

# EB16 Optical Single Mode and Multimode Pin and Socket Termini

Durability and Ruggedness of Expanded Beam (EB) Optics using Springless Mating and Crimpless Cable Retention

EVERY CONNECTION COUNTS



# EB16 Optical Termini

Durability and Ruggedness  
of Expanded Beam (EB)  
Optics

## Key Benefits:

- **Springless** Mating
- **Crimpless** Cable Retention
- Non-contacting Optical Interface



# Product Features & Benefits

## DURABILITY

- No wear on the optical interface
- Shock and vibration resistant
- Highly resistant to dirt and debris

## REPEATABLE, LOW-LOSS PERFORMANCE

- Low sensitivity to thermal fluctuations and optical interface contamination
- Consistent Insertion Loss (IL) providing a stable optical “link budget”
- Single mode AR coated at 1310nm and 1550nm
- Multimode AR coated at 850nm and 1300nm
- Terminus durability is > 1,000 mate/de-mate cycles

## EASY TO USE

- Drop-in replacement for the MIL-PRF- 29504 /4 and /5 physical contact termini
- Durable, non-contacting optical interface assists with ease of use/cleaning
- Factory or customer terminated
- Installed with standard insertion/removal tools

## VERSATILE

- Fits the MIL-DTL-38999 Series I & III size 16 cavity
- Also fits the MIL-STD-1760 size 16 cavity

# Applications/Markets

## INDUSTRIES

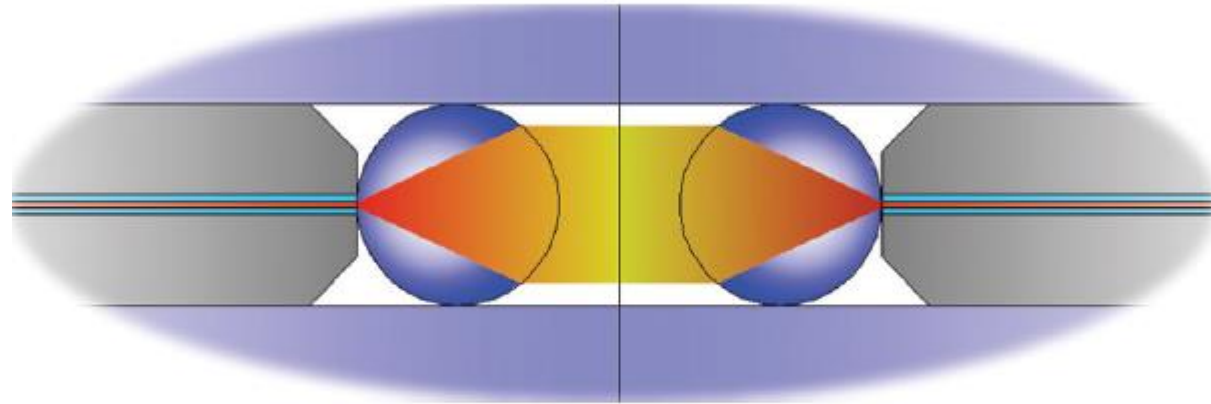
- Military Ground and Aviation
- Commercial Aviation
- Space
- Harsh Environment Industrial

## APPLICATIONS/MARKETS

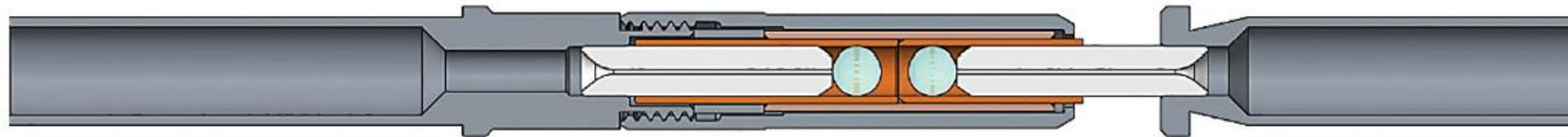
- Radar and Sensor Systems
- Rugged Communications Networks
- Fixed Wing and Rotary Aircraft
- Unmanned Aerial Vehicles
- Commercial Avionics and Sensing
- Military Avionics, Sensing and Ordnance
- Military Ground Vehicles



# EB16 Optical Termini - Technology



Expanded Beam Technology



Mated EB16 Pin and Socket Termini



# Physical Contact (PC) or Expanded Beam (EB)

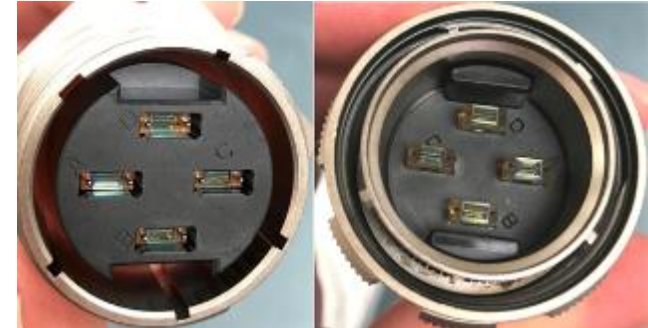
## Which Fiber Optic Contact Technology should I choose?



PC Connector



EB Connector



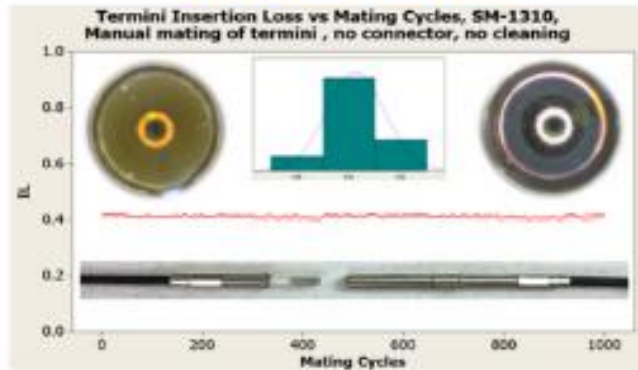
### Comparison of PC and EB Connector Technologies

Performance Criteria	PC	EB
Insertion Loss	****	**
Return Loss (SM)	****	**
Return Loss (SM) – Unmated	*	**
Lateral Connector Misalignment	*	****
Connector Angular Tilt	****	*
Mating Durability	**	****
Water Exposure	***	**

Performance Criteria	PC	EB
Dust Exposure	*	***
Vibration Susceptibility	**	***
Repair	**	**
Cleanability	**	****
Wear	*	****
Wavelength Range	****	**

# EB16 Pin and Socket Termini

EB16-SM Termini Durability (1,000 X)



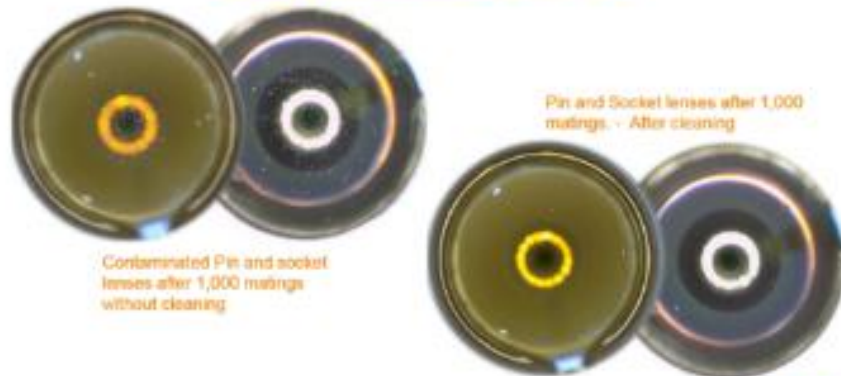
## Key Features:

- Conforms to the external dimensional envelope of MIL-PRF-29504 /4D & /5D and is D38999 compatible
- Single mode and multimode pin and socket termini are available
- Insertion (IL) loss: MM - 1.10 dB Max, SM – 1.60 dB Max
- 1.25mm ferrule, 1.25mm ball lens & 1.25mm alignment sleeve
- Easy access to the expanded beam lens for cleaning and maintenance, more tolerant of contamination than physical contact
- Factory or customer terminated, accommodates simplex fiber cables at diameters of 1.8mm – 2.0mm
- AS8438-style termini and ARINC 845 form, fit and function compatible

## EB16 Pin & Socket applications:

- Radar & tactical, rugged communications networks
- Military ground vehicles
- Commercial & military avionics systems
- Shipboard communications
- Test equipment
- Environments subject to high shock and vibration, as well as multiple mate/demate cycles

Pin and Socket Lenses after 1,000 X matings



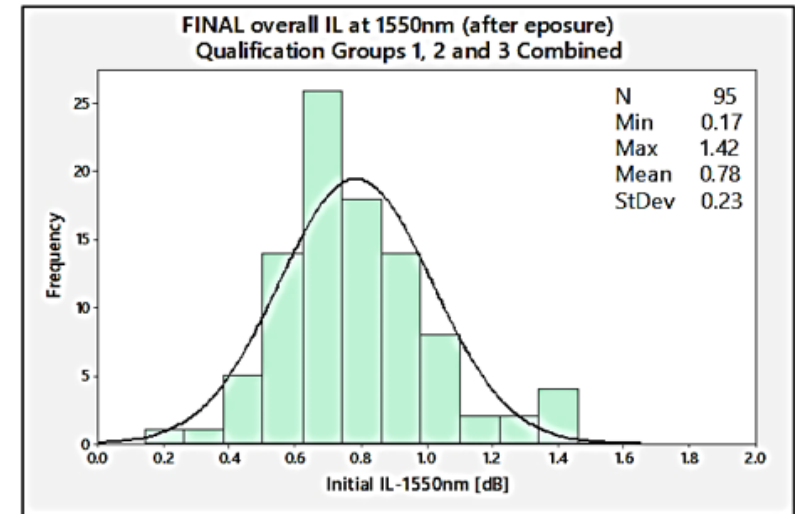
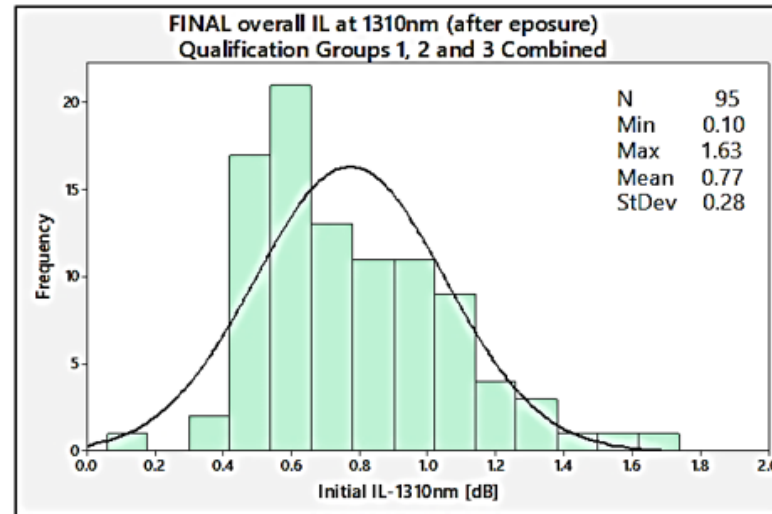
## Environmental performance summary:

- Temp Cycling: -65°C to +165°C
- Thermal Shock: -55°C to +125°C
- Sinusoidal Vibration: 60g
- Mechanical Shock: 300g
- Altitude Immersion 100k feet

# Expanded Beam Size 16 Insertion Loss Distribution

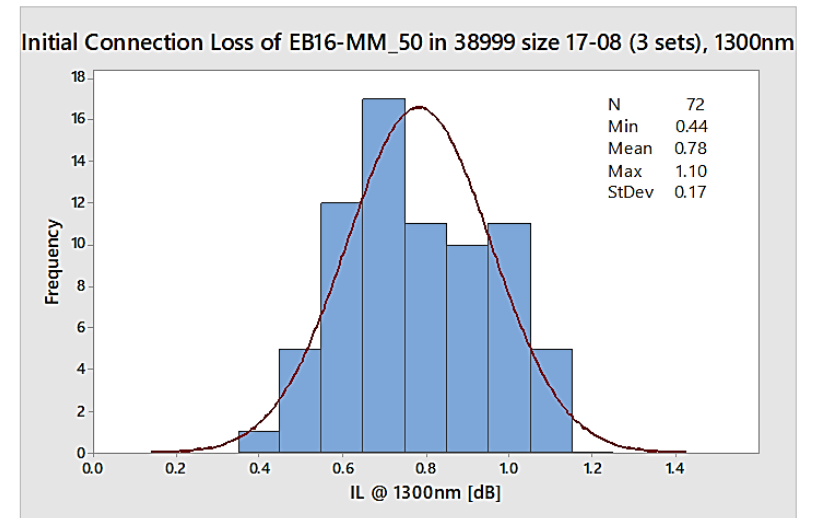
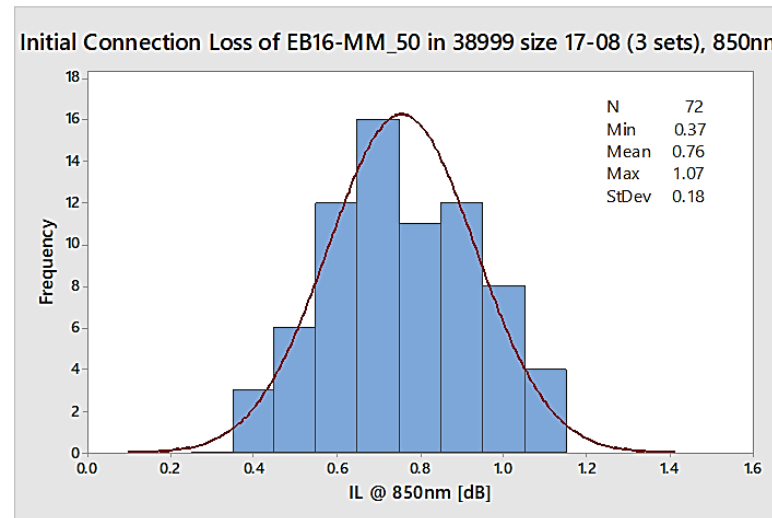
## Single Mode Data

1310nm: 79% < 1.0dB IL  
 1550nm: 83% < 1.0dB IL



## 50µm Multimode Data

850nm: 91% < 1.0dB IL  
 1300nm: 90% < 1.0dB IL





## EB16 Single Mode – Altitude Immersion at 50,000 ft

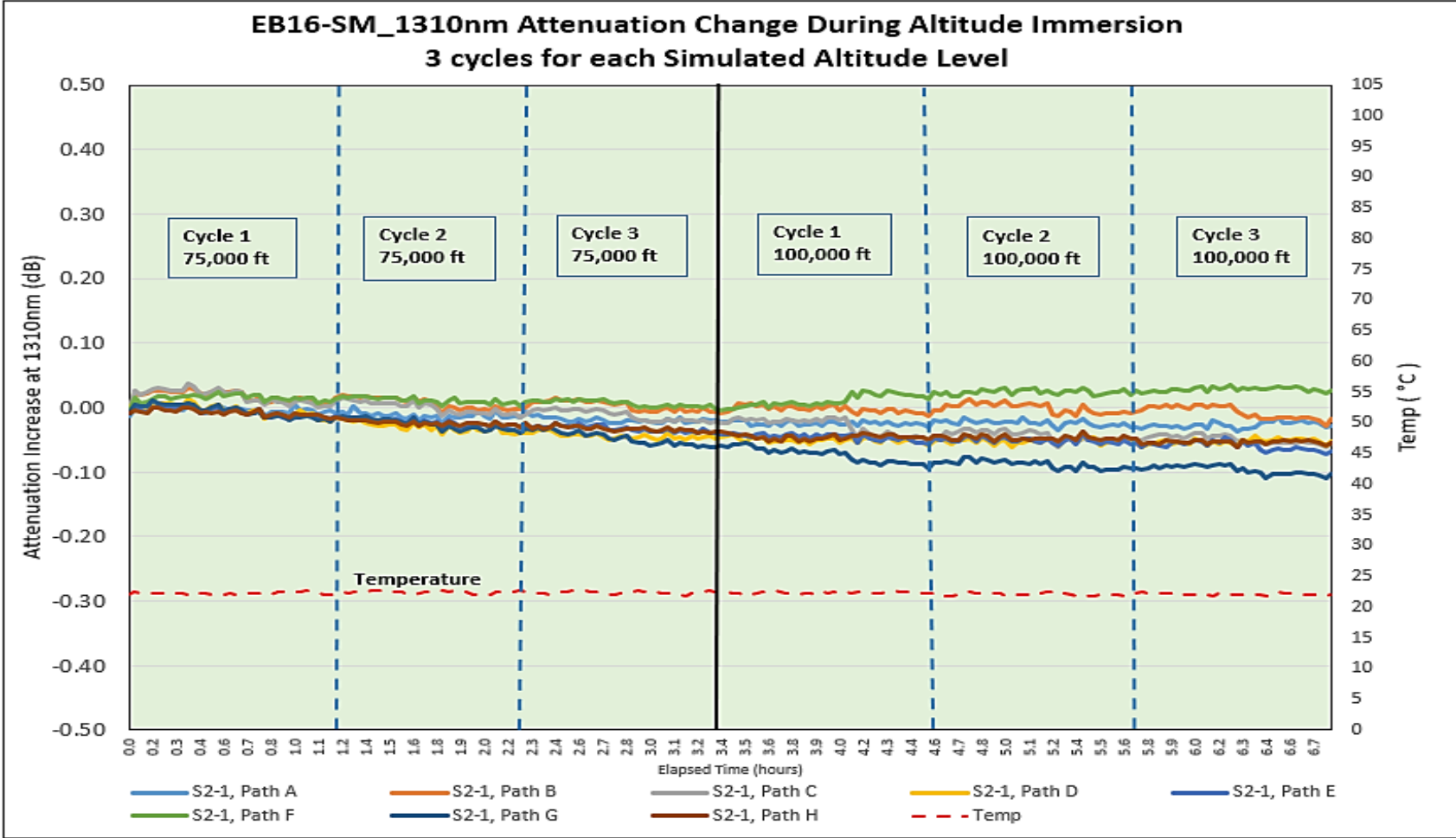
During the EB16-SM Qualification, three sets of 38999, size 17-08 assemblies (24 paths) were tested at a minimum pressure equivalent to an altitude of 15,200 m (50,000 ft.). The testing followed the EIA/TIA-455-15A, FOTP-15 specification, where the samples are exposed to 3 cycles from lab ambient [760mm of mercury or 760 torr] to approximately 83mm of mercury [83 torr] within a maximum period of 5 minutes. This condition simulated an altitude of 50,000 feet [15,200 meters]. All samples passed with a max loss increase of < 0.15dB and a negligible return loss change.

It was decided to do further exploratory testing at a simulated higher Altitude Immersion.

One of the samples that had passed the 50k was selected for this testing.



# EB16 SM – Altitude Immersion at 75,000 ft and 100,000 ft



Max IL increase: -0.07dB for both altitudes

## EB16 SM – Altitude Immersion at 75,000 ft and 100,000 ft

EIA/TIA-455-15A, FOTP-15 specifies a max ramp time of 5 minutes. The ramp times at 100k were: cycle 1: 8 min, cycle 2: 4 min, cycle 3: 4 min – obviously, cycle-1 ramp took longer, probably due to more air being contained within the connector layers that had to be evacuated than what was needed at the following cycles.



At ambient pressure



At 75,000 ft simulation



At 100,000 ft simulation

Water starts “boiling” at 75,000 ft and severe “boiling” is experienced at 100,000 ft altitude

# Product Offering

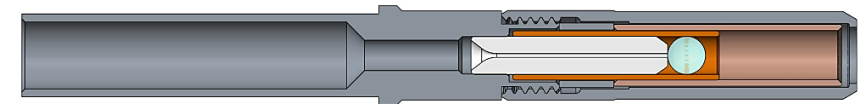
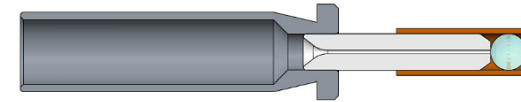
## Part Numbers

Description	Part Number	Fiber Hole [ $\mu\text{m}$ ] (Nominal)
EB16-SM Pin	2313255-1	126
EB16-SM Pin	2313255-2	126.5
EB16-SM Socket	2313256-1	126
EB16-SM Socket	2313256-2	126.5
EB16-MM Pin	2332897-1	126.5
EB16-MM Socket	2332899-1*	126.5
Socket Curing Fixture	2828502-1*	N/A
Pin Curing Fixture	2828502-2*	N/A

\*Refer to Termination Procedure

## Termination Procedure\*

- 408-163020



# Additional Information

## Available Content

- [EB16 Landing Page](#)
- [EB16 Brochure \(English\)](#)
- [Online eCatalog Connector Listing](#)

## Contact Information

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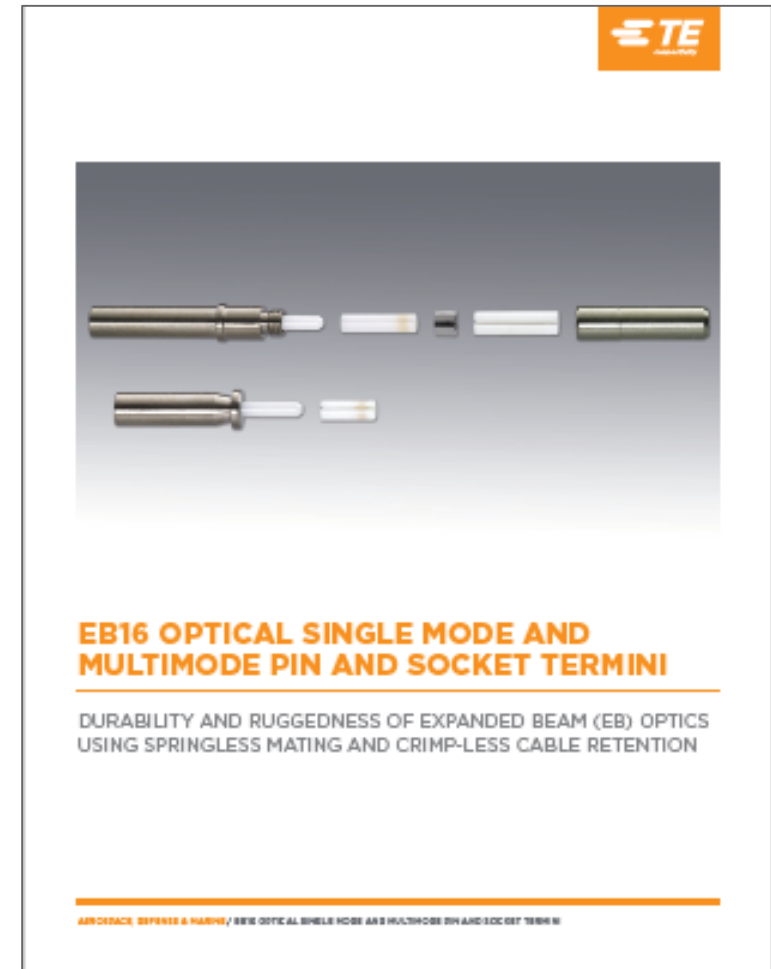
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**ANY  
CONNECTION  
CAN CHANGE  
THE WORLD**

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EVERY CONNECTION COUNTS

