

E Series™ Broadband Services Routers

E Series™ End-of-Life Module Guide



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This guide provides an overview and description of E Series modules that are end-of-life (EOL) and can no longer be ordered for the following routers:

- ERX7xx models
- ERX14xx models
- ERX310 router
- E120 router
- E320 router

Depending on the EOL schedule of a module, new software releases might not support the module.

Table 1 on page 3 lists EOL modules alphabetically. It lists EOL modules for ERX routers first and then for E120 and E320 routers.



NOTE: Any future JunosE release number provided in the *Actual or Predicted Last JunosE Support* field of Table 1 on page 3 is based on the current JunosE release schedule. If the release schedule changes in the future, Juniper Networks will update the associated Product Support Notification (PSN) Technical Bulletin for any affected EOL modules.

For more information about E Series routers and modules, refer to the following guides:

- ERX module installation and maintenance—*ERX Hardware Guide*
- E120 and E320 module installation and maintenance—*E120 and E320 Hardware Guide*
- Managing E Series routers—*JunosE System Basics Configuration Guide*
- Configuring E Series modules—*JunosE Link Layer Configuration Guide*

To obtain the most current list of EOL modules, see the End-of-Life Products page on the Juniper Networks Web site at <http://www.juniper.net/support/eol>.

Table 1: End-of-Life Modules

Combination Name	Line Module Label	I/O Module Label	First JunosE Support	Actual or Predicted Last JunosE Support	Page
ERX ROUTER MODULES					
CE1					
CE1	CE1	CE1 FULL I/O	1.1.0	7.3.x	8
Channelized OC3/STM1					
cOC3/STM1 multimode	cOCx/STMx F0	cOC3 STM1 F0 I/O MULTIMODE	2.2.0	15.0.x	9
cOC3/STM1 single-mode intermediate reach	cOCx/STMx F0	cOC3 STM1 F0 I/O SINGLE MODE	2.2.0	15.0.x	11
cOC3/STM1 single-mode long reach	cOCx/STMx F0	cOC3 STM1 F0 I/O LONG HAUL	2.2.0	15.0.x	13
Channelized OC12/STM4					
cOC12/STM4 multimode without APS/MSP redundancy	cOCx/STMx F0	cOC12 STM4 F0 I/O MULTI MODE	2.2.0	15.0.x	15
cOC12/STM4 single-mode intermediate reach without APS/MSP redundancy	cOCx/STMx F0	cOC12 STM4 F0 I/O SINGLE MODE	2.2.0	15.0.x	17
cOC12/STM4 single-mode intermediate reach with APS/MSP redundancy	cOCx/STMx F0	COC12 F0 APS SINGLE MODE	6.1.3, 7.0.2, 7.2.0	15.0.x	19
cOC12/STM4 single-mode long reach	cOCx/STMx F0	cOC12 STM4 LONG HAUL	2.2.0	15.0.x	21
Channelized T1					
CT1	CT1	CT1 FULL I/O	1.1.0	7.3.x	23
Channelized T3					

Table 1: End-of-Life Modules *(continued)*

Combination Name	Line Module Label	I/O Module Label	First JunosE Support	Actual or Predicted Last JunosE Support	Page
CT3 (3 ports)	CT3	CT3/T3 I/O	1.0.0	7.0.x	24
CT3/T3 12 (12 ports)	CT3/T3-F0	CT3/T3 12 I/O	3.2.0	14.0.x	25
E3					
E3 ATM	E3 ATM	E3 I/O	1.1.0	7.1.x	26
E3 Frame (3 ports)	E3 FRAME	E3 I/O	1.1.0	7.0.x	27
E3 Frame (12 ports)	COCX-F3	E3-12 FRAME I/O	4.0.2	14.0.x	28
Fast Ethernet					
FE-2 (2 ports)	FE-2	FE-2 I/O	1.3.0	7.0.x	29
FE-8 (8 ports) (128 MB)	GE/FE	FE-8 I/O	2.0.0	5.2.x	30
Only line module is EOL.					
Gigabit Ethernet (1–port)					
GE 1000Base-LH (128 MB)	GE/FE	GE I/O SFP	2.0.0	5.2.x	31
Only line module is EOL.					
GE 1000Base-SX (128 MB)	GE/FE	GE I/O SFP	2.0.0	5.2.x	33
Only line module is EOL.					
GE 1000Base-ZX (128 MB)	GE/FE	GE I/O SFP	2.0.0	5.2.x	35
Only line module is EOL.					
HSSI					
HSSI	HSSI-3F	HSSI-3 I/O	3.1.0	7.3.x	37
IPSec Service					
IPSec Service	IPSEC SERVICE	No I/O module	4.0.2	14.0.x	38
OC3/STM1					

Table 1: End-of-Life Modules *(continued)*

Combination Name	Line Module Label	I/O Module Label	First JunosE Support	Actual or Predicted Last JunosE Support	Page
OC3 (dual-port) multimode	OC3	OC3 I/O MULTI MODE	1.0.0	4.1.x	39
OC3 (dual-port) single-mode	OC3	OC3 I/O SINGLE MODE	1.0.0	4.1.x	40
OC3/STM1 ATM					
OC3/STM1 ATM multimode without APS/MSP redundancy (128 MB)	OCx/STMx ATM <i>or</i> OCx/STMx /DS3-ATM	OC3-4 I/O MULTI MODE	2.0.0	5.2.x	41
Only line module is EOL.					
OC3/STM1 ATM single-mode intermediate reach without APS/MSP redundancy (128 MB)	OCx/STMx ATM <i>or</i> OCx/STMx /DS3-ATM	OC3-4 I/O SINGLE MODE	2.0.0	5.2.x	43
Only line module is EOL.					
OC3/STM1 ATM single-mode long reach without APS/MSP redundancy (128 MB)	OCx/STMx ATM <i>or</i> OCx/STMx /DS3-ATM	OC3-4 I/O LONG HAUL	2.0.0	5.2.x	45
Only line module is EOL.					
OC12/STM4 ATM					
OC12/STM4 ATM multimode without APS/MSP redundancy (128 MB)	OCx/STMx ATM <i>or</i> OCx/STMx /DS3-ATM	OC12 STM4 I/O MULTI MODE	2.0.0	5.2.x	47
Only line module is EOL.					
OC12/STM4 ATM single-mode intermediate reach without APS/MSP redundancy (128 MB)	OCx/STMx ATM <i>or</i> OCx/STMx /DS3-ATM	OC12 STM4 I/O SINGLE MODE	2.0.0	5.2.x	49
Only line module is EOL.					

Table 1: End-of-Life Modules (*continued*)

Combination Name	Line Module Label	I/O Module Label	First JunosE Support	Actual or Predicted Last JunosE Support	Page
OC12/STM4 ATM single-mode long reach without APS/MSP redundancy (128 MB)	OCx/STMx ATM <i>or</i> OCx/STMx /DS3-ATM	OC12 STM4 I/O LONG HAUL	2.0.0	5.2.x	51
Only line module is EOL.					
SRPs					
SRP-5G (512 MB)	SRP-5G	SRP I/O	1.0.0	5.2.x	53
SRP-5G+ (512 MB)	SRP-5G+	SRP I/O	3.0.2	8.0.x	54
SRP-5G+ (2-GB memory)	SRP-5G+	SRP I/O	4.1.3, 5.0.4, 5.1.2, 5.2.0	14.0.x	55
SRP-10G (512 MB)	SRP-10G	SRP I/O	1.1.0	5.2.x	56
SRP-10G (1-GB memory)	SRP-10G	SRP I/O	4.1.3, 5.0.4, 5.1.2, 5.2.0	8.0.x	57
SRP-SE10G (512 MB)	SRP-SE10G	SRP-SE I/O	5.1.0	7.1.x	58
SRP-40G (512 MB)	SRP-40G	SRP I/O	3.4.1	5.2.x	59
SRP-40G PLUS (1 GB)	SRP-40G PLUS	SRP I/O	4.0.0	7.1.x	60
T3					
T3 ATM (3 ports)	T3 ATM	CT3/T3 I/O	1.1.0	7.0.x	61
T3 ATM (4 ports) (128 MB)	OCx/STMx ATM <i>or</i> OCx/STMx /DS3-ATM	4xDS3 ATM I/O	4.1.0	5.2.x	62
Only line module is EOL.					
T3 Frame (3 ports)	T3 FRAME	CT3/T3 I/O	1.1.0	7.0.x	63
T3 Frame (12 ports)	COCX-F3	CT3/T3 12 I/O	4.0.2	14.0.x	64
Tunnel Service Module (TSM)					

Table 1: End-of-Life Modules *(continued)*

Combination Name	Line Module Label	I/O Module Label	First JunosE Support	Actual or Predicted Last JunosE Support	Page
TSM	TUNNEL SERVICE	No I/O module	3.0.2	8.0.x	65
X.21/V.35					
X.21/V.35	X.21/V.35	X.21/V.35 I/O	2.10.1, 3.3.2	7.3.x	66
E120 and E320 ROUTER MODULES					
Gigabit Ethernet IOA					
10GE IOA	ES2-S1 10GE IOA	ES2-S1 10GE IOA	7.0.1	14.0.x	68

CE1 Module Combination

Line module label	CE1
I/O module label	CE1 FULL I/O
Number of I/O ports	<ul style="list-style-type: none"> 20
Software release	<ul style="list-style-type: none"> First supported: 1.1.0 Final supported: 7.3.x
Description	<ul style="list-style-type: none"> 40 W Channelized E1
Type	<ul style="list-style-type: none"> Non-ASIC
Capability	<ul style="list-style-type: none"> E1 HDLC framing
Software features	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix A, Module Protocol Support</i> for information about the layer 2 and layer 3 protocols and applications that this module combination supports.
Model compatibility	<ul style="list-style-type: none"> ERX7xx models ERX1410 router
SRP module compatibility	<ul style="list-style-type: none"> SRP-5G SRP-5G+ SRP-10G
Module redundancy support	<ul style="list-style-type: none"> 1:N redundancy
Cables and connectors	<ul style="list-style-type: none"> RJ-48C, 120 ohm BNC, 75-ohm via a balun panel that connects to the I/O module Use shielded cables to maintain EMC compliance. The transmitted signal complies with ITUT G.703, Physical/electrical characteristics of hierarchical digital interfaces (November 2001) for cable lengths up to 450 m (492 yards). See <i>ERX Hardware Guide, Chapter 5, Cabling ERX Routers</i> for more information.
LEDs	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix B, Module LEDs</i>.
Alarms, errors, and events	<ul style="list-style-type: none"> See <i>Monitoring Interfaces</i> in the <i>Configuring Channelized T1 and Channelized E1 Interfaces</i> chapter of the <i>JunosE Physical Layer Configuration Guide</i> for Release 8.0.x and earlier.

cOC3/STM1 Multimode Module Combination

Line module label	cOCx/STMx F0
I/O module label	cOC3 STM1 F0 I/O MULTI MODE
Number of I/O ports	<ul style="list-style-type: none"> 4
Software release	<ul style="list-style-type: none"> First supported: 2.2.0 Final supported: 15.0.x
Description	<ul style="list-style-type: none"> 130 W OC3/STM1 channelized to DS3, DS1, E1, and DS0 Supports either E1 or T1 operation, but not E1 and T1 operation simultaneously
Type	<ul style="list-style-type: none"> EFA ASIC
Capability	<ul style="list-style-type: none"> OC3/STM1 DS3 T1, E1 DS0 HDLC framing
Software features	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix A, Module Protocol Support</i> for information about the layer 2 and layer 3 protocols and applications that this module combination supports.
Model compatibility	<ul style="list-style-type: none"> ERX7xx models ERX14xx models ERX310 router
SRP module compatibility	<ul style="list-style-type: none"> SRP-5G+ SRP-10G SRP-40G SRP-40G PLUS SRP-SE10G
Module redundancy support	<ul style="list-style-type: none"> 1:N redundancy NOTE: Line module redundancy is not supported on the ERX310 router.

Cables and connectors

- Up to four SC full duplex connectors
- Tx power:
 - min: -19 dBm
 - max: -14 dBm
- Center wavelength: 1310 nm
- Rx input power:
 - min: -30 dBm
 - max: -14 dBm
- Rated for 2 km (1.2 miles) over 62.5-micron core cable with an optical loss of 0–9 dB or 50-micron core cable with an optical loss of 7 dB
- See *ERX Hardware Guide, Chapter 5, Cabling ERX Routers* for more information.

LEDs

- See *ERX Module Guide, Appendix B, Module LEDs*.

Alarms, errors, and events

- See *Monitoring Interfaces in JunosE Physical Layer Configuration Guide, Chapter 4, Configuring Channelized OCx/STMx Interfaces*.
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cOC3/STM1 Single-Mode Intermediate Reach Module Combination

Line module label	cOCx/STMx F0
I/O module label	cOC3 STM1 F0 I/O SINGLE MODE
Number of I/O ports	<ul style="list-style-type: none"> 4
Software release	<ul style="list-style-type: none"> First supported: 2.2.0 Final supported: 15.0.x
Description	<ul style="list-style-type: none"> 130 W OC3/STM1 channelized to DS3, DS1, E1, and DS0
Type	<ul style="list-style-type: none"> EFA ASIC
Capability	<ul style="list-style-type: none"> OC3/STM1 DS3, DS1 T1, E1 DS0 HDLC framing
Software features	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix A, Module Protocol Support</i> for information about the layer 2 and layer 3 protocols and applications that this module combination supports.
Model compatibility	<ul style="list-style-type: none"> ERX7xx models ERX14xx models ERX310 router
SRP module compatibility	<ul style="list-style-type: none"> SRP-5G+ SRP-10G SRP-40G SRP-40G PLUS SRP-SE10G
Module redundancy support	<ul style="list-style-type: none"> 1:N redundancy NOTE: Line module redundancy is not supported on the ERX310 router.

Cables and connectors

- Up to four SC full duplex connectors
- Tx power:
 - min: -15 dBm
 - max: -8 dBm
- Center wavelength: 1310 nm
- Rx input power:
 - min: -31 dBm
 - max: -8 dBm
- Rated for 15 km (9.3 miles) of 9-micron core cable
- See *ERX Hardware Guide, Chapter 5, Cabling ERX Routers* for more information.

LEDs

- See *ERX Module Guide, Appendix B, Module LEDs*.

Alarms, errors, and events

- See *Monitoring Interfaces* in *JunosE Physical Layer Configuration Guide, Chapter 4, Configuring Channelized OCx/STMx Interfaces*.
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cOC3/STM1 Single-Mode Long Reach Module Combination

Line module label	cOCx/STMx F0
I/O module label	cOC3 STM1 F0 I/O LONG HAUL
Number of I/O ports	<ul style="list-style-type: none"> 4
Software release	<ul style="list-style-type: none"> First supported: 2.2.0 Final supported: 15.0.x
Description	<ul style="list-style-type: none"> 130 W OC3/STM1 channelized to DS3, DS1, E1, and DS0
Type	<ul style="list-style-type: none"> EFA ASIC
Capability	<ul style="list-style-type: none"> OC3/STM1 DS3, DS1 T1, E1 DS0 HDLC framing
Software features	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix A, Module Protocol Support</i> for information about the layer 2 and layer 3 protocols and applications that this module combination supports.
Model compatibility	<ul style="list-style-type: none"> ERX7xx models ERX14xx models ERX310 router
SRP module compatibility	<ul style="list-style-type: none"> SRP-5G+ SRP-10G SRP-40G SRP-40G PLUS SRP-SE10G
Module redundancy support	<ul style="list-style-type: none"> 1:N redundancy NOTE: Line module redundancy is not supported on the ERX310 router.

Cables and connectors

- Up to four SC full duplex connectors
- Tx power:
 - min: -5.0 dBm
 - max: 0 dBm
- Center wavelength: 1310 nm
- Rx input power:
 - min: -34 dBm
 - max: -7 dBm
- Fiber type: 9-micron core
- Rated for 40 km (24.8 miles) of 9-micron core cable
- See *ERX Hardware Guide, Chapter 5, Cabling ERX Routers* for more information.

LEDs

- See *ERX Module Guide, Appendix B, Module LEDs*.

Alarms, errors, and events

- See *Monitoring Interfaces* in *JunosE Physical Layer Configuration Guide, Chapter 4, Configuring Channelized OCx/STMx Interfaces*.
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cOC12/STM4 Multimode Without APS/MSP Redundancy Module Combination

Line module label	cOCx/STMx F0
I/O module label	cOC12 STM4 F0 I/O MULTI MODE
Number of I/O ports	<ul style="list-style-type: none"> 1
Software release	<ul style="list-style-type: none"> First supported: 2.2.0 Final supported: 15.0.x
Description	<ul style="list-style-type: none"> 130 W OC12/STM4 channelized to DS3, DS1, E1, and DS0
Type	<ul style="list-style-type: none"> EFA ASIC
Capability	<ul style="list-style-type: none"> OC12/STM4 OC3/STM1 DS3, DS1 T1, E1 DS0 HDLC framing
Software features	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix A, Module Protocol Support</i> for information about the layer 2 and layer 3 protocols and applications that this module combination supports.
Model compatibility	<ul style="list-style-type: none"> ERX7xx models ERX14xx models ERX310 router
SRP module compatibility	<ul style="list-style-type: none"> SRP-5G+ SRP-10G SRP-40G SRP-40G PLUS SRP-SE10G
Module redundancy support	<ul style="list-style-type: none"> 1:N redundancy NOTE: Line module redundancy is not supported on the ERX310 router.

Cables and connectors

- SC full duplex connector
- Tx power:
 - min: -19 dBm
 - max: -14 dBm
- Center wavelength: 1310 nm
- Rx input power:
 - min: -30 dBm
 - max: -14 dBm
- Rated for 2 km (1.2 miles) over 62.5-micron core cable with an optical loss of 0–9 dB or 50-micron core cable with an optical loss of 7 dB
- See *ERX Hardware Guide, Chapter 5, Cabling ERX Routers* for more information.

LEDs

- See *ERX Module Guide, Appendix B, Module LEDs*.

Alarms, errors, and events

- See *Monitoring Interfaces in JunosE Physical Layer Configuration Guide, Chapter 4, Configuring Channelized OCx/STMx Interfaces*.
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cOC12/STM4 Single-Mode Intermediate Reach Without APS/MSP Redundancy Module Combination

Line module label	cOCx/STMx F0
I/O module label	cOC12 STM4 F0 I/O SINGLE MODE
Number of I/O ports	<ul style="list-style-type: none"> 1
Software release	<ul style="list-style-type: none"> First supported: 2.2.0 Final supported: Not applicable
Description	<ul style="list-style-type: none"> 130 W OC12/STM4 channelized to DS3, DS1, E1, and DS0
Type	<ul style="list-style-type: none"> EFA ASIC
Capability	<ul style="list-style-type: none"> OC12/STM4 OC3/STM1 DS3, DS1 T1, E1 DS0 HDLC framing
Software features	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix A, Module Protocol Support</i> for information about the layer 2 and layer 3 protocols and applications that this module combination supports.
Model compatibility	<ul style="list-style-type: none"> ERX7xx models ERX14xx models ERX310 router
SRP module compatibility	<ul style="list-style-type: none"> SRP-5G+ SRP-10G SRP-40G SRP-40G PLUS SRP-SE10G
Module redundancy support	<ul style="list-style-type: none"> 1:N redundancy NOTE: Line module redundancy is not supported on the ERX310 router.

Cables and connectors

- SC full duplex connector
- Tx power:
 - min: -15 dBm
 - max: -8 dBm
- Center wavelength: 1310 nm
- Rx input power:
 - min: -31 dBm
 - max: -8 dBm
- Rated for 15 km (9.3 miles) of 9-micron core cable
- See *ERX Hardware Guide, Chapter 5, Cabling ERX Routers* for more information.

LEDs

- See *ERX Module Guide, Appendix B, Module LEDs*.

Alarms, errors, and events

- See *Monitoring Interfaces in JunosE Physical Layer Configuration Guide, Chapter 4, Configuring Channelized OCx/STMx Interfaces*.
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cOC12/STM4 Single-Mode Intermediate Reach With APS/MSP Redundancy Module Combination

Line module label	cOCx/STMx F0
I/O module label	COC12 F0 APS SINGLE MODE
Number of I/O ports	<ul style="list-style-type: none"> • 2 • 1 active, 1 redundant
Software release	<ul style="list-style-type: none"> • First supported: 6.1.3 or later 6.1.x release, 7.0.2 or later 7.0.x release, 7.2.0 and higher-numbered release • Final supported: 15.0.x
Description	<ul style="list-style-type: none"> • 130 W • OC12/STM4 channelized to DS3, DS1, E1, and DS0
Type	<ul style="list-style-type: none"> • EFA ASIC
Capability	<ul style="list-style-type: none"> • OC12/STM4 • OC3/STM1 • DS3, DS1 • T1, E1 • DS0 • HDLC framing
Software features	<ul style="list-style-type: none"> • See <i>ERX Module Guide, Appendix A, Module Protocol Support</i> for information about the layer 2 and layer 3 protocols and applications that this module combination supports.
Model compatibility	<ul style="list-style-type: none"> • ERX7xx models • ERX14xx models • ERX310 router
SRP module compatibility	<ul style="list-style-type: none"> • SRP-5G+ • SRP-10G • SRP-40G • SRP-40G PLUS • SRP-SE10G
Module redundancy support	<ul style="list-style-type: none"> • 1:N redundancy • NOTE: Line module redundancy is not supported on the ERX310 router.

Cables and connectors

- SC full duplex connector
- Tx power:
 - min: -15 dBm
 - max: -8 dBm
- Center wavelength: 1310 nm
- Rx input power:
 - min: -31 dBm
 - max: -7 dBm
- Rated for 15 km (9.3 miles) of 9-micron core cable
- See *ERX Hardware Guide, Chapter 5, Cabling ERX Routers* for more information.

LEDs

- See *ERX Module Guide, Appendix B, Module LEDs*.

Alarms, errors, and events

- See *Monitoring Interfaces in JunosE Physical Layer Configuration Guide, Chapter 4, Configuring Channelized OCx/STMx Interfaces*.
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cOC12/STM4 Single-Mode Long Reach Module Combination

Line module label	cOCx/STMx F0
I/O module label	cOC12 STM4 LONG HAUL
Number of I/O ports	<ul style="list-style-type: none"> 1 active, 1 redundant
Software release	<ul style="list-style-type: none"> First supported: 2.2.0 Final supported: 15.0.x
Description	<ul style="list-style-type: none"> 130 W OC12/STM4 channelized to DS3, DS1, E1, and DS0
Type	<ul style="list-style-type: none"> EFA ASIC
Capability	<ul style="list-style-type: none"> OC12/STM4 OC3/STM1 DS3, DS1 T1, E1 DS0 HDLC framing
Software features	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix A, Module Protocol Support</i> for information about the layer 2 and layer 3 protocols and applications that this module combination supports.
Model compatibility	<ul style="list-style-type: none"> ERX7xx models ERX14xx models ERX310 router
SRP module compatibility	<ul style="list-style-type: none"> SRP-5G+ SRP-10G SRP-40G SRP-40G PLUS SRP-SE10G
Module redundancy support	<ul style="list-style-type: none"> 1:N redundancy NOTE: Line module redundancy is not supported on the ERX310 router.

Cables and connectors

- SC full duplex connector
- Tx power:
 - min: -5.0 dBm
 - max: 0 dBm
- Center wavelength: 1310 nm
- Rx input power:
 - min: -34 dBm
 - max: -7 dBm
- Fiber type: 9-micron core
- Rated for 40 km (24.8 miles) of 9-micron core cable
- See *ERX Hardware Guide, Chapter 5, Cabling ERX Routers* for more information.

LEDs

- See *ERX Module Guide, Appendix B, Module LEDs*.

Alarms, errors, and events

- See *Monitoring Interfaces* in *JunosE Physical Layer Configuration Guide, Chapter 4, Configuring Channelized OCx/STMx Interfaces*.
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CT1 Module Combination

Line module label	CT1
I/O module label	CT1 FULL I/O
Number of I/O ports	<ul style="list-style-type: none"> • 24
Software release	<ul style="list-style-type: none"> • First supported: 1.1.0 • Final supported: 7.3.x
Description	<ul style="list-style-type: none"> • 40 W • Channelized T1
Type	<ul style="list-style-type: none"> • Non-ASIC
Capability	<ul style="list-style-type: none"> • DS1, DS0 • HDLC Framing
Software features	<ul style="list-style-type: none"> • See <i>ERX Module Guide, Appendix A, Module Protocol Support</i> for information about the layer 2 and layer 3 protocols and applications that this module combination supports.
Model compatibility	<ul style="list-style-type: none"> • ERX7xx models • ERX1410 router
SRP module compatibility	<ul style="list-style-type: none"> • SRP-5G • SRP-5G+ • SRP-10G
Module redundancy support	<ul style="list-style-type: none"> • 1:N redundancy
Cables and connectors	<ul style="list-style-type: none"> • RJ-48C 100-ohm connector • Use shielded cables to maintain EMC compliance. • The line interface unit supports multiple line buildouts. • Signal strength is software controlled. • The transmitted signal complies with ANSI T1.102-1993 Digital Hierarchy - Electrical Interfaces (1999) for cable lengths up to 201 m (660 feet). • See <i>ERX Hardware Guide, Chapter 5, Cabling ERX Routers</i> for more information.
LEDs	<ul style="list-style-type: none"> • See <i>ERX Module Guide, Appendix B, Module LEDs</i>.
Alarms, errors, and events	<ul style="list-style-type: none"> • See <i>Monitoring Interfaces</i> in the <i>Configuring Channelized T1 and Channelized E1 Interfaces</i> chapter of the <i>JunosE Physical Layer Configuration Guide</i> for Release 8.0.x and earlier.

CT3 Module Combination (3 Ports)

Line module label	CT3
I/O module label	CT3/T3 I/O
Number of I/O ports	<ul style="list-style-type: none"> 3
Software release	<ul style="list-style-type: none"> First supported: 1.0.0 Final supported: 7.0.x
Description	<ul style="list-style-type: none"> 60 W Channelized T3
Type	<ul style="list-style-type: none"> Non-ASIC
Capability	<ul style="list-style-type: none"> DS3, DS1, DS0 HDLC framing
Software features	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix A, Module Protocol Support</i> for information about the layer 2 and layer 3 protocols and applications that this module combination supports.
Model compatibility	<ul style="list-style-type: none"> ERX7xx models ERX1410 router
SRP module compatibility	<ul style="list-style-type: none"> SRP-5G SRP-5G+ SRP-10G
Module redundancy support	<ul style="list-style-type: none"> 1:N redundancy
Cables and connectors	<ul style="list-style-type: none"> BNC 75-ohm connector The line interface unit supports two line buildouts: <ul style="list-style-type: none"> 0–68.5 m (0–225 feet) 69–137 m (226–450 feet) Signal strength is software controlled. The transmitted signal complies with ANSI T1.102-1993 Digital Hierarchy - Electrical Interfaces (1999) for cable lengths up to 201 m (660 feet). See <i>ERX Hardware Guide, Chapter 5, Cabling ERX Routers</i> for more information.
LEDs	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix B, Module LEDs</i>.
Alarms, errors, and events	<ul style="list-style-type: none"> See <i>Monitoring Interfaces</i> in the <i>Configuring Channelized T3 Interfaces</i> chapter of the <i>JunosE Physical Layer Configuration Guide</i> for Release 8.0.x and earlier.

CT3/T3 12 Module Combination (12 Ports)

Line module label	CT3/T3-F0
I/O module label	CT3/T3 12 I/O
Number of I/O ports	<ul style="list-style-type: none"> 12
Software release	<ul style="list-style-type: none"> First supported: 3.2.0 Final supported: 14.0.x
Description	<ul style="list-style-type: none"> 130 W Channelized and unchannelized T3
Type	<ul style="list-style-type: none"> EFA ASIC
Capability	<ul style="list-style-type: none"> DS3, DS1, DS0 HDLC framing
Software features	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix A, Module Protocol Support</i> for information about the layer 2 and layer 3 protocols and applications that this module combination supports.
Model compatibility	<ul style="list-style-type: none"> ERX7xx models ERX14xx models ERX310 router
SRP module compatibility	<ul style="list-style-type: none"> SRP-5G+ SRP-10G SRP-40G SRP-40G PLUS SRP-SE10G
Module redundancy support	<ul style="list-style-type: none"> 1:N redundancy NOTE: Line module redundancy is not supported on the ERX310 router.
Cables and connectors	<ul style="list-style-type: none"> BT43 SMB connector Cable that adapts to 75-ohm BNC is available. The line interface unit supports two line buildouts: <ul style="list-style-type: none"> 0–68.5 m (0–225 feet) 69–137 m (226–450 feet) Signal strength is software controlled. The transmitted signal complies with ANSI T1.102-1993 Digital Hierarchy - Electrical Interfaces (1999) for cable lengths up to 201 m (660 feet). See <i>ERX Hardware Guide, Chapter 5, Cabling ERX Routers</i> for more information.
LEDs	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix B, Module LEDs</i>.
Alarms, errors, and events	<ul style="list-style-type: none"> See <i>Monitoring Interfaces in JunosE Physical Layer Configuration Guide, Chapter 1, Configuring Channelized T3 Interfaces</i>.

E3 ATM Module Combination

Line module label	E3 ATM
I/O module label	E3 I/O
Number of I/O ports	<ul style="list-style-type: none"> 3
Software release	<ul style="list-style-type: none"> First supported: 11.0 Final supported: 7.1.x
Description	<ul style="list-style-type: none"> 60 W Unchannelized E3 for ATM
Type	<ul style="list-style-type: none"> Non-ASIC
Capability	<ul style="list-style-type: none"> ATM/AAL5
Software features	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix A, Module Protocol Support</i> for information about the layer 2 and layer 3 protocols and applications that this module combination supports.
Model compatibility	<ul style="list-style-type: none"> ERX7xx models ERX1410 router
SRP module compatibility	<ul style="list-style-type: none"> SRP-5G SRP-5G+ SRP-10G
Module redundancy support	<ul style="list-style-type: none"> 1:N redundancy
Cables and connectors	<ul style="list-style-type: none"> BNC 75-ohm connector The transmitted signal complies with ITUT G.703, Physical/electrical characteristics of hierarchical digital interfaces (November 2001) for cable lengths from 0–137 m (0–450 feet). See <i>ERX Hardware Guide, Chapter 5, Cabling ERX Routers</i> for more information.
LEDs	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix B, Module LEDs</i>.
Alarms, errors, and events	<ul style="list-style-type: none"> See <i>Monitoring Interfaces</i> in the <i>Configuring T3 and E3 Interfaces</i> chapter of the <i>JunosE Physical Layer Configuration Guide</i> for Release 8.0.x and earlier.

E3 Frame Module Combination (3 Ports)

Line module label	E3 FRAME
I/O module label	E3 I/O
Number of I/O ports	<ul style="list-style-type: none"> • 3
Software release	<ul style="list-style-type: none"> • First supported: 1.1.0 • Final supported: 7.0.x
Description	<ul style="list-style-type: none"> • 60 W • Unchannelized E3 for Frame
Type	<ul style="list-style-type: none"> • Non-ASIC
Capability	<ul style="list-style-type: none"> • E3 • HDLC framing
Software features	<ul style="list-style-type: none"> • See <i>ERX Module Guide, Appendix A, Module Protocol Support</i> for information about the layer 2 and layer 3 protocols and applications that this module combination supports.
Model compatibility	<ul style="list-style-type: none"> • ERX7xx models • ERX1410 router
SRP module compatibility	<ul style="list-style-type: none"> • SRP-5G • SRP-5G+ • SRP-10G
Module redundancy support	<ul style="list-style-type: none"> • 1:N redundancy
Cables and connectors	<ul style="list-style-type: none"> • BNC 75-ohm connector • The transmitted signal complies with ITUT G.703, Physical/electrical characteristics of hierarchical digital interfaces (November 2001) for cable lengths from 0–137 m (0–450 feet). • See <i>ERX Hardware Guide, Chapter 5, Cabling ERX Routers</i> for more information.
LEDs	<ul style="list-style-type: none"> • See <i>ERX Module Guide, Appendix B, Module LEDs</i>.
Alarms, errors, and events	<ul style="list-style-type: none"> • See <i>Monitoring Interfaces</i> in the <i>Configuring T3 and E3 Interfaces</i> chapter of the <i>JunosE Physical Layer Configuration Guide</i> for Release 8.0.x and earlier.

E3 Frame Module Combination (12 Ports)

Line module label	COCX-F3
I/O module label	E3-12 FRAME I/O
Number of I/O ports	<ul style="list-style-type: none"> 12
Software release	<ul style="list-style-type: none"> First supported: 4.0.2 Final supported: 14.0.x
Description	<ul style="list-style-type: none"> 135 W Unchannelized E3 for Frame
Type	<ul style="list-style-type: none"> EFA ASIC
Capability	<ul style="list-style-type: none"> E3 HDLC framing
Software features	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix A, Module Protocol Support</i> for information about the layer 2 and layer 3 protocols and applications that this module combination supports.
Model compatibility	<ul style="list-style-type: none"> ERX7xx models ERX14xx models ERX310 router
SRP module compatibility	<ul style="list-style-type: none"> SRP-5G+ SRP-10G SRP-40G SRP-40G PLUS SRP-SE10G
Module redundancy support	<ul style="list-style-type: none"> 1:N redundancy NOTE: Line module redundancy is not supported on the ERX310 router.
Cables and connectors	<ul style="list-style-type: none"> BT43 SMB connector Cable that adapts to 75-ohm BNC is available. The transmitted signal complies with ITUT G.703, Physical/electrical characteristics of hierarchical digital interfaces (November 2001) for cable lengths from 0–137 m (0–450 feet). See <i>ERX Hardware Guide, Chapter 5, Cabling ERX Routers</i> for more information.
LEDs	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix B, Module LEDs</i>.
Alarms, errors, and events	<ul style="list-style-type: none"> See <i>Monitoring Interfaces in JunosE Physical Layer Configuration Guide, Chapter 2, Configuring T3 and E3 Interfaces</i>.

FE-2 Module Combination (2 Ports)

Line module label	FE-2
I/O module label	FE-2 I/O
Number of I/O ports	<ul style="list-style-type: none"> 2
Software release	<ul style="list-style-type: none"> First supported: 13.0 Last supported: 7.0.x
Description	<ul style="list-style-type: none"> 60 W Fast Ethernet
Type	<ul style="list-style-type: none"> Non-ASIC
Capability	<ul style="list-style-type: none"> IEEE 802.3 standards compliance 10/100Base-T
Software features	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix A, Module Protocol Support</i> for information about the layer 2 and layer 3 protocols and applications that this module combination supports.
Model compatibility	<ul style="list-style-type: none"> ERX7xx models ERX1410 router
SRP module compatibility	<ul style="list-style-type: none"> SRP-5G SRP-5G+ SRP-10G
Module redundancy support	<ul style="list-style-type: none"> Not applicable
Cables and connectors	<ul style="list-style-type: none"> Accepts up to two RJ-45 connectors. For 10-Mbps operation, use CAT 3, 4, or 5 UTP cable. For 100-Mbps operation, use only CAT 5 UTP cable. The transmitted signal complies with IEEE 802.3/802.3u for cable lengths up to 100 m (328 feet). See <i>ERX Hardware Guide, Chapter 5, Cabling ERX Routers</i> for more information.
LEDs	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix B, Module LEDs</i>.
Alarms, errors, and events	<ul style="list-style-type: none"> See <i>Monitoring Ethernet Interfaces</i> in the <i>Configuring Ethernet Interfaces</i> chapter of the <i>JunosE Physical Layer Configuration Guide</i> for Release 8.0.x and earlier.

FE-8 Module Combination (8 Ports) (128 MB)

This module combination is no longer supported because the line module has reached end-of-life. However, the I/O module is still supported.

Line module label	GE/FE
I/O module label	FE-8 I/O
Number of I/O ports	<ul style="list-style-type: none"> 8
Software release	<ul style="list-style-type: none"> First supported: 2.0.0 Final supported: 5.2.x
Description	<ul style="list-style-type: none"> 130 W Fast Ethernet
Type	<ul style="list-style-type: none"> ASIC
Capability	<ul style="list-style-type: none"> IEEE 802.3 standards compliance 10/100Base-T
Software features	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix A, Module Protocol Support</i> for information about the layer 2 and layer 3 protocols and applications that this module combination supports.
Model compatibility	<ul style="list-style-type: none"> ERX7xx models ERX14xx models ERX310 router
SRP module compatibility	<ul style="list-style-type: none"> SRP-5G+ SRP-10G SRP-40G SRP-40G PLUS SRP-SE10G
Module redundancy support	<ul style="list-style-type: none"> Not applicable
Cables and connectors	<ul style="list-style-type: none"> RJ-45 connectors For 10-Mbps operation, use CAT 3, 4, or 5 UTP cable. For 100-Mbps operation, use only CAT 5 UTP cable. The transmitted signal complies with IEEE 802.3/802.3u for cable lengths up to 100 m (328 feet). See <i>ERX Hardware Guide, Chapter 5, Cabling ERX Routers</i> for more information.
LEDs	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix B, Module LEDs</i>.
Alarms, errors, and events	<ul style="list-style-type: none"> See <i>Monitoring Ethernet Interfaces</i> in the <i>Configuring Ethernet Interfaces</i> chapter of the <i>JunosE Physical Layer Configuration Guide</i> for Release 8.0.x and earlier.

GE 1000Base-LH Module Combination (1 Port) (128 MB)

This module combination is no longer supported because the line module has reached end-of-life. However, the I/O module is still supported.

Line module label	GE/FE
I/O module label	GE I/O SFP
Number of I/O ports	<ul style="list-style-type: none"> 1 active, 1 redundant
Software release	<ul style="list-style-type: none"> First supported: 2.0.0 Final supported: 5.2.x
Description	<ul style="list-style-type: none"> 130 W Gigabit Ethernet The GE SFP I/O module uses a range of small form-factor pluggable (SFP) transceivers to support different modes and cable lengths. The transceivers on this GE I/O module are 1000Base-LX/LH compliant.
Type	<ul style="list-style-type: none"> ASIC
Capability	<ul style="list-style-type: none"> Ethernet (IEEE 802.3z) 1000Base-LH
Software features	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix A, Module Protocol Support</i> for information about the layer 2 and layer 3 protocols and applications that this module combination supports.
Model compatibility	<ul style="list-style-type: none"> ERX7xx models ERX14xx models ERX310 router
SRP module compatibility	<ul style="list-style-type: none"> SRP-5G+ SRP-10G SRP-40G SRP-40G PLUS SRP-SE10G
Module redundancy support	<ul style="list-style-type: none"> Not applicable

Cables and connectors

- LC full duplex
- Tx power:
 - min: -9.5 dBm
 - max: -3 dBm
- Center wavelength: 1300 nm
- Rx input power:
 - min: -20 dBm
 - max: -3 dBm
- Rated for 10 km (6.2 miles) over 10-micron core cable
- See *ERX Hardware Guide, Chapter 5, Cabling ERX Routers* for more information.

LEDs

- See *ERX Module Guide, Appendix B, Module LEDs*.

Alarms, errors, and events

- See *Monitoring Ethernet Interfaces* in the *Configuring Ethernet Interfaces* chapter of the *JunosE Physical Layer Configuration Guide* for Release 8.0.x and earlier.
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GE 1000Base-SX Module Combination (1 Port) (128 MB)

This module combination is no longer supported because the line module has reached end-of-life. However, the I/O module is still supported.

Line module label	GE/FE
I/O module label	GE I/O SFP
Number of I/O ports	<ul style="list-style-type: none"> 1 active, 1 redundant
Software release	<ul style="list-style-type: none"> First supported: 2.0.0 Final supported: 5.2.x
Description	<ul style="list-style-type: none"> 130 W Gigabit Ethernet The GE SFP I/O module uses a range of small form-factor pluggable (SFP) transceivers to support different modes and cable lengths. The transceivers on this GE I/O module are 1000Base-SX compliant.
Type	<ul style="list-style-type: none"> ASIC
Capability	<ul style="list-style-type: none"> Ethernet (IEEE 802.3z) 1000Base-SX
Software features	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix A, Module Protocol Support</i> for information about the layer 2 and layer 3 protocols and applications that this module combination supports.
Model compatibility	<ul style="list-style-type: none"> ERX7xx models ERX14xx models ERX310 router
SRP module compatibility	<ul style="list-style-type: none"> SRP-5G+ SRP-10G SRP-40G SRP-40G PLUS SRP-SE10G
Module redundancy support	<ul style="list-style-type: none"> Not applicable

Cables and connectors

- LC full duplex
- Tx power:
 - min: -9.5 dBm
 - max: -4 dBm
- Center wavelength: 850 nm
- Rx input power:
 - min: -17 dBm
 - max: -3 dBm
- Rated for 275 m (300 yards) over 62.5-micron core cable
- Rated for 550 m (601 yards) over 50-micron core cable
- See *ERX Hardware Guide, Chapter 5, Cabling ERX Routers* for more information.

LEDs

- See *ERX Module Guide, Appendix B, Module LEDs*.

Alarms, errors, and events

- See *Monitoring Ethernet Interfaces* in the *Configuring Ethernet Interfaces* chapter of the *JunosE Physical Layer Configuration Guide* for Release 8.0.x and earlier.
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GE 1000Base-ZX Module Combination (1 Port) (128 MB)

This module combination is no longer supported because the line module has reached end-of-life. However, the I/O module is still supported.

Line module label	GE/FE
I/O module label	GE I/O SFP
Number of I/O ports	<ul style="list-style-type: none"> 1 active, 1 redundant
Software release	<ul style="list-style-type: none"> First supported: 2.0.0 Final supported: 5.2.x
Description	<ul style="list-style-type: none"> 130 W Gigabit Ethernet The GE SFP I/O module uses a range of small form-factor pluggable (SFP) transceivers to support different modes and cable lengths. The transceivers on this GE I/O module are 1000Base-ZX compliant.
Type	<ul style="list-style-type: none"> ASIC
Capability	<ul style="list-style-type: none"> Ethernet (IEEE 802.3z) 1000Base-ZX
Software features	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix A, Module Protocol Support</i> for information about the layer 2 and layer 3 protocols and applications that this module combination supports.
Model compatibility	<ul style="list-style-type: none"> ERX7xx models ERX14xx models ERX310 router
SRP module compatibility	<ul style="list-style-type: none"> SRP-5G+ SRP-10G SRP-40G SRP-40G PLUS SRP-SE10G
Module redundancy support	<ul style="list-style-type: none"> Not applicable

Cables and connectors

- LC full duplex
- Tx power:
 - min: -3 dBm
 - max: 2 dBm
- Center wavelength: 1550 nm
- Rx input power:
 - min: -23 dBm
 - max: -3 dBm
- Rated for 70 km (43.4 miles) over 10-micron core cable
- See *ERX Hardware Guide, Chapter 5, Cabling ERX Routers* for more information.

LEDs

- See *ERX Module Guide, Appendix B, Module LEDs*.

Alarms, errors, and events

- See *Monitoring Ethernet Interfaces* in the *Configuring Ethernet Interfaces* chapter of the *JunosE Physical Layer Configuration Guide* for Release 8.0.x and earlier.
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HSSI Module Combination

Line module label	HSSI-3F
I/O module label	HSSI-3 I/O
Number of I/O ports	<ul style="list-style-type: none"> 3
Software release	<ul style="list-style-type: none"> First supported: 3.1.0 Final supported: 7.3.x
Description	<ul style="list-style-type: none"> 60 W High-speed serial interface
Type	<ul style="list-style-type: none"> Non-ASIC
Capability	<ul style="list-style-type: none"> Up to 44.736 MHz data rate HDLC Framing
Software features	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix A, Module Protocol Support</i> for information about the layer 2 and layer 3 protocols and applications that this module combination supports.
Model compatibility	<ul style="list-style-type: none"> ERX7xx models ERX1410 router
SRP module compatibility	<ul style="list-style-type: none"> SRP-5G SRP-5G+ SRP-10G
Module redundancy support	<ul style="list-style-type: none"> Not applicable
Cables and connectors	<ul style="list-style-type: none"> Standard HSSI connector: 2-row, 50-pin, receptacle header with rails and latch blocks 50 feet (15.24 m) maximum cable length See <i>ERX Hardware Guide, Chapter 5, Cabling ERX Routers</i> for more information.
LEDs	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix B, Module LEDs</i>.
Alarms, errors, and events	<ul style="list-style-type: none"> See <i>Monitoring Interfaces</i> in the <i>Configuring HSSIs</i> chapter of the <i>JunosE Physical Layer Configuration Guide</i> for Release 8.0.x and earlier.

IPSec Service Module Combination

Line module label	IPSEC SERVICE
I/O module label	No I/O module
Number of I/O ports	<ul style="list-style-type: none"> Not applicable
Software release	<ul style="list-style-type: none"> First supported: 4.0.2 Final supported: 14.0.x
Description	<ul style="list-style-type: none"> 130 W IPSec Tunnel Service
Type	<ul style="list-style-type: none"> EFA ASIC
Capability	<ul style="list-style-type: none"> IPSec tunnels
Software features	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix A, Module Protocol Support</i> for information about the layer 2 and layer 3 protocols and applications that this module combination supports.
Model compatibility	<ul style="list-style-type: none"> ERX7xx models ERX14xx models ERX310 router
SRP module compatibility	<ul style="list-style-type: none"> SRP-5G+ SRP-10G SRP-40G SRP-40G PLUS SRP-SE10G
Module redundancy support	<ul style="list-style-type: none"> Multiple IPSec Service modules provide redundancy.
Cables and connectors	<ul style="list-style-type: none"> Not applicable
LEDs	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix B, Module LEDs</i>.
Alarms, errors, and events	<ul style="list-style-type: none"> See <i>Monitoring Tunnel-Service Interfaces</i> in <i>JunosE Physical Layer Configuration Guide, Chapter 6, Managing Tunnel-Service and IPSec-Service Interfaces</i>.

OC3 (Dual-Port) Multimode Module Combination

Line module label	OC3
I/O module label	OC3 I/O MULTI MODE
Software release	<ul style="list-style-type: none">• First supported: 1.0.0• Final supported: 4.1.x
Description	<ul style="list-style-type: none">• Obsolete, no longer supported

OC3 (Dual-Port) Single-Mode Module Combination

Line module label	OC3
I/O module label	OC3 I/O SINGLE MODE
Software release	<ul style="list-style-type: none">• First supported: 1.0.0• Final supported: 4.1.x
Description	<ul style="list-style-type: none">• Obsolete, no longer supported

OC3/STM1 ATM Multimode Without APS/MSP Redundancy Module Combination (128 MB)

This module combination is no longer supported because the line module has reached end-of-life. However, the I/O module is still supported.

Line module label	OCx/STMx ATM or OCx/STMx /DS3-ATM
I/O module label	OC3-4 I/O MULTI MODE
Number of I/O ports	<ul style="list-style-type: none"> 4
Software release	<ul style="list-style-type: none"> First supported: 2.0.0 Final supported: 5.2.x
Description	<ul style="list-style-type: none"> 130 W Unchannelized, concatenated OC3/STM1 for ATM
Type	<ul style="list-style-type: none"> ASIC
Capability	<ul style="list-style-type: none"> OC3/STM1 ATM:AAL5
Software features	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix A, Module Protocol Support</i> for information about the layer 2 and layer 3 protocols and applications that this module combination supports.
Model compatibility	<ul style="list-style-type: none"> ERX7xx models ERX14xx models ERX310 router
SRP module compatibility	<ul style="list-style-type: none"> SRP-5G+ SRP-10G SRP-40G SRP-40G PLUS SRP-SE10G
Module redundancy support	<ul style="list-style-type: none"> 1:N redundancy NOTE: Line module redundancy is not supported on the ERX310 router.

Cables and connectors

- SC full duplex connector
- Tx power:
 - min: -19 dBm
 - max: -14 dBm
- Center wavelength: 1310 nm
- Rx input power:
 - min: -30 dBm
 - max: -14 dBm
- Rated for 2 km (1.2 miles) over 62.5-micron core cable with an optical loss of 0–9 dB or 50-micron core cable with an optical loss of 7 dB
- See *ERX Hardware Guide, Chapter 5, Cabling ERX Routers* for more information.

LEDs

- See *ERX Module Guide, Appendix B, Module LEDs*.

Alarms, errors, and events

- See *Monitoring SONET/SDH Interfaces* in the *Configuring Unchannelized OCx/STMx Interfaces* chapter of the *JunosE Physical Layer Configuration Guide* for Release 8.0.x and earlier.
-

OC3/STM1 ATM Single-Mode Intermediate Reach Without APS/MSP Redundancy Module Combination (128 MB)

This module combination is no longer supported because the line module has reached end-of-life. However, the I/O module is still supported.

Line module label	OCx/STMx ATM or OCx/STMx /DS3-ATM
I/O module label	OC3-4 I/O SINGLE MODE
Number of I/O ports	<ul style="list-style-type: none"> • 4
Software release	<ul style="list-style-type: none"> • First supported: 2.0.0 • Final supported: 5.2.x
Description	<ul style="list-style-type: none"> • 130 W • Unchannelized, concatenated OC3/STM1 for ATM
Type	<ul style="list-style-type: none"> • ASIC
Capability	<ul style="list-style-type: none"> • OC3/STM1 • ATM/AAL5
Software features	<ul style="list-style-type: none"> • See <i>ERX Module Guide, Appendix A, Module Protocol Support</i> for information about the layer 2 and layer 3 protocols and applications that this module combination supports.
Model compatibility	<ul style="list-style-type: none"> • ERX7xx models • ERX14xx models • ERX310 router
SRP module compatibility	<ul style="list-style-type: none"> • SRP-5G+ • SRP-10G • SRP-40G • SRP-40G PLUS • SRP-SE10G
Module redundancy support	<ul style="list-style-type: none"> • 1:N redundancy • NOTE: Line module redundancy is not supported on the ERX310 router.

Cables and connectors

- SC full duplex
- Tx power:
 - min: -15 dBm
 - max: -8 dBm
- Center wavelength: 1310 nm
- Rx input power:
 - min: -31 dBm
 - max: -8 dBm
- Rated for 15 km (9.3 miles) of 9-micron core cable
- See *ERX Hardware Guide, Chapter 5, Cabling ERX Routers* for more information.

LEDs

- See *ERX Module Guide, Appendix B, Module LEDs*.

Alarms, errors, and events

- See *Monitoring SONET/SDH Interfaces* in the *Configuring Unchannelized OCx/STMx Interfaces* chapter of the *JunosE Physical Layer Configuration Guide* for Release 8.0.x and earlier.
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OC3/STM1 ATM Single-Mode Long Reach Without APS/MSP Redundancy Module Combination (128 MB)

This module combination is no longer supported because the line module has reached end-of-life. However, the I/O module is still supported.

Line module label	OCx/STMx ATM or OCx/STMx /DS3-ATM
I/O module label	OC3-4 I/O LONG HAUL
Number of I/O ports	<ul style="list-style-type: none"> 4
Software release	<ul style="list-style-type: none"> First supported: 2.0.0 Final supported: 5.2.x
Description	<ul style="list-style-type: none"> 130 W Unchannelized, concatenated OC3/STM1 for ATM
Type	<ul style="list-style-type: none"> ASIC
Capability	<ul style="list-style-type: none"> OC3/STM1 ATM/AAL5
Software features	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix A, Module Protocol Support</i> for information about the layer 2 and layer 3 protocols and applications that this module combination supports.
Model compatibility	<ul style="list-style-type: none"> ERX7xx models ERX14xx models ERX310 router
SRP module compatibility	<ul style="list-style-type: none"> SRP-5G+ SRP-10G SRP-40G SRP-40G PLUS SRP-SE10G
Module redundancy support	<ul style="list-style-type: none"> 1:N redundancy NOTE: Line module redundancy is not supported on the ERX310 router.

Cables and connectors

- SC full duplex
- Tx power:
 - min: -5.0 dBm
 - max: 0 dBm
- Center wavelength: 1310 nm
- Rx input power:
 - min: -34 dBm
 - max: -7 dBm
- Rated for 40 km (24.8 miles) of 9-micron core cable
- See *ERX Hardware Guide, Chapter 5, Cabling ERX Routers* for more information.

LEDs

- See *ERX Module Guide, Appendix B, Module LEDs*.

Alarms, errors, and events

- See *Monitoring SONET/SDH Interfaces* in the *Configuring Unchannelized OCx/STMx Interfaces* chapter of the *JunosE Physical Layer Configuration Guide* for Release 8.0.x and earlier.
-

OC12/STM4 ATM Multimode Without APS/MSP Redundancy Module Combination (128 MB)

This module combination is no longer supported because the line module has reached end-of-life. However, the I/O module is still supported.

Line module label	OCx/STMx ATM or OCx/STMx /DS3-ATM
I/O module label	OC12 STM4 I/O MULTI MODE
Number of I/O ports	<ul style="list-style-type: none"> 1
Software release	<ul style="list-style-type: none"> First supported: 2.0.0 Final supported: 5.2.x
Description	<ul style="list-style-type: none"> 130 W Unchannelized, concatenated OC12/STM4 for ATM
Type	<ul style="list-style-type: none"> ASIC
Capability	<ul style="list-style-type: none"> OC12/STM4 ATM/AAL5
Software features	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix A, Module Protocol Support</i> for information about the layer 2 and layer 3 protocols and applications that this module combination supports.
Model compatibility	<ul style="list-style-type: none"> ERX7xx models ERX14xx models ERX310 router
SRP module compatibility	<ul style="list-style-type: none"> SRP-5G+ SRP-10G SRP-40G SRP-40G PLUS SRP-SE10G
Module redundancy support	<ul style="list-style-type: none"> 1:N redundancy NOTE: Line module redundancy is not supported on the ERX310 router.

Cables and connectors

- SC full duplex
- Tx power:
 - min: -19 dBm
 - max: -14 dBm
- Center wavelength: 1310 nm
- Rx input power:
 - min: -30 dBm
 - max: -14 dBm
- Rated for 2 km (1.2 miles) over 62.5-micron core cable with an optical loss of 0–9 dB or 50-micron core cable with an optical loss of 7 dB
- See *ERX Hardware Guide, Chapter 5, Cabling ERX Routers* for more information.

LEDs

- See *ERX Module Guide, Appendix B, Module LEDs*.

Alarms, errors, and events

- See *Monitoring SONET/SDH Interfaces* in the *Configuring Unchannelized OCx/STMx Interfaces* chapter of the *JunosE Physical Layer Configuration Guide* for Release 8.0.x and earlier.
-

OC12/STM4 ATM Single-Mode Intermediate Reach Without APS/MSP Redundancy Module Combination (128 MB)

This module combination is no longer supported because the line module has reached end-of-life. However, the I/O module is still supported.

Line module label	OCx/STMx ATM or OCx/STMx /DS3-ATM
I/O module label	OC12 STM4 I/O SINGLE MODE
Number of I/O ports	<ul style="list-style-type: none"> 1
Software release	<ul style="list-style-type: none"> First supported: 2.0.0 Final supported: 5.2.x
Description	<ul style="list-style-type: none"> 130 W Unchannelized, concatenated OC12/STM4 for ATM
Type	<ul style="list-style-type: none"> ASIC
Capability	<ul style="list-style-type: none"> OC12/STM4 ATM/AAL5
Software features	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix A, Module Protocol Support</i> for information about the layer 2 and layer 3 protocols and applications that this module combination supports.
Model compatibility	<ul style="list-style-type: none"> ERX7xx models ERX14xx models ERX310 router
SRP module compatibility	<ul style="list-style-type: none"> SRP-5G+ SRP-10G SRP-40G SRP-40G PLUS SRP-SE10G
Module redundancy support	<ul style="list-style-type: none"> 1:N redundancy NOTE: Line module redundancy is not supported on the ERX310 router.

Cables and connectors

- SC full duplex
- Tx power:
 - min: -15 dBm
 - max: -8 dBm
- Center wavelength: 1310 nm
- Rx input power:
 - min: -31 dBm
 - max: -8 dBm
- Rated for 15 km (9.3 miles) of 9-micron core cable
- See *ERX Hardware Guide, Chapter 5, Cabling ERX Routers* for more information.

LEDs

- See *ERX Module Guide, Appendix B, Module LEDs*.

Alarms, errors, and events

- See *Monitoring SONET/SDH Interfaces* in the *Configuring Unchannelized OCx/STMx Interfaces* chapter of the *JunosE Physical Layer Configuration Guide* for Release 8.0.x and earlier.
-

OC12/STM4 ATM Single-Mode Long Reach Without APS/MSP Redundancy Module Combination (128 MB)

This module combination is no longer supported because the line module has reached end-of-life. However, the I/O module is still supported.

Line module label	OCx/STMx ATM or OCx/STMx /DS3-ATM
I/O module label	OC12 STM4 I/O LONG HAUL
Number of I/O ports	<ul style="list-style-type: none"> 1
Software release	<ul style="list-style-type: none"> First supported: 2.0.0 Final supported: 5.2.x
Description	<ul style="list-style-type: none"> 130 W Unchannelized, concatenated OC12/STM4 for ATM
Type	<ul style="list-style-type: none"> ASIC
Capability	<ul style="list-style-type: none"> OC12/STM4 ATM/AAL5
Software features	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix A, Module Protocol Support</i> for information about the layer 2 and layer 3 protocols and applications that this module combination supports.
Model compatibility	<ul style="list-style-type: none"> ERX7xx models ERX14xx models ERX310 router
SRP module compatibility	<ul style="list-style-type: none"> SRP-5G+ SRP-10G SRP-40G SRP-40G PLUS SRP-SE10G
Module redundancy support	<ul style="list-style-type: none"> 1:N redundancy NOTE: Line module redundancy is not supported on the ERX310 router.

Cables and connectors

- SC full duplex
- Tx power:
 - min: -5.0 dBm
 - max: 0 dBm
- Center wavelength: 1310 nm
- Rx input power:
 - min: -34 dBm
 - max: -7 dBm
- Fiber type: 9-micron core
- Rated for 40 km (24.8 miles) of 9-micron core cable
- See *ERX Hardware Guide, Chapter 5, Cabling ERX Routers* for more information.

LEDs

- See *ERX Module Guide, Appendix B, Module LEDs*.

Alarms, errors, and events

- See *Monitoring SONET/SDH Interfaces* in the *Configuring Unchannelized OCx/STMx Interfaces* chapter of the *JunosE Physical Layer Configuration Guide* for Release 8.0.x and earlier.
-

SRP-5G Module Combination (512 GB)

Line module label	SRP-5G
I/O module label	SRP I/O
Number of I/O ports	<ul style="list-style-type: none"> 7
Software release	<ul style="list-style-type: none"> First supported: 1.0.0 Final supported: 5.2.x
Description	<ul style="list-style-type: none"> 100 W Switch route processor (5 Gbps)
Type	<ul style="list-style-type: none"> Not applicable
Capability	<ul style="list-style-type: none"> Ethernet (IEEE 802.3) 10/100Base-T RS-232
Software features	<ul style="list-style-type: none"> Not applicable
Model compatibility	<ul style="list-style-type: none"> ERX705 router
SRP module compatibility	<ul style="list-style-type: none"> SRP-5G
Module redundancy support	<ul style="list-style-type: none"> 1:1 redundancy
Cables and connectors	<ul style="list-style-type: none"> Terminal blocks BNC, 75-ohm Wire wrap posts RJ-45 RS-232 (DB-9) See <i>ERX Hardware Guide, Chapter 5, Cabling ERX Routers</i> for more information.
LEDs	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix B, Module LEDs</i>.
Alarms, errors, and events	<ul style="list-style-type: none"> See <i>Monitoring Modules in JunosE System Basics Configuration Guide, Chapter 6, Managing Modules</i>.

SRP-5G+ Module Combination (512 MB)

Line module label	SRP-5G+
I/O module label	SRP I/O
Number of I/O ports	<ul style="list-style-type: none"> 7
Software release	<ul style="list-style-type: none"> First supported: 3.0.2 Final supported: 8.0.x
Description	<ul style="list-style-type: none"> 125 W Switch route processor (5 Gbps)
Type	<ul style="list-style-type: none"> Not applicable
Capability	<ul style="list-style-type: none"> Ethernet (IEEE 802.3) 10/100Base-T RS-232
Software features	<ul style="list-style-type: none"> Not applicable
Model compatibility	<ul style="list-style-type: none"> ERX705 router
SRP module compatibility	<ul style="list-style-type: none"> SRP-5G+
Module redundancy support	<ul style="list-style-type: none"> 1:1 redundancy
Cables and connectors	<ul style="list-style-type: none"> Terminal blocks BNC, 75-ohm Wire wrap posts RJ-45 RS-232 (DB-9) See <i>ERX Hardware Guide, Chapter 5, Cabling ERX Routers</i> for more information.
LEDs	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix B, Module LEDs</i>.
Alarms, errors, and events	<ul style="list-style-type: none"> See <i>Monitoring Modules in JunosE System Basics Configuration Guide, Chapter 6, Managing Modules</i>.

SRP-5G+ Module Combination (2-GB Memory)

Line module label	SRP-5G+
I/O module label	SRP I/O
Number of I/O ports	<ul style="list-style-type: none"> 7
Software release	<ul style="list-style-type: none"> First supported: 4.1.3 or later 4.1.x release, 5.0.4 or later 5.0.x release, 5.1.2 or higher-numbered release, 5.2.0 Final supported: 14.0.x
Description	<ul style="list-style-type: none"> 125 W Switch route processor (5 Gbps) Has a minimum of 2 GB of error checking and correction (ECC) memory with a 1-GB nonvolatile storage (NVS) card. The 512-MB version has reached end-of-life.
Type	<ul style="list-style-type: none"> Not applicable
Capability	<ul style="list-style-type: none"> Ethernet (IEEE 802.3) 10/100Base-T RS-232
Software features	<ul style="list-style-type: none"> Not applicable
Model compatibility	<ul style="list-style-type: none"> ERX705 router
SRP module compatibility	<ul style="list-style-type: none"> SRP-5G+
Module redundancy support	<ul style="list-style-type: none"> 1:1 redundancy
Cables and connectors	<ul style="list-style-type: none"> Terminal blocks BNC, 75-ohm Wire wrap posts RJ-45 RS-232 (DB-9) See <i>ERX Hardware Guide, Chapter 5, Cabling ERX Routers</i> for more information.
LEDs	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix B, Module LEDs</i>.
Alarms, errors, and events	<ul style="list-style-type: none"> See <i>Monitoring Modules in JunosE System Basics Configuration Guide, Chapter 6, Managing Modules</i>.

SRP-10G Module Combination (512 MB)

Line module label	SRP-10G
I/O module label	SRP I/O
Number of I/O ports	<ul style="list-style-type: none">• 7
Software release	<ul style="list-style-type: none">• First supported: 1.1.0• Final supported: 5.2.x
Description	<ul style="list-style-type: none">• 125 W• Switch route processor (10 Gbps)
Type	<ul style="list-style-type: none">• Not applicable
Capability	<ul style="list-style-type: none">• Ethernet (IEEE 802.3)• 10/100Base-T• RS-232
Software features	<ul style="list-style-type: none">• Not applicable
Model compatibility	<ul style="list-style-type: none">• ERX710 router• ERX1410 router
SRP module compatibility	<ul style="list-style-type: none">• SRP-10G
Module redundancy support	<ul style="list-style-type: none">• 1:1 redundancy
Cables and connectors	<ul style="list-style-type: none">• Terminal blocks• BNC, 75-ohm• Wire wrap posts• RJ-45• RS-232 (DB-9)• See <i>ERX Hardware Guide, Chapter 5, Cabling ERX Routers</i> for more information.
LEDs	<ul style="list-style-type: none">• See <i>ERX Module Guide, Appendix B, Module LEDs</i>.
Alarms, errors, and events	<ul style="list-style-type: none">• See <i>Monitoring Modules in JunosE System Basics Configuration Guide, Chapter 6, Managing Modules</i>.

SRP-10G Module Combination (1-GB Memory)

Line module label	SRP-10G
I/O module label	SRP I/O
Number of I/O ports	<ul style="list-style-type: none"> 7
Software release	<ul style="list-style-type: none"> First supported: 4.1.3 or later 4.1.x release, 5.0.4 or later 5.0.x release, 5.1.2 or higher-numbered release, 5.2.0 Final supported: 8.0.x
Description	<ul style="list-style-type: none"> 125 W Switch route processor (10 Gbps) Has a minimum of 1 GB of error checking and correction (ECC) memory with a 1-GB nonvolatile storage (NVS) card.
Type	<ul style="list-style-type: none"> Not applicable
Capability	<ul style="list-style-type: none"> Ethernet (IEEE 802.3) 10/100Base-T RS-232
Software features	<ul style="list-style-type: none"> Not applicable
Model compatibility	<ul style="list-style-type: none"> ERX710 router ERX1410 router
SRP module compatibility	<ul style="list-style-type: none"> SRP-10G
Module redundancy support	<ul style="list-style-type: none"> 1:1 redundancy
Cables and connectors	<ul style="list-style-type: none"> Terminal blocks BNC, 75-ohm Wire wrap posts RJ-45 RS-232 (DB-9) See <i>ERX Hardware Guide, Chapter 5, Cabling ERX Routers</i> for more information.
LEDs	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix B, Module LEDs</i>.
Alarms, errors, and events	<ul style="list-style-type: none"> See <i>Monitoring Modules in JunosE System Basics Configuration Guide, Chapter 6, Managing Modules</i>.

SRP-SE10G Module Combination (512 MB)

Line module label	SRP-SE10G
I/O module label	SRP-SE I/O
Number of I/O ports	<ul style="list-style-type: none">• 2
Software release	<ul style="list-style-type: none">• First supported: 5.1.0• Final supported: 7.1.x• Does not operate with JunosE Release 5.3.0 or higher
Description	<ul style="list-style-type: none">• 35 W• Switch route processor for ERX310 router only (10 Gbps)
Type	<ul style="list-style-type: none">• Not applicable
Capability	<ul style="list-style-type: none">• Ethernet (IEEE 802.3)• 10/100Base-T• RS-232
Software features	<ul style="list-style-type: none">• Not applicable
Model compatibility	<ul style="list-style-type: none">• ERX310 router
SRP module compatibility	<ul style="list-style-type: none">• SRP-SE10G
Module redundancy support	<ul style="list-style-type: none">• Not applicable
Cables and connectors	<ul style="list-style-type: none">• RJ-45• RS-232 (DB-9)• See <i>ERX Hardware Guide, Chapter 5, Cabling ERX Routers</i> for more information.
LEDs	<ul style="list-style-type: none">• See <i>ERX Module Guide, Appendix B, Module LEDs</i>.
Alarms, errors, and events	<ul style="list-style-type: none">• See <i>Monitoring Modules in JunosE System Basics Configuration Guide, Chapter 6, Managing Modules</i>.

SRP-40G Module Combination (512 MB)

Line module label	SRP-40G
I/O module label	SRP I/O
Number of I/O ports	<ul style="list-style-type: none"> 7
Software release	<ul style="list-style-type: none"> First supported: 3.4.1 Final supported: 5.2.x
Description	<ul style="list-style-type: none"> 210 W Switch route processor (40 Gbps)
Type	<ul style="list-style-type: none"> Not applicable
Capability	<ul style="list-style-type: none"> Ethernet (IEEE 802.3) 10/100Base-T RS-232
Software features	<ul style="list-style-type: none"> Not applicable
Model compatibility	<ul style="list-style-type: none"> ERX1440 router
SRP module compatibility	<ul style="list-style-type: none"> SRP-40G SRP-40G PLUS
Module redundancy support	<ul style="list-style-type: none"> 1:1 redundancy
Cables and connectors	<ul style="list-style-type: none"> Terminal blocks BNC, 75-ohm Wire wrap posts RJ-45 RS-232 (DB-9) See <i>ERX Hardware Guide, Chapter 5, Cabling ERX Routers</i> for more information.
LEDs	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix B, Module LEDs</i>.
Alarms, errors, and events	<ul style="list-style-type: none"> See <i>Monitoring Modules in JunosE System Basics Configuration Guide, Chapter 6, Managing Modules</i>.

SRP-40G PLUS Module Combination (1 GB)

Line module label	SRP-40G PLUS
I/O module label	SRP I/O
Number of I/O ports	<ul style="list-style-type: none"> 7
Software release	<ul style="list-style-type: none"> First supported: 4.0.0 Final supported: 7.1.x Has a minimum of 1 GB of error checking and correction (ECC) memory with a 1-GB nonvolatile storage (NVS) card.
Description	<ul style="list-style-type: none"> 210 W Switch route processor (40 Gbps)
Type	<ul style="list-style-type: none"> Not applicable
Capability	<ul style="list-style-type: none"> Ethernet (IEEE 802.3) 10/100Base-T RS-232
Software features	<ul style="list-style-type: none"> Not applicable
Model compatibility	<ul style="list-style-type: none"> ERX1440 router
SRP module compatibility	<ul style="list-style-type: none"> SRP-40G SRP-40G PLUS
Module redundancy support	<ul style="list-style-type: none"> 1:1 redundancy
Cables and connectors	<ul style="list-style-type: none"> Terminal blocks BNC BNC, 75-ohm Wire wrap posts RJ-45 RS-232 (DB-9) See <i>ERX Hardware Guide, Chapter 5, Cabling ERX Routers</i> for more information.
LEDs	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix B, Module LEDs</i>.
Alarms, errors, and events	<ul style="list-style-type: none"> See <i>Monitoring Modules in JunosE System Basics Configuration Guide, Chapter 6, Managing Modules</i>.

T3 ATM Module Combination (3 Ports)

Line module label	T3 ATM
I/O module label	CT3/T3 I/O
Number of I/O ports	<ul style="list-style-type: none"> 3
Software release	<ul style="list-style-type: none"> First supported: 1.1.0 Final supported: 7.0.x
Description	<ul style="list-style-type: none"> 60 W Unchannelized T3 for ATM
Type	<ul style="list-style-type: none"> Non-ASIC
Capability	<ul style="list-style-type: none"> ATM/AAL5
Software features	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix A, Module Protocol Support</i> for information about the layer 2 and layer 3 protocols and applications that this module combination supports.
Model compatibility	<ul style="list-style-type: none"> ERX7xx models ERX1410 router
SRP module compatibility	<ul style="list-style-type: none"> SRP-5G SRP-5G+ SRP-10G
Module redundancy support	<ul style="list-style-type: none"> 1:N redundancy
Cables and connectors	<ul style="list-style-type: none"> BNC 75-ohm connector The line interface unit supports two line buildouts: <ul style="list-style-type: none"> 0–68.5 m (0–225 feet) 69–137 m (226–450 feet) Signal strength is software controlled. The transmitted signal complies with ANSI T1.102-1993 Digital Hierarchy - Electrical Interfaces (1999) for cable lengths up to 201 m (660 feet).
LEDs	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix B, Module LEDs</i>.
Alarms, errors, and events	<ul style="list-style-type: none"> See <i>Monitoring Interfaces</i> in the <i>Configuring T3 and E3 Interfaces</i> chapter of the <i>JunosE Physical Layer Configuration Guide</i> for Release 8.0.x and earlier.

T3 ATM Module Combination (4 Ports) (128 MB)

This module combination is no longer supported because the line module has reached end-of-life. However, the I/O module is still supported.

Line module label	OCx/STMx ATM or OCx/STMx /DS3-ATM
I/O module label	4xDS3 ATM I/O
Number of I/O ports	<ul style="list-style-type: none"> • 4
Software release	<ul style="list-style-type: none"> • First supported: 4.1.0 • Final supported: 5.2.x
Description	<ul style="list-style-type: none"> • 130 W • Unchannelized T3 for ATM
Type	<ul style="list-style-type: none"> • ASIC
Capability	<ul style="list-style-type: none"> • ATM/AAL5
Software features	<ul style="list-style-type: none"> • See <i>ERX Module Guide, Appendix A, Module Protocol Support</i> for information about the layer 2 and layer 3 protocols and applications that this module combination supports.
Model compatibility	<ul style="list-style-type: none"> • ERX7xx models • ERX14xx models • ERX310 router
SRP module compatibility	<ul style="list-style-type: none"> • SRP-5G+ • SRP-10G • SRP-40G • SRP-40G PLUS • SRP-SE10G
Module redundancy support	<ul style="list-style-type: none"> • 1:N redundancy
Cables and connectors	<ul style="list-style-type: none"> • 75-ohm connector • The line interface unit supports two line buildouts: <ul style="list-style-type: none"> • 0–68.5 m (0–225 feet) • 69–137 m (226–450 feet) • Signal strength is software controlled. • The transmitted signal complies with ANSI T1.102-1993 Digital Hierarchy - Electrical Interfaces (1999) for cable lengths up to 201 m (660 feet).
LEDs	<ul style="list-style-type: none"> • See <i>ERX Module Guide, Appendix B, Module LEDs</i>.
Alarms, errors, and events	<ul style="list-style-type: none"> • See <i>Monitoring Interfaces</i> in the <i>Configuring T3 and E3 Interfaces</i> chapter of the <i>JunosE Physical Layer Configuration Guide</i> for Release 8.0.x and earlier.

T3 Frame Module Combination (3 Ports)

Line module label	T3 FRAME
I/O module label	CT3/T3 I/O
Number of I/O ports	<ul style="list-style-type: none"> 3
Software release	<ul style="list-style-type: none"> First supported: 11.0 Final supported: 7.0.x
Description	<ul style="list-style-type: none"> 60 W Unchannelized T3 for Frame
Type	<ul style="list-style-type: none"> Non-ASIC
Capability	<ul style="list-style-type: none"> DS3 Subrate DS3 HDLC framing
Software features	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix A, Module Protocol Support</i> for information about the layer 2 and layer 3 protocols and applications that this module combination supports.
Model compatibility	<ul style="list-style-type: none"> ERX7xx models ERX1410 router
SRP module compatibility	<ul style="list-style-type: none"> SRP-5G SRP-5G+ SRP-10G
Module redundancy support	<ul style="list-style-type: none"> 1:N redundancy
Cables and connectors	<ul style="list-style-type: none"> BNC 75-ohm connector The line interface unit supports two line buildouts: <ul style="list-style-type: none"> 0–68.5 m (0–225 feet) 69–137 m (226–450 feet) Signal strength is software controlled. The transmitted signal complies with ANSI T1.102-1993 Digital Hierarchy - Electrical Interfaces (1999) for cable lengths up to 201 m (660 feet).
LEDs	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix B, Module LEDs</i>.
Alarms, errors, and events	<ul style="list-style-type: none"> See <i>Monitoring Interfaces</i> in the <i>Configuring T3 and E3 Interfaces</i> chapter of the <i>JunosE Physical Layer Configuration Guide</i> for Release 8.0.x and earlier.

T3 Frame Module Combination (12 Ports)

Line module label	COCX-F3
I/O module label	CT3/T3 12 I/O
Number of I/O ports	<ul style="list-style-type: none"> 12
Software release	<ul style="list-style-type: none"> First supported: 4.0.2 Final supported: 14.0.x
Description	<ul style="list-style-type: none"> 135 W Unchannelized T3 for Frame
Type	<ul style="list-style-type: none"> EFA ASIC
Capability	<ul style="list-style-type: none"> DS3 Subrate DS3 HDLC framing
Software features	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix A, Module Protocol Support</i> for information about the layer 2 and layer 3 protocols and applications that this module combination supports.
Model compatibility	<ul style="list-style-type: none"> ERX7xx models ERX14xx models ERX310 router
SRP module compatibility	<ul style="list-style-type: none"> SRP-5G+ SRP-10G SRP-40G SRP-40G PLUS SRP-SE10G
Module redundancy support	<ul style="list-style-type: none"> 1:N redundancy NOTE: Line module redundancy is not supported on the ERX310 router.
Cables and connectors	<ul style="list-style-type: none"> BT43 SMB Cable that adapts to 75-ohm BNC is available. The line interface unit supports two line buildouts: <ul style="list-style-type: none"> 0–68.5 m (0–225 feet) 69–137 m (226–450 feet) Signal strength is software controlled. The transmitted signal complies with ANSI T1.102-1993 Digital Hierarchy – Electrical Interfaces (1999) for cable lengths up to 201 m (660 feet).
LEDs	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix B, Module LEDs</i>.
Alarms, errors, and events	<ul style="list-style-type: none"> See <i>Monitoring Interfaces</i> in <i>JunosE Physical Layer Configuration Guide, Chapter 2, Configuring T3 and E3 Interfaces</i>.

Tunnel Service Module (TSM) Module Combination

Line module label	TUNNEL SERVICE
I/O module label	No I/O module
Number of I/O ports	<ul style="list-style-type: none"> Not applicable
Software release	<ul style="list-style-type: none"> First supported: 3.0.2 Final supported: 8.0.x
Description	<ul style="list-style-type: none"> 130 W Tunnel Service for IP tunnels and LNS termination
Type	<ul style="list-style-type: none"> ASIC
Capability	<ul style="list-style-type: none"> IP tunnels LNS termination Network Address Translation Stateful firewall
Software features	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix A, Module Protocol Support</i> for information about the layer 2 and layer 3 protocols and applications that this module combination supports.
Model compatibility	<ul style="list-style-type: none"> ERX7xx models ERX14xx models ERX310 router
SRP module compatibility	<ul style="list-style-type: none"> SRP-5G+ SRP-10G SRP-40G SRP-40G PLUS SRP-SE10G
Module redundancy support	<ul style="list-style-type: none"> Multiple TSMs provide redundancy. See the <i>Managing Tunnel-Service and IPSec-Service</i> chapter of the <i>JunosE Physical Layer Configuration Guide</i> for Release 8.0.x and earlier.
Cables and connectors	<ul style="list-style-type: none"> Not applicable
LEDs	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix B, Module LEDs</i>.
Alarms, errors, and events	<ul style="list-style-type: none"> See <i>Monitoring Tunnel-Service Interfaces</i> in the <i>Managing Tunnel-Service and IPSec-Service Interfaces</i> chapter of the <i>JunosE Physical Layer Configuration Guide</i> for Release 8.0.x and earlier.

X.21/V.35 Module Combination

Line module label	X.21/V.35
I/O module label	X.21/V.35 I/O
Number of I/O ports	<ul style="list-style-type: none"> 16
Software release	<ul style="list-style-type: none"> First supported: 2.10.1, 3.3.2 Final supported: 7.3.x
Description	<ul style="list-style-type: none"> 60 W X.21/V.35 synchronous serial interface
Type	<ul style="list-style-type: none"> Non-ASIC
Capability	<ul style="list-style-type: none"> HDLC framing
Software features	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix A, Module Protocol Support</i> for information about the layer 2 and layer 3 protocols and applications that this module combination supports.
Model compatibility	<ul style="list-style-type: none"> ERX7xx models ERX1410 router
SRP module compatibility	<ul style="list-style-type: none"> SRP-5G SRP-5G+ SRP-10G
Module redundancy support	<ul style="list-style-type: none"> Not applicable
Cables and connectors	<ul style="list-style-type: none"> 200-pin proprietary socket on I/O module DB15 X.21 or DB34 V.35 at remote end Serial signals can travel a limited distance without significant degradation. Slower serial signals can travel farther without degradation than faster serial signals. See “Cable Lengths” row for the maximum cable lengths you can use to prevent signal degradation at various transmission speeds.
Cable Lengths	
Transmission Speed (Hz)	Cable Length (Meters/Feet)
<ul style="list-style-type: none"> 2400 4800 9600 19200 38400 56000 2048000 	<ul style="list-style-type: none"> 1250/4100 625/2050 312/1025 156/513 78/256 31/102 8/25
LEDs	<ul style="list-style-type: none"> See <i>ERX Module Guide, Appendix B, Module LEDs</i>.

Alarms, errors, and events

- See *Monitoring Interfaces* in the *Configuring X.21/V.35 Interfaces* chapter of the *JunosE Physical Layer Configuration Guide* for Release 8.0.x and earlier.
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10GE IOA

IOA label	ES2-S1 10GE IOA
Number of IOA ports	<ul style="list-style-type: none"> 1
Software release	<ul style="list-style-type: none"> First supported: 7.0.1 Final supported: 14.0.x
Description	<ul style="list-style-type: none"> 40 W maximum Full-height module Uses a range of 10-gigabit small form-factor pluggable (XFP) transceivers to support different modes and cable lengths.
Capability	<ul style="list-style-type: none"> Ethernet (IEEE 802.3ae) 10Gb Base-SR/LR/ER/ZR Port can operate in full duplex mode with an average data rate of 3.4 Gbps
Software features	<ul style="list-style-type: none"> See <i>E120 and E320 Module Guide, Appendix A, Module Protocol Support</i> for information about the layer 2 and layer 3 protocols and applications that this module combination supports.
Model compatibility	<ul style="list-style-type: none"> E320 router E120 router
Line module compatibility	<ul style="list-style-type: none"> ES2 4G LM
SRP module compatibility	<ul style="list-style-type: none"> SRP-100 SRP-120 SRP-320
Line module redundancy compatibility	<ul style="list-style-type: none"> Can be paired with an ES2 4G LM. Must be installed in the same redundancy group as an ES2 4G LM and ES2-S1 REDUND IOA combination.
Port redundancy support	<ul style="list-style-type: none"> Not applicable
Cables and connectors (multimode [SR])	<ul style="list-style-type: none"> One LC full duplex connector Transmit power: <ul style="list-style-type: none"> min: -7.3 dBm max: -1.0 dBm Receive input power: <ul style="list-style-type: none"> min: -9.9 dBm max: -1.0 dBm See the following corresponding table (SR Fiber Optic Cabling) for cabling requirements. See <i>E120 and E320 Hardware Guide, Chapter 5, Cabling the Router</i> for more information.

Cables and connectors (single-mode [LR])	<ul style="list-style-type: none"> • One LC full duplex connector • Transmit power: <ul style="list-style-type: none"> • min: -8.2 dBm • max: 0.5 dBm • Receive input power: <ul style="list-style-type: none"> • min: -14.4 dBm • max: 0.5 dBm • See the following corresponding table (LR Fiber Optic Cabling) for cabling requirements. • See <i>E120 and E320 Hardware Guide, Chapter 5, Cabling the Router</i> for more information.
Cables and connectors (single-mode [ER])	<ul style="list-style-type: none"> • One LC full duplex connector • Transmit power: <ul style="list-style-type: none"> • min: -4.7 dBm • max: 4.0 dBm • Receive input power: <ul style="list-style-type: none"> • min: -15.8 dBm • max: -1.0 dBm • See the following corresponding table (ER Fiber Optic Cabling) for cabling requirements. • See <i>E120 and E320 Hardware Guide, Chapter 5, Cabling the Router</i> for more information.
Cables and connectors (single-mode [ZR])	<ul style="list-style-type: none"> • One LC full duplex connector • Transmit power: <ul style="list-style-type: none"> • min: 0 dBm • max: 4 dBm • Receive input power: <ul style="list-style-type: none"> • min: -24.0 dBm • max: -7.0 dBm • See the following corresponding table (ZR Fiber Optic Cabling) for cabling requirements. • See <i>E120 and E320 Hardware Guide, Chapter 5, Cabling the Router</i> for more information.
LEDs	<p>Board-level LEDs:</p> <ul style="list-style-type: none"> • OK (green)—Physical link is connected properly and is functioning properly • FAIL (red)—Failure detected <p>Port LEDs:</p> <ul style="list-style-type: none"> • LK (green)—Ethernet link is up • ACT (green)—Blinks when there is Ethernet traffic being received
Alarms, errors, and events	<ul style="list-style-type: none"> • See <i>Monitoring Ethernet Interfaces in JunosE Physical Layer Configuration Guide, Chapter 5, Configuring Ethernet Interfaces</i>.

Table 2: SR Fiber Optic Cabling

Fiber Type	Minimal Modal Bandwidth at 850 nm (MHz*km)	Maximum Operating Range (meters)
62.5 microns	160	26 (85.3 ft)
	200	33 (108.27 ft)
50 microns	400	66 (216.54 ft)
	500	82 (269.03 ft)
	2000	300 (984.25 ft)

Table 3: LR Fiber Optic Cabling

Fiber Type	Nominal Wavelength (nm)	Maximum Operating Range (kilometers)
9 microns	1310	10 (6.2 miles)

Table 4: ER Fiber Optic Cabling

Fiber Type	Nominal Wavelength (nm)	Maximum Operating Range (kilometers)
9 microns	1550	40 (24.85 miles)

Table 5: ZR Fiber Optic Cabling

Fiber Type	Nominal Wavelength (nm)	Maximum Operating Range (kilometers)
9 microns	1550	80 (49.6 miles)

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