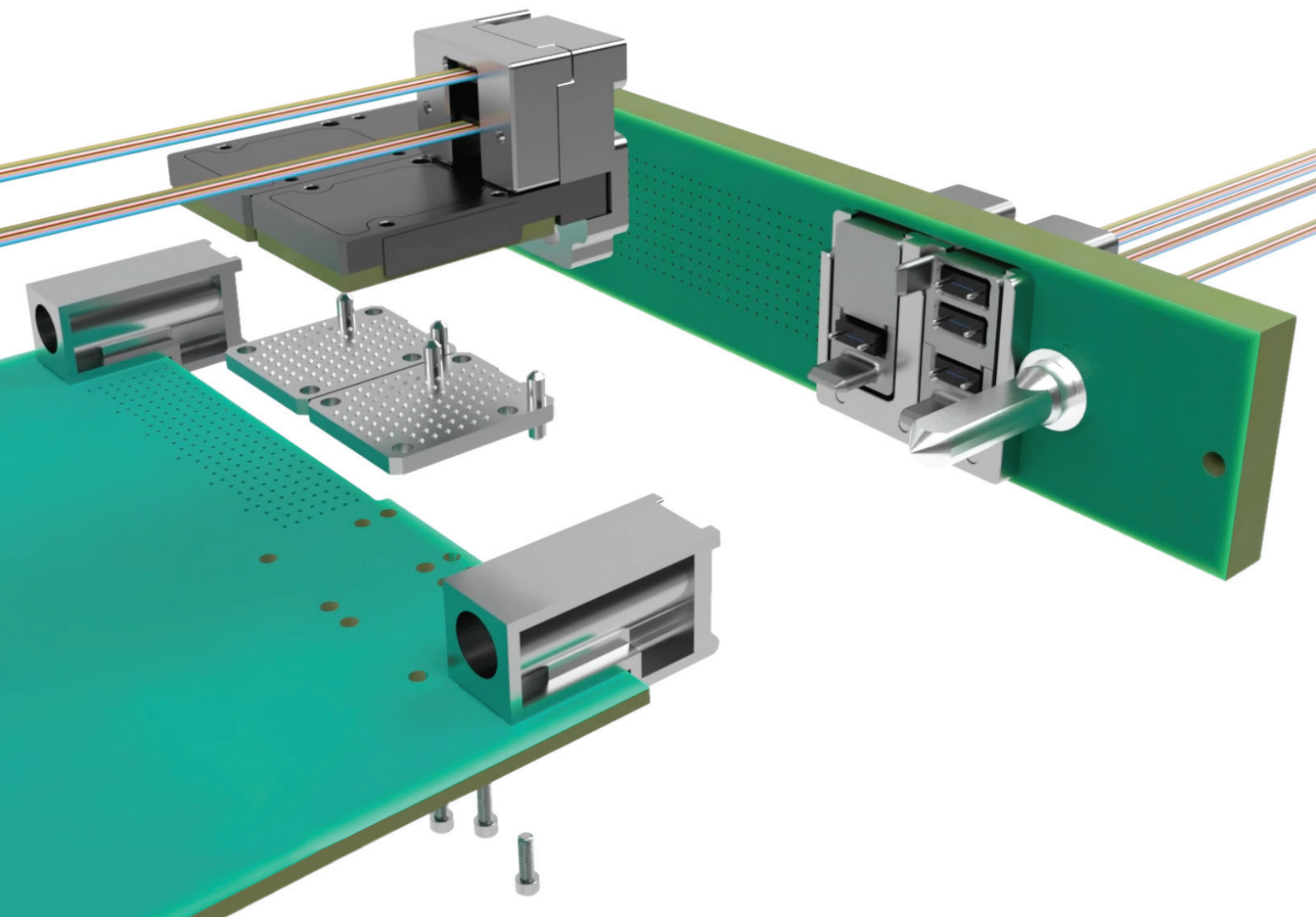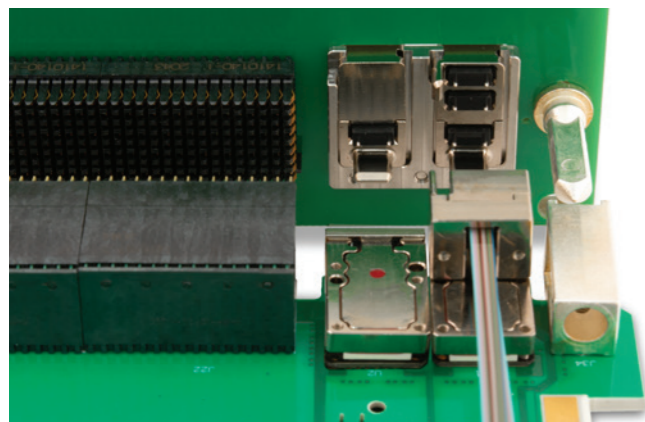# *Light*CONEX

Optical plug-in and backplane module connectors for VPX systems

*Light*CONEX

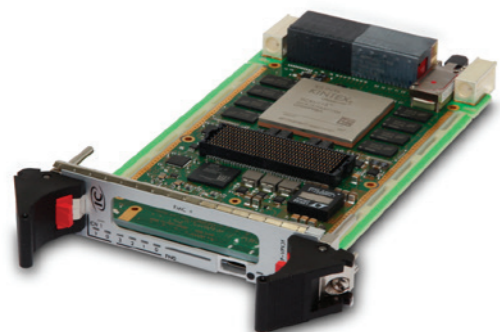Optical plug-in and backplane module connectors for VPX systems

The *Light*CONEX® series of optical plug-in and backplane module connectors for VPX systems is Smiths Interconnects' answer to the stringent SWaP requirements of today's defence applications in which fibre optics are replacing high bandwidth copper interconnects.

This VPX series of active, blind-mate optical interconnect solutions offer flexibility, light weight, very high bandwidth, and forward compatibility.

The *Light*CONEX active blind mate optical interconnect is a revolutionary solution for VPX systems that includes a fixed, plug-in module connector and a floating backplane connector that have been developed to be compliant with the forth-coming VITA 66.5 standard and in alignment with the SOSA™ technical standard.

The low-profile plug-in module connector is screwed on the board edge through an interposer, saving board space and eliminating fiber cable handling. The backplane connector has a spring-loaded mechanical transfer (MT) ferrule to ensure a secure optical mating connection under extreme shock and vibration conditions.

This Interface Concept 3U VPX card uses a *Light*CONEX LC 12TRX, 120G (full duplex) Style A.

VPX optical interconnect designed to meet the defence industry requirements

Key advantages

- Increases volumetric density of 3U and 6U high-speed switch and payload VPX boards by integrating optical transceiver into plug-in connector.
- Intermateability with VITA 66.5-defined backplane connectors enables multiple sources and drives faster design cycles.
- Reduces optical interconnect SWaP with rugged, MIL-STD qualified, edge-mounted, optical interconnects.
- Enables ultra-high port bandwidth density of up to 720 Gbps full-duplex in a half-width slot.
- Simplifies VPX board assembly and rework by eliminating fibre pigtail on edge-mount transceiver.

Configurations

10.3125G

- 4TRX (40G, full duplex)
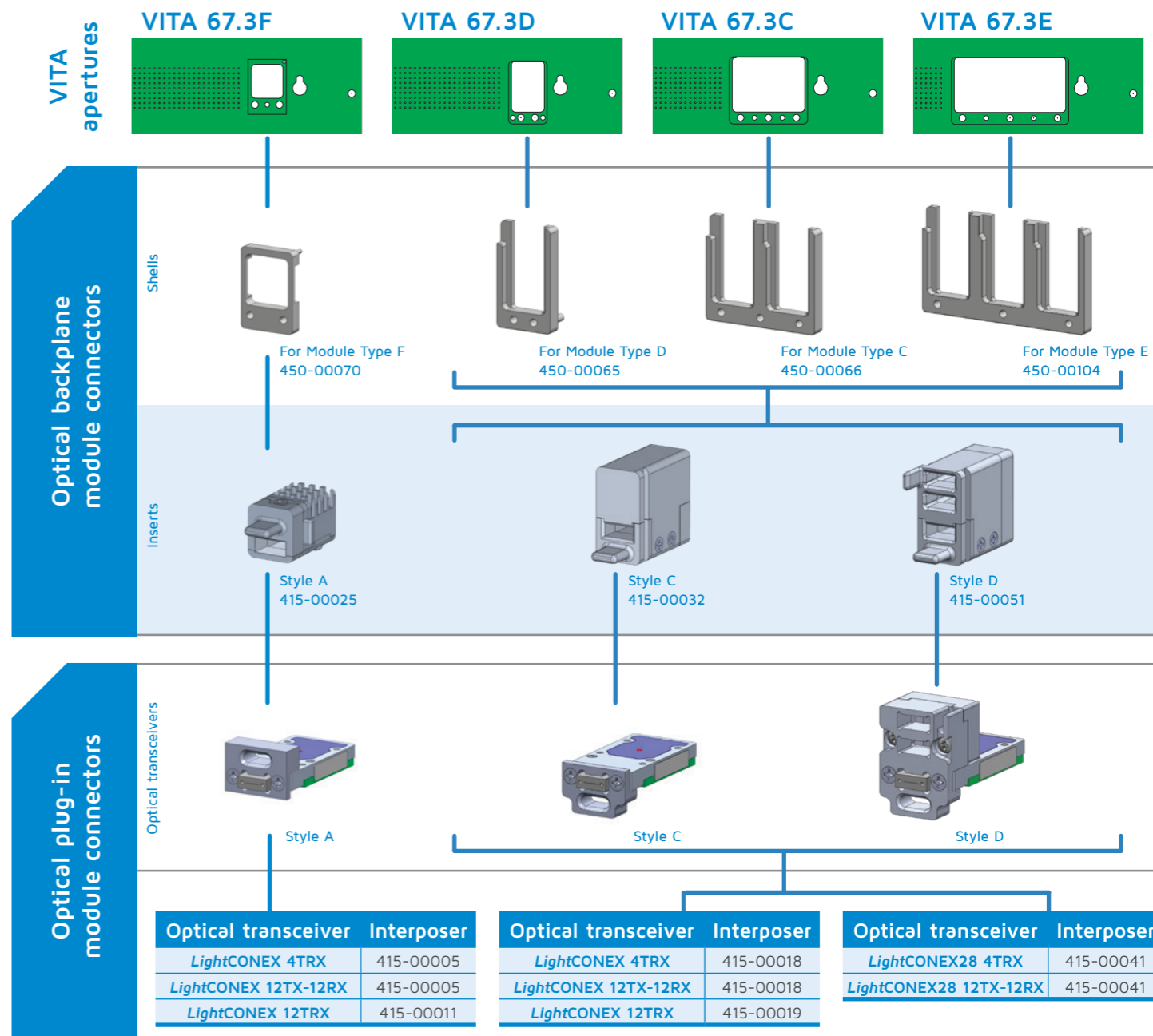- 12TX or 12RX (120G)
- 12TRX (120G, full duplex)

28G

- 4TRX (100G, full duplex),
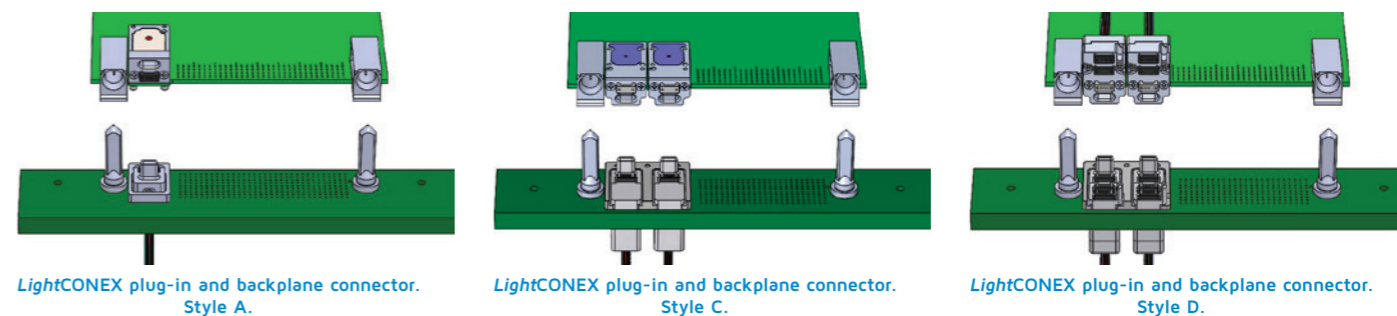- 12TX or 12RX (300G), in development

Applications

- VPX single board computing
- C4ISR embedded systems
- AESA radars
- High-throughput Ethernet switches

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*Light*CONEX Styles A, C, and D product line

VITA apertures

| VITA 67.3F | VITA 67.3D | VITA 67.3C | VITA 67.3E |

Optical backplane module connectors

Shells

| For Module Type F 450-00070 | For Module Type D 450-00065 | For Module Type C 450-00066 | For Module Type E 450-00104 |

Inserts

| Style A 415-00025 | Style C 415-00032 | Style D 415-00051 |

Optical plug-in module connectors

Optical transceivers

| Style A | Style C | Style D |

Optical transceiver	Interposer	Optical transceiver	Interposer	Optical transceiver	Interposer
*Light*CONEX 4TRX	415-00005	*Light*CONEX 4TRX	415-00018	*Light*CONEX28 4TRX	415-00041
*Light*CONEX 12TX-12RX	415-00005	*Light*CONEX 12TX-12RX	415-00018	*Light*CONEX28 12TX-12RX	415-00041
*Light*CONEX 12TRX	415-00011	*Light*CONEX 12TRX	415-00019		

Insert and plug-in connectors do not include cables. Cables are ordered separately (see page 7 for ordering information).

*Light*CONEX plug-in and backplane connector. Style A.

*Light*CONEX plug-in and backplane connector. Style C.
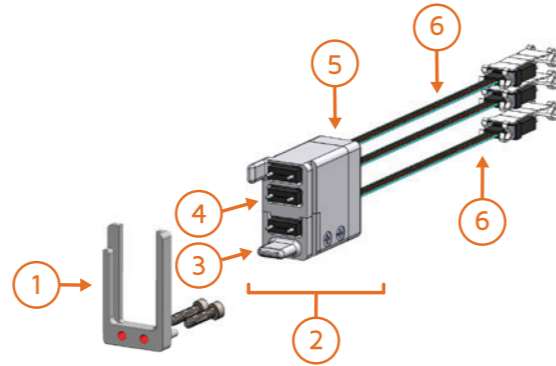
*Light*CONEX plug-in and backplane connector. Style D.

Optical backplane module connector features

The *Light*CONEX® optical backplane module connector consists of a connector shell and insert. The shell is designed to provide float for the insert in both the X- and Y-directions to enable alignment of the MT ferrule mating interfaces. The design complies with the ANSI/VITA 66.4 mating requirements with the MT ferrule displacement occurring within the backplane connector.

- Tab guiding feature provides coarse alignment
- Spring-loaded MT ferrule (12-channel or 24-channel)
- Compatible with 12-channel or 24-channel OM3 or OM4 fibre ribbon cable

The main components of the backplane module connector are:

1. Connector shells for VITA 67.3 Module Types C, D, and F.
2. Connector inserts available in VITA 66.5 Styles A, C, and D. The main components of the insert are:
   3. Tab primary guiding feature
   4. MT ferrule(s) with alignment pins
   5. Removable fibre back-clamp
6. Optical cable assembly with spring (several cable options are available).

*Light*CONEX backplane module connector. Style D shown here.
(The Style D connector includes a secondary guiding feature).

Style A

The *Light*CONEX backplane connector insert Style A design is intended for active optical applications utilizing the 0.8 in. board pitch. It is designed to fit into the VITA 67.3 Module Type F aperture. The interface is standardized in VITA 66.5.

- 1× MT only.
- Module connector compatible with VITA 66.4 aperture (0.8 in. pitch).

Insert Style A.   Insert Style C.   Insert Style D.

The *Light*CONEX backplane connectors for the VITA 67.3 apertures are available in two versions:

Style C

The *Light*CONEX backplane connector insert Style C design is intended for active optical applications utilizing the 1 in. board pitch. It is designed to fit into VITA 67.3 Module Types C, D, and E apertures. The interface is standardized in VITA 66.5
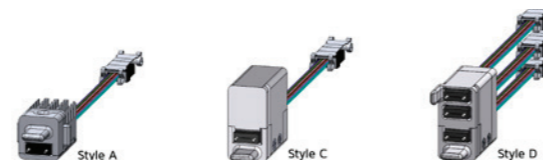
- 1× MT only, or hybrid with 1× MT and 10 nanoRF above

Style D

The *Light*CONEX backplane connector insert Style D design is intended for active optical applications utilizing the 1 in. board pitch. It is designed to fit into VITA 67.3 Module Types C, D, and E apertures. The interface is standardized in VITA 66.5.

- Up to 3× MT, in which case the lower MT ferrule mates with the plug-in module active MT, while the upper MT ferrules on the plug-in side are cabled to mid-board transceivers.

Backplane connector components

Connector shells

Different backplane connector shells are available to accommodate VITA 67.3 apertures:

- **450-00070**: Backplane connector shell for Module Type F
- **450-00065**: Backplane connector shell for Module Type D
- **450-00066**: Backplane connector shell for Module Type C
- **450-00104**: Backplane connector shell for Module Type E

Inserts

Backplane module inserts are available in the following configurations:

Style A   Style C   Style D

- **415-00025**: Backplane connector insert Style A
- **415-00032**: Backplane connector insert Style C
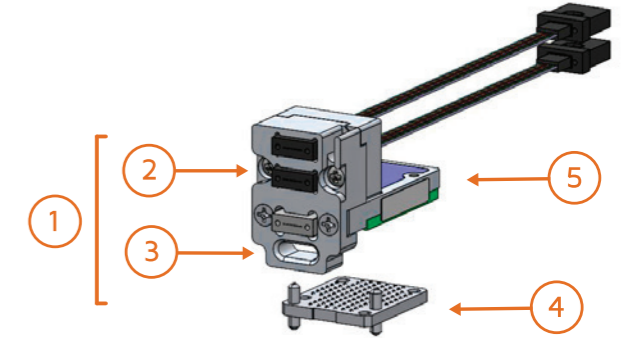- **415-00051**: Backplane connector insert Style D

Optical plug-in module connector features

The *Light*CONEX® plug-in module connector contains the optical transceiver with its MT ferrule, an LGA interposer, and a connector shroud.

- Plug-in module connectors are secured with screws directly to the edge of the host board along with their dedicated LGA interposers.
- 5.6 mm transceiver height
- Up to two additional passive optical ports that are connected with detachable cables to mid-board mounted *Light*ABLE transceivers.

The main components of the plug-in module connector are:

1. Connector shroud, with:
   2. Optional additional MT ferrule(s) in positions MT-B and MT-C
   3. Slot primary guiding feature
4. Interposer
5. Optical transceiver (its MT ferrule in position MT-A)

*Light*CONEX plug-in module connector
Style D shown here.

Style A

The *Light*CONEX plug-in module connector Style A is dedicated for the VITA 66.4 aperture and is a unique style with the slot primary alignment feature located above the optical transceiver.

Plug-in module connector Style A.   Plug-in module connector Style C.   Plug-in module connector Style D.

The *Light*CONEX plug-in module connector for the VITA 67.3 apertures are available in two versions. They have connector shrouds for each respective styles with the slot primary guiding feature located below the optical transceiver.

Style C

- Style C has one optical transceiver.

Style D

- Style D has one optical transceiver and two cabled MT.

Plug-in module connector components

Optical transceiver with connector shroud

The plug-in module connectors are equipped with optical transceivers offering multiple transmit and receive and bandwidth configurations:

Style A   Style C   Style D

- *Light*CONEX 10G LC 4TRX module: for Styles A, C, and D
- *Light*CONEX 10G LC 12RX, 12TX, and 12TRX modules: for Styles A, C, and D
- *Light*CONEX 28G LC 4TRX, 12TX, and 12RX modules: for Style C and D

Interposers

- **415-00005**: 2.74 mm, 96 positions. Style A
- **415-00011**: 3.03 mm, 233 positions. Style A
- **415-00018**: 1 mm, 96 positions. Style C and D
- **415-00019**: 1.2 mm, 233 positions. Style C and D
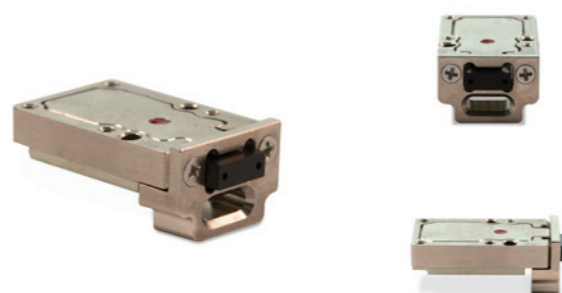- **415-00041**: 1.55 mm, 96 positions. Style C and D

233-position interposer.   96-position interposer.

*Light*CONEX optical performance

The *Light*CONEX® 10G LC Series and *Light*CONEX® 28G LC Series optical modules are available in different configurations. These modules offers flexibility, light weight, very high bandwidth, and forward compatibility.

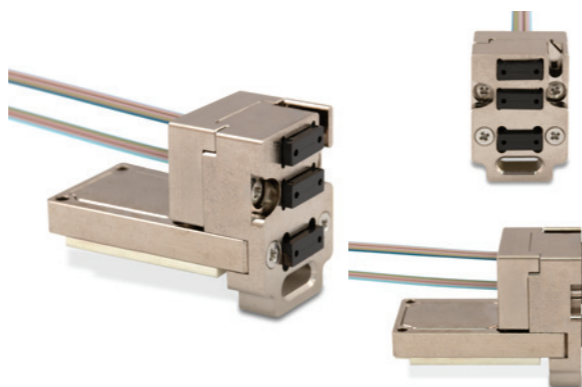## *Light*CONEX 10G 4TRX, 12RX, 12TX, and 12TRX optical modules

- **Performance**: 10.3125 Gbps/channel from −40 °C to 85 °C
- **Size**: 5.6 mm high (module and interposer)
- **Ruggedness**: MIL-STD 883 shock and vibration qualified
- **Ingress protection**: Moisture and thermal shock resistant
- **Reach**: up to 300 m, OM3 fibre
- **Sensitivity**: −12 dBm or −9 dBm with BER 10^{-12}
- **Power consumption**: 1.4 W (12-channel, 10.3125G). 2.8 W (24-channel, 10.3125G)

10G 4TRX optical module, Style C shown.
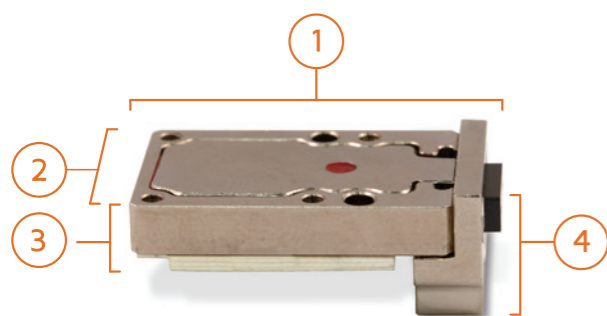
*Light*CONEX 28G 4TRX optical modules

- **Performance**: 28 Gbps/lane from −40 °C to 85 °C
- **Size**: 5.6 mm high (module and interposer)
- **Ruggedness**: MIL-STD 883 shock and vibration qualified
- **Ingress protection**: Moisture and thermal shock resistant
- **Reach**: up to 100 m, OM3 fibre
- **Sensitivity**: −7.5 dBm with BER 10^{-12}
- **Power consumption**: 1.4 W (4+4-lane, 28G)

28G 4TRX optical module, Style D shown.

*Light*CONEX optical modules dimensions

	Type	Style	Length ①	Width ②	Height ③ (w/o connector shroud)	Height ④ (with connector shroud)
10G	4TRX, 12TX, 12RX	A	23.7	13.8	4.6	9.6
		C				9.5
		D				19.4
	12TRX	A	32.3	13.4	4.6	9.6
		C		13.8	4.4	9.5
		D				19.4
28G	4TRX, 12TX, 12RX	C	28.4	14.1	4.0	9.5
		D				19.4

*Light*CONEX ordering information

Module Style	Product description	Plug-in module part number	TRX Lanes or TX/RX channels	Sensitivity (dBm)	Interposer part number
A	*Light*CONEX 10G LC 4TRX transceiver	LCX04P4185321AA	4+4	−9	415-00005
		LCX04A4185321AA	4+4	−9	
		LCX04P4185323AA	4+4	−12	
	*Light*CONEX 10G LC 12TRX transceiver	LCX12P418532101	12+12	−9	415-00011
C	*Light*CONEX 10G LC 4TRX transceiver	LCX04C418532101	4+4	−9	415-00018
		LCX04C418532301	4+4	−12	
	*Light*CONEX 10G LC 12TRX transceiver	LCX12C418532101*	12+12	−9	415-00019
	*Light*CONEX 28G LC 4TRX transceiver	LCX04C428532502	4+4	-7.5	415-00041
	*Light*CONEX 28G LC 12TX transmitter	LCT12C428532002**	12	n.a	
	*Light*CONEX 28G LC 12RX receiver	LCR12C428530502**	12	-7.5	
D	*Light*CONEX 10G LC 4TRX transceiver	LCX04D418532101	4+4	−9	415-00018
		LCX04D418532302	4+4	−12	
	*Light*CONEX 10G LC 12TRX transceiver	LCX12D418532101*	12+12	−9	415-00019
	*Light*CONEX 28G LC 4TRX transceiver	LCX04D428532502	4+4	-7.5	415-00041
	*Light*CONEX 28G LC 12TX transmitter	LCT12D428532002**	12	n.a	
	*Light*CONEX 28G LC 12RX receiver	LCR12D428530502**	12	-7.5	

*: Low-rate initial production
**: In development

Ordering notes

- 10G versions of 12TX and 12RX are also available.
- A version of the Module E shell is available that uses a half-width slot for 1× optical insert (Style D) and a full width slot for 14× SMPM RF inserts.
- A hybrid version of the Style C plug-in and backplane module connectors is available for 10× nanoRF connector inserts and 1× optical (transceiver on plug-in side).
- See datasheets for cables available for Style D plug-in and backplane module connectors.
  Plug-in cables connect the plug-in module connector to additional *Light*ABLE™ transceivers mounted mid-board.

Fibre optic cable ordering information

Backplane fibre cables

Product description	Fibre configuration	Part number
Backplane 15 cm (6 in.) MT-to-MT fibre cable (10 N spring and clip)	1×12	500-00258
Backplane 15 cm (6 in.) MT-to-MT fibre cable (20 N spring and clip)	2×12	500-00268
Backplane 15 cm (6 in.) MT-to-MPO fibre cable (10 N spring and clip)	1×12	500-00267
Backplane 15 cm (6 in) MT-to-MPO fibre cable (20 N spring and clip)	2×12	500-00266

Plug-in fibre cables

Product description	Fibre configuration	Part number
Plug-in 15cm (6 in.) MT-to-MT fibre cable	1×12	500-00256
Plug-in 15cm (6 in.) MT-to-MT fibre cable	2×12	500-00262
Plug-in 15cm (6 in.) MT-to-breakout fibre cable	2×12 and 1×12	500-00269

Worldwide Support

Connectors

Americas

Sales
connectors.uscsr@smithsinterconnect.com

Technical Support
connectors.ustechsupport@smithsinterconnect.com

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Technical Support
connectors.emeatechsupport@smithsinterconnect.com

Asia

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asiatechsupport@smithsinterconnect.com

Fibre Optics & RF Components

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Technical Support
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