, DDM, internal calibration, 1310 nm, multimode, LED, 2 km (1.2 mi)
 2 Fast Ethernet/STM-1, 1310 nm, single mode, laser, 15 km (9.3 mi)
 2D Fast Ethernet/STM-1, DDM, internal calibration, 1310 nm, single mode, laser, 15 km (9.3 mi)
 3 Fast Ethernet/STM-1, 1310 nm, single mode, laser, 40 km (24.8 mi)
 3D Fast Ethernet/STM-1, DDM, internal calibration, 1310 nm, single mode, laser, 40 km (24.8 mi)
 10a Fast Ethernet/STM-1, Tx - 1310 nm, Rx - 1550 nm, single mode (single fiber), laser (WDM), 20 km (12.4 mi)
 10b Fast Ethernet/STM-1, Tx - 1550 nm, Rx - 1310 nm, single mode (single fiber), laser (WDM), 20 km (12.4 mi)
 18a STM-1/OC-3, Tx - 1310 nm, Rx - 1550 nm, 9/25 single mode (single fiber), laser (WDM), 40 km (24.8 mi)
 18b STM-1/OC-3, Tx - 1550 nm, Rx - 1310 nm, 9/25 single mode (single fiber), laser (WDM), 40 km (24.8 mi)



Optional Accessories

CBL-DB26-8SHDSL	Cable for splitting a single 26-pin SHDSL.bis connector to 8 x RJ-45 connectors
CBL-G703-8/RJ45	Splitter cable for splitting the 44-pin E1 connector to 8 E1 balanced RJ-45 connectors
CBL-G703-8/RJ45/X	Splitter cross-cable for splitting the 44-pin E1 connector to 8 E1 balanced RJ-45 connectors
CBL-G703-8/COAX	Splitter cable for splitting the 44-pin E1 connector to 8 pairs of E1 unbalanced BNC connectors
CBL-G703-8/OPEN/2M	Open-ended cable with DB-44 connector for balanced E1 applications
OP-108C	4-Channel E1 and Ethernet Multiplexer, module for LRS-102
OP-106C	4-Channel T1 and Ethernet Multiplexer, module for LRS-102
OP-108C/~/!/+	
OP-106C/~/!/+	
^	E1 connector
B	Balanced (RJ-45)
U	Unbalanced (BNC connectors on a special LRS-102 rack, E1 only)
!	Optional user port
ETH	10/100BaseT User Ethernet port
+	Uplink interface connector
SFP1	LED, 1310 nm, multimode, LC only
SFP2	Laser, 1310 nm, single mode, LC only
SFP3	Long-haul laser, 1310 nm, single mode, LC only
SFP4	Long-haul laser, 1550 nm, single mode, LC only
SFP10A	Laser WDM, Tx -1550 nm, Rx -1310 nm, single mode, single fiber, LC only (SF1)
SFP10B	Laser WDM, Tx -1310 nm, Rx -1550 nm, single mode, single fiber, LC only (SF2)
SFP24	VSCSEL, 850 nm, multimode, LC only
SFP18A	Laser WDM, Tx -1310 nm, Rx -1550 nm, single mode, single fiber, LC only
SFP18B	Laser WDM, Tx -1550 nm, Rx -1310 nm, single mode, single fiber, LC only
2XSFP1	Dual SFP1 modules
2XSFP2	Dual SFP2 modules
2XSFP3	Dual SFP3 modules
2XSFP4	Dual SFP4 modules
2XSFP10A	Dual SFP10A modules
2XSFP10B	Dual SFP10B modules
2XSFP18A	Dual SFP18A modules
2XSFP18B	Dual SFP18B modules
2XSFP24	Dual SFP24 modules
4XSFP1	Quad SFP1 modules
4XSFP2	Quad SFP2 modules
4XSFP3	Quad SFP3 modules
4XSFP4	Quad SFP4 modules
4XSFP10A	Quad SFP10A modules
4XSFP10B	Quad SFP10B modules
4XSFP18A	Quad SFP18A modules
4XSFP18B	Quad SFP18B modules
4XSFP24	Quad SFP24 modules

Note: For single fiber applications, a device with the SF1 interface should always be used opposite a device with the SF2 interface, and vice versa. The SF3 interface works opposite another SF3.

Optional Card Accessories

CBL-G703-8/RJ45	Kit for mounting 1 or 2 units in a 19-inch rack
CBL-G703-8/RJ45/X	Splitter cross-cable for splitting the 44-pin card connector to 8 E1 or 8 T1 balanced RJ-45 connectors
CBL-G703-8/COAX	Splitter cable for splitting the 44-pin OP-108C card connector to 8 pairs of unbalanced BNC connectors
CBL-G703-8/OPEN/2M	Open-ended cable with DB-44 connector on the LRS-102 side for balanced E1 or T1 applications

OP-34C

OP-25C

OP-34C/~/!/+	16 E1, Ethernet or Data over E3 or Fiber multiplexer module
OP-25C/~/!/+	16 T1, Ethernet or Data Fiber multiplexer module
!	Ethernet port (Default=no Ethernet): ETH 10/100BaseT Ethernet port
+	Uplink interface
SFP-12	E3 interface, SMB connector (OP-34 only)
SFP-1	Fast Ethernet/STM-1, 1310 nm, multimode, LED, 2 km (1.2 mi)
SFP-2	Fast Ethernet/STM-1, 1310 nm, single mode, laser, 15 km (9.3 mi)
SFP-3	Fast Ethernet/STM-1, 1310 nm, single mode, laser, 40 km (24.8 mi)
SFP-4	Fast Ethernet/STM-1, 1550 nm, single mode, laser, 80 km (49.7 mi)
SFP-10A	Fast Ethernet/STM-1, DDM, Tx - 1310 nm, Rx - 1550 nm, single mode (single fiber), laser (WDM) , 20 km (12.4 mi)
SFP-10B	Fast Ethernet/STM-1, Tx - 1550 nm, Rx - 1310 nm, single mode (single fiber), laser (WDM) , 20 km (12.4 mi)
2XSFP12	Dual SFP-12 modules
2XSFP1	Dual SFP-1 modules
2XSFP2	Dual SFP-2 modules
2XSFP3	Dual SFP-3 modules
2XSFP4	Dual SFP-4 modules
2XSFP10A	Dual SFP-10a modules
2XSFP10B	Dual SFP-10b modules

Supplied Accessories

CBL-SMB-BNC/M	SMB to BNC adapter cable (supplied with SFP-12)
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Optional Accessories

CBL-G703-8/RJ45/ETH	Splitter cable for splitting each 44-pin card connector to 8 E1 or 8 T1 balanced RJ-45 connectors and one Ethernet RJ-45 connector
CBL-G703-8/COAX/ETH	Splitter cable for splitting each 44-pin OP-34C card connector to 8 pairs of unbalanced BNC connectors and one Ethernet RJ-45 connector

Megaplex-2100/2104

Modular Integrated Access Multiplexers
Standard Megaplex-2100/2104 systems are comprised of a basic unit, as well as main link and I/O modules, which are ordered separately. Basic units include a chassis, single Common Logic (CL) module, single power supply, and power supply cables.



MP-2100/~/&/2#	4U-high chassis with 12 module slots and CL.2 common logic module
MP-2104/~/+2#	2U-high chassis with 5 module slots and CL.2 common logic module

System modules

System modules can be ordered separately for redundancy or special requirements

MP-2100M-PS/*	Higher Power Supply Module for MP-2100
MP-2100M-CL.2/#	Common Logic Module
~	Power supply input voltage
115	115 VAC
230	230 VAC
24	24 VDC
24/FLG	24 VDC with floating ground
48	-48 VDC
&	Redundancy (MP-2100 only) (Default=for 1 x PS, 1 x CL)
R	Full (2 x PS, 2 x CL)
+	Built-in ringer for MP-2104
RI	Built-in ringer (only). (Default=without ringer)
#	CL second management port (in addition to standard 9-pin DCE port)
UTP	Ethernet 10BaseT (UTP)
BNC	Ethernet 10Base2 (BNC)
V24	V.24/RS-232 DTE

System Modules

System modules can be ordered separately for redundancy or special requirements.

MP-2100M-PS/~	Power supply module for MP-2100
MP-2100M-CL.2/#	Common logic module

Supplied Accessories

AC power cord	For AC unit
DC adapter plug	For DC unit
RM-MP-MX-23/19	Hardware kit for mounting one MP-2100 unit into both 19-inch and 23-inch racks
RM-MP-2104-MN	Hardware kit for mounting one MP-2104 unit into a 19" rack

Optional Accessories

CBL-SP-9/SH	Standard DB-9 to DB-9 control port cable
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Megaplex-2100/2104 Modules**ACM**

MP-2100M-ACM	Alarm and Diagnostics module for MP-2100/MP-2104
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Note: This module is supported only by Megaplex systems with CL.2 common logic

HS-2

MP-2100M-HS-2	2-Channel high speed data module for MP-2100/2104
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Optional Accessories

CBL-HS2/*/#	Adapter cable for HS-2's DB-25 channel connectors. Converts to connector of specified (separate cable is needed for each connector). The cable must be chosen to match the desired clock mode. Cable length is 2 m (6 ft)
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*** Interface, clock mode**

V1	34-pin V.35, DCE
V2	34-pin V.35, Ext-DCE
V3	34-pin V.35, DTE
R1	37-pin V.36/RS-449, DCE
R2	37-pin V.36/RS-449, Ext-DCE
R3	37-pin V.36/RS-449, DTE
X1	15-pin X.21, DCE
X2	15-pin X.21, Ext-DCE
#	Connector (on user side)
F	Female
M	Male

HS-6N, HS-12N

MP2100M-HS-6N/^	6-channel high speed data module for MP-2100/2104 and Megaplex-4
MP2100M-HS-12N/^	12-channel high speed data module for MP-2100/2104 and Megaplex-4
^	Interface
232	V.24/RS-232
V35	V.35
V35/H1	V.35 interface, 34-pin, IEEE-1613 compliant
422	V.11/RS-422 (for V.36/RS-449, RS-530 or X.21)

Optional Accessories

CBL-SCS68/3/*/#/8	Cable for converting each of the HS-6N/12N's 68-pin SCSI connectors into 3 separate channel connectors with the physical interface specified
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Note: a separate cable is required for each of the four HS-12N/two HS-6N channel connectors.

*** Cable connector interface**

232	V.24/RS-232, 25-pin
V35	V.35 interface, 34-pin
V36	V.36/RS-449, 37-pin
530	RS-530, 25-pin
X21	X.21, 15-pin

#	Cable length (Default=2m (6.5 ft))
3M	3m (9.8 ft)
5M	5m (16.4 ft)

& Connector

F	Female
M	Male

HS-703

MP-2100M-HS-703	4-channel G.703 codirectional data module for MP-2100/2104 and MP-4100
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HS-DP/3

MP-2100M-HS-DP/3	3-channel OCU-DP data module for MP-2100/2104
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HS-ETH

MP-2100M-HS-ETH/*/UTP/#/8	Ethernet Bridge/Router Module for MP-2100/2104
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*** Bridge/router**

V	10BaseT Bridge with VLAN
F	10/100BaseT Bridge with VLAN
R	10BaseT Router

Number of LAN interfaces

1	1 channel
2	2 channels
4	4 channels

&	Internal bus support (Default=C and D not supported)
CD	Support of internal buses C and D

HS-ETH/SW

MP-2100M-HS-ETH/SW/UTP/4	4-Port Ethernet Bridge module with L2 Switch for MP-2100/2104
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HS-Q/N

MP-2100M-HS-Q/N	4-Channel High Speed Data Module for MP-2100/2104
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Optional Accessories

CBL-SCS26/*/#	Adaptor cables for HS-Q/N module 26-pin SCSI connectors. Each cable converts to a connector of the specified (a separate cable is required for each channel). Cable length is 2m (6 ft).
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*** Cable connector interface**

V35	V.35 interface, 34-pin
V36	V.36/RS-449 interface, 37-pin
530	RS-530 interface, 25-pin
X21	X.21 interface, 15-pin



# Connector	
F	Female
M	Male

HS-RN

MP-2100M-HS-RN/V110 4-Channel Low Speed Data Module with V.110 rate adaptation for MP-2100/2104 or Megaplex-4

MP-2100M-HS-RN/V110/H1 4-Channel Low Speed Data Module with V.110 rate adaptation for MP-4100 and MP-4104, IEEE-1613-compliant

MP-2100M-HS-RN/HDL 4-Channel Low Speed Data Module with HDLC rate adaptation for MP-2100/2104 or Megaplex-4

Optional Accessories

Y-cables for splitting each of the HS-RN module's 25-pin channel connectors into two separate 25-pin connectors:

CBL-HSR/F	Female
CBL-HSR/M	Male

Note: A separate cable is required for each of the two HS-RN channel connectors.

HS-S

MP-2100M-HS-S 4-channel ISDN "S" interface data module for MP-2100/2104 and MP-4100 For Power Feed, see Ringer data sheet.

Optional Accessories

HSF-1, HSF-2

MP-2100M-HSF-1/ST/85 Single port fiber optic teleprotection interface module for MP-2100/2104

MP-2100M-HSF-2/ST/85 Dual-port fiber optic teleprotection interface module for MP-2100/2104 and MP-4100/4104

MP-2100M-HSF-2/ST/85/H1 Dual-port fiber optic teleprotection interface module for MP-4100 and MP-4104, IEEE-1613 compliant

LS-6N, LS-12

MP-2100M-LS-6N 6-Channel Low Speed Data Module for MP-2100/2104 and MP-4100

MP-2100M-LS-12 12-Channel Low Speed Data Module for MP-2100/2104 and MP-4100

Optional Accessories

CBL-LS12/# Octopus cable for splitting one 68-pin SCSI female module connector into six 25-pin D-channel connectors, for direct connection to DTE equipment. Cable length is 2m (6 ft).

# Cable D- connectors	
F	Female
M	Male

ML-1/2E1/T1, MLF-1/2E1/T1

MP-2100M-ML-1@ Single Copper Interface Main Link Module for MP-2100/2104

MP-2100M-ML-2@/^ Dual Copper Interface Main Link Module for MP-2100/2104

MP-2100M-MLF-1@/#/+ Single Fiber Optic Interface Main Link Module for MP-2100/2104

MP-2100M-MLF-2@/#/+ Dual Fiber Optic Interface Main Link Module for MP-2100/2104

@ Link	
E1	E1 link(s)
T1	T1 link(s)

# Fiber optic connector	
ST	ST connector
SC	SC connector
FC	FC connector

+ Fiber optic interface wavelength	
85	850 nm, multimode, laser
13L	1310 nm, single mode, laser
15L	1550 nm, single mode, laser (not with SC connectors)

^ Port bypass BP Port bypass between dual copper links.

Optional Accessories

CBL-MINIBNC-BNC/* Cable for converting from ML-1E1/ML-2E1 module's mini BNC unbalanced connectors to standard BNC interface. (A separate cable must be ordered for each individual mini BNC connector.)

CBL-MINIBNC-MINIBNC/* Cable for connecting the ML-1E1/ML-2E1 module's mini BNC unbalanced connectors to another mini BNC interface. (A separate cable must be ordered for each individual mini BNC connector.)

* Cable length	
2.5METER	2.5m/8.2 ft
5METER	5m/16.4 ft

ML-20N

MP-2100M-ML-20N/#/* Single/Dual n x 64 kbps Main Link Module for MP-2100/2104

# Number of ports	
1	Single port
2	Two ports

* Interface	
AMI	AMI
V35	V.35
RS449	RS-449 (via supplied cable)
RS530	RS-530
X21	X.21

Supplied Accessories

CBL-530/449/F Adaptor cable for connecting V.36/RS-449 user equipment to the module RS-530 connector

ML-8E1, ML-8T1

MP-2100M-ML-8E1 8-port E1 module with balanced interface for MP-2100 and MP-2104 chassis

MP-2100M-ML-8T1 8-port T1 module for MP-2100 and MP-2104 chassis

Optional Accessories

CBL-G703-8/RJ45/ST Splitter cable with station clock for splitting the 44-pin module connector to 8 E1 or 8 T1 balanced RJ-45 connectors

CBL-G703-8/RJ45/ST/X Splitter cross-cable with station clock for splitting the 44-pin module connector to 8 E1 or 8 T1 balanced RJ-45 connectors

CBL-G703-8/OPEN/2M Open-ended cable with DB-44 connector on the megaplex side for balanced applications

Note: All the cables are 2m (6.6 ft) long.

ML-IP

MP-2100M-ML-IP/*/@ TDMoIP Main Link Module for MP-2100/MP-2104

* Uplinks interface (User port is always UTP)	
UTP	Copper interface with RJ-45 connectors
ST/13L	1310 nm single mode fiber with laser transmitter, ST connectors
FC/13L	1310 nm single mode fiber with laser transmitter, FC/PC connectors

@ Echo Cancellor (Default=no echo canceller) 1E Echo canceller (supports up to 30 voice channels)

**MSL-8**

MP-2100M-MSL-8/E1 8-Port E1 module with 2-wire SHDSL interface for Megaplex-2100 and Megaplex-2104 chassis

Optional Accessories

CBL-MSL8-SCS40/RJ45

Cable for splitting MSL-8 single 40-pin SCSI connector to 8 x RJ-45 connectors

CBL-MSL8-SCS40/OPEN/12M

Cable for splitting MSL-8 single 40-pin SCSI connector to 8 x RJ-45 connectors

Ringer-2100R, Ringer-2000, Ringer-2200N

RING2000/+/#/* Standalone power supply unit, supports up to 60 active voice channels

+ DC battery (feed) voltage output
24 -24 VDC
48 -48 VDC

Ring voltage (Default=without ring voltage)
72 Ring voltage output

Note: +72 VDC is provided by AC-powered models; +60 VDC is provided by DC-powered models

* Power Supply (operating (input) voltage)
115 115 VAC
230 230 VAC
48 -48 VDC
24 -24 VDC

Note: Only the following ordering option combinations are possible:

RINGER-2000/24/72/115

RINGER-2000/24/72/230

RINGER-2000/24/72/24

RINGER-2000/48/72/115

RINGER-2000/48/72/230

RINGER-2000/48/72/48

RINGER-2000/48/115 (no ring voltage)

RINGER-2000/48/230 (no ring voltage)

RINGER-2100R/^ Power supply module for Megaplex-2100, supports up to 32 active voice channels

^ Power supply: Operating (input) voltage:
AC 115 to 230 VAC
24 -24 VDC

RING2000/48/72/* Standalone power supply unit for up to 60 active voice channels with -48/+72 VDC output voltage

* Operating (input) voltage:
115 115 VAC
230 230 VAC

RINGER-2200N/& Standalone power supply unit, supports up to 120 active voice channels

& Power supply: Operating (input) voltage:
110 110 VAC
230 230 VAC
230/ISDN 230 VAC + ISDN for both +48 VDC and -48 VDC outputs

Supplied Accessories

AC power cord

KM-2004/RM

Hardware for mounting the Ringer-2000 unit in a 19" rack

RING-2200-RM

Hardware kit for mounting the Ringer-2200N unit into a 19" rack

CBL-RINGER2200N-1/OPEN

Cable with stripped ends (no connector) for connecting to a Ringer-2200N 3-pin TB DC-output connector

Optional Accessories

CBL-RINGER-1/TB

Cable for connecting a Ringer-2000 3-pin DC-output DIN (circular) connector to a 3-pin TB Megaplex DC-input connector

CBL-RINGER2200N-1/TB

Cable for connecting a Ringer-2200N TB DC-output connector to a 3-pin TB Megaplex DC-input connector

CBL-RINGER2200N-2/TB

Cable for connecting a Ringer-2200N TB DC-output connector to two Megaplex chassis

VC-16A

MP-2100M-VC16A

16-Channel ADPCM/PCM Voice Module with No Signaling

Optional Accessory

CBL-VC16A/RJ-45

Cable for splitting the VC-16A's single 64-pin Telco connector into 16 x RJ-45 connectors

VC-4/4A, VC-8/8A, VC-16

MP-2100M-VC-4/#/*

4-Channel PCM Voice Module

MP-2100M-VC-8/#/*

8-Channel PCM Voice Module

MP-2100M-VC-16/#/*

16-Channel PCM Voice Module

MP-2100M-VC-4A/#/*

4-Channel ADPCM Voice Module

MP-2100M-VC-8A/#/*

8-Channel ADPCM Voice Module

Interface

E&M

E&M interface

E&M/POS

E&M interface with positive signaling (for VC-8 and VC-16 only)

E&M/EXT

E&M interface operating at -48 VDC

E&M/4WIRE

E&M interface with enhanced gain levels (for VC-16, VC-8, VC-4)

E&M/RJ/POS/24

E&M with signaling and 24 VDC (for VC-8 in MP-2100/MP-2104 only)

E&M/DS

E&M with double signaling (for VC-8 only)

FXS

FXS interface with Telco connector (for VC-16, VC-8, VC-8A; and with RJ-12 connectors for VC-4, VC-4A)

FXS/RJ

FXS interface with RJ-12 connectors (for VC-8)

FXS/24VDC

FXS module operating with 24 VDC (for VC-16 only*)

FXO

FXO with Telco connector (for VC-16, VC-8, VC-8A; and with RJ-12 connectors for VC-4, VC-4A)

FXO/RJ

FXO with RJ-12 connector (for VC-8, VC-8A)

Note: VC-4/FXS, VC-4A/FXS, VC-8/FXS/RJ and VC-8A/FXS modules support both -24 and -48 VDC.

* Floating ground (Default=no floating ground)

FLG

Floating ground option for use in 24 VDC and any floating system (AC / -48V)

Optional Accessories

Octopus cables for splitting the high-density module (VC-8 and VC-16) connector(s) into separate channels with RJ-12/RJ-45 connectors, for direct connection to user equipment. Cable lengths are 2m (6 ft):



CBL-VC16/FXSO	Cable with 16 x RJ-12 connectors, for splitting the VC-16/FXS or VC-16/FXO's single 50-pin Telco connector
CBL-VC8/FXSO	Cable with 8 x RJ-12 connectors, for splitting the VC-8/FXS or VC-8/FXO's single 50-pin Telco connector
CBL-KVF8/E&M	Cable with 8 x RJ-45 connectors, for splitting a single VC-8/E&M or VC-16/E&M 68-pin SCSI connector
CBL-KVF8/E&M/OPEN	Open-end cable with stranded core, for splitting a single VC-8/E&M or VC-16/E&M 68-pin SCSI connector, 2m long
CBL-KVF8/E&M/OPEN/4METER	Open-end cable with stranded core, for splitting a single VC-8/E&M or VC-16/E&M 68-pin SCSI connector, 4m long
CBL-KVF8/E&M/OPEN/10METER	Open-end cable with stranded core, for splitting a single VC-8/E&M or VC-16/E&M 68-pin SCSI connector, 10m long
CBL-KVF8/E&M/OPEN/25METER	Open-end cable with stranded core, for splitting a single VC-8/E&M or VC-16/E&M 68-pin SCSI connector, 25m long
CBL-KVF8/E&M/OPEN/12M	Open-end cable with solid core, for splitting a single VC-8/E&M or VC-16/E&M 68-pin SCSI connector, 12m long

When ordering FXS or E&M modules, a RINGER may be required. For ordering refer to the RINGER ordering information in this list.

Note: FXS modules require a -48 VDC (nominal) source for feed and ring voltages. This power can be provided by a Ringer-2000/2200N unit or Ringer-2100R module. E&M applications may also require -48 VDC. (-48 VDC-powered chassis, or AC-powered MP-2104 chassis with built-in ringer option, do not require an additional Ringer.)

VC-4/OMNI

MP2100M-VC-4/E&M/OMNI	Omnibus PCM voice module for MP-2100/2104/ 4100 with E&M signaling
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VC-6/LB

MP-2100M-VC-6/LB	6-Channel PCM Voice Module for Local Battery Telephones for MP-2100/2104
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VF-24/30/48/60

MP-2100M-VF-24/T1	Single T1 Digital Voice Compression Module for MP-2100/2104
MP-2100M-VF-30/E1	Single E1 Digital Voice Compression Module for MP-2100/2104
MP-2100M-VF-48/T1	Dual T1 Digital Voice Compression Module for MP-2100/2104
MP-2100M-VF-60/E1	Dual E1 Digital Voice Compression Module for MP-2100/2104

Optional Accessories

MP-CBL-RJ45/2BNC/E1	Adapter for VF-30/60 modules converting an E1 port RJ-45 connector into a pair of BNC connectors for unbalanced coax interface
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VFS-24/30/48/60

MP-2100M-VFS-24/1T1	Single T1 Digital Voice Compression Server Module for MP-2100/2104
MP-2100M-VFS-30/1E1	Single E1 Digital Voice Compression Server Module for MP-2100/2104
MP-2100M-VFS-48/2T1	Dual T1 Digital Voice Compression Server Module for MP-2100/2104
MP-2100M-VFS-60/2E1	Dual E1 Digital Voice Compression Server Module for MP-2100/2104

Optional Accessories

MP-CBL-RJ45/2BNC/E1	Adapter for VFS-30/60 modules converting an E1 port RJ-45 connector into a pair of BNC connectors for unbalanced coax interface
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Megaplex-4

Megaplex-4100

MP-4100-MN	Next Generation Multiservice Access Node
MP-4100-2/!/*/SA/\$	Megaplex-4100 chassis with no PS or CL.2 module
!	Megaplex-4100 chassis equipped with PS and CL.2 modules
!	Power supply modules
115	Single/dual, 115 VAC (including HVDC support of 100 to 360 VDC)
115R	Single/dual, 115 VAC (including HVDC support of 100 to 360 VDC), IEEE-1613 compliant
115/H1	Single/dual, 230 VAC (including HVDC support of 100 to 360 VDC)
115R/H1	Single/dual, 230 VAC (including HVDC support of 100 to 360 VDC), IEEE-1613 compliant
230	Single/dual, 230 VAC (including HVDC support of 100 to 360 VDC)
230R	Single/dual, 230 VAC (including HVDC support of 100 to 360 VDC), IEEE-1613 compliant
230/H1	Dual, +24 VDC
230R/H1	Single/dual, -48 VDC
24R	Single/dual, -48 VDC, IEEE-1613 compliant
48	
48R	
48/H1	
48R/H1	
AC48	
AC48/H1	100 -48 VDC
*	Link option
D50	Single/dual CL.2 modules without SDH/SONET and GbE links
DS0R	Single/dual CL.2 modules with SDH/SONET UTP sockets and GbE UTP connectors
622GBEUTP	Single/dual CL.2 modules with SDH/SONET SFP sockets and GbE SFP sockets
622GBESFP	Single/dual CL.2 modules with STM-1/OC-3 SFP sockets and GbE UTP connectors, Ethernet Carrier-ready
622GBESFPR	Single/dual CL.2 modules with STM-1/OC-3 SFP sockets and GbE SFP sockets, Ethernet Carrier-ready
622GBEAUTP	
622GBEAUTPR	
622GBEASFP	
622GBEASFPR	
SA	SW key activation (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
MP-4100M-PS/~	Power supply module
~	Power supply modules
115	Single, 115 VAC (including HVDC support of 100 to 330 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)
230/H1	Single, 230 VAC (including HVDC support of 100 to 360 VDC), IEEE-1613 compliant
24	Single, +24 VDC
48	Single, -48 VDC
48/H1	Single, -48 VDC, IEEE-1613 compliant
MP-4100M-CL.2/#/SA/\$	CL.2 module
#	Link option
D50	No SDH/SONET and GbE links
622GBEUTP	SDH/SONET SFP sockets and GbE UTP connectors
622GBESFP	SDH/SONET SFP sockets and GbE SFP sockets
622GBEAUTP	SDH/SONET SFP sockets and GbE UTP connectors, Ethernet Carrier-ready
622GBEASFP	SDH/SONET SFP sockets and GbE SFP sockets, Ethernet Carrier-ready
GBEAUTP	No SDH/SONET sockets, GbE UTP connectors, Carrier Ethernet ready
GBEASFP	No SDH/SONET sockets, GbE SFP sockets, Carrier Ethernet ready



SA SW key activation for full STM-4/OC-12 capabilities (Default=full STM-4/OC-12 capabilities)
 \$ IEEE-1613 compliance for CL module (Default=not compliant):
 H1 IEEE-1613 compliant
 MP-4100-LIC/622SK License key for activation from STM-1/OC-3 to STM-4/OC-12 (per CL module)

Supplied Accessories (only with MP-4100-2)
 CBL-SP-9/SH Dual DB-9 to single DB-9 control cable
 RM-MP-MX-23/19 Hardware kit for mounting one MP-4100 unit into 19-inch or 23-inch racks

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

Megaplex-4104
 MP-4104-MN Next Generation Multiservice Access Node
 Megaplex-4104 chassis with no PS or CL.2 module
 MP-4104-MN/NF Megaplex-4104 "no-fans" 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 100 to 300 VDC)

% Link option
 DS0 Single/dual CL.2 modules without SDH/SONET and GbE links
 DS0R Single/dual CL.2 modules without SDH/SONET and without GbE links for IEEE-1613 compliant chassis (48R only)
 622GBEUTP Single/dual CL.2 modules with SDH/SONET UTP sockets and GbE UTP connectors
 622GBEUTPR Single/dual CL.2 modules with SDH/SONET SFP sockets and GbE SFP sockets
 622GBESFP SFP sockets and GbE SFP sockets
 622GBESFPR Single/dual CL.2 modules with STM-1/OC-3 SFP sockets and GbE UTP connectors, Ethernet Carrier-ready
 622GBEAUTP Single/dual CL.2 modules with STM-1/OC-3 SFP sockets and GbE UTP connectors, Ethernet Carrier-ready
 622GBEAUTPR Single/dual CL.2 modules with STM-1/OC-3 SFP sockets and GbE SFP sockets, Ethernet Carrier-ready
 GBEAUTP GbE UTP connectors, Carrier Ethernet ready
 GBEASFP GbE SFP sockets, Carrier Ethernet ready

SA SW key activation (Default=full STM-4/OC-12 capabilities)
 155SK SW key activation for STM-4/OC-12
 MP-4104M-PS/~ Power supply module
 ~ 48 Single, -48 VDC
 AC Dual, 90 VAC to 260 VAC (including HVDC support of 100 to 300 VDC)

MP-4104M-CL.2/#/SA CL.2 module
 # Link option
 DS0 No SDH/SONET and GbE links
 622GBEUTP SDH/SONET SFP sockets and GbE UTP connectors
 622GBESFP SDH/SONET SFP sockets and GbE SFP sockets
 622GBEAUTP SDH/SONET SFP sockets and GbE UTP connectors, Ethernet Carrier-ready
 622GBEASFP SDH/SONET SFP sockets and GbE SFP sockets, Ethernet Carrier-ready

SA SW key activation (Default=full STM-4/OC-12 capabilities)
 MP-4104-LIC/622SK License key for activation from STM-1/OC-3 to STM-4/OC-12 (per CL module)

Supplied Accessories (only with MP-4104-2)
 CBL-MUSB-DB9F Control cable
 CBL-MP-4104/AR/OPEN/2M Open-ended alarm cable
 RM-42 Hardware kit for mounting one MP-4104 unit in a 19-inch rack

Optional Accessories
 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

Megaplex-4 Cabling Solution
 PATCHPNL-12-DB25 12-port DB-25 patch panel
 PATCHPNL-16-DB15 16-port DB-15 patch panel
 PATCHPNL-32-BNC 32-port BNC patch panel
 PATCHPNL-32-RJ45 32-port RJ-45 patch panel
 PATCHPNL-BRUSH Brush Guard Panel

Megaplex-4 Modules
ASMi-54C
 MP-4100M-ASMi-54C/ETH/#/~ Ethernet over SHDSL/SHDSL.bis 8-port module
 MP-4100M-ASMi-54C/E1/N/~ E1 over SHDSL/SHDSL.bis 8-port module
 MP-4100M-ASMi-54C/E1/ETH/#/N/~ E1 and Ethernet over SHDSL/SHDSL.bis 8-port module
 # Fast Ethernet Interface and Connectors
 UTP 2 UTP (RJ-45 connectors)
 SFPa 2 SFP sockets including SFP transceivers (see below for a)
 a SFP transceivers for Ethernet 100BaseFx Interface
 1 Fast Ethernet, 1310 nm, multimode, LED, 2 km (1.2 mi)
 1D Fast Ethernet, DDM, internal calibration, 1310 nm, multimode, LED, 2 km (1.2 mi)
 2 Fast Ethernet, 1310 nm, single mode, laser, 15 km (9.3 mi)
 2D Fast Ethernet, DDM, internal calibration, 1310 nm, single mode, laser, 15 km (9.3 mi)
 3 Fast Ethernet, 1310 nm, single mode, laser, 40 km (24.8 mi)
 3D Fast Ethernet, DDM, internal calibration, 1310 nm, single mode, laser, 40 km (24.8 mi)
 4 Fast Ethernet, 1550 nm, single mode, laser, 80 km (49.7 mi)
 4D Fast Ethernet, DDM, internal calibration, 1550 nm, single mode, laser, 80 km (49.7 mi)
 10a Fast Ethernet, Tx - 1310 nm, Rx - 1550 nm, single mode (single fiber), laser (WDM), 20 km (12.4 mi)
 10AD Fast Ethernet, DDM, Tx - 1310 nm, Rx - 1550 nm, single mode (single fiber), laser (WDM), 20 km (12.4 mi)
 10B Fast Ethernet, Tx - 1550 nm, Rx - 1310 nm, single mode (single fiber), laser (WDM), 20 km (12.4 mi)
 10BD Fast Ethernet, DDM, Tx - 1550 nm, Rx - 1310 nm, single mode (single fiber), laser (WDM), 20 km (12.4 mi)

18a	Fast Ethernet, Tx - 1310 nm, Rx - 1550 nm, 9/25 single mode (single fiber), laser (WDM), 40 km (24.8 mi)	2D	Fast Ethernet/STM-1, DDM, internal calibration, 1310 nm, single mode, laser, 15 km (9.3 mi)
18b	Fast Ethernet, Tx - 1550 nm, Rx - 1310 nm, 9/25 single mode (single fiber), laser (WDM), 40 km (24.8 mi)	3	Fast Ethernet/STM-1, 1310 nm, single mode, laser, 40 km (24.8 mi)
24	Fast Ethernet, 850 nm, 50/125 multimode, 2 km (1.2 mi); 62.5/125 multimode, 1 km (0.6)	3D	Fast Ethernet/STM-1, DDM, internal calibration, 1310 nm, single mode, laser, 40 km (24.8 mi)
~ Remote power feeding (Default=no remote power feeding)		10a	Fast Ethernet/STM-1, Tx - 1310 nm, Rx - 1550 nm, single mode (single fiber), laser (WDM) , 20 km (12.4 mi)
RFP	Remote power feeding support	10b	Fast Ethernet/STM-1, Tx - 1550 nm, Rx - 1310 nm, single mode (single fiber), laser (WDM) , 20 km (12.4 mi)
<i>Optional Accessories</i>	<i>Note: All the cables are 2m (6.6 ft) long.</i>	18a	STM-1/OC-3, Tx - 1310 nm, Rx - 1550 nm, 9/25 single mode (single fiber), laser (WDM), 40 km (24.8 mi)
CBL-DB26-8SHDSL	Cable for splitting a single 26-pin connector into 8 x RJ-45 connectors. Cable length is 2m (6 ft).	18b	STM-1/OC-3, Tx - 1550 nm, Rx - 1310 nm, 9/25 single mode (single fiber), laser (WDM), 40 km (24.8 mi)
CBL-G703-8/RJ45/ST	Splitter cable for splitting the 44-pin E1 connector to 8 E1 balanced RJ-45 connectors	Ethernet 100BaseTx (Electrical) Interface	
CBL-G703-8/RJ45/X	Splitter cross-cable for splitting the 44-pin E1 connector to 8 E1 balanced RJ-45 connectors	9F*	Fast Ethernet, RJ-45 connector, 100m (238 ft)
CBL-G703-8/COAX	Splitter cable for splitting the 44-pin E1 connector to 8 pairs of E1 unbalanced BNC connectors	<i>Optional Accessories</i>	<i>Note: All the cables are 2m (6.6 ft) long.</i>
CBL-G703-8/OPEN/2M	Open-ended cable with DB-44 connector for balanced E1 applications	CBL-G703-8/RJ45	Splitter cable for splitting the 44-pin module connector to 8 E1 or 8 T1 balanced RJ-45 connectors
MP-PATCH-16-BNC/DB44	Low-cost adapter patch panel terminated in BNC connectors at the user's end, for connecting several ASMi-54C/N modules to equipment with unbalanced E1 interfaces	CBL-G703-8/RJ45/X	Splitter cross-cable for splitting the 44-pin module connector to 8 E1 or 8 T1 balanced RJ-45 connectors
CBL-DB44-DB44	Cable for connecting each DB-44 connector of the module to the corresponding DB-44 connector of the patch panel	CBL-G703-8/COAX	Splitter cable for splitting the 44-pin M8E1 module connector to 8 pairs of unbalanced BNC connectors
D-NFV		CBL-G703-8/OPEN/2M	Open-ended cable with DB-44 connector on the Megaplex side for balanced E1 or T1 applications.
MP-4100M-DNFV/I7/128S/GBEUTP	Virtualization I/O module		DC Power Feed Supply for Remote SHDSL
HSF-2		MPF	
MP-2100M-HSF-2/ST/85	Dual-port fiber optic teleprotection interface module for MP-2100/2104 and MP-4100 Access Gigabit Ethernet Module	MPF/48/120VDC	
M-ETH		<i>Supplied Accessories</i>	
MP-4100M-ETH/#		DC connection kit	
# Interface and Connectors		RM-34/A	Hardware kit for mounting the MPF unit into a 19-inch rack
UTP/*	8 10/100/1000Mbps, UTP (RJ-45 connectors)	# Interface and Connectors	
SFP/*	8 100/1000 Mbps, SFP sockets	MPW-1	
UTPPOE	8 10/100/1000Mbps, UTP (RJ-45 connectors), PoE capabilities	MPW-1/#	
UTP/H1	8 10/100/1000Mbps, UTP (RJ-45 connectors), IEEE-1613 compliant	# Interface and Connectors	
* Distribution of Sync-E clock (Default: no Sync-E clock distribution)		3XUTP	3 UTP (RJ-45 connectors)
SYE	Distribution of Sync-E clock enabled	3XNULL	3 SFP sockets without SFP transceivers
<i>Note: M-ETH options with SYNC-E distribution are supported only with CL.2/A starting from HW Rev. 1.1 and higher.</i>		3XSFPa	3 SFP sockets including SFP transceivers (see below for a)
M8E1, M8T1	8-Port E1 and T1 Modules	a SFP transceivers for Ethernet 100BaseFx Interface	
MP-4100M-8E1/#	8-port E1 module for Megaplex-4100	1	Fast Ethernet/STM-1, 1310 nm, multimode, LED, 2 km (1.2 mi)
MP-4100M-8T1/#	8-port T1 module for Megaplex-4100	1D	Fast Ethernet/STM-1, DDM, internal calibration, 1310 nm, multimode, LED, 2 km (1.2 mi)
# Interface and Connectors		2	Fast Ethernet/STM-1, 1310 nm, single mode, laser, 15 km (9.3 mi)
3XUTP	3 UTP (RJ-45 connectors)	2D	Fast Ethernet/STM-1, DDM, internal calibration, 1310 nm, single mode, laser, 15 km (9.3 mi)
3XNULL	3 SFP sockets without SFP transceivers	3	Fast Ethernet/STM-1, 1310 nm, single mode, laser, 40 km (24.8 mi)
3XSFPa	3 SFP sockets including SFP transceivers (see below)	3D	Fast Ethernet/STM-1, DDM, internal calibration, 1310 nm, single mode, laser, 40 km (24.8 mi)
a SFP transceivers for Ethernet 100BaseFx Interface		10a	Fast Ethernet/STM-1, Tx - 1310 nm, Rx - 1550 nm, single mode (single fiber), laser (WDM) , 20 km (12.4 mi)
1	Fast Ethernet/STM-1, 1310 nm, multimode, LED, 2 km (1.2 mi)		
1D	Fast Ethernet/STM-1, DDM, internal calibration, 1310 nm, multimode, LED, 2 km (1.2 mi)		
2	Fast Ethernet/STM-1, 1310 nm, single mode, laser, 15 km (9.3 mi)		



10b	Fast Ethernet/STM-1, Tx - 1550 nm, Rx - 1310 nm, single mode (single fiber), laser (WDM) , 20 km (12.4 mi)		
18a	STM-1/OC-3, Tx - 1310 nm, Rx - 1550 nm, 9/25 single mode (single fiber), laser (WDM), 40 km (24.8 mi)		
18b	STM-1/OC-3, Tx - 1550 nm, Rx - 1310 nm, 9/25 single mode (single fiber), laser (WDM), 40 km (24.8 mi)		
9F	Fast Ethernet, RJ-45 connector, 100m (238 ft)		
M8SL	8-Port SHDSL E1 Module		
MP-4100M-8SL/#	8-Port E1 module with 2-wire SHDSL interface for Megaplex-4100		
#	Interface and Connectors		
3XUTP	3 UTP (RJ-45 connectors)		
3XNULL	3 SFP sockets without SFP transceivers		
3XSFPa	3 SFP sockets including SFP transceivers (see below for a)		
a	SFP transceivers for Ethernet 100BaseFx Interface		
1	Fast Ethernet/STM-1, 1310 nm, multimode, LED, 2 km (1.2 mi)		
1D	Fast Ethernet/STM-1, DDM, internal calibration, 1310 nm, multimode, LED, 2 km (1.2 mi)		
2	Fast Ethernet/STM-1, 1310 nm, single mode, laser, 15 km (9.3 mi)		
2D	Fast Ethernet/STM-1, DDM, internal calibration, 1310 nm, single mode, laser, 15 km (9.3 mi)		
3	Fast Ethernet/STM-1, 1310 nm, single mode, laser, 40 km (24.8 mi)		
3D	Fast Ethernet/STM-1, DDM, internal calibration, 1310 nm, single mode, laser, 40 km (24.8 mi)		
10a	Fast Ethernet/STM-1, Tx - 1310 nm, Rx - 1550 nm, single mode (single fiber), laser (WDM) , 20 km (12.4 mi)		
10b	Fast Ethernet/STM-1, Tx - 1550 nm, Rx - 1310 nm, single mode (single fiber), laser (WDM) , 20 km (12.4 mi)		
18a	STM-1/OC-3, Tx - 1310 nm, Rx - 1550 nm, 9/25 single mode (single fiber), laser (WDM), 40 km (24.8 mi)		
18b	STM-1/OC-3, Tx - 1550 nm, Rx - 1310 nm, 9/25 single mode (single fiber), laser (WDM), 40 km (24.8 mi)		
	Ethernet 100BaseTx (Electrical) Interface		
9F	Fast Ethernet, RJ-45 connector, 100m (238 ft)		
	<i>Optional Accessories</i>		
	CBL-MSL8-SCS40/RJ45	Cable for splitting the M8SL single 40-pin SCSi connector to 8 x RJ-45 connectors	
	M16E1, M16T1		
	MP-4100M-16E1/\$	M16E1 module	
	MP-4100M-16T1/\$	M16T1 module	
	\$ IEEE-1613 compliance (Default=not compliant): H1	IEEE-1613 compliant	
	MP-4100M-16T1/Y	M16T1 module supporting I/O group protection (ver 3.x and higher)	
			<i>Optional Accessories</i>
			CBL-G703-8/RJ45/ST
			Splitter cable for splitting each 44-pin module connector to 8 E1 or 8 T1 balanced RJ-45 connectors
			CBL-G703-8/RJ45/X
			Splitter cross-cable for splitting each 44-pin module connector to 8 E1 or 8 T1 balanced RJ-45 connectors
			CBL-G703-8/COAX
			Splitter cable for splitting each 44-pin M16E1 module connector to 8 pairs of unbalanced BNC connectors
			CBL-G703-8/OPEN/2M
			Open-ended cable with DB-44 connector on the Megaplex side for balanced E1 or T1 applications
			CBL-G703-8/RJ45/Y
			Y-cable with two DB-44 connectors on the Megaplex side and 8 T1 balanced RJ-45 connectors on the user's side for I/O group protection (ver 3.x only)
			OP-108C
			MP-4100M-OP-108/ETH/+
			4-Channel E1 and Ethernet Multiplexer Modules
			+ SFP fiber optic link interface
		SFP1	LED, 1310 nm, multimode, LC only
		SFP2	Laser, 1310 nm, single mode, LC only
		SFP3	Long-haul laser, 1310 nm, single mode, LC only
		SFP4	Long-haul laser, 1550 nm, single mode, LC only
		SFP10A	Laser WDM, Tx -1550 nm, Rx -1310 nm, single mode, single fiber, LC only (SF1)
		SFP10B	Laser WDM, Tx -1310 nm, Rx -1550 nm, single mode, single fiber, LC only (SF2)
		SFP24	VSCEL, 850 nm, multimode, LC only
		2XSFP1	Dual SFP1 modules
		2XSFP2	Dual SFP2 modules
		2XSFP3	Dual SFP3 modules
		2XSFP4	Dual SFP4 modules
		2XSFP10A	Dual SFP10A modules
		2XSFP10B	Dual SFP10B modules
		2XSFP24	Dual SFP24 modules
		4XSFP1	Quad SFP1 modules
		4XSFP2	Quad SFP2 modules
		4XSFP3	Quad SFP3 modules
		4XSFP4	Quad SFP4 modules
		4XSFP10A	Quad SFP10A modules
		4XSFP10B	Quad SFP10B modules
		4XSFP24	Quad SFP24 modules
			OP-34C
			MP-4100M-OP-34/ETH/+
			16-Channel E1, Ethernet over E3 or Fiber Multiplexer Module
			+ SFP fiber optic link interface
		NULL	No SFP transceiver
		SFP1	LED, 1310 nm, multimode, LC only
		SFP2	Laser, 1310 nm, single mode, LC only
		SFP3	Long-haul laser, 1310 nm, single mode, LC only
		SFP4	Long-haul laser, 1550 nm, single mode, LC only
		SFP10A	Laser WDM, Tx -1550 nm, Rx -1310 nm, single mode, single fiber, LC only (SF1)
		SFP10B	Laser WDM, Tx -1310 nm, Rx -1550 nm, single mode, single fiber, LC only (SF2)
		2XSFP1	Dual SFP-1 modules
		2XSFP2	Dual SFP-2 modules
		2XSFP3	Dual SFP-3 modules
		2XSFP4	Dual SFP-4 modules
		2XSFP10a	Dual SFP-10a modules
		2XSFP10b	Dual SFP-10b modules



Optional Accessory

SFP-12 Electrical coax SFP transceiver (supplied with SMB to BNC adapter cable CBL-SMB-BNC/M)

Notes:

- 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. For additional SFPs, contact your RAD Partner. For single fiber applications, a device with SF1 (SFP-10A) interface is always used opposite a device with SF2 (SFP-10B) interface, and vice versa. An SF3 interface works only opposite another SF3 interface.

SH16 Ethernet over SHDSL/SHDSL.bis 16-Port Module
MP-4100M-16SHDSL Ethernet over SHDSL.bis 16-port module
MP-4100M-16SHDSL/PF Ethernet over SHDSL.bis 16-port module with remote power feeding

Optional Accessory

CBL-DB26-8SHDSL Cable for splitting a single 26-pin SHDSL.bis connector to 8 x RJ-45 connectors

TP

MP-4100M-TP/#/* Distance Teleprotection Module
Nominal input control voltage
110 ± 110 VDC
220 ± 220 VDC
CV Configurable voltage
* Relay
SSR Solid-state relay
EMR Electro-mechanical relay
\$ IEEE-1613 compliance (Default=not compliant):
H1 IEEE-1613 compliant (available only with MP-4100M-TP/110/EMR module)

T3

MP-4100M-T3 T3 multiplexer module

VS

MP-4100M-VS/?/# Multiservice module
? Versatile interfaces
12S 12 serial ports
6S/BIN/* 6 serial ports and 8 binary command ports
6S/C37 6 serial ports and 2 C37.94 ports
6S/8FXS 6 serial ports and 8 FXS ports
6S/8FXO 6 serial ports and 8 FXO ports
6S/4E&M 6 serial ports and 4 E&M ports
8FXS/4E&M 6 FXS ports and 4 E&M ports
Fast Ethernet interface (not available with 8FXS/4E&M option)
UTP UTP (RJ-45 connector)
SFP SFP socket without SFP transceivers
Note: not with 8FXS/4E&M option
* Binary command interface:
SSR Solid-state relay
EMR Electro-mechanical relay

MiNID Smart Miniature Network Interface Device on an SFP Sleeve

MiNID/+

+ Port speed:
GE 1 Gbps per port
FE 100 Mbps per port

Optional Accessory

SFP-CA Configuration adapter for connecting MiNID to a PC

MiRiCi-155 Intelligent Miniature GbE over STM-1/OC-3 NTU
MiRiCi-155

Optional Accessory

SFP-CA Configuration adapter module for configuring MiRiCi-E3T3 by connecting it to a PC

MiRiCi-E3T3

+ SFP port
FE Fast Ethernet
GbE Gigabit Ethernet

Supplied Accessory

CBL-1023-BNC Two 30 cm (11.8 in) DIN 1.0/2.3-to-BNC cable adaptors

Optional Accessory

SFP-CA Configuration adapter module for configuring MiRiCi-E3T3 by connecting it to a PC

MiTOP-E1/T1

MITOP-E1T1/+ SFP-Format TDM Pseudowire Gateway

+ PSN interface
FE Fast Ethernet
GE Gigabit Ethernet

Optional Accessory

SFP-CA.2 Configuration adapter module for configuring unit by connecting it to a PC

MiTOP-E3/T3

MITOP-E3T3/+/? SFP-Format TDM Pseudowire Gateway

+ PSN interface
FE Fast Ethernet
GE Gigabit Ethernet
? Enclosure (Default=regular enclosure):
H Temperature-hardened enclosure (MiTOP-E3/T3/FE units only)

Supplied Accessory

CBL-1023-BNC Two 30 cm (11.8 in) DIN 1.0/2.3 to BNC cable adaptors

Optional Accessory

SFP-CA Configuration adapter module for configuring unit by connecting it to a PC

Optimux-1032

Optimux-1025

OP-1032/!/A/?/C/PA/+3/EA Fiber Optic Multiplexer for 16E1 and Gigabit Ethernet

OP-1025/!/A/?/PA/+3/EA Fiber Optic Multiplexer for 16T1 and Gigabit Ethernet

! Power supply:
AC 90 to 260 VAC power supply
ACR Two AC power supplies
DC -40 to -72 VDC (-48 VDC) power supply
DCR Two DC power supplies
AD Combined AC and DC power supplies
PS 90 to 260 VAC and 40 to 375 VDC wide-range power supply (available only with ordering options featuring a single USER-ETH interface (1NULL or 1UTP))

PSR Two wide-range power supplies
^ Alarm port (Default=no alarm port)
A Alarm port

? Extended temperature version (Default=no extended temperature support):



H	-20°–65°C (-4°–149°F) temperature range support
C	Optimux-1032 enclosure and E1 connector:
B	1U-high unit, balanced RJ-45 connectors
U	2U-high unit, unbalanced BNC connectors
UBR	2U-high unit with DIP switches to disconnect GND from the Rx signal, unbalanced IEC-169/13 connectors
PA	TDM Port Activation (Default=4 TDM ports activated):
4SK	Additional 4 Ports
8SK	Additional 8 Ports
12SK	Additional 12 Ports
+3	Ethernet User Interface:
1UTP2NULL	1xCopper RJ-45 port, 2xSFP sockets
2UTP1NULL	2xCopper RJ-45 ports, 1xSFP socket
1NULL	1xSFP socket
3NULL	3xSFP sockets
1UTP	1xCopper RJ-45 port
3UTP	3xCopper RJ-45 ports
EA	User Ethernet port activation (Default=single Ethernet port activated):
2SK	Additional 2 ports
<i>Supplied Accessories</i>	
RM-34	Kit for mounting one 1U-high unit in a 19-inch rack
RM-36	Kit for mounting one 2U-high Optimux-1032 unit in a 19-inch rack
<i>Optional Accessories</i>	
C	Type of license:
E1	E1 TDM Activation (OP-1032)
T1	T1 TDM Activation (OP-1025)
ETH	USER-ETH port Activation
PA	Number of Ports to Activate:
2SK	Additional 2 USER-ETH Port Activation
4SK	Additional 4 TDM Port Activation
8SK	Additional 8 TDM Port Activation
12SK	Additional 12 TDM Port Activation
OP-1032-PS/AC	90–260 VAC power supply modules for adding a redundant power supply to an existing unit or replacing the original power supply module
OP-1025-PS/AC	-40 to -72 VDC (-48 VDC) power supply modules for adding a redundant power supply to an existing unit or replacing the original power supply module
OP-1032-PS/DC	90 to 260 VAC and 40 to 375 VDC wide-range power supply (available only with ordering options featuring a single USER-ETH interface (1NULL or 1UTP).
OP-1025-PS	
OP-1032-PS-BP	Blank panels for power supply modules
OP-1025-PS-BP	
OP-1025-PS-BP	Blank panels for power supply modules
Optimux-108	4-Channel E1 and Ethernet Multiplexer
Optimux-106	4-Channel T1 and Ethernet Multiplexer
OP-108C, OP-106C	See LRS-102 Modules
OP-108/~/^/%/!/#/+/\$/*/?/?	
OP-106/~/%/!/#/+/\$/*/?/?	
OP-108-M/#/+/\$/?/?	Note: For ordering the card version or coax uplink, please contact the Optimux Product Line Manager.
OP-106-M/#/+/\$/?/?	Additional uplink module
~	Power supply
24	24 VDC
^	E1 connector
B	Balanced (RJ-45)
U	Unbalanced (BNC)
%	Redundant power supply

R	Second (redundant) power supply
!	Optional user port
ETH	10/100BaseT User Ethernet port
V35	V.35 interface (see <i>Optional Accessories</i>)
#	Uplink interface connector
ST	ST connector
FC	FC/PC connector
SC	SC connector
<i>Note: ST and FC connectors are not available for the single fiber options.</i>	
+	Fiber optic link interface
85L	850 nm, multimode, VCSEL
13	1310 nm, multimode, LED
<i>Note: Available with ST and SC connectors only</i>	
13L	1310 nm, single mode, laser diode
15L	1550 nm, single mode, laser diode
13LH	1310 nm, single mode, long-haul laser diode
15LH	1550 nm, single mode, long-haul laser diode
SF1	Transmit 1310 nm laser (WDM), receive 1550 nm
SF2	Transmit 1550 nm laser (WDM), receive 1310 nm
SF3	Transmit and receive at 1310 nm laser diode
SF4	Transmit 1310 nm laser (WDM), receive 1550 nm, long haul
SF5	Transmit 1550 nm laser (WDM), receive 1310 nm, long haul
\$	Extended temperature version (Default=no extended temperature support)
H	Extended temperature support (13L, 15L, 13LH, 15LH fiber link versions only)
*	Redundant uplink module (Default=single uplink)
D	Second main link module
<i>Note: For single fiber applications, a device with SF1 interface is always used opposite a device with SF2 interface, and vice versa. An SF3 interface works only opposite another SF3 interface.</i>	
?	Enclosure (Default=plastic enclosure)
ME	Metal enclosure
<i>Supplied Accessories</i>	
AC power cord	For AC unit
DC adapter kit	For DC unit
CBL-MUSB-DB9F	Control port cable
CBL-RJ45-DB9/F	Alarm port cable
CBL-AMP-M34	Cable to connect the Optimux-108 Smart Serial interface connector to the M34 connector of the user equipment
<i>Optional Accessories</i>	
RM-33-2	Kit for mounting 1 or 2 units in a 19" rack
RM-35/@	Hardware kit for mounting one or two metal units in a 19-inch rack
WM-35-TYPE4	Hardware kit for mounting 8.5-inch units in metal enclosure on a wall
@	Rack mount kit (Default=both kits)
P1	Mounting one unit
P2	Mounting two units
<i>V.35 interface cables</i>	
CBL-AMP-DB25-ISO2110	Smart Serial to ISO 2110 interface
CBL-AMP-DB25-TLBS	Smart Serial to Telebras interface
Optimux-108L	Fiber Multiplexer for 4 E1s and Ethernet
OP-108L/~/*/?/~/^/!/#/+/	
~	Power supply (Default: Wide-range AC/DC power supply)
48	Dedicated on-board DC power supply
*	Ethernet management port (Default: with management port)
BM	No Ethernet management port
?	Enclosure (Default: plastic enclosure)
ME	Metal enclosure
\$	Extended temperature support (with metal enclosure only)



H	Extended Temperature	6M	Software key for activating the 10/100BaseT Ethernet port at 6 Mbps granularity (Optimux-125 only)
^ E1 connector			
B	Balanced (RJ-45)		
U	Unbalanced (BNC)	8M	Software key for activating the 10/100BaseT Ethernet port at 8 Mbps granularity (Optimux-134 only)
! User port (Default: No user port)			
ETH	10/100BaseT Ethernet		
# Uplink interface connector:		100M	Software key for activating the 10/100BaseT Ethernet USER port at 100 Mbps and 134/125 Mbps operation mode
ST	ST		
FC	FC/PC		
SC	SC		
+ Wavelength		\$	Extended temperature support (Default=no extended temperature)
13	1310 nm, multimode, LED	H	Extended temperature
<i>Note: 85L and 13 optical interfaces are available with ST and SC connectors only.</i>			
13L	1310 nm, single mode, laser diode	Uplink Interface (SFP)	See SFP Data Sheet
15L	1550 nm, single mode, laser diode	<i>Supplied Accessories</i>	
13LH	1310 nm, single mode, long-haul laser diode	RM-34	Hardware kit for mounting one 1U Optimux-34 unit in a 19" rack
15LH	1550 nm, single mode, long-haul laser diode	RM-36	Hardware kit for mounting one 2U Optimux-34 unit in a 19" rack
SF1	Transmit 1310 nm laser (WDM), receive 1550 nm	CBL-SMB-BNC/M	SMB to BNC adapter cable (supplied with SFP-12)
SF2	Transmit 1550 nm laser (WDM), receive 1310 nm	<i>Optional Accessories</i>	
SF3	Transmit and receive at 1310 m laser diode	OP-134-LIC-ETH/!	Software keys for activating the 10/100BaseT Ethernet port
SF4	Transmit 1310 nm laser (WDM), receive 1550 nm, long haul	OP-125-LIC-ETH/!	
SF5	Transmit 1550 nm laser (WDM), receive 1310 nm, long haul	! Capacity	
<i>Note: For single fiber applications, a device with SF1/SF4 interface is always used opposite a device with SF2/SF5 interface, and vice versa. An SF3 interface works only opposite another SF3 interface.</i>			
<i>Supplied Accessories</i>			
AC power cord	AC power cord with a matching plug		
DC adapter plug	A plug for DC power supply connection		
<i>Optional Accessories</i>			
RM-33-2	Hardware kit for mounting one or two plastic units in a 19-inch rack	OP-125-PS	Wide range 90–260 VAC/–48 VDC power supply modules for adding a redundant power supply to an existing unit or replacing the original power supply module
RM-35/P1	Hardware kit for mounting one metal units in a 19-inch rack	OP-134-PS	
RM-35/P2	Hardware kit for mounting two metal units in a 19-inch rack	OP-125-PS/DC	+24/-48 VDC power supply modules for adding a redundant power supply to an existing unit or replacing the original power supply module
WM-35-TYPE4	Hardware kit for wall mounting of 8.5-inch units in metal enclosure	OP-134-PS/DC	Blank panels for power supply module
Optimux-134			
Optimux-125			
OP-134/*/?/+/%/!//\$	16-Channel E1 and Ethernet-over-E3/Fiber-Optic Multiplexer		
OP-125/*/?/+/%/!//\$	16-Channel E1 and Ethernet-over-E3/Fiber-Optic Multiplexe		
* Power supply (Default=one OP-125-134-PS wide range power supply):			
PSR	Dual wide range power supply (90-260 AC, -40— -70 VDC)		
DC	Single +24/-48 VDC		
DCR	Dual +24/-48 VDC		
? E1 connector for Optimux-134:			
B	Balanced (RJ-45, 1U-high unit)		
U	Unbalanced (BNC, 2U-high unit)		
UBR	Unbalanced (IEC-169/13, 2U-high unit with DIP switches to disconnect GND from the Rx signal)		
+ Alarm port (Default=no alarm port)			
A	Alarm port		
% V.35 user port (Default=no V.35 user port)			
V35	DB-25 connector with ISO-2110 pinout		
V35T	DB-25 connector with Telebras pinout		
! Activation key (Default=no activation key)			
		8M	Software key for activating the 10/100BaseT Ethernet port at 8 Mbps granularity (Optimux-134 only)
		100M	Software key for activating the 10/100BaseT Ethernet USER port at 100 Mbps and 134/125 Mbps operation mode
		OP-125-PS	Wide range 90–260 VAC/–48 VDC power supply modules for adding a redundant power supply to an existing unit or replacing the original power supply module
		OP-134-PS	
		OP-125-PS/DC	+24/-48 VDC power supply modules for adding a redundant power supply to an existing unit or replacing the original power supply module
		OP-134-PS/DC	Blank panels for power supply module
		OP-125-PS-BP	
		OP-134-PS-BP	
		CBL-RJ45/BNC/E1/X	RJ-45 to BNC adapter cross-cable (for use with 1U Optimux-134 chassis)
		CBL-8H/M/1METER	V.35, DB-25 to M-34 cable
		CBL-DB9F-DB9M-STR	Control port cable
		Optimux-1551 STM-1/OC-3 Terminal Multiplexer	
		Main link modules, tributary modules, interface adaptors, cables and mounting kits are all ordered separately.	
		<i>Note: To ensure good ventilation during operation, all empty slots must be covered by blank panels.</i>	
		OP-	STM-1/OC-3 Terminal Multiplexer
		1551/*/\$/#/!//?/+/^	
		* Tribute interface module	
		2128	Module with 21xE1, or 28xT1 links
		4256	Module with 42xE1, or 56xT1 links
		6384	Module with 63xE1, or 84xT1 links
		2x2128	Two 2128 modules
		2x4256	Two 4256 modules
		2x6384	Two 6384 modules
		\$ Station clock	
		STC	Optional station clock
		<i>Note: For tributary module redundancy, order two modules. Each tributary module may be defined either as E1 or T1 channels.</i>	
		# Power supply	
		AC	100 to 240



48	-48 VDC
AD	Redundant 100 to 240 VAC and -48 VDC power supplies
!	Redundant power supply
R	Redundant power supply (same as above)
?	Main link connector
ST	ST fiber
SC	S fiber
FC	FC fiber

Note: For single fiber connection, only SC connectors are available. For 1310 nm multimode LED option, only SC and ST connectors are available.

+	Optional wavelength and transmitter (not relevant with CX option)
CX	Electric interface with coaxial BNC connectors
13	1310 nm, multimode LED
13L	1310 nm, single mode, laser diode
15L	1550 nm, single mode, laser diode
13LH	1310 nm, single mode, long haul laser diode
15LH	1550 nm, single mode, long haul laser diode
85L	850 nm, multimode VCSEL
SF1	Transmit 1310 nm, receive 1550 nm
SF2	Transmit 1550 nm, receive 1310 nm
SF3	1310nm single wavelength laser

Note: For single-fiber applications, a device with the SF-1 connector should always be used opposite the device with the SF-2 connector, and vice versa. The SF-3 connector can be used on both sides of the link.

^	Second main link
D	Optional second main link

Supplied Accessories

AC power cord	For AC unit
DC adapter plug	For DC unit
OP-1551-FT	Fan tray module (one included)
RM-36	Hardware for mounting a single Optimux-1551 in a 19" rack.

Optional Accessories

Additional tributary module	
OP-1551-M/*/\$	Additional tributary module <i>Note: Each module should be ordered separately.</i>
OP-M/?/+	Main link interface only
OP-1551-PS/AC	100 to 240 VAC Power Supply
OP-1551-PS/48	-48 VDC Power Supply
OP-A/ADAPTOR/%	Patch panel interface to convert Telco into channel connectors
%	Patch panel interface
21BNC/1551	Patch panel with 21 BNC unbalanced E1 interfaces
28RJ	Patch panel with 28 RJ-45 balanced E1/T1 interfaces

Note: Two CBL-TELCO-TELCO/2M cables included with each patch panel

CBL-TELCO-OPEN/2M	Adaptor cable if patch panel is not required, Telco 64 pin, open ended, 2 meters (6.5 feet).
CBL-TELCO-RJ45/2M	Adaptor cable if patch panel is not required, Telco 64 pin, open ended, 2 meters (6.5 feet).
CBL-TELCO-RJ45-CROSS/2M	Extension cable Telco 64-pin to 14 RG-45 connectors with cross connections, 2 meters (6.5 feet).

CBL-TELCO-TELCO/2M	Extension cable if patch panel is not required, Telco 64-pin to Telco 64-pin, 2 meters (6.5 feet).
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Note: Six Telco-Telco cables are required to support all the tributary channels.

Two CBL-TELCO-TELCO/2M cables are included with each OP-A/ADAPTOR patch panel

Blank panels
Note: To ensure good ventilation during operation, all empty slots must be covered by blank panels.

OP-1551-PS-BP	Power supply blank panel
OP-M-BP	Main module blank panel
OP-1551-M-BP	Tributary interface module blank panel

Optimux-1553	STM-1/OC-3 Terminal Multiplexer
OP-1553/*/\$/#/!/?/+/^	Main link modules and tributary modules are ordered separately.
OP-1553-M/*/\$	Additional tributary module <i>Note: Each module should be ordered separately.</i>
OP-M/?/+	Main link interface module

* Tributary interface module	
3E3T3	Module with three E3/T3 links
2x3E3T3	Two E3T3 modules

\$	Station clock
STC	Optional station clock

Note: For tributary interface module redundancy, order two modules. Each tributary modules may be defined either as E1 or T1 channels.

#	Power supply
AC	100 to 240 VAC
48	-48 VDC
AD	100 to 240 VAC with redundant -48 VDC power supply

!	Redundant power supply
R	Redundant power supply of same

?	Main link connector
ST	ST fiber
SC	SC fiber
FC	FC fiber

Note: For single-fiber connection, only SC connectors are available. For 1310 nm multimode LED option, only SC and ST are available.

+	Optical wavelength and transmitter (not relevant with CX option)
CX	Electrical interface with coaxial BNC connectors
13	1310 nm, multimode LED
13L	1310 nm single mode, laser diode
15L	1550 nm single mode, laser diode
13LH	1310 nm single mode, long haul laser diode
15LH	1550 nm single mode, long haul laser diode
85L	850 nm, multimode VCSEL
SF1	Transmit 1310 nm, receive 1550 nm
SF2	Transmit 1550 nm, receive 1310 nm
SF3	1310nm single wavelength laser

Note: For single-fiber applications, a device with the SF-1 connector should always be used opposite the device with the SF-2 connector, and vice versa. The SF-3 connector can be used on both sides of the link.

^	Second main link
D	Optional second main link

Supplied Accessories

AC power cord	For AC unit
DC adapter plug	For DC unit
RM-34	Hardware kit for mounting a single Optimux-1553 unit into a 19" rack.

Optional Accessories

CBL-DB9F-DB9M-STR	Control port cable
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Power Supply	
OP-1553-PS/AC	100 to 240 VAC
OP-1553-PS/48	-48 VDC



Optimux-45

Optimux-45L

OP-45/&/^/~/@/?/#/+/\$/f	21 E1 or 28 T1 over T3 or Fiber Optic Multiplexer
OP-45L/&/^/~/@/?/#/+/\$	Low-cost 21 E1 or 28 T1 over T3 or Fiber Optic Multiplexer
OP-45-M/#/+	Uplink interface module
& Channel interface	
B	Balanced E1/T1 interface
U	Unbalanced E1 interface
^ User interfaces	
4X	4T1/3E1 balanced
8X	8T1/6E1 balanced
12X	12T1/9E1 balanced
21X	8T1/6E1 balanced
28X	28T1/21E1 balanced
~ Power supply	
AC	100 to 240 VAC
48	-48 VDC
24	24 VDC
AD	100 to 240 VAC with redundant -48 VDC (OP-45 only)
@ Redundant power supply (Default=one power supply)	
R	Second (redundant) power supply (identical to the first power supply)
? Station Clock (Default=no station clock)	
STC	Optional station clock
# Uplink connector	
CX	Electrical interface with coaxial BNC connectors
FC	FC fiber
SC	SC fiber
ST	ST fiber

Notes: For single fiber, single wavelength connection (SF3 interface module), only SC connectors are available. For 1310 nm multimode LED option, only SC and ST connectors are available.

+ Optical wavelength and transmitter	
85L	850 nm, multimode VCSEL laser diode
13	1310 nm, multimode LED
13L	1310 nm, single mode, laser diode
15L	1550 nm, single mode, laser diode
13LH	1310nm, single mode, long haul laser diode
15LH	1550 nm, single mode, long haul laser diode
SF1	Single fiber for transmit 1310 nm, receive 1550 nm
SF2	Single fiber for transmit 1550 nm, receive 1310 nm
SF3	Single fiber for 1310 nm single wavelength laser.

Note: For single-fiber applications, a device with the SF-1 interface should always be used opposite the device with the SF-2 interface, and vice versa. The SF-3 interface can be used on both sides of the link.

\$ Redundant uplink	
D	Redundant uplink (Default=main link only)
f Wireless signal support	
WR	Wireless signal support

Supplied Accessories

RM-34 Hardware for mounting a single Optimux-45L in a 19" rack (one included with each unit)

AC power cord
 DC connection kit
 CBL-OP-45 Monitoring cable
 DB9F-DB9M Terminal cross adapter

Optional Accessories

CBL-DB9F-DB9M-STR Terminal straight cable
 CBL-TELCO-OPEN/2M Adaptor cable telco 64 pin, open ended, 2m long.

Note: Two Telco-Open cable sets need to be ordered to support all of the tributary channels.

CBL-TELCO-TELCO/2M Extension cable for balanced interface, telco 64 pin to telco 64 pin, 2m long

CBL-MINIBNC-BNC Mini-BNC to BNC adapter cable for Optimux-45
 OP-A/ADAPTOR/% Patch panel interface adaptors for Optimux-45L to convert Telco into channel connectors

% Patch panel interface
 21BNC/45L Patch panel with 21 BNC unbalanced E1 interfaces, includes one CBL-TELCO-TELCO/UB cable
 28RJ Patch panel with 28 RJ-45 balanced E1/T1 interfaces, includes two CBL-TELCO-TELCO/2M cables.

CBL-TELCO-TELCO/UB Extension cable for unbalanced interface, telco 64 pin to telco 64 pin, 2m long

RM-34/ETSI Hardware for mounting a single Optimux-45/45L in a 19" (ETSI) rack

WM-34 Hardware for mounting a single Optimux-45/45L on the wall

PS-48V/5V External 48 VDC to 5 VDC Power Converter
 PS-48V/5V DC-to-DC power converter

RADview-PC Carrier Class network management system
 RADview-PC EMS/NMS, 300 ENW license points (for Windows)
 RADview-PC/SM Service Manager, 450 ENW license points
 RADview-PC/PM Performance Manager, 450 ENW license points
 RADview-PC/PMSM Service Manager and Performance Monitor, 600 ENW license points

RADview-LINUX RADview system for installation on a Linux-based server, with 400 ENW license points

RADview-LINUX/SM RADview system for installation on a Linux-based server, with Service Manager, 600 ENW license points, includes RADview-Service Center

RADview- LINUX/PM RADview system for installation on a Linux-based server, with Performance Monitor, 600 ENW license points

RADview- LINUX /PMSM RADview system for installation on a Linux-based server, with Service Manager and Performance Monitor, 800 ENW license points

RADview-UNIX Carrier Class network management system
 RADview-UNIX EMS/NMS, 400 ENW license points (for Unix)
 RADview-UNIX/SM Service Manager, 600 ENW license points
 RADview-UNIX/SC TDM Service Center, 600 ENW license points
 RADview-UNIX/PM Performance Monitor, 600 ENW license points
 RADview-UNIX/PMSM Service Manager and Performance Monitor, 800 ENW license points

**RADview Licenses**

RV-LIC/@/!

@	License type	
	ENW	Additional license points, (Equivalent Node Weight). Each RAD device is assigned an ENW
	SM	Service Management
	PM	Performance Management
	PMSM	Performance and Service Management
!	Redundancy (default = no redundancy)	
	R	Redundancy license to install the RADview configuration on main and backup servers

RIC-155GE Gigabit Ethernet to STM-1/OC-3c Network Termination Unit

RIC-155GE/*/%/\$/&/+/^

*	Power supplies	
	AC	100 to 230 VAC
	48	-48 VDC
	ACR	Dual 100 to 230 VAC NEBS compliance
	48R	Dual -48 VDC NEBS compliance
%	STM-1/OC-3c connector	
	SC	Fiber optic SC connector
	ST	Fiber optic ST connector
\$	STM-1/OC-3c optical wavelength	
	13	1310 nm multimode, 2.3 km (1.4 miles), SC connector.
	13L	1310 nm single mode S1.1, 15 km (9.4 miles), SC connector.
	13LH	1310 nm single mode L1.1, 40 km (25 miles), SC connector.
&	Gigabit Ethernet port	
	85	850 nm multimode, 270 m (1000 ft), LC connector.
	13L	1310 nm single mode, 5 km (3.1 miles), LC connector
	15LH	1550 nm single mode, 40 km (25 miles), LC connector
	UTP	1000BaseT, 100m (330 ft), RJ-45 connector
+	NEBS-3 compliance (Default=8.5 inch)	
	N3	NEBS-3 compliant (19")
^	Alarm Relay port option (1/2 19" unit only)	
	ALM	For alarm relay port

Supplied Accessories

	AC power cord	For AC unit
	DC adapter kit	For DC unit
	RM-34	Hardware kit for mounting one 19-inch unit (NEBS-compliant unit only)
	CBL-DB9F-DB9M-STR	DB9-to-DB9 control port cable (NEBS-compliant unit)

Optional Accessories

	RM-35/@	Hardware kit for mounting one or two 8.5-inch units in a 19" rack
@	Rack mounting kit	
	P1	For mounting one unit
	P2	For mounting two units
	WM-34	Hardware kit for mounting one NEBS-compliant unit on wall
	WM-35-1	Hardware kit for mounting one 8.5-inch unit on wall
	CBL-DB9F-DB9M-STR	DB9-to-DB9 control port cable

RIC-155L

RIC-155L/NULL/NULL

Gigabit Ethernet over STM-1/OC-3 Converter

Supplied Accessories

Wide range 100–240 VAC/48–60 VDC cable

Optional Accessories

	RM-33-2	Hardware kit for mounting one unit into a 19-inch rack
	CBL-DB9F-DB9M-STR	Control port cable

RIC-622GE

RIC-622GE!/!/^/+/S

!	Power supply	
	AC	100 to 240 VAC
	48	-48 VDC
	ACR	Dual 100 to 240 VAC
	48R	Dual -48 VDC
^	SFP optical interface type for STM-4 port	
	SFP-14D	STM-4, DDM, internal calibration, 1310 nm, multimode, laser, 0.5 km (0.3 mi)
	SFP-15	STM-4, 1310 nm, single mode, laser, 15 km (9.3 mi)
	SFP-16	STM-4, 1550 nm, single mode, laser, 80 km (49.7 mi)
	NULL	Two empty SFP slots
+	Gigabit Ethernet interface	
	13L	1000BaseLX, 1310 nm single mode, 5 km (3.1 miles), LC connector
	85	1000BaseSX, 850 nm multimode, 270m (1000 ft), LC connector
	UTP	Built-in 1000BaseT, RJ-45 connector
S	NEBS-3 compliancy (default=not NEBS-3 compliant)	
	N3	NEBS-3 compliant

Supplied Accessories

	AC power cord	For AC unit
	DC power connection kit	If DC power supply is ordered
	RM-34	Hardware kit for mounting one regular RICi-155GE unit in a 19-inch rack (if the non-NEBS option is ordered)

Optional Accessories

CBL-DB9F-DB9M-STR Control port cable

RIC-E1, RIC-T1

	RIC-E1/*/#	E1 Interface Converter
	RIC-T1/*/#	T1 Interface Converter
	RIC-E1/R/#	E1, card for ASM-MN-214 card cage
	RIC-T1/R/#	T1, card for ASM-MN-214 card cage

* Power supply

	AC	100 to 240 VAC
	24	24 VDC
	48	-48 VDC

DTE interface

	V35	V.35 interface
	X21	X.21 interface
	V36	V.36 interface
	530	RS-530 interface
	UTP	IR-ETH module with RJ-45 connector
	UTP/QN	IR-ETH/V module
	UTP/IP	IR-IP module

RIC-LC

RIC-LC!/!/\$/@

Ethernet Converter for Bonded PDH Circuits

* PDH Ports

	E1	1 E1 port
	4E1	4 E1 ports
	8E1	8 E1 ports
	16E1	16 E1 ports
\$	E1 interface (default=balanced)	
	U	Unbalanced



@ Ethernet ports
 4UTP 4 10/100BaseT Ethernet ports
 2NULL@UTP 2 10/100BaseT and 2 SFP (100FX) ports

Supplied Accessories

AC power cord
 CBL-MUSB-DB9F Mini USB control port cable

Optional Accessories

RM-33-2 Hardware kit for mounting one or two units in a 19-inch rack
 CBL-RJ45/2BNC/E1 RJ-45 to BNC adapter cable (if a 16-E1 port unit with unbalanced interfaces is ordered)

DC Connection Kit

RICi-155GE

RICi-155GE/*/%/&/S Gigabit Ethernet over 2 x STM-1/OC-3c Network Termination Unit

* Power supply
 AC 100 to 240 VAC
 48 -48 VDC
 ACR Dual 100 to 240 VAC
 48R Dual -48 VDC
 % Gigabit Ethernet port interface
 SFP5 Single SFP-5 transceiver, Gigabit Ethernet, 850 nm, multimode, VCSEL
 SFP6 Single SFP-6 transceiver, Gigabit Ethernet, 1310 nm, single mode, laser
 SFP6D Single SFP-6D transceiver, Gigabit Ethernet, DDM, internal calibration, 1310 nm, single mode, laser
 2XSFP5 Dual SFP-5 transceivers
 2XSFP6D Dual SFP-6D transceivers
 2XUTP Dual built-in 10/100/1000BT RJ-45 connector
 NULL Two empty SFP slots

Note: if single SFP is ordered, second slot is empty

& SDH/SONET port interface
 SFP1 Fast Ethernet/STM-1, 1310 nm, multimode, LED, 2 km (1.2 mi)
 SFP2 Fast Ethernet/STM-1, 1310 nm, single mode, laser, 15 km (9.3 mi)
 SFP2D Fast Ethernet/STM-1, DDM, internal calibration, 1310 nm, single mode, laser, 15 km (9.3 mi)
 SFP11 Dual SFP 11 transceivers:
 Fast Ethernet/STM-1, coaxial, mini BNC, 135m
 2XSFP1 Dual SFP-1 transceivers
 2XSFP2 Dual SFP-2 transceivers
 2XSFP2D Dual SFP-2D transceivers
 2XSFP11 Dual SFP-11 transceivers
 NULL Two empty SFP slots

Note:

If single SFP is ordered, second slot is empty.

S NEBS-3 compliancy (Default=19 inch)
 N3 NEBS-3 compliant (23")

Supplied Accessories

AC power cord For AC unit
 DC power connection kit If DC power supply is ordered
 CBL-DB9F-DB9M-STR Control port cable

Optional Accessories

RICi-155GE-PS/AC 100-240 VAC power supply module
 RICi-155GE-PS/48 -48 VDC power supply module
 RM-34 Hardware kit for mounting one regular RICi-155GE unit in a 19-inch rack (if the non-NEBS option is ordered)

RM-34-23 Hardware kit for mounting one NEBS-compliant RICi-155GE unit in a 23-inch rack (if the NEBS option is ordered)
 WM-34 Hardware kit for mounting one regular RICi-155GE unit on a wall (if the non-NEBS option is ordered)

RICi-16

RICi-16/B/@/*/#/!/|/\$/? Ethernet over bonded PDH Network Termination Unit
 B E1/T1 ports (Default=16 ports)
 16E1 16 E1 ports
 16T1 16 T1 ports
 8E1 8 E1 ports
 8T1 8 T1 ports
 4E1 4 E1 ports
 4T1 4 T1 ports
 2T3 2 T3 ports
 @ T3 ports (Default=no T3 ports):
 2T3 2T3 ports
 * License pack for PDH link activation
 Pack 1 8 E1/T1 links
 Pack 2 12 E1/T1 links
 Pack 3 16 E1/T1 links
 # Operation mode (Default=bridge)
 EVPL Enable Ethernet Virtual Private Line services using Ethernet flows
 | Power supplies (Default=one power supply)
 R Two power supplies
 \$ E1 interface (Default=balanced)
 U Unbalanced E1 interface via RJ-45 to BNC adapter cable
 ? Temperature range (Default=normal temperature range, NEBS non-compliant)
 H Temperature-hardened, compliant with NEBS level 3, s 2, 3, and 4/

License Packages

RICi-16-EVPL Ethernet Virtual Private Line services using Ethernet flows
 RICi-16-Pack 1 8 E1/T1 links
 RICi-16-Pack 2 12 E1/T1 links
 RICi-16-Pack 3 16 E1/T1 links

Supplied Accessories

AC power cord For AC unit
 DC adapter kit For DC unit
 CBL-RJ45/2BNC/E1 RJ-45 to BNC adapter cable (if an unbalanced E1 interface is ordered)

Optional Accessories

CBL-DB9F-DB9M-STR Control port cable
 RM-34 Hardware kit for mounting one units in a 19" rack
 WM-34 Hardware kit for mounting one RICi-16 unit on a wall
 RICi-16-PS Spare wide-range power supply module (100-240 VAC/-48 VDC)

RICi-4E1, RICi-4T1, RICi-8E1, RICi-8T1

Fast Ethernet over Multiple E1/T1 Lines Network Termination Units
 RICi-8E1/*/#/\$ Over eight E1s network termination unit
 RICi-8T1/*/# Over eight T1s network termination unit
 RICi-4E1/*/#/\$ Over four E1s network termination unit
 RICi-4T1/*/# Over four T1s network termination unit
 * Ethernet Ports
 4UTP Four 10/100BaseT ports
 2GEUTP Two GbE UTP ports



	2GESFP	Two GbE SFP ports
	4UTP	Four 10/100BaseT ports
#	Operation mode (Default=bridge mode):	
	EVPL	Enable Ethernet Virtual Private Line services using Ethernet flows
\$	E1 Interface type (Default=balanced):	
	U	Unbalanced E1 interface via RJ-45 to BNC adapter cable

License Packages

RiCi-4-EVPL	Software package for activating Ethernet flows working mode for RiCi-4E1/T1
RiCi-8-EVPL	Software package for activating Ethernet flows working mode for RiCi-8E1/T1

Supplied Accessories

AC power cord	For AC unit
DC adapter kit	For DC unit
CBL-RJ45/2BNC/E1	RJ-45 to BNC adapter cable (if an unbalanced E1 interface is ordered)

Optional Accessories

CBL-DB9F-DB9M-STR	Control port cable
RM-34	Hardware kit for mounting one unit in a 19-inch rack
WM-34	Hardware kit for mounting one unit on a wall

RiCi-E1, RiCi-T1	Fast Ethernet over E1/T1 Intelligent Converter
RiCi-E1/!/\$/?	E1
RiCi-T1/!/?	T1
!	Power supply/Enclosure
24	24 VDC with temperature-hardened enclosure
?	Temperature range
H	Wide-range power supply (100 to 240 VAC or 48/60 VDC) with temperature-hardened plastic enclosure

Note: If this option is not selected, the unit is supplied with a wide-range power supply (100 to 240 VAC or 48/60 VDC).

\$	E1 Interface
U	Unbalanced interface

Note: E1 unbalanced option is supported via an adapter cable (CBL-RJ45/2BNC/E1, see Supplied Accessories).

Supplied Accessories

AC power cord	For AC unit
DC adapter kit	For DC unit
CBL-RJ45/2BNC/E1	Interface adapter for converting a balanced E1 RJ-45 connector to a pair of BNC unbalanced coaxial connectors - supplied when ordering E1 unbalanced option (E1U)

Optional Accessories

CBL-DB9F -DB9M-STR	Control Port Cable
RM-33-2	Hardware kit for mounting one unit in a 19" rack
RM-35/@	Hardware kit for mounting one or two units in a 19" rack, for units with
@	Rack mounting kit
P1	Mounting one unit
P2	Mounting two units
WM-35	Hardware for mounting one unit on a wall, for units with metal enclosure

RiCi-E3, RiCi-T3	Fast Ethernet over E3/T3 Intelligent Converter
RiCi-E3/\$	E3
RiCi-T3/\$	T3
\$	H Temperature-hardened

Supplied Accessories

RM-33-2	Hardware kit for mounting one or two units in a 19" rack
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Optional Accessories

CBL-DB9F-DB9M-STR	Control port cable
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ROC-19, ROC-19/L

ROC-19/24V	Outdoor cabinet with 3-point door locking and intake fan, 24 VDC input
ROC-19/L	Outdoor cabinet with 2-point door locking and passive ventilation, 24 or 48 VDC input

Supplied Accessories

Wall mounting kit	
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Optional Accessories

ROC-19/PMK	Pole mounting kit for FOC-19/19L
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RSD-1

Digital Sharing Device	
RSD-1/*/&	Standalone with internal power supply
* Power supply (Default = 115/230 VAC selectable)	
48	-48 VDC operation
&	Buffer on each subchannel (Default = no buffers)
B	Buffers

Supplied Accessories

AC power cord, DC adapter plug (with DC power supply only)	
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RSD-10

8-Channel Digital Sharing Device	
RSD-10/*	
* Power supply (Default=115/230 VAC switchable)	
48	-48 VDC

S-RPT

SHDSL Repeater	
S-RPT	2-wire SHDSL/SHDSL.bis repeater, plastic enclosure
S-RPT-4W/\$	4-wire SHDSL/SHDSL.bis repeater, metal enclosure

Supplied Accessories

AC to 48 VDC power adapter (European orders only)	
CBL-RJ45-DB9/S-RPT	Control cable for metal enclosure

S-RPT/EFM

SHDSL Repeater	
S-RPT/4W/EFM	4-wire SHDSL/SHDSL.bis repeater, plastic enclosure
S-	4-wire SHDSL/SHDSL.bis repeater, metal enclosure
RPT/4W/IP67/EFM	

Supplied Accessories

Cable Connector	Mating circular plug to the outdoor unit input/output port
Cable Connector	Mating circular plug to the outdoor unit input/output port

Optional Accessories

S-PRT/PS	100/240 VAC to 48VDC power adapter
RM-33-2	Hardware kit for mounting one or two indoor units in a 19-inch rack

SecFlow-2

Ruggedized SCADA-Aware Ethernet Switch/Router	
SF2/NP/!/+/+3/C/C2	
NP Operating Mode	
B	Basic operating mode with Ethernet and Gateway functionalities



S	Advanced operating mode with Ethernet, Gateway, security, VPN, IPSec and routing functionalities	SFP Transceivers	Small Form-Factor Pluggable Transceivers
!	Power Supply	<i>Fiber Optic Fast Ethernet/STM-1/STM-4 SFPs</i>	
	12VDC	SFP-1	Fast Ethernet/STM-1, 1310 nm, multimode, LED, 2 km (1.2 mi)
	24VDC	SFP-1D	Fast Ethernet/STM-1, DDM, internal calibration, 1310 nm, multimode, LED, 2 km (1.2 mi)
	48VDC	SFP-2	Fast Ethernet/STM-1, 1310 nm, single mode, laser, 15 km (9.3 mi)
	AC	SFP-2H	Fast Ethernet/STM-1, industrially hardened, 1310 nm, single mode, laser, 15 km (9.3 mi)
+	Ethernet Ports	SFP-2D	Fast Ethernet/STM-1, DDM, internal calibration, 1310 nm, single mode, laser, 15 km (9.3 mi)
	2GE8UTP	SFP-3	Fast Ethernet/STM-1, 1310 nm, single mode, laser, 40 km (24.8 mi)
	2GE16UTP	SFP-3D	Fast Ethernet/STM-1, DDM, internal calibration, 1310 nm, single mode, laser, 40 km (24.8 mi)
	2GE8UTP8SFP	SFP-3H	Fast Ethernet/STM-1, industrially hardened, 1310 nm, single mode, laser, 40 km (24.8 mi)
	<i>Note: The 2GE16UTP and 2GE8UTP8SFP options are available with the 24 VDC, 48 VDC, 110 VDC and 220 VDC power supplies</i>		
+3	Power over Ethernet (PoE)	SFP-4	Fast Ethernet/STM-1, 1550 nm, single mode, laser, 80 km (49.7 mi)
	POE	SFP-4D	Fast Ethernet/STM-1, DDM, internal calibration, 1550 nm, single mode, laser, 80 km (49.7 mi)
		SFP-10A	Fast Ethernet/STM-1, Tx - 1310 nm, Rx - 1550 nm, single mode (single fiber), laser (WDM) , 20 km (12.4 mi)
	POE2AM	SFP-10AD	Fast Ethernet/STM-1, DDM, Tx - 1310 nm, Rx - 1550 nm, single mode (single fiber), laser (WDM) , 20 km (12.4 mi)
		SFP-10B	Fast Ethernet/STM-1, Tx - 1550 nm, Rx - 1310 nm, single mode (single fiber), laser (WDM) , 20 km (12.4 mi)
	POE4AM	SFP-10BD	Fast Ethernet/STM-1, DDM, Tx - 1550 nm, Rx - 1310 nm, single mode (single fiber), laser (WDM) , 20 km (12.4 mi)
C	Serial Ports	SFP-14D	STM-4, DDM, internal calibration, 1310 nm, multimode, laser, 0.5 km (0.3 mi)
	RS232	SFP-15	STM-4, 1310 nm, single mode, laser, 15 km (9.3 mi)
C2	Cellular Port	SFP-16	STM-4, 1550 nm, single mode, laser, 80 km (49.7 mi)
	CEL	SFP-18A	Fast Ethernet/STM-1, Tx - 1310 nm, Rx - 1550 nm, 9/25 single mode (single fiber), laser (WDM), 40 km (24.8 mi)
		SFP-18B	Fast Ethernet/STM-1, Tx - 1550 nm, Rx - 1310 nm, 9/25 single mode (single fiber), laser (WDM), 40 km (24.8 mi)
	<i>Note: The CEL option is available with the 24 VDC, 48 VDC, 110 VDC and 220 VDC power supplies.</i>		
		SFP-24	Fast Ethernet/STM-1; 850 nm, 50/125 multimode, 2 km (1.2 mi); 62.5/125 multimode, 1 km (0.6 mi)
		<i>Fiber Optic Gigabit Ethernet SFPs</i>	
		SFP-5	Gigabit Ethernet, 850 nm, multimode, VCSEL, 0.55 km (0.3 mi)
		SFP-5D	Gigabit Ethernet, DDM, internal calibration, 850 nm, multimode, VCSEL, 0.55 km (0.3 mi)
		SFP-5DH	Gigabit Ethernet, DDM, internal calibration, industrially hardened, 850 nm, multimode, VCSEL, 0.55 km (0.3 mi)
		SFP-5H	Gigabit Ethernet, industrially hardened, 850 nm, multimode, VCSEL, 0.55 km (0.3 mi)
		SFP-6	Gigabit Ethernet, 1310 nm, single mode, laser, 10.0 km (6.2 mi)
		SFP-6D	Gigabit Ethernet, DDM, internal calibration, 1310 nm, single mode, laser, 10.0 km (6.2 mi)
		SFP-6DH	Gigabit Ethernet, DDM, internal calibration, industrially hardened, 1310 nm, single mode, laser, 10.0 km (6.2 mi)
		SFP-6H	Gigabit Ethernet, industrially hardened, 1310 nm, single mode, laser, 10.0 km (6.2 mi)



SFP-7	Gigabit Ethernet, 1550 nm, single mode, laser, 80.0 km (49.7 mi)	SFP-12	E3 interface, SMB connector, 135m (442 ft)
SFP-7D	Gigabit Ethernet, DDM, internal calibration, 1550 nm, single mode, laser, 80.0 km (49.7 mi)	SFP-E1T1/FE****	Fast Ethernet, E1/T1, remote bridge, RJ-45 connector
SFP-7DH	Gigabit Ethernet, DDM, internal calibration, industrially hardened, 1550 nm, single mode, laser, 80.0 km (49.7 mi)	SFP-E1/T1/GbE****	Gigabit Ethernet, E1/T1, remote bridge, RJ-45 connector
SFP-8	Gigabit Ethernet, 1310 nm, single mode, laser, 40.0 km (24.8 mi)	SFP-E3T3/FE****	Fast Ethernet, E3/T3, remote bridge, SMB
SFP-8D	Gigabit Ethernet, DDM, internal calibration, 1310 nm, single mode (single fiber), laser, 40.0 km (24.8 mi)	SFP-E3/T3/GbE****	Gigabit Ethernet, E3/T3, remote bridge, SMB
SFP-8DH	Gigabit Ethernet, DDM, internal calibration, industrially hardened, 1310 nm, single mode (single fiber), laser, 40.0 km (24.8 mi)	SFP-PWE1T1****	TDM to Ethernet pseudowire gateway
SFP-8H	Gigabit Ethernet, industrially hardened, 1310 nm, single mode, laser, 40.0 km (24.8 mi)	<i>Note:</i>	
SFP-17A	Gigabit Ethernet, Tx -1310 nm, Rx -1490 nm, single mode (single fiber), laser (WDM), 10.0 km (6.2 mi)	* SFP-9F includes a LED indicator, along with an underside DIP switch which controls the autonegotiation mode.	
SFP-17B	Gigabit Ethernet, Tx -1490 nm, Rx -1310 nm, single mode (single fiber), laser (WDM), 10.0 km (6.2 mi)	For more information, refer to the SFP-9F installation and operation manual.	
SFP-20	Gigabit Ethernet, 1550 nm, single mode, laser, 120.0 km (74.5 mi)	** With SFP-11 and SFP-12, 135m range is attainable when using RG59 B/U (at 78 MHz, in accordance with the square root of frequency law).	
SFP-20EDH	Gigabit Ethernet, DDM, external calibration, industrially hardened, 1550 nm, single mode, laser, 120.0 km (74.5 mi)	*** SFP-E3/CBL-BNC and SFP-T3/CBL-BNC converters are supplied with SMB-to-BNC adapter cables.	
SFP-21A	Gigabit Ethernet, Tx -1310 nm, Rx -1490 nm, single mode (single fiber), laser (WDM), 40.0 km (24.8 mi)	**** Designed to work with RAD products only. An internal mechanism in these SFP units checks whether the hosting device is a RAD product.	
SFP-21AD	Gigabit Ethernet, DDM, internal calibration, Tx -1310 nm, Rx -1490 nm, single mode (single fiber), laser (WDM), 40.0 km (24.8 mi)	CBL-MINIBNC-BNC	Two adapter cables for converting mini BNC connectors to regular BNC coaxial connectors (for SFP-11)
SFP-47DH	Gigabit Ethernet, DDM, internal calibration, industrially hardened, 1470 nm, CWDM, 24 dB, budget	CBL-SMB-BNC/M	Two adapter cable for converting SMB connectors to regular BNC coaxial connectors (for SFP-12)
SFP-49DH	Gigabit Ethernet, DDM, internal calibration, industrially hardened, 1490 nm, CWDM, 24 dB, budget	CLB-1023-BNC	Two adapter cable for converting mini BNC connectors to regular BNC coaxial connectors (for SFP-E3T3/FE and SFP-E3T3/GbE)
SFP-51DH	Gigabit Ethernet, DDM, internal calibration, industrially hardened, 1510 nm, CWDM, 24 dB, budget	SFP-CA.2	
SFP-53DH	Gigabit Ethernet, DDM, internal calibration, industrially hardened, 1530 nm, CWDM, 24 dB, budget	Configuration tool for Smart SFPs and MINID	
SFP-55DH	Gigabit Ethernet, DDM, internal calibration, industrially hardened, 1550 nm, CWDM, 24 dB, budget	SFP-ER	
SFP-57DH	Gigabit Ethernet, DDM, internal calibration, industrially hardened, 1570 nm, CWDM, 24 dB, budget	Miniature Ethernet Copper Range-Extension Device	
SFP-59DH	Gigabit Ethernet, DDM, internal calibration, industrially hardened, 1590 nm, CWDM, 24 dB, budget	SPD-703-1	
SFP-61DH	Gigabit Ethernet, DDM, internal calibration, industrially hardened, 1610 nm, CWDM, 24 dB, budget	G.703 Rate and Interface Converter	
<i>Electrical Interface SFPs</i>		SPD-703-1/*/#	
SFP-9F*	Fast Ethernet, RJ-45 connector, 100m (238 ft)	Card for the ASM-MN-214 modem rack	
SFP-9G	GbE interface, RJ-45 connector, 100m (238 ft)	* Power supply	
SFP-9GH	GbE interface, industrially hardened, RJ-45 connector, 100m (238 ft)	115	
SFP-11	STM-1E, mini-BNC connector, DIN 1.0/2.3, 135m (442 ft)	230	
		48	
		# DTE interface	
		V24	
		V35	
		530	
		X21	
		UTP	
		BNC	
		CIA/&	
		& Connector	
		V35/1	
		X21/1	
		SPH-16	
		SFP Patching Hub	
		SPH-16/#/RM	
		# Power supply	
		AC	
		DC	
		ACR	
		DCR	
		RM Rack mounting equipment (default=none)	
		CT	
		Cable tray	



Supplied Accessories

AC power cord (with AC power supply only)
DC power cord (with DC power supply only)

Optional Accessories

RM-43 Hardware for mounting one unit into a 19" ETSI rack
RM-43-19 Hardware for mounting one unit into a 19" non-ETSI rack (including cable tray)
RM-43-19-H1 Hardware for mounting one units into a 19" non-ETSI rack

SPS-3

Miniature Packet Switching Access Unit

SPS-3/&

& Port 1 (network) and port 2 (user) interface
V35/V35 V.35 on both ports
V35/V24 V.35 network interface and V.24 user interface
V24/V24 V.24 on both ports
X21/X21 X.21 on both ports

Supplied Accessories

CBL-8H/F Adapter cable for V.24 and V.35 interface (if V.24 or V.35 interface is ordered)
CBL-530T/21C/F Adapter cable for X.21 interface (if X.21 interface is ordered)
CBL-SPS-V.24 Splitter cable for ports with V.24 interface (if V.24 interface is ordered)
CBL-SPS-V.35 Splitter cable for ports with V.35 interface (if V.35 interface is ordered)
CBL-SPS-X.21 Splitter cable for ports with X.21 interface (if X.21 interface is ordered)

Optional Accessories

P/S-AC/5/1200 Standalone regulated 115-230 VAC to 5 VDC/1200 mA power supply

SPS-3S

Multiprotocol FRAD/PAD Packet Switch

SPS-3S/*/#/\$

* Optional DC power supply
24 24 VDC
48 48 VDC

Link 1 interface

V24 V.24/RS-232 interface
V35 V.35 interface
V36 V.36/RS-449 interface
X21 X.21 interface
530 RS-530 interface
DDS Integral DDS interface
IBE ISDN BRI 'S' interface
IBU ISDN BRI 'U' interface
UTP 10BaseT Ethernet interface
BNC 10Base2 interface

\$ Link 2 and link 3 interface

V24 V.24/RS-232 interface
V35 V.35 interface
V36 V.36/RS-449 interface
X21 X.21 interface
530 RS-530 interface

Note: All X.21, V.35 and V.36 interfaces include an adapter cable (see Supplied Accessories).

Supplied Accessories

AC power cord For AC unit
DC adapter kit For DC unit
CBL-RJ45/D9/F/STR Adapter cable for converting RJ-45 control to DB-9 control
CBL-8H/F Adapter cable for V.35 (if V.35 interface is ordered)
CBL-530/499/F Adapter cable for V.36 (if V.36 interface is ordered)

CBL-530T/21C/F Adapter cable for X.21 (if X.21 interface is ordered)

SPS-4

Multiprotocol Packet Switch

SPS-4/@-*/&-*

@ Link 1 interface
V24 V.24 (RS-232) interface
V35 V.35 interface
* Clocking mode
DCE DCE mode
DTE DTE mode
& Link 2 interface
V24 V.24 (RS-232) interface
V35 V.35 interface

Supplied Accessories

AC power cord For AC unit
DC adapter kit For DC unit
CBL-8H/F Adapter cable for V.35 interface (if V.35 interface is ordered)
CBL-RJ45/D9/F/STR Adapter cable for converting RJ-45 control to DB-9 control

Optional Accessories

CBL-DB9F-DB9M-STR DB-9 to DB-9 control port cable
RM-33-2 Hardware kit for mounting one or two SPS-4 units into a 19" rack

SRM-5A

Miniature Async Short Range Modem

SRM-5A/*/+NEW

Transformer isolated

* Connector

F Female 25-pin connector
M Male 25-pin connector

+ Line interface (Default=RJ-45 and terminal block connectors)

RJ-11 RJ-11
RJ-45 RJ-45

TinyBridge-100

Miniature Remote Fast Ethernet bridge

TINYBRIDGE-100/#/\$

TINYBRIDGE-100/4W/\$

Miniature remote Fast Ethernet bridge with 4-wire WAN interface

WAN interface

V24 V.24/RS-232
V35F V.35 (female adapter cable supplied)
V35M V.35 (male adapter cable supplied)
V36 V.36 (adapter cable supplied)
530 RS-530
X21F X.21 (female adapter cable supplied)
X21M X.21 (male adapter cable supplied)

\$ Switching power supply

AC 100-240 VAC switching power supply with integral AC connector (may be ordered separately as P/S-AC/5/1200)

Vmux-110

Voice Trunking Gateway for Remote Sites

Vmux-110/*/+%/&

* Power supply

AC Single 100 to 240 VAC
48 Single -36 to -72 VDC
24 Temperature-hardened, 20 to 32 VDC

+ Voice port

E1/30 Full E1 digital voice port
T1/24 Full T1 digital voice port
4FXS 4 analog FXS ports
8FXS 8 analog FXS ports
4FXO 4 analog FXO ports
8FXO 8 analog FXO ports
4E&M 4 analog E&M ports



8E&M	8 analog E&M ports
% Ethernet port	
ETH-UTP Ethernet 10/100BaseT port	
& Positive E&M signaling (default=without)	
POS	With positive E&M signaling
<i>Supplied Accessories</i>	
AC power cord	For AC unit
DC adapter kit	For DC unit
<i>Optional Accessories</i>	
CBL-VM110/?	Serial link adapter cable, 40 cm long
? Interface and clock mode	
V35/DCE	V.35, DCE mode
V35/DTE	V.35, DTE mode
X21/DCE	X.21, DCE mode
X21/DTE	X.21, DTE mode
530/DTE	RS-530, DTE mode
<i>Note: An adapter cable is not required for connecting to RS-530 equipment when Vmux-110 operates in DCE clock mode.</i>	
CBL-KVF8/FXOS	Adapter cable for converting the FXO/FXS interface D-25 connector to 8 x RJ-12 connectors
CBL-KVF8/E&M	Adapter cable for converting the E&M interface 68-pin SCSI connector to 8 x RJ-45 connectors
CBL-RJ45/2BNC/E1	Interface adapter cable for converting the balanced E1 port RJ-45 connector into a pair of BNC connectors for unbalanced coax interface
RM-35/@	Hardware for mounting one or two Vmux-110 units in a 19" rack. To order both P1 and P2 kits, define RM-35 only.
@Rack mount kit:	
AC	Single 100 to 240 VAC
DC	Single -36 to -72 VDC
RM-35-23	Hardware kit for mounting one unit in a 23-inch rack
RM-35-ETSI	Hardware kit for mounting one unit in an ETSI rack
WM-35-TYPE4	Hardware kit for mounting one unit on the wall.
Vmux-210	
Analog Voice Trunking Gateway	
Vmux-210/*/&/\$/%/#	
* Power supply	
AC	Single 100 to 240 VAC
DC	Single -36 to -72 VDC
& Uplink	
E1	E1 uplink
T1	T1 uplink
\$ Number of FXS channels supported by analog voice port	
12FXS	Up to 12
15FXS	Up to 15
24FXS	Up to 24
30FXS	Up to 30
% Adapter cable for the serial link	
V35DCE	V.35, DCE
V35DTE	V.35, DTE
X21DCE	X.21, DCE
X21DTE	X.21, DTE
530DTE	RS-530, DTE
NULL	RS-530, DCE
<i>Note: An adapter cable is not required for connecting to RS-530 equipment when Vmux-210 operates in DCE clock mode.</i>	
# Telco adapter cable for voice channels	
Telco50open	50-pin Telco connector to open-ended
Telco64open	64-pin Telco connector to open-ended
Telco50-24RJ12	50-pin Telco connector to 24 RJ-12 connectors
Telco64-30RJ12	64-pin Telco connector to 30 RJ-12 connectors
NULL	No adaptor cable supplied
<i>Supplied Accessories</i>	
AC power cord	For AC unit
DC adapter kit	For DC unit

Optional Accessories
CBL-RJ45/2BNC/E1

Interface adapter cable for converting the balanced E1 port R-45 connector into a pair of BNC connectors for unbalanced coax interface

Telco adapter cables for voice channels:

CBL-Telco50open	50-pin Telco connector to open-ended
CBL-Telco64open	64-pin Telco connector to open-ended
CBL-Telco50-24RJ12	50-pin Telco connector to 24 RJ-12 connectors
CBL-Telco64-30RJ12	64-pin Telco connector to 30 RJ-12 connectors
RM-34	Hardware kit for mounting one Vmux-210 unit into a 19" rack
RM-34-23	Hardware kit for mounting one Vmux-210 unit in a 23-inch rack
RM-34-ETSI	Hardware kit for mounting one Vmux-210 unit in an ETSI rack

Vmux-2100

Voice Trunking Gateway

Vmux-2100*/\$

Note: System includes rack, power supplies and power supply cables only. A Control Module and at least one Voice Compression Module must be ordered for every Vmux-2100 system. All modules can be ordered separately.

* Power supply	
AC	100 to 240 VAC
48	-36 to -72 VDC
24	20 to 36 VDC
\$ Redundant power supply	
R	Redundant power supply (of same)

Modules

VMUX-M/M-ETH-#	Control Module with single Ethernet port by default, and optional redundant E1, T1, or serial links
# Redundant TDM link (Default=Ethernet port only)	
E1	E1 link
T1	T1 link
VMUX-M/VCA-&/%	Enhanced Voice Compression Module
& TDM interface	
E1	E1 ports
T1	T1 ports
% Number of E1/T1 ports	
2	2 ports
4	4 ports
VMUX-2100-PS/*	Power Supply Module

Supplied Accessories

AC power cord	For AC unit
DC adapter kit	For DC unit
RM-VMUX-2100/19	Hardware kit for mounting one Vmux-2100 unit into a 19" rack

Optional Accessories

CBL-DB9F-DB9M-STR	Control port cable
CBL-RJ45/2BNC/E1	Interface adapter cable for converting one Control module E1 port RJ-45 connector into a pair of BNC connectors for unbalanced coax interface

Note: For E1 Voice Modules and Channelized E1 Modules, conversion to unbalanced 75Ω interfaces must be performed externally (e.g., using RAD's BE-1).

RM-VMUX-2100/23	Hardware kit for mounting one Vmux-2100 unit into a 23" rack
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Vmux-2120	Voice Trunking Gateway
Vmux-2120/*/@/\$	
<i>Note: System includes the chassis, redundant PS and one voice card for voice compression or 3G media gateway services. For a redundant voice card system (two voice cards), order an additional voice card.</i>	
Vmux-2120-M/@/\$	Voice cards for Vmux-2120.
Vmux-2120-LIC/!	Vmux-2120 upgrade license to activate additional voice ports.
*	Power supply
ACR	Redundant, 100 to 240 VAC, 50/60 Hz
DCR	Redundant, -48 (-36 to -72) VDC
?	Main card
VC	Voice Compression module
8E1	8 E1 ports
\$	For 16-port devices (Default=all ports activated)
2SK	2 activated ports
4SK	4 activated ports
8SK	8 activated ports
12SK	12 activated ports
!	Software key for activating additional voice ports on an existing module:
2SK	Activate 2 additional voice ports
4SK	Activate 4 additional voice ports
8SK	Activate 8 additional voice ports
<i>Supplied Accessories</i>	
AC power cord	For AC unit
DC adapter kit	For DC unit
RM-VMUX-2100/19	Hardware kit for mounting one Vmux-2120 unit into a 19" rack
<i>Optional Accessories</i>	
VMUX-2100-PS/&	
&	Power supply type:
AC	100 to 240 VAC
DC	-48 (-36 to -72) VDC
CBL-DB9F-DB9M-STR	Control port cable
CBL-RJ45/2BNC/E1	Interface adapter cable for converting one Control module E1 port RJ-45 connector into a pair of BNC connectors for unbalanced coax interface
RM-VMUX-2100/23	Hardware kit for mounting one Vmux-2100 unit into a 23" rack