

# RUCKUS® Ethernet Optics

High quality transceivers for CommScope switches and APs

## BENEFITS

### GUARANTEED COMPATIBILITY AND COMPLIANCE

- We guarantee compatibility with CommScope switches and APs and full compliance with industry standards. That's something you don't get from generic transceivers.
- Standards-based—802.3an, 802.3ah, 802.3u, 802.3ae, 802.3ak, 802.3ba, 802.3cu, SFF-8431, SFF-8402, SFF-8436, and SFF-8636—compliant as required
- Compliant with Restrictions on Hazardous Substances (RoHS), meeting RoHS 6 EU standards

### FACTORY TESTED

- Every batch of CommScope transceivers is factory tested, so you're assured that they function properly and reliably

### EASY TO DEPLOY AND UPGRADE

- Hot-swappable flexibility in the field for greater ease and lower total cost of ownership

## Highly reliable, RUCKUS-qualified optics

CommScope offers a unique set of high-performance, reliable, and cost-effective optical transceivers to help enterprises and service providers meet the challenges of diverse network topologies. To ensure maximum quality, CommScope selects and tests the most reliable, highest-performing optical transceivers on the market, and then warrants their availability, capacity, and performance in CommScope product.

Extensive performance and reliability testing reflects an ongoing commitment to quality. CommScope tests transceivers using the industry's most advanced tools and instruments to help ensure that they provide the right mix of functionality and performance when used in conjunction with CommScope products. The speed, capacity, reliability, and low cost of ownership that CommScope is known for is also provided in all optical components.

By using CommScope-qualified components, organizations can be assured that their quality, warranty and service requirements will be met and that their CommScope products will continually provide the uptime, performance, and reliability required by today's leading enterprise service providers.

### RUCKUS Global Services

RUCKUS Global Services has the expertise to help organizations build scalable, efficient cloud infrastructures. Leveraging 20 years of expertise in storage, networking, and virtualization, RUCKUS Global Services delivers world-class professional services, technical support, network monitoring services, and education, enabling organizations to maximize their CommScope investments, accelerate new technology deployments, and optimize the performance of networking infrastructures.

### Maximizing Investments

To help optimize technology investments, CommScope and its partners offer complete solutions that include professional services, technical support, and education. For more information, contact a CommScope sales partner or visit [www.commscope.com](http://www.commscope.com).

## Ethernet Optics Family Features

The RUCKUS Ethernet optics family includes several offerings designed to meet the performance and scalability requirements of service provider and enterprise environments.

100 MbE SFP OPTICS	
<ul style="list-style-type: none"> <li>• 100 Megabit Ethernet (MbE) transceivers support link lengths from 2Km to 40Km</li> <li>• Both SMF and MMF fiber types</li> </ul>	<ul style="list-style-type: none"> <li>• RoHS 5 and 6 compliant</li> <li>• Enterprise switching and routing</li> </ul>
1 GbE SFP OPTICS	
<ul style="list-style-type: none"> <li>• 1GbE transceivers support link lengths from 300m to 100Km</li> <li>• Both SMF and MMF fiber types</li> <li>• Coarse Wavelength Division Multiplexing (CWDM) support for distances of 80Km to 100Km</li> </ul>	<ul style="list-style-type: none"> <li>• RoHS 5 and 6 compliant</li> <li>• For core routers and security applications</li> </ul>
10 GbE SFP+ OPTICS	
<ul style="list-style-type: none"> <li>• 10GbE transceivers support link lengths of 26m to 80Km</li> <li>• Protocol-independent</li> <li>• Less than one-third the power and size of MSA optic</li> <li>• Hot-swappable</li> <li>• Digital Optical Monitoring (DOM) support</li> </ul>	<ul style="list-style-type: none"> <li>• RoHS 5 and 6 compliant</li> <li>• Application delivery and acceleration</li> <li>• High-Performance Computing (HPC) interconnects</li> <li>• Service provider traffic management</li> </ul>
25 GbE SFP28 OPTICS	
<ul style="list-style-type: none"> <li>• 25 GbE transceivers support link lengths of 70 m to 10 km</li> <li>• Hot-swappable</li> <li>• Digital Optical Monitoring (DOM) support</li> </ul>	<ul style="list-style-type: none"> <li>• RoHS 6 compliant</li> <li>• High-Performance Computing (HPC) interconnects</li> <li>• Service provider traffic management</li> </ul>
40 GbE QSFP+ OPTICS	
<ul style="list-style-type: none"> <li>• 40GbE transceivers support link lengths from 100 m to 40Km</li> <li>• Hot-pluggable</li> <li>• Industry-standard QSFP+</li> </ul>	<ul style="list-style-type: none"> <li>• Digital Optical Monitoring (DOM) support</li> <li>• High-density 40GbE connectivity options for data center, enterprise, and service provider applications</li> </ul>
100 GbE QSFP28 OPTICS	
<ul style="list-style-type: none"> <li>• 100 GbE transceivers support link lengths up to 40 km</li> <li>• Hot-pluggable</li> <li>• Industry-standard QSFP28</li> </ul>	<ul style="list-style-type: none"> <li>• Digital Optical Monitoring (DOM) support</li> <li>• Carrier, service provider, and cloud services</li> <li>• Enterprise campus core routing</li> <li>• RoHS 6 compliant</li> </ul>

Specifications subject to change.

## Product Support for Fast Ethernet

Fast Ethernet Optics	ICX 7000 Series						
	ICX 7150	ICX 7250	ICX 7450	ICX 7550	ICX 7650	ICX 7750	ICX 7850
E1MG-100FX-OM	● <sup>1</sup>		●	● <sup>2</sup>	●		
E1MG-100FX-A	● <sup>1</sup>		●	● <sup>2</sup>	●		
E1MG-100FX-IR-OM	● <sup>1</sup>		●	● <sup>2</sup>	●		
E1MG-100FX-LR-OM			●	● <sup>2</sup>	●		

<sup>1</sup> Only compatible with ICX7150-24F model. Requires FI software 9.0.10 or later..

<sup>2</sup> Requires FI software 8.0.95d or later.

## Product Support for 1 Gigabit Ethernet

1 GbE Fiber Optics	ICX 7000 Series							Wi-Fi Access Points				Smart-Zone
	ICX 7150	ICX 7250	ICX 7450	ICX 7550	ICX 7650	ICX 7750	ICX 7850	T710	T750	T811cm	Fiber Back-pack	SZ144
E1MG-SX-OM	●	●	●	●	●	●	●	●	●	●	●	
E1MG-SX-OM-T	●	●	●	●	●	●	●	●		●		
E1MG-SX-A	●	●	●	●	●	●	●	●		●		
E1MG-LX-OM	●	●	●	●	●	●	●	●	●	●	●	
E1MG-LX-OM-T	●	●	●	●	●	●	●	●		●		
E1MG-LX-A	●	●	●	●	●	●	●	●		●		
E1MG-LHA-OM								●		●		
E1MG-LHA-OM-T	●	●	●	●	●	●	●	●		●	●	
E1MG-BXD	●	●	●	●	●	● <sup>1</sup>	●	●		●	●	
E1MG-BXU	●	●	●	●	●	● <sup>1</sup>	●	●		●	●	
E1MG-BXD-TA	● <sup>2</sup>	● <sup>2</sup>	● <sup>2</sup>	● <sup>2</sup>	● <sup>2</sup>		● <sup>2</sup>					
E1MG-BXU-TA	● <sup>2</sup>	● <sup>2</sup>	● <sup>2</sup>	● <sup>2</sup>	● <sup>2</sup>		● <sup>2</sup>					
E1MG-TX	●	●	●	●	●	●	●					
E1MG-TX-A	●	●	●	●	●	●	●					
E1MG-CWDM80-XXXX												
1G-SFP-TWX-XXXX	●	●										

○ Optics supported for both stacking links and Ethernet data links.

● Optics supported for Ethernet data links only (i.e. not for stacking).

<sup>1</sup> Requires FI software 8.0.30b or later.

<sup>2</sup> Requires FI software 9.0.0 or later.

Specifications subject to change.

## Product Support for 10 Gigabit Ethernet

	ICX 7000 Series							Wi-Fi Access Points				Smart-Zone
	ICX 7150	ICX 7250	ICX 7450	ICX 7550	ICX 7650	ICX 7750	ICX 7850	T710	T750	T811cm	Fiber Backpack	SZ144
10 GbE Fiber Optics												
10G-SFPP-USR	⊙	⊙	⊙	●	●	●	●					
10G-SFPP-USR-SA	⊙	⊙	⊙	●	●	●	●					
10G-SFPP-SR	⊙	⊙	⊙	●	●	●	●		●			●
10G-SFPP-SR-SA	⊙	⊙	⊙	●	●	●	●					●
10G-SFPP-SR-S	⊙	⊙	⊙	●	●	●	●					●
10G-SFPP-LR	⊙	⊙	⊙	●	●	●	●		●			●
10G-SFPP-LR-SA	⊙	⊙	⊙	●	●	●	●					●
10G-SFPP-LR-S	⊙	⊙	⊙	●	●	●	●					●
10G-SFPP-ER	●	●	●	●	●	●	●					
10G-SFPP-ZR	●	●	●	●	●	●	●					
10G-SFPP-LRM			●	● <sup>5</sup>	●		● <sup>4</sup>					
10G-SFPP-LRM-X-ADP	● <sup>1</sup>	● <sup>1</sup>				● <sup>1</sup>						
10G-SFPP-BXD-S	⊙	⊙	⊙	●	●	●	●					
10G-SFPP-BXU-S	⊙	⊙	⊙	●	●	●	●					
10G-SFPP-TX-A		● <sup>3</sup>		● <sup>3</sup>		● <sup>3</sup>	● <sup>3</sup>					
10G-SFPP-TX-LP-A	● <sup>6</sup>	● <sup>6</sup>	● <sup>6</sup>	● <sup>6</sup>	● <sup>6</sup>		● <sup>6</sup>					
10G-SFPP-TWX-XXXX	⊙	⊙	⊙	●	●	●	●					
10G-SFPP-TWX-P-XXXX	⊙ <sup>2</sup>	⊙	⊙	●	●	●	●					
10GE-SFPP-AOC-XXXX	●	●	⊙	●	●	●	●					

⊙ Optics supported for both stacking links and Ethernet data links.

● Optics supported for Ethernet data links only (i.e. not for stacking).

<sup>1</sup> Requires FI software 8.0.61 or later.

<sup>2</sup> Stacking and uplinks not supported with the 5-meter passive cable on the 7150. 3-meter passive cable does not support cross-connection stacking on ICX7150 (for example, from n/3/1 to n/3/3); however, the cables can be used for same-port connections (for example, n/3/1 to n/3/1). <https://support.ruckuswireless.com/articles/000011828>

<sup>3</sup> Requires FI software 8.0.90a or later. Due to the high-power consumption, there is a limit on how many transceivers that can be installed, please refer to <https://support.ruckuswireless.com/articles/000011205>

<sup>4</sup> Optics supported only on the ICX7850-48FS natively.

<sup>5</sup> Optics supported only on the ICX7650-4X10GF modules.

<sup>6</sup> Requires FI software 8.0.95e or 9.0.10 and later.

Specifications subject to change.

## Product Support for 25 Gigabit Ethernet

25 GbE Fiber Optics	ICX 7000 Series						
	ICX 7150	ICX 7250	ICX 7450	ICX 7550	ICX 7650	ICX 7750	ICX 7850
E25G-SFP28-SR							●
E25G-SFP28-LR							●
E25G-SFP28-AOC-1001							● <sup>1</sup>
E25G-SFP28-TWX-P-XXXX							●

○ Optics supported for both stacking links and Ethernet data links.

● Optics supported for Ethernet data links only (i.e. not for stacking).

<sup>1</sup> Requires FI software 8.0.90a or later.

## Product Support for 40 Gigabit Ethernet

40 GbE Fiber Optics	ICX 7000 Series						
	ICX 7150	ICX 7250	ICX 7450	ICX 7550	ICX 7650	ICX 7750	ICX 7850
E40G-QSFP-SR4			○	○	○	○	○
E40G-QSFP-SR4-INT				● <sup>5,6</sup>		●	● <sup>5,6</sup>
E40G-QSFP-ESR4			●	○	●	○	○
E40G-QSFP-LR4			○	○	○	○	○
E40G-QSFP-LR4-A			○ <sup>5</sup>	○ <sup>5</sup>	○ <sup>5</sup>		○ <sup>5</sup>
E40G-QSFP-LR4-INT				● <sup>5,6</sup>		●	● <sup>5,6</sup>
E40G-QSFP-LM4			○	○	○	○	○
E40G-QSFP-ER4			●	○	○	○	○
E40G-QSFP-SR-BIDI			●	○	○	○	○
E40G-QSFP-4SFP-C-XXXX				● <sup>5</sup>		●	●
E40G-QSFP-4SFP-AOC-XXXX				● <sup>5</sup>		●	●
E40G-QSFP-QSFP-C-XXXX			○	○	○	○	○
E40G-QSFP-C-XXXXX			○ <sup>1</sup>	○ <sup>1</sup>	○ <sup>1</sup>	○ <sup>1</sup>	○ <sup>1</sup>
40G-QSFP-C-005XX			○	○	○	○	○
40G-QSFP-C-005XX-A			○ <sup>3</sup>	○ <sup>3</sup>	○ <sup>3</sup>	○ <sup>3</sup>	○ <sup>3</sup>
E40G-QSFP-QSFP-P-XXXX			○	○	○	○	○
E40G-Q-Q-C-XXXX-A			○ <sup>4</sup>	○ <sup>4</sup>	○ <sup>4</sup>	○ <sup>4</sup>	○ <sup>4</sup>
E40G-QSFP-QSFP-AOC-XXXX			●	○	○	○	○

○ Optics supported for both stacking links and Ethernet data links.

● Optics supported for Ethernet data links only (i.e. not for stacking).

<sup>1</sup> Stacking not supported with the 5-meter passive cable.

<sup>2</sup> Breakout is not supported for ICX7650.

<sup>3</sup> Requires FI software 8.0.95b or later.

<sup>4</sup> Requires FI software 8.0.95c or later.

<sup>5</sup> Requires FI software 9.0.0 or later.

<sup>6</sup> Supports 1G breakout starting 9.0.10 or later

Specifications subject to change.

## Product Support for 100 Gigabit Ethernet

	ICX 7000 Series						
100 GbE Fiber Optics	ICX 7150	ICX 7250	ICX 7450	ICX 7550	ICX 7650	ICX 7750	ICX 7850
E100G-QSFP28-SR4				⊙ <sup>3</sup>	⊙		⊙
E100G-QSFP28-SR4-A				⊙ <sup>4</sup>	⊙ <sup>4</sup>		⊙ <sup>4</sup>
E100G-QSFP-ESR4				⊙ <sup>3</sup>	⊙		⊙
E100G-QSFP28-DR1				● <sup>2</sup>	● <sup>2</sup>		● <sup>2</sup>
E100G-QSFP28-CWDM4-2KM				⊙ <sup>3</sup>	●		⊙
E100G-QSFP28-LR4L-2KM					⊙		
E100G-QSFP28-FR1				● <sup>2</sup>	● <sup>2</sup>		● <sup>2</sup>
E100G-QSFP28-LR4-10KM					⊙		
E100G-QSFP28-LR4-LP-10KM				⊙ <sup>3</sup>	⊙		⊙
E100G-QSFP28-LR1				● <sup>2</sup>	● <sup>2</sup>		● <sup>2</sup>
E100G-QSFP28-ER4				● <sup>2</sup>	● <sup>2</sup>		● <sup>1</sup>
E100G-QSFP-QSFP-AOC-XXXX				●	●		●
E100G-QSFP-QSFP-P-XXXX				⊙ <sup>3</sup>	⊙		⊙
E100G-QSFP-4SFP-P-XXXX				⊙ <sup>4</sup>			●

⊙ Optics supported for both stacking links and Ethernet data links.

● Optics supported for Ethernet data links only (i.e. not for stacking).

<sup>1</sup> Requires FI software 8.0.92a or later.

<sup>2</sup> Requires FI software 8.0.95 or later.

<sup>3</sup> Requires FI software 8.0.95c or later to stack.

<sup>4</sup> Requires FI software 9.0.0 or later.

Specifications subject to change.

## Key Standards and Features

	IEEE Standards	Domestic Safety Standards	International Safety Standards	Wavelength (nm)	Fiber Type	Maximum Cable Distance	Digital Optical Monitoring
Part Number	<b>Fast Ethernet</b>						
<b>E1MG-100FX-OM</b> <b>E1MG-100FX-A</b>	802.3u	FDA 21CFR 1040.10 Class 1, CSA 60950-1-03/ UL 60950-1	EN 60825-1, EN 60950-1	1,310	MMF	2Km	Yes
<b>E1MG-100FX-IR-OM</b>	802.3			1,310	SMF	15Km	Yes
<b>E1MG-100FX-LR-OM</b>	802.3			1,310	SMF	40Km	Yes

Part Number	<b>1 GbE Fiber</b>						
<b>E1MG-SX-OM/</b> <b>E1MG-SX-OM-T</b> <b>E1MG-SX-A</b>	802.3z	FDA 21CFR 1040.10 Class 1, CSA 60950-1-03/ UL 60950-1	EN 60825-1, EN 60950-1	850	MMF	220m to 550m	Yes
<b>E1MG-LX-OM/</b> <b>E1MG-LX-OM-T</b> <b>E1MG-LX-A</b>	802.3z			1,310	MMF/SMF	550m to 10Km	Yes
<b>E1MG-LHA-OM/</b> <b>E1MG-LHA-OM-T</b>	802.3z			1,550	SMF	70Km	Yes
<b>E1MG-BXD</b>	802.3ah			TX: 1,490 RX: 1,310		10Km	No
<b>E1MG-BXU</b>	802.3ah			TX: 1,310 RX: 1,490		10Km	No
<b>E1MG-BXD-TA</b>	802.3ah			TX: 1,490 RX: 1,310		20Km	Yes
<b>E1MG-BXU-TA</b>	802.3ah			TX: 1,310 RX: 1,490		20Km	Yes
<b>E1MG-CWDM80-XXXX</b>	802.3z			1,470 to 1,610		80Km	No

Part Number	<b>1000BASE-T Copper</b>						
<b>E1MG-TX</b>	802.3ab	CSA 60950-1-03/UL	EN 60950-1	N/A	Cat5	100m	N/A
<b>1G-SFP-TWX-0x01</b>	802.3z	Direct Attach SFP copper cables				1m, 5m	No

Part Number	<b>10 GbE Fiber</b>						
<b>10G-SFPP-USR</b>	N/A	FDA 21CFR 1040.10 Class 1, CSA 60950-1-03/ UL 60950-1	EN 60825-1, EN 60950-1	850	OM3 MMF	100m	Yes
<b>10G-SFPP-SR</b>	802.3ae			850	OM3 MMF OM4 MMF	300m 400m	
<b>10G-SFPP-LR</b>	802.3ae			1,310	SMF	10Km	
<b>10G-SFPP-ER</b>	802.3ae			1,550	SMF	40Km	
<b>10G-SFPP-ZR</b>	802.3ae			1,550	SMF	80Km	
<b>10G-SFPP-BXD-S</b>	802.3ae			1330-TX/ 1270-RX	SMF	10Km	
<b>10G-SFPP-BXU-S</b>	802.3ae			1270-TX/ 1330-RX	SMF	10Km	
<b>10G-SFPP-LRM</b>	802.3ae			1,310	OM1/OM2 OM3 MMF OM4 MMF	220m 300m	
<b>10G-SFPP-TX-LP-A</b>	802.3an	CSA 60950-1-03/UL	EN 60950-1	N/A	Cat 6a/7	30m	No

Specifications subject to change.

## Key Standards and Features

	IEEE Standards	Domestic Safety Standards	International Safety Standards	Wavelength (nm)	Fiber Type	Maximum Cable Distance	Digital Optical Monitoring
Part Number	<b>10GBASE DAC CABLE</b>						
<b>10G-SFP-TWX-XXXX</b>	802.3ak	Direct Attach SFP+ Twinax active copper cables				1m, 3m, 5m	No
<b>10G-SFP-AOC-XXXX</b>	N/A	Direct Attach SFP+ active optical cables				7m, 10m	No
<b>10G-SFP-TWX-P-XXXX</b>	802.3ak	Direct Attach SFP+ Twinax passive copper cables				1m, 3m, 5m	No
Part Number	<b>25 GbE SFP28 FIBER</b>						
<b>E25G-SFP28-SR</b>	802.3by	North America: UL/CSA 60950, CDRH Class 1		850	OM3 MMF OM4 MMF	70m 100m	Yes
<b>E25G-SFP28-LR</b>	802.3bm	European Union: EN 60950, EB 60825 Class 1		1295, 1300, 1305, 1310	SMF	10Km	
Part Number	<b>25 GbE SFP28 DAC CABLE</b>						
<b>E25G-SFP28-AOC-1001</b>	N/A	Direct Attach SFP28 to SPP28 active direct attach copper cables				10m	No
<b>E25G-SFP28-TWX-P-00xxx</b>	N/A	Direct Attach SFP28 to SPP28 passive direct attach copper cables				0.5m, 1m, 3m	N/A
Part Number	<b>40 GbE Fiber</b>						
<b>E40G-QSFP-SR4</b>	802.3ba	FDA 21CFR 1040.10 Class 1, CSA 60950-1-03/UL 60950-1	EN 60825-1, EN 60950-1	850	OM3 MMF OM4 MMF	100m 150m	Yes
<b>E40G-QSFP-SR4-INT</b> (compatible with 10GBASE-SR)	802.3ba				OM3 MMF OM4 MMF	100m 150m	Yes
<b>E40G-QSFP-LR4</b> <b>E40G-QSFP-LR4-A</b>	802.3ba			1264.5 to 1337.5	SMF	10Km	Yes
<b>E40G-QSFP-LR4-INT</b>	802.3ba			1310	SMF	10Km	Yes
<b>E40G-QSFP-ER4</b>	802.3ba			1264.5 to 1337.5	SMF	40Km	Yes
<b>E40G-QSFP-ESR4</b>	802.3ba			850	OM3 MMF OM4 MMF	300m 400m	Yes
<b>E40G-QSFP-LM4</b>	802.3ba			1264.5 to 1337.5	OM3/OM4 MMF	160m	Yes
<b>E40G-QSFP-SR-BIDI</b>	802.3ba			850 to 900	OM3/OM4 MMF	100m	No

Specifications subject to change.



## Key Standards and Features

	IEEE Standards	Domestic Safety Standards	International Safety Standards	Wavelength (nm)	Fiber Type	Maximum Cable Distance	Digital Optical Monitoring
Part Number	<b>40 GbE DAC CABLE</b>						
E40G-QSFP-4SFP-C-XXXX	N/A	Direct Attach QSFP+ to 4 SFP+ active copper breakout cables				1m, 3m, 5m	No
E40G-QSFP-QSFP-C-XXXX E40G-Q-Q-C-XXXX-A	N/A	Direct Attach QSFP+ to QSFP+ active copper cables				1m, 3m, 5m	No
40G-QSFP-C-005XX E40G-QSFP-C-XXXX E40G-QSFP-QSFP-P-XXXX	N/A	Direct Attach QSFP+ to QSFP+ passive copper cables				0.5m, 1m, 3m, 5m	No
E40G-QSFP-QSFP-AOC-XXXX	N/A	Direct Attach QSFP+ to QSFP+ active optical cables				10m	No
E40G-QSFP-4SFP-AOC-XXXX	N/A	Direct Attach QSFP+ to 4 SFP+ active optical breakout cables				10m	No

Part Number	<b>100 GbE QSFP28 FIBER</b>					
E100G-QSFP28-SR4 E100G-QSFP28-SR4-A	802.3bm	North America: UL/CSA 60950, CDRH Class 1  European Union: EN 60950, EB 60825 Class 1	850	OM4 MMF	100m	Yes
E100G-QSFP-ESR4	802.3bm		850	OM4 MMF	300m	
E100G-QSFP28-DR1	802.3cu		1311	SMF	500m	
E100G-QSFP28-CWDM4-2KM	802.3am		1310	SMF	2Km	
E100G-QSFP28-LR4L-2KM	802.3ba		1295, 1300, 1305, 1310	SMF	2Km	
E100G-QSFP28-FR1	802.3cu		1311	SMF	2Km	
E100G-QSFP28-LR4-10KM	802.3bm		1295, 1300, 1305, 1310	SMF	10Km	
E100G-QSFP28-LR4-LP-10KM	802.3ba		1295, 1300, 1305, 1310	SMF	10Km	
E100G-QSFP28-LR1	802.3cu		1311	SMF	10Km	
E100G-QSFP28-ER4L	802.3bm		1295, 1300, 1305, 1310	SMF	40Km	

Part Number	<b>100 GbE QSFP28 DAC CABLE</b>				
E100G-QSFP-QSFP-AOC-1001	N/A	Direct Attach QSFP28 to QSFP28 active optical cables		10m	No
E100G-QSFP-QSFP-P-XXXX	N/A	Direct Attach QSFP28 to QSFP28 passive copper cables		1m, 3m, 5m	N/A
E100G-QSFP-4SFP-P-XXXX	N/A	Direct Attach QSFP28 to 4 SFP28 passive copper breakout cables		1m, 3m, 5m	N/A

Specifications subject to change.

## TX and RX Power

SKU	Description	TX		RX	
		Min (dBm)	Max (dBm)	Min (dBm)	Max (dBm)
E1MG-100FX-A / E1MG-100FX-OM	100BASE-FX SFP optic MMF, LC connector, optical monitoring capable	-20	-15	0	-30
E1MG-SX-A / E1MG-SX-OM	1000BASE-SX SFP optic, MMF, LC connector, optical monitoring capable	-9	-2.5	0	-18
E1MG-LX-A / E1MG-LX-OM	1000BASE-LX SFP optic, SMF, LC connector, optical monitoring capable	-9.5	-3	0	-19
10G-SFPP-USR / 10G-SFPP-USR-SA	10GBASE-USR, SFP+ optic (LC), target range 100m over MMF	-7.3	-1.3	-1	-11.1
10G-SFPP-SR / 10G-SFPP-SR-S / 10G-SFPP-SR-SA	10GBASE-SR, SFP+ optic (LC), target range 300m over MMF	-4.3	-1	-1	-11.1
10G-SFPP-LR / 10G-SFPP-LR-S / 10G-SFPP-LR-SA	10GBASE-LR, SFPP SMF (LC), for up to 10km over SMF	-8.2	0.5	0	-14.4
10G-SFPP-LRM	10GBASE-LRM SFP+ optic (LC), for up to 220m over MMF	-6.5	0.5	1.5	-6.5
E40G-QSFP-SR-BIDI	40GBASE-SR QSFP+ optic (LC), bidirectional, 100 m over OM3 MMF, 150 m over OM4 MMF	-4	5	-6	5
E40G-QSFP-LR4	40GBASE-LR4 QSFP+ optic (LC), for up to 10km over SMF	-6	3.5	-13.7	2.3
E100G-QSFP28-SR4	100GBASE-SR4 QSFP28 optic (MTP 1x12), for up to 100 m over MMF	-8.4	2.4	-10.3	2.4

## Max Distances with CommScope LazrSPEED® Multimode Fiber Cables

Thanks to advanced design and superior build quality, CommScope LazrSPEED fiber solutions expands the maximum distances specified in the standards.

Part Number	OM4 MMF		OM5 MMF	
	Max distance on standard fiber	Max distance on CommScope LazrSPEED fiber	Max distance on standard fiber	Max distance on CommScope LazrSPEED fiber
10G-SFPP-SR 10G-SFPP-SR-SA 10G-SFPP-SR-S	400m	500m	400m	500m
E25G-SFP28-SR	100m	130m	100m	130m
E40G-QSFP-SR-BiDI	150m	150m	200m	210m
E40G-QSFP-SR4	150m	215m	150m	215m
E40G-QSFP-eSR4	400m	500m	400m	500m
E100G-QSFP28-SR4	100m	130m	100m	130m

Specifications subject to change.

## RUCKUS Ethernet Optics Ordering Information

Part Number	100 MbE SFP Transceivers
E1MG-100FX-A	100BASE-FX SFP optic MMF, LC connector, optical monitoring capable, TAA compliant
E1MG-100FX-A8	100BASE-FX SFP optic MMF, LC connector, optical monitoring capable, TAA compliant, 8-pack
E1MG-100FX-IR-OM	100BASE-FX IR SFP optic for SMF with LC connector, optical monitoring capable. For distances up to 15Km
E1MG-100FX-LR-OM	100BASE-FX LR SFP optic for SMF with LC connector, optical monitoring capable. For distances up to 40Km
E1MG-100FX-OM	100BASE-FX SFP optic MMF, LC connector, optical monitoring capable
E1MG-100FX-OM-8	100BASE-FX SFP optic MMF, LC connector, optical monitoring capable, 8-pack

Part Number	1 GbE SFP
E1MG-BXD	1000BASE-BXD SFP optic SMF, transmits at 1490nm and receives at 1310nm, LC connector, single strand SMF fiber. This optic should only be connected to an E1MG-BXU at the far end.
E1MG-BXU	1000BASE-BXU SFP optic SMF, transmits at 1310nm and receives at 1490nm, LC connector, single strand SMF fiber. This optic should only be connected to an E1MG-BXD at the far end.
E1MG-BXD-TA	1000BASE-BXD SFP optic SMF, transmits at 1490nm and receives at 1310nm, LC connector, 20km single strand SMF fiber, optical monitoring capable, industrial temperature (-40°C to 85°C), TAA Compliant. This optic should only be connected to an E1MG-BXU-TA at the far end.
E1MG-BXU-TA	1000BASE-BXU SFP optic SMF, transmits at 1310nm and receives at 1490nm, LC connector, 20km single strand SMF fiber, optical monitoring capable, industrial temperature (-40°C to 85°C), TAA Compliant. This optic should only be connected to an E1MG-BXD-TA at the far end.
E1MG-CWDM80-1470	1GbE CWDM SFP optic, 80Km, 1470nm, LC connector
E1MG-CWDM80-1490	1GbE CWDM SFP optic, 80Km, 1490nm, LC connector
E1MG-CWDM80-1510	1GbE CWDM SFP optic, 80Km, 1510nm, LC connector
E1MG-CWDM80-1530	1GbE CWDM SFP optic, 80Km, 1530nm, LC connector
E1MG-CWDM80-1550	1GbE CWDM SFP optic, 80Km, 1550nm, LC connector
E1MG-CWDM80-1570	1GbE CWDM SFP optic, 80Km, 1570nm, LC connector
E1MG-CWDM80-1590	1GbE CWDM SFP optic, 80Km, 1590nm, LC connector
E1MG-CWDM80-1610	1GbE CWDM SFP optic, 80Km, 1610nm, LC connector
E1MG-LHA-OM	1000BASE-LHA SFP optic, SMF, LC connector, optical monitoring capable
E1MG-LHA-OM-T	1000BASE-LHA SFP optic, SMF, LC connector, optical monitoring capable, industrial temperature (-40°C to 85°C)
E1MG-LX-A	1000BASE-LX SFP Optic, SMF, LC connector, TAA compliant
E1MG-LX-A8	1000BASE-LX SFP Optic, SMF, LC connector, TAA compliant, 8-pack
E1MG-LX-OM	1000BASE-LX SFP optic, SMF, LC connector, optical monitoring capable
E1MG-LX-OM-8	1000BASE-LX SFP optic, SMF, LC connector, optical monitoring capable, 8-pack
E1MG-LX-OM-T	1000BASE-LX SFP optic, SMF, LC connector, optical monitoring capable, industrial temperature (-40°C to 85°C)
E1MG-SX-A	1000BASE-SX SFP Optic, MMF, (LC), TAA compliant
E1MG-SX-A8	1000BASE-SX SFP Optic, MMF, (LC), TAA compliant, 8-pack
E1MG-SX-OM	1000BASE-SX SFP optic, MMF, LC connector, optical monitoring capable
E1MG-SX-OM-8	1000BASE-SX SFP optic, MMF, LC connector, optical monitoring capable, 8-pack
E1MG-SX-OM-T	1000BASE-SX SFP optic, MMF, LC connector, optical monitoring capable, industrial temperature (-40°C to 85°C)
E1MG-TX	100/1000BASE-T SFP Copper, RJ-45 connector
E1MG-TX-A	100/1000BASE-T SFP Copper, RJ-45, TAA compliant
E1MG-TX-A8	100/1000BASE-T SFP Copper, RJ-45, TAA compliant, 8-pack
1G-SFP-TWX-0101	1GbE Direct Attach SFP to SFP active copper cable, 1m
1G-SFP-TWX-0501	1GbE Direct Attach SFP to SFP active copper cable, 5m

## RUCKUS Ethernet Optics Ordering Information

Part Number	10 GbE SFP+
10G-SFPP-BXD-S	10GBASE-LR SFP+ Optic (LC) bidirectional downstream, standard temperature (0°C to 70°C)
10G-SFPP-BXU-S	10GBASE-LR SFP+ Optic (LC) bidirectional upstream, standard temperature (0°C to 70°C)
10G-SFPP-ER	10GBASE-ER SFP+ optic (LC), for up to 40Km over SMF
10G-SFPP-ER-2	10GBASE-ER SFP+ optic (LC), for up to 40Km over SMF, 2-pack
10G-SFPP-LR	10GBASE-LR, SFP+ optic (LC), for up to 10Km over SMF
10G-SFPP-LR-8	10GBASE-LR, SFPP SMF (LC), for up to 10Km over SMF, 8-pack
10G-SFPP-LR-S	10GBASE-LR, SFPP SMF (LC), for up to 10Km over SMF, standard temperature (0°C to 70°C)
10G-SFPP-LR-S8	10GBASE-LR, SFPP SMF (LC), for up to 10Km over SMF, standard temperature (0°C to 70°C), 8-pack
10G-SFPP-LR-SA	10GBASE-LR, SFP+ optic (LC), for up to 10Km over SMF, standard temperature (0°C to 70°C), TAA compliant
10G-SFPP-LR-SA8	10GBASE-LR, SFP+ optic (LC), for up to 10Km over SMF, standard temperature (0°C to 70°C), TAA compliant, 8-pack
10G-SFPP-LRM	10GBASE-LRM SFP+ optic (LC), for up to 220m over MMF
10G-SFPP-LRM-1-ADP	10GBASE-LRM SFP+ optic (LC), for up to 220m over MMF, w/ 1-LRM Optic, 1-Dual Port Adapter, & L-Bracket Mount for ICX7150, ICX7250 and ICX7750 (Optional 8 unit rack-mount shelf available)
10G-SFPP-LRM-2-ADP	10GBASE-LRM SFP+ Optic (LC), for up to 220m over MMF, w/ 2-LRM Optic, 1-Dual Port Adapter, & L-Bracket Mount for ICX7150, ICX7250 and ICX7750 (Optional 8 unit rack-mount shelf available)
10G-SFPP-LRM-8	10GBASE-LRM SFP+ optic (LC), for up to 220m over MMF, 8-pack
10G-SFPP-SR	10GBASE-SR, SFP+ optic (LC), target range 300m over MMF
10G-SFPP-SR-8	10GBASE-SR, SFPP MMF LC connector, 8-pack
10G-SFPP-SR-S	10GBASE-SR, SFPP MMF LC connector, standard temperature (0°C to 70°C)
10G-SFPP-SR-S8	10GBASE-SR, S FPP MMF LC connector, standard temperature (0°C to 70°C), 8-pack
10G-SFPP-SR-SA	10GBASE-SR, SFP+ optic (LC), target range 300m over MMF, standard temperature (0°C to 70°C), TAA compliant
10G-SFPP-SR-SA8	10GBASE-SR, SFP+ optic (LC), target range 300m over MMF, standard temperature (0°C to 70°C), TAA compliant, 8-pack
10G-SFPP-TWX-0101	10GbE Direct Attach SFP+ to SFP+ Active copper cable, 1m
10G-SFPP-TWX-0108	10GbE Direct Attach SFP+ to SFP+ Active copper cable, 1m, 8-pack
10G-SFPP-TWX-0301	10GbE Direct Attach SFP+ to SFP+ Active copper cable, 3m
10G-SFPP-TWX-0308	10GbE Direct Attach SFP+ to SFP+ Active copper cable, 3m, 8-pack
10G-SFPP-TWX-0501	10GbE Direct Attach SFP+ to SFP+ Active copper cable, 5m
10G-SFPP-TWX-0508	10GbE Direct Attach SFP+ to SFP+ Active copper cable, 5m, 8-pack
10G-SFPP-TWX-P-0101	10GbE Direct Attach SFP+ to SFP+ Passive copper cable, 1m
10G-SFPP-TWX-P-0108	10GbE Direct Attach SFP+ to SFP+ Passive copper cable, 1m, 8-pack
10G-SFPP-TWX-P-0301	10GbE Direct Attach SFP+ to SFP+ Passive copper cable, 3m
10G-SFPP-TWX-P-0308	10GbE Direct Attach SFP+ to SFP+ Passive copper cable, 3m, 8-pack
10G-SFPP-TWX-P-0501	10GbE Direct Attach SFP+ to SFP+ Passive copper cable, 5m
10G-SFPP-TWX-P-0508	10GbE Direct Attach SFP+ to SFP+ Passive copper cable, 5m, 8-pack
10G-SFPP-USR	10GBASE-USR, SFP+ optic (LC), target range 100m over MMF
10G-SFPP-USR-8	10GBASE-USR, SFP+ optic (LC), target range 100m over MMF, 8-pack
10G-SFPP-USR-SA	10GBASE-USR, SFP+ Optic (LC), Range 100m MMF, standard temperature (0°C to 70°C), TAA compliant

Specifications subject to change.

## RUCKUS Ethernet Optics Ordering Information

<b>10G-SFPP-USR-SA8</b>	10GBASE-USR, SFP+ Optic (LC), Range 100m MMF, standard temperature (0°C to 70°C), TAA compliant, 8-pack
<b>10G-SFPP-ZR</b>	10GBASE-ZR SFP+ optic (LC), for up to 80Km over SMF
<b>10G-SFPP-ZR-2</b>	10GBASE-ZR SFP+ Optic (LC), for up to 80Km over SMF, 2-pack
<b>10GE-SFPP-AOC-0701</b>	10GbE Direct Attach SFP+ to SFP+ Active Optical Cable, 7m
<b>10GE-SFPP-AOC-1001</b>	10GbE Direct Attach SFP+ to SFP+ Active Optical Cable, 10m
<b>10G-SFPP-TX-A</b>	10G-BASE-TX RJ-45 up to 30M over CAT 6a/7 cable TAA Applicable
<b>10G-SFPP-TX-LP-A</b>	10G-BASE-TX RJ-45 up to 30M over CAT 6a/7 cable TAA Applicable Low Power

Part Number	<b>25 GbE SFP28</b>
<b>E25G-SFP28-SR</b>	25GE SR SFP28 (LC), 100 m over MMF OM4, 70 m over MMF OM3, 1-pack
<b>E25G-SFP28-LR</b>	25GE LR SFP28 (LC), 10km over SMF, 1-pack
<b>E25G-SFP28-AOC-1001</b>	25GE SFP28 AOC 10m 1-pack
<b>E25G-SFP28-TWX-P-00501</b>	25GE Direct Attached SFP28 to SFP28 Passive Copper cable, 0.5m, 1-pack
<b>E25G-SFP28-TWX-P-0101</b>	25GE Direct Attached SFP28 to SFP28 Passive Copper cable, 1m, 1-pack
<b>E25G-SFP28-TWX-P-0301</b>	25GE Direct Attached SFP28 to SFP28 Passive Copper cable, 3m, 1-pack

Part Number	<b>40 GbE QSFP+</b>
<b>E40G-QSFP-SR4</b>	40GBASE-SR4 QSFP+ optic (MTP 1x8 or 1x12), 100m over MMF OM3. 150m over MMF OM4
<b>E40G-QSFP-SR4-8</b>	40GBASE-SR4 QSFP+ optic (MTP 1x8 or 1x12), 100m over MMF OM3. 150m over MMF OM4, 8-pack
<b>E40G-QSFP-SR4-INT</b>	40GBASE-SR4 QSFP+ optic (MTP 1x8 or 1x12), 100m over MMF, compatible with 10GBASE-SR, 10G breakout-capable
<b>E40G-QSFP-ESR4</b>	40GBASE-ESR4 QSFP+ optic (MTP 1x8 or 1x12), 300m over MMF
<b>E40G-QSFP-ESR4-8</b>	40GBASE-ESR4 QSFP+ optic (MTP 1x8 or 1x12), 300m over MMF, 8-pack
<b>E40G-QSFP-ER4</b>	40GBASE-ER4 QSFP+ optic (LC), for up to 40Km over SMF
<b>E40G-QSFP-LR4</b>	40GBASE-LR4 QSFP+ optic (LC), for up to 10Km over SMF
<b>E40G-QSFP-LR4-8</b>	40GBASE-LR4 QSFP+ optic (LC), for up to 10Km over SMF, 8-pack
<b>E40G-QSFP-LR4-A</b>	40GBASE-LR4 QSFP+ optic (LC), for up to 10Km over SMF TAA Compliant
<b>E40G-QSFP-LR4-INT</b>	40GBASE-LR4 QSFP+ to 4 SFP+ optic (MTP 1x8 or 1x12), for up to 10Km over SMF (compatible with 10GBASE-LR, 10G breakout-capable)
<b>E40G-QSFP-LM4</b>	40GBASE-LM4 QSFP+, 1310nm, 160m over duplex LC OM4 MMF
<b>E40G-QSFP-SR-BIDI</b>	40GbE SR QSFP+ optic (LC), bidirectional, 100m over OM3 MMF
<b>E40G-QSFP-4SFP-AOC-1001</b>	4x10GbE Direct Attach QSFP+ to 4 SFP+ Active Optical Breakout Cable, 10m
<b>E40G-QSFP-4SFP-C-0101</b>	4x10GbE Direct Attach QSFP+ to 4 SFP+ Active Copper Breakout Cable, 1m
<b>E40G-QSFP-4SFP-C-0301</b>	4x10GbE Direct Attach QSFP+ to 4 SFP+ Active Copper Breakout Cable, 3m
<b>E40G-QSFP-4SFP-C-0501</b>	4x10GbE Direct Attach QSFP+ to 4 SFP+ Active Copper Breakout Cable, 5m
<b>E40G-QSFP-QSFP-AOC-1001</b>	40GbE Direct Attach QSFP+ to QSFP+ Active Optical Cable, 10m
<b>E40G-QSFP-QSFP-C-0101</b>	40GbE Direct Attach QSFP+ to QSFP+ Active Copper cable, 1m
<b>E40G-QSFP-QSFP-C-0301</b>	40GbE Direct Attach QSFP+ to QSFP+ Active Copper cable, 3m
<b>E40G-QSFP-QSFP-C-0501</b>	40GbE Direct Attach QSFP+ to QSFP+ Active Copper cable, 5m
<b>E40G-Q-Q-C-0101-A</b>	40GbE Direct Attach QSFP+ to QSFP+ Active Copper cable, 1 m, TAA Compliant
<b>E40G-Q-Q-C-0301-A</b>	40GbE Direct Attach QSFP+ to QSFP+ Active Copper cable, 3 m, TAA Compliant

Specifications subject to change.

## RUCKUS Ethernet Optics Ordering Information

<b>E40G-Q-Q-C-0501-A</b>	40GbE Direct Attach QSFP+ to QSFP+ Active Copper cable, 5 m, TAA Compliant
<b>40G-QSFP-C-00501</b>	40GbE Direct Attach QSFP+ to QSFP+ Passive Copper Cable, 0.5m
<b>40G-QSFP-C-00501-A</b>	40GE QSFP Direct Attach Copper Cable, 0.5m, 1-pack, passive TAA Compliant
<b>40G-QSFP-C-00508</b>	40GbE Direct Attach QSFP+ to QSFP+ Passive Copper Cable, 0.5m, 8-pack
<b>E40G-QSFP-C-0101</b>	40GbE Direct Attach QSFP+ to QSFP+ Passive Copper Cable, 1m
<b>E40G-QSFP-QSFP-P-0101</b>	40GbE Direct Attach QSFP+ to QSFP+ Passive Copper Cable, 1m
<b>E40G-QSFP-QSFP-P-0301</b>	40GbE Direct Attach QSFP+ to QSFP+ Passive Copper Cable, 3m
<b>E40G-QSFP-C-0501</b>	40GbE Direct Attach QSFP+ to QSFP+ Passive Copper Cable, 5m

Part Number	100 GbE QSFP28
<b>E100G-QSFP28-SR4</b>	100GBASE-SR4 QSFP28 optic (MTP 1x12), for up to 100m over MMF
<b>E100G-QSFP28-SR4-A</b>	100GBASE-SR4 QSFP28 optic (MTP 1x12), for up to 100m over MMF TAA Compliant
<b>E100G-QSFP-ESR4</b>	100GBASE-ESR4 QSFP+ optic (MTP 1x8 or 1x12), for up to 300m over MMF
<b>E100G-QSFP28-DR1</b>	100GBASE-DR QSFP28 PAM4 optic, LC, 500m over SMF, FEC enabled
<b>E100G-QSFP28-CWDM4-2KM</b>	100GBASE-CWDM4 QSFP28 optic (LC), for distances up to 2Km over SMF
<b>E100G-QSFP28-LR4L-2KM</b>	100GBASE-LR4 Lite QSFP28 transceiver 2Km over SMF
<b>E100G-QSFP28-FR1</b>	100GBASE-FR QSFP28 PAM4 optic, LC, 2km over SMF, FEC enabled
<b>E100G-QSFP28-LR4-10KM</b>	100GBASE-LR4 QSFP28 optic (LC), for distances up to 10Km over SMF
<b>E100G-QSFP28-LR4-LP-10KM</b>	100GBASE-LR4 Low Power, QSFP28 optic (LC), for distances up to 10Km over SMF
<b>E100G-QSFP28-LR1</b>	100GBASE-LR QSFP28 PAM4 optic, LC, 10km over SMF, FEC enabled
<b>E100G-QSFP28-ER4L</b>	100GBASE-ER4 Lite QSFP28 (LC), SMF, 30Km NO FEC, 40Km w/ FEC
<b>E100G-QSFP-QSFP-P-0101</b>	100GbE QSFP28 to QSFP28 Direct Attach, Passive Copper Cable, 1m
<b>E100G-QSFP-QSFP-P-0301</b>	100GbE QSFP28 to QSFP28 Direct Attach, Passive Copper Cable, 3m
<b>E100G-QSFP-QSFP-P-0501</b>	100GbE QSFP28 to QSFP28 Direct Attach, Passive Copper Cable, 5m
<b>E100G-QSFP-QSFP-AOC-1001</b>	100GbE QSFP28 to QSFP28 Direct Attach, Active Optical Cable, 10m
<b>E100G-QSFP-4SFP-P-0101</b>	4x25GE Direct Attached QSFP28 to 4 SFP28 PASSIVE Copper Breakout Cable, 1m, 1-pack
<b>E100G-QSFP-4SFP-P-0301</b>	4x25GE Direct Attached QSFP28 to 4 SFP28 PASSIVE Copper Breakout Cable, 3m, 1-pack
<b>E100G-QSFP-4SFP-P-0501</b>	4x25GE Direct Attached QSFP28 to 4 SFP28 PASSIVE Copper Breakout Cable, 5m, 1-pack

Specifications subject to change.

## Understanding Part Number Descriptions

**Operating Temperature Ranges:** When no temperature range is mentioned in the description, the transceiver temperature range is 0°C to 85°C. “standard temperature” in the description means 0°C to 70°C. “industrial temperature” means -40°C to 85°C.

**Multi-Unit Bundles:** 8-pack means the SKU is a bundle of 8 units. 2-pack, a bundle of 2 units.

**TAA Compliance:** TAA refers to the Trade Agreements Act (19 U.S.C. & 2501-2581). TAA requires that the U.S. Government may acquire only “U.S. made or designated country end products”. This act requires that contractors must certify that each end product meets the applicable requirements. End products are ‘those articles, materials and supplies to be acquired for public use’. This includes items which have been “substantially transformed” in the United States.

**Active vs Passive Copper Cables:** Direct attach passive copper cables have transceiver shaped connectors directly soldered to the cable without any active component in the system. Passive copper cables offer the shortest distances and they are the most affordable. CommScope recommends the use of passive copper cables for links between RUCKUS switches up to 3 meters. These cables should be the default choice for stacking RUCKUS switches together within a rack or across nearby racks.

Active copper cables include active components in the transceivers on each end of the cable. This enables Active copper cables to deliver a stronger signal and to support longer distances. However, they do cost more than their passive counterparts.

## Warranty

RUCKUS optics are covered by the RUCKUS switching products standard limited warranty. For details, visit [www.ruckuswireless.com/warranty](http://www.ruckuswireless.com/warranty).

## Legal disclaimer

Product features, functionality and specifications may change or be discontinued without notice. Nothing in this document shall be deemed to create a warranty of any kind, either express or implied, statutory or otherwise, including but not limited to, any implied warranties of merchantability, fitness for a particular purpose, non-infringement of third-party rights or availability with respect to any products and services.

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