COTSWORKS®

Product Guide

COTSWORKS®

Rugged Optical Product Platform

4-CHANNEL PLUGGABLE

HYBRID ASSEMBLY

2-CHANNEL RJ FORM FACTOR

STANDARD FORM FACTOR
BI-DI, 2-CHANNEL PLUGGABLE

RCP 10G-SX-DX 850nm

RCP 10G-SX-TX 850nm

RCP 10G-SX-RX 850nm | **RJ** 28G-SX 850nm | **RJ** 5G-SX(-C) 850nm | **SFP** SFP 100Mbps - 1Gbps | **SFB** 3G-27/33 1310-1550nm | **LAC** 10G-SR-TX/RX 850nm

RCP 5G-SX-DX 850nm | **RJ** 10G-SX 850nm | **RJ** 3G-TX2/RX2 850nm | **RJ** 3G-SDI-TX2/RX2 850nm | **SFF** 4G-SX-DPLX 850nm | **SFP** SFP+ 10Gbps-16Gbps | **SFB** 3G-31/55 1310-1550nm | **HM** HERMETIC POTTED CONN SM & MM

RCP 5G-SX-TX 850nm | **RJ** 10G-LX/LR/LR4 1310nm | **RJ** 3G-EX/LX 1310nm | **RJ** 3G-SDI-LX 1310nm | **SFF** 3G-TX2/RX2 850nm | **SFP** SFP 28 25Gbps | **SFB** G-31/55 1310-1550nm | **DC** DAUGHTER CARD ASSEMBLY RJ/RCP/SFF/SFB

RCP 5G-SX-RX 850nm | **RJ** 10G-CWDM/ DWDM C-BAND | **RJ** 3G-ZX-DPLX 1550nm | **RJ** 155M-FX-DPLX 1310nm | **SFF** 4G-LX-DPLX 1310nm | **SFP** QSFP CWDM | **SFB** M-31/55 1310-1550nm | **PT** PIGTAIL ASSEMBLY RJ/RCP/SFF/SFB

ROSA OPTICAL SUB ASSEMBLY RX | **TOSA** OPTICAL SUB ASSEMBLY TX | **BOSA** OPTICAL SUB ASSEMBLY BI-DIRECTIONAL | **COB** CHIP ON BOARD LASER

I2CU INTER-INTEGRATED CIRCUIT UNIT 1G-10G ETHERNET | **OES** OPTICAL ELEMENT SOFTWARE 1G-10G ETHERNET | **LS** LIGHTNING STICK 1G-ETHERNET | **OC** OPTO-CUBE 10G-ETHERNET | **VFL** VISUAL FAULT LOCATOR VFL-SFP | **RMS** RUGGED MECHANICAL SPLICE SM & MM

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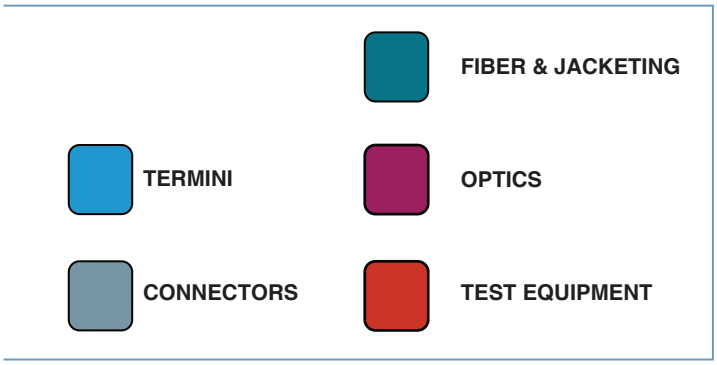
Elemental



MMF — MULTI MODE FIBER — 50/62.5µm

PTFE — TEFLON — SM & MM

MPO — MULTI-FIBER PUSH ON — SM & MM

MMF+ — MULTI MODE FIBER — 100/140 µm

PVC — POLYVINYL CHLORIDE — SM & MM

LC — LC — SM & MM

4/5 — M29504 4/5 — SM & MM

CB — C-BEAM — MM

MIL — 38999 — SM & MM

SIM — EN4165 — SM & MM

SMF — SINGLE MODE FIBER — 5µm-9µm

PE — POLYETHYLENE — SM & MM

LC-L — LC LOCKING — SM & MM

14/15 — M29504 14/15 — SM & MM

JWL — JEWEL — SM & MM

µM — M-38999 — SM & MM

EPX — EN 4694 — SM & MM

PLX — SIMPLEX/ DUPLEX — SM & MM

POF — PLASTIC OPTICAL FIBER — 1mm

LC-T — LC TAB — SM & MM

20/21 — M29504 20/21 — SM & MM

A846 — QM TITAN — SM & MM

A600 — ARINC600 — SM & MM

28876 — M28876 — SM & MM

CPLX — COMPLEX/ MULTI-CH — SM & MM

PMMA — ACRYLIC — 50µm-1mm

LC-R — LC RUGGED — SM & MM

A801 — ARINC801 1.25mm — SM & MM

MT(P) — MECHANICAL TRANSFER — SM & MM

TF — TFOCA — SM & MM

83526 — M83526 — SM & MM

RIBN — RIBBON FIBER — SM & MM

HYB — HYBRID ASSEMBLY — COPPER/FIBER

VCSEL — VERTICAL CAVITY SURFACE EMITTING LASER

FP — FABRY PEROT LASER

DFB — DISTRIBUTED FEEDBACK LASER

LED — LIGHT EMITTING DIODE — LASER

EML — EXTERNALLY MODULATED LASER

APD — AVALANCHE PHOTODIODE — DIODE

PIN — PIN DIODE — DIODE

LTLY — LIGHTLY — SM & MM

LCT801 — ARINC801 ADAPTER — SM & MM

OMX — LR4, SWDM, CWDM, DWDM — SM & MM

3155 — OPTICAL SPLITTER — SM & MM

EVAL — EVALUATION BOARD — SM & MM

LI — LUCIOL INSTRUMENTS — SM & MM

KI — KINGFISHER INTERNATIONAL — SM & MM

Opto-Electronic

RJ

RJ Module Jack (RJ) is a high-performance miniature duplex data link for opto-electronic communication over single mode or multimode optical fiber.

- Compliant to 802.3z and 802.3ae Ethernet, InfiniBand, sFPDP,XAUI, FCAV and ARINC 818 FC
- MIL-STD-883 certified
- Digital Diagnostics per MSA SFF-8472
- Surface mount electrical connector with screw or solder posts for high shock/vibe environments

Part Number	Data Rate	Fiber	Wavelength	TX	RX	P. Out Min	P. Out Max.	Rx Sens Max	Link Budget Min.	Operating Temperature Range
RJ-28G-SR	8.5-28.05Gbps	MMF	850nm	VCSEL	PIN	-3dBm	2.4dBm	-12.2dBm	9.2dB	-40°C to 85°C
RJ-10G-CWDM	5-10.3125Gbps	SMF	1260-1620nm	EML	PIN	-1dBm	3dBm	-15dBm	14dB	
RJ-10G-DWDM	6-10.3125Gbps	SMF	DWDM C-Band	EML	PIN	-2dBm	2dBm	-15dBm	13dB	
RJ-10G-SX	6-10Gbps	MMF	850nm	VCSEL	PIN	-5dBm	-1dBm	-11.1dBm	6.1dB	
RJ-10G-LR4	6-10Gbps	SMF	1271-1331nm	DFB		-5dBm	0.5dBm	-12.6dBm	7.6dB	
RJ-5G-SX	1-5Gbps	MMF	850nm	VCSEL		-5dBm	-1dBm	-14dBm	9dB	
RJ-5G-SX-C								N/A		
RJ-3G-TX2	1-3Gbps				N/A				N/A	
RJ-3G-RX2				N/A	PIN	N/A	N/A	-15dBm		
RJ-3G-LX	125Mbps-3Gbps	SMF	1310nm	FP		-5dBm	1dBm	-20dBm	15dB	
RJ-3G-EX				DFB		-1dBm	3dBm		19dB	
RJ-3G-ZX			1550nm	DFB		-1dBm	5dBm	-22dBm	21dB	
RJ-155M-FX	155Mbps	MMF	1310nm	LED		-20dBm	-14dBm	-33dBm	13dB	

RCP

Rugged Chip Scale Pluggable (RCP) is a multi-channel pluggable optical transceiver.

- The RCP is an electrically pluggable device with four ARINC 801 optical interfaces
- Fiber tray aligns the laser receivers to the cables within the housing
- High-speed data transmission at industrial temperatures

Part Number	Data Rate	Fiber	Wavelength	TX	RX	P. Out Min	P. Out Max.	Rx Sens Max	Link Budget Min.	Operating Temperature Range		
RCP-10G-SX-DX	6-10Gbps	MMF	850nm	VCSEL	PIN	-5dBm	-0.8dbBm	-12dBm	7dB	-40°C to 85°C		
RCP-10G-SX-TX					N/A			N/A	N/A			
RCP-10G-SX-RX				N/A	PIN	N/A	N/A	-12dBm	N/A			
RCP-5G-SX-DX	1-5Gbps			VCSEL		-5dBm	-1dBm	-14dBm	9dB	-40°C to 85°C	-40°C to 95°C	-40°C to 100°C
RCP-5G-SX-TX					N/A		-1dBm	N/A	N/A			
RCP-5G-SX-RX				N/A	PIN	N/A	N/A	-14dBm	-5dB			

SFF/B

Small Form Factor and Bi-Directional (SFF/B) is a rugged industry standard form factor with options for duplex or bi-directional functionality.

- Industry standard MSA 2x5/7 electrical footprint
- Digital Diagnostics per MSA SFF-8472
- Rugged LC connector housing including screw mounted OSAs
- Ethernet, sFPDP, ARINC 818 FC, InfiniBand, PCIe

Part Number	Data Rate	Fiber	Wavelength	TX	RX	P. Out Min	P. Out Max.	Rx Sens Max	Link Budget Min.	Operating Temperature Range
SFF-4G-SX	1.25-4Gbps	MMF	850nm	VCSEL	PIN	-5dBm	-1dBm	-15dBm	10dB	-40°C to 85°C
SFF-3G-TX2	1-3Gbps				N/A			N/A	N/A	
SFF-3G-RX2				N/A	PIN	N/A	N/A	-15dBm		
SFF-3G-LX	1.25-3Gbps	SMF	1310nm	FP		-5dBm	-1dBm	-18dBm	13dB	
SFB-G-xx	1.25Gbps	SMF	TX 1310/1550nm RX			-6dBm	0dBm	-22dBm	16dB	
SFB-M-xx	155Mbps		TX 1550/1310nm RX			-9dBm	-3dBm	-31dBm	22dB	

HYBRID

Hybrid Assemblies can provide a variety of options when it comes to customizing our COTSWORKS form factors and pluggable transceivers. Contact our sales team to find out more about our custom hybrid assembly options available.

- Mounted transceiver(s) on rigid or rigid-flex daughter cards or interposer PCB
- Pigtailed fiber cables into optical transceivers
- Full CCA and loop-back testing

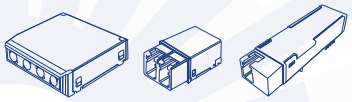
Product Overview

COTSWORKS, INC. designs and manufactures rugged optical components and subsystems to operate in harsh environments. Products are utilized worldwide in commercial and military aerospace, military tactical, oil and gas, and other industrial markets.

Founded in 2006, the company is headquartered in Cleveland, OH supporting the Americas and Asia while COTSWORKS GmbH, located in Fulda Germany, supports Europe and the Middle East.

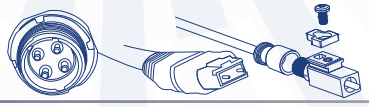
Over 100,000 mission critical rugged opto-electronic and interconnect products are produced each year in our state-of-the-art manufacturing facility. The company maintains a quality program with ISO 9100:2015 + AS9100D Certification and ATEX compliance.

Opto-Electronic



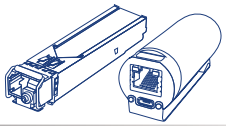
All transceivers operate at Industrial Temperature as outlined for MIL-STD-883 or MIL-STD-810-type environments. COTSWORKS' transceivers offer a variety of interfaces enabling pluggable, surface mount, or thru-hole solder attach. Optical interfaces include industry-standard LC, COTSWORKS' unique ruggedized metal LC, ARINC 801, or pigtails. Standard or custom components meet shock, vibration, temperature, mechanical force, or environmental compliances.

InterConnect



Rugged fiber cables, with Military or Commercial Aerospace grade termini and connectors, are made to meet industry certifications, supply chain, and manufacturing standards and requirements. All cabling, connectors, termini, and accessories undergo an incoming inspection, manufacturing, assembly, and final testing following standard industry procedures, specifications, and customer requirements. An optical test report with video microscope images and interferometer data is available on request.

Optical Testing Equipment



COTSWORKS test boards are ideal electrical interfaces for testing, programming, and troubleshooting optical transceivers. Customers can comprehensively measure transceiver functionality through optional clamping hardware, digital diagnostics test points, and extended temperature support. COTSWORKS currently offers test boards for all product platforms with options based on customer applications and requests.

Optical Testing Equipment

COTSWORKS delivers portable and modular test and networking solutions. Proud partners with Kingfisher and Luciol, we provide a wide range of testing equipment to make inspection, testing, and certifying fiber optics easier.

OptoCube 10G

The OptoCube is COTSWORKS' new 10G media converter. OptoCube compatibility spans all COTSWORKS 10Gbps transceiver offerings and operates at 10Gbps.

Features

10G Ethernet Media Converter/Test

- 10G media converter with built in diagnostics
- 10GBASE-X Fiber Interface
- Network switch support
- 2.5/5/10GBase-T copper port speeds
- USB port/ link monitoring & Digital Diagnostics
- Available with SFP+ or RJ transceiver config

Lightning Stick™

The Lightning Stick is a pocket-sized optical to copper media converter. Its rugged all-metal case makes it secure but also lightweight to make it effective to use both on-site and in a lab.

Features

1G Ethernet Media Converter/Test

- 100Base & 1000Base-X
- 10/100/1000 Base-T copper port speeds
- Pluggable/embedded fiber & copper cable diagnostics
- Industry standard USB for data and power

VFL-SFP

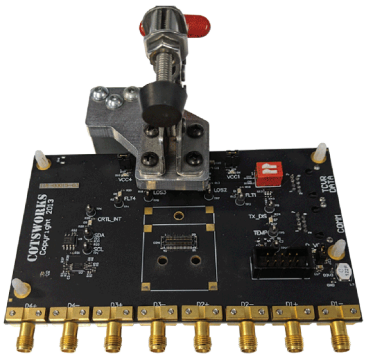
SFP with pushbutton control or software control to detect breaks in fiber cables when used with any standard MSA or SFP port, ethernet switches, servers or COTSWORKS Lightning Stick.

Features

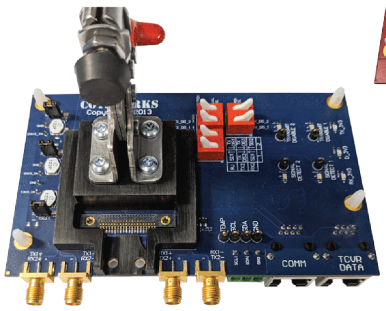
Visual Fault Locator Small Form-Factor Pluggable

- 650nm LED transmitter
- Pushbutton control or software control
- Detects breaks in fiber cables
- LC connector
- Operational in any standard SFP port, ethernet switches, servers, and Lightning Stick™

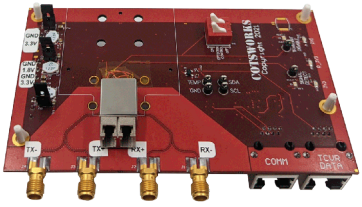
Test Boards



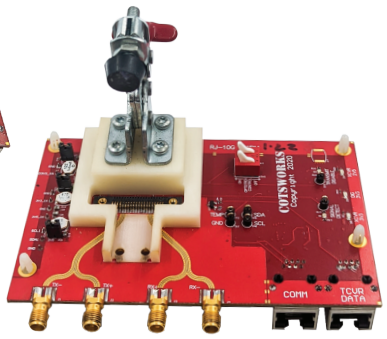
RCP-SX-DX



RJ-5G/10G



RJ-28G-SR

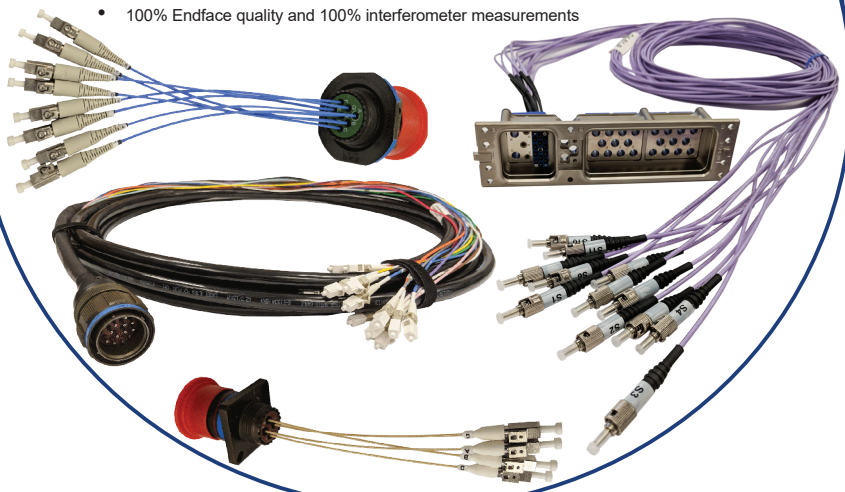


RJ-10G CWDM/DWDM

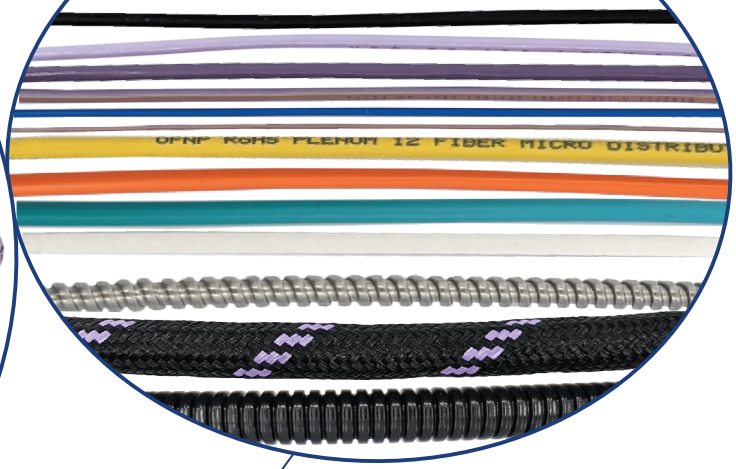
InterConnect

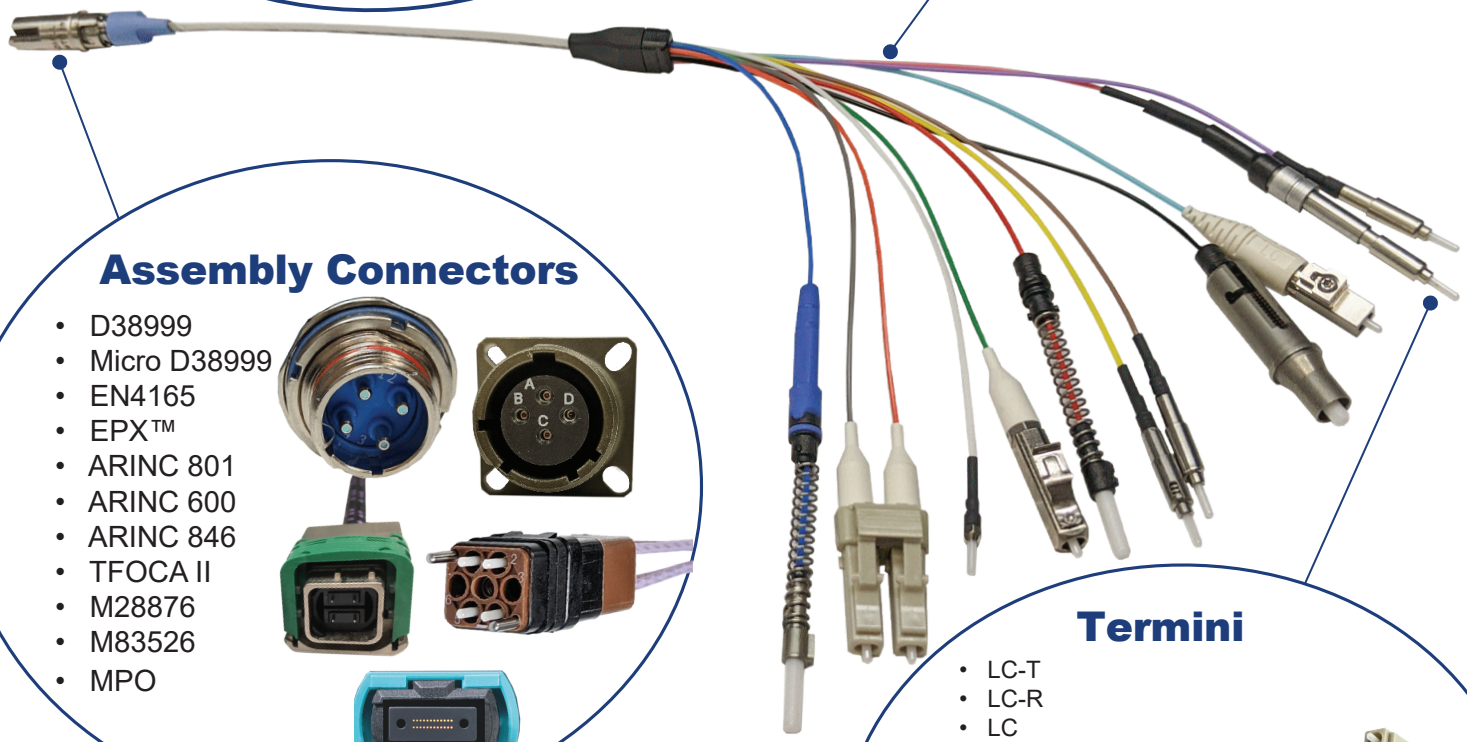
Complex Cable Assemblies

- Simplex and multi-channel fiber optic cables: OM1, 2, 3, 4, TOS1, 2, & POF
- MIL/AERO connectors: D38999, M28876, GPRB/EPXB, EN4165, Micro D38999, TFOCA
- MIL/AERO termini: M29504/4, /5, /14, /15, ARINC 801, EN4531, Jewel, Expanded Beam
- Commercial Connectors: LC, SC, FC, ST, SMA
- COTSWORKS' LC-R, LC-801, and TAO termini/connectors
- Superior insertion loss and return loss performance
- 100% Endface quality and 100% interferometer measurements



Fiber Type & Jacketing





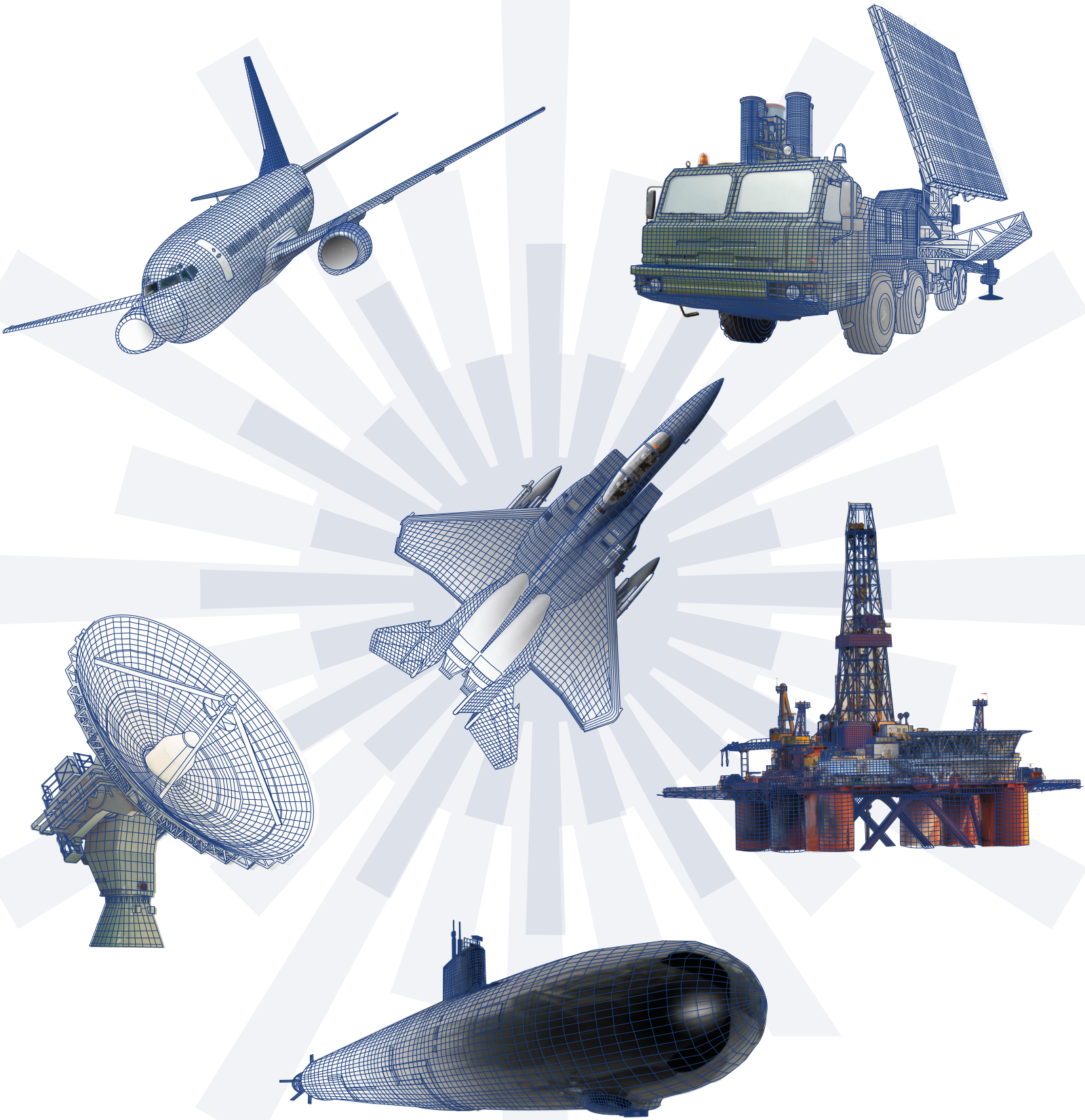
Assembly Connectors

- D38999
- Micro D38999
- EN4165
- EPX™
- ARINC 801
- ARINC 600
- ARINC 846
- TFOCA II
- M28876
- M83526
- MPO

Termini

- LC-T
- LC-R
- LC
- Lightly™
- ARINC 801/POF
- M29504: 4/5, 14/15, 20/21
- SC
- Jewel
- Elio®
- C-Beam
- FC
- ST
- EB16
- MT

COTSWORKS manufactures fiber optic cable assemblies using the highest quality materials and processes available. Our manufacturing facility test equipment consists of the highest quality automated polishers, programmable curing ovens, interferometers, video microscopes with Pass/Fail software, and high-resolution OTDRs with accuracy to 40 microns and without dead zone.



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