



Approved

NETWORKS

for the smart data center

Optics | DACs | Cables | Cable Management | Fiber TAPs

APPROVED NETWORKS

PROVIDING PRODUCTS AND SERVICES FOR THE SMART DATA CENTER.

WE ARE APPROVED.

Approved Networks is the industry authority on enterprise class, third-party networking products for the smart data center. For over a decade our technical expertise has allowed us to consistently deliver first-to-market compatibility solutions in the most rigorous, optical networking environments. Headquartered in Los Angeles, Approved provides technical, logistical and sales support to over 3,000 clients in 30 countries.

Approved's core competencies include: transceivers, direct attach cables, fiber cabling and cable management. Because we partner with the largest global contract manufacturers, we're able to provide customers with high quality, cost-effective solutions in direct contrast to the budget-prohibitive prices commonly associated with OEM networking products.

In addition to our extensive product line, our customer service has earned us a reputation of trust that is unparalleled in the industry. We help clients navigate the complexities of their hardware architecture to guarantee compliance throughout the network. Our service success is proven by the loyalty and support of some of the largest data centers in the world, including: telecommunications, corporations and government agencies.

TESTED, TRUSTED, APPROVED.

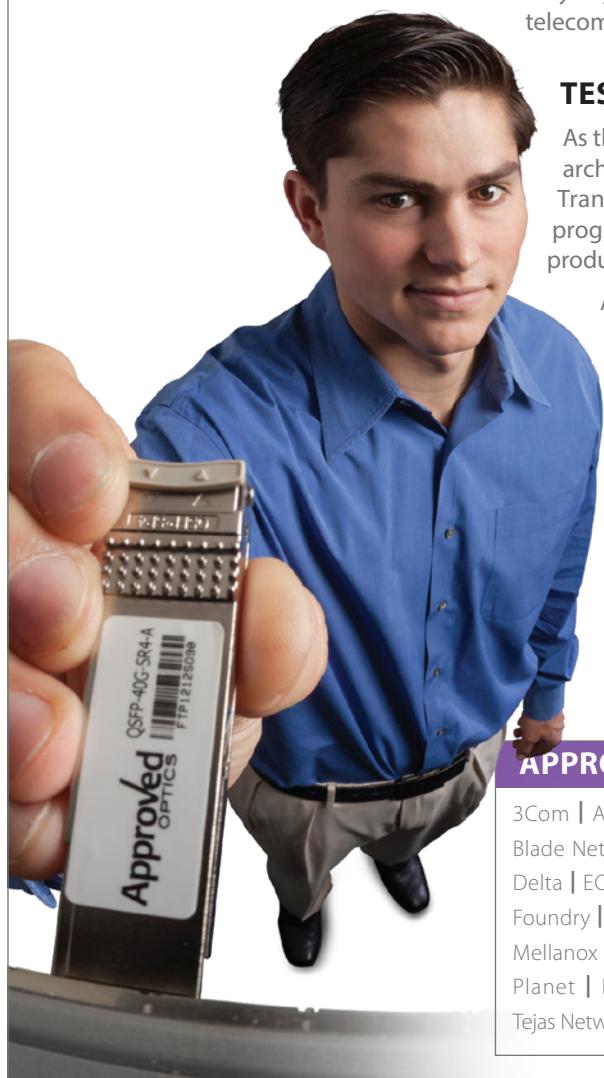
As the networking industry continues to move toward a more complex standard in optical architecture, increasingly stringent test equipment and higher standards are imperative. Transceivers running over multiple fibers at speeds of up to 120GB demand precise programming and state-of-the-art testing. To ensure true compatibility, customers need products that have been programmed – and tested – by industry leading experts.

Approved invests heavily in technology, a practice that allows us to expertly use cutting-edge test equipment on each module we provide, ensuring its precise programming. In our Environmental Test Lab, every transceiver is run through an extensive series of platform diagnostic tests. In addition, all Approved Networks products endure a rigid, physical network emulation test. This state-of-the-art procedure provides comprehensive benchmark measurements and performance analysis of the optic in both real world and customer specific application flows. An Approved product only goes to market after compatibility and performance (at-speed in its intended OEM operating environment) has been absolutely proven.

Through our Environmental Test Lab and the continued enhancements of our testing procedures to keep pace with the fast-moving industry, Approved has set the standard for networking compatibility and reliability. This level of commitment ensures our customers always receive products and service of the highest quality.

APPROVED TRANSCEIVERS AND DACs SUPPORT THE FOLLOWING:

3Com | Adtran | Adva | Aerohive | Alcatel | Allied Telesis | Alvarion | Arista | Aruba | Asus | Avaya
Blade Networks | Brocade | BTI | Calix | Coriant | Check Point | Chelsio | Ciena | Cisco | D-Link | DELL
Delta | ECI Telecom | Enterasys | Extreme | F5 Networks | Finisar | Fluke Networks | Force10 | Fortinet
Foundry | FTTX | Fujitsu | Gigamon | H3C | HP | Huawei | IBM | Intel | JDSU | Juniper | Linksys | Marconi
Mellanox | Meraki | MRV | Netgear | Nokia | Nortel | Nutanix | Oplink | Overture | Palo Alto | Pannaway
Planet | Rad Group | Redback | Riverbed | Riverstone | Sixnet | SMC | Sun | Sunrise Telecom
Tejas Networks | Telco Systems | TP Link | Transition Networks | TRENDnet | Ubiquiti | XKL | Zhone | ZTE | Zyxe





APPROVED TRANSCEIVERS

INSTALL WITH CONFIDENCE AND COST EFFECTIVENESS.

Optical transceivers from Approved come with a lifetime warranty and adhere to strict MSA standards for form, fit and function. Fully compliant with Ethernet, Fiber Channel, SONET/SDH/OTN and PON standards, all Approved transceivers feature exceptional performance over multiple voltage and temperature ranges. They also maintain constant latency and minimize electromagnetic interference and power dissipation.

GIGABIT TRANSCEIVERS



With data rates from 100MB to 4.25GB, Approved gigabit transceivers are used in data and telecommunication applications. Every transceiver is compact, hot pluggable and supports digital diagnostics monitoring when applicable. They are available in distances from 550 meters (multi-mode fiber) to 160Km (single mode fiber).

FORM FACTORS | VARIATIONS

GBIC, SFP | SX, LX, EX, ZX, EZX, BX, OC-3, OC-12, OC-48, GPON, GEPO, CWDM, DWDM, Copper-T

10 GIGABIT TRANSCEIVERS



With data rates from 6GB to 16GB, Approved's comprehensive 10GB transceiver line includes multiple form factors utilizing both SC and LC fiber connectors. Every transceiver is hot pluggable and supports digital diagnostics monitoring when applicable. They are available in distances from 100 meters (multi-mode fiber) to 120Km (Single Mode Fiber).

FORM FACTORS | VARIATIONS

XENPAK, X2, XFP, SFP+ | USR, SR, LR, LRM, ER, ZR, BX, OC-192, CWDM, DWDM, CX4, LX4, PON, 10GBase-T

25 GIGABIT TRANSCEIVERS



With data rates up to 28GB, Approved's 25GB transceiver evolved from the 100GB standard, which is typically implemented with 4 x 25 Gbit/s data lanes. Identical in mechanical dimensions to SFP and SFP+, SFP28 implements one 28 Gbit/s lane. SFP28 may also be used to "break out" a single 100GbE switch port into four 25 Gbit/s individual connections. They are available in distances from 100 meters (multi-mode fiber) to 30Km (Single Mode Fiber).

FORM FACTORS | VARIATIONS

SFP28 | SR, LR, Dual Rate

40 GIGABIT TRANSCEIVERS



With data rates up to 41.2GB aggregate bit rates, Approved's 40GB transceiver line is used in data and telecommunication applications. Every transceiver is compact, hot pluggable and supports digital diagnostics monitoring. They are available in distances from 100 meters (multi-mode fiber) to 40Km (single-mode fiber). 40GB transceivers are also used in 4x10GB mode along with Approved fiber breakout cables for connectivity to four 10GBASE-SR or LR optical interfaces.

FORM FACTORS | VARIATIONS

CFP, QSFP+ | SR4, BIDI, CSR4, UNIVERSAL, LRL4, PLRL4, LR4, PLR4, ER4, OC-768, OTU3

100 GIGABIT TRANSCEIVERS



With data rates up to 135.6GB aggregate bit rates, Approved's 100GB transceiver line is used in data and telecommunication applications. Ranging in size from CFP to the compact CXP, every transceiver is hot pluggable and supports digital diagnostics monitoring. They are available in distances from 100 meters (multi-mode fiber) to 25Km (single-mode fiber). 100GB transceivers are also used in 4x25GB mode along with Approved fiber breakout cables for connectivity to four SFP28-SR or LR optical interfaces.

FORM FACTORS | VARIATIONS

CFP, CFP2, CFP4, CXP, QSFP28 | SR10, SR4, PSM4, CWDM4, LRL4, PLRL4, PLR4, LR420, LR425, ER4, OTU4, OC-768, COHERENT



APPROVED DIRECT ATTACH CABLES

CONNECTIVITY MADE EFFICIENT AND EASY.

Approved Direct Attach Cables (DACs) fill the need for short, cost-effective connectivity and provide a power-efficient and cost-effective replacement to optical transceivers. Fully compliant with EEPROM and memory map requirements to assure proper system identification and interoperability, Approved DACs are available in 1, 10, 16, 40, 56, 100, 112, 120 & 168GB ethernet, fiber channel and InfiniBand.

PASSIVE COPPER CABLES



FORM FACTORS

SFP, XFP, SFP+, XFP-SFP+,
SFP28, QSFP+, QSFP+ Breakout,
CXP, CXP Breakout, QSFP28, QSFP28 Breakout

With data rates from 1GB to aggregate rates up to 168GB of total bandwidth in distances up to 7 meters, Approved's passive copper cables provide robust connections and require no power from the connector.

APPLICATIONS

High capacity I/O in Storage Area Networks, Network Attached Storage and storage servers. High bandwidth switches and routers. Data center cabling infrastructure and high-density connections between equipment.

BENEFITS

Support higher data rates than traditional copper interfaces. Ultra low crosstalk for improved performance. Low insertion loss. Rugged diecast covers protect the highly controlled wire termination area as well as deliver superior cable strain relief.

ACTIVE COPPER CABLES



FORM FACTORS

SFP, XFP, SFP+, QSFP+,
QSFP+ Breakout,
CXP, CXP Breakout

With aggregate rates up to 168GB of total bandwidth, Approved's active copper cables provide robust connections and require only 0.2W of power consumption while filling the need for short connectivity (up to 15 meters) in the data center.

APPLICATIONS

Top-of-Rack (ToR) switch environments. High bandwidth switches and routers. Storage Area Networks (SAN), Network Attached Storage (NAS) and servers.

BENEFITS

Ultra low crosstalk for improved performance. Low insertion loss. Low power. Cost effective solution to optical modules. Thinner and lighter than passive copper. Circuits draw power only at each end.

ACTIVE OPTICAL CABLES



FORM FACTORS

SFP+, SFP28, QSFP+,
QSFP+ Breakout, CXP, CXP Breakout,
CX4, QSFP28, QSFP28 Breakout

With aggregate rates up to 168GB of total bandwidth, Approved's Active Optical Cables (AOC) are ideal for the high density signal transmission seen in most data centers and high performance computing applications. Currently offering cable lengths up to 300 meters, Approved AOC's consume less than 2W per connection on a 120GB CXP end.

APPLICATIONS

Rack-to-rack, shelf-to-shelf interconnection of data center hubs, switches, routers, servers and storage systems.

BENEFITS

Bit Error Rate (BER) is 1000x better than copper cables. 3x-4x lighter than copper cables with a tighter bend radius. Typical power (275 mW per end) is 1/3 the wattage of a SFP+ transceiver with improved EMI.





APPROVED CABLES

CUSTOM CONFIGURED TO MEET CUSTOMERS' UNIQUE NEEDS.

Approved cables are currently used globally in space, military, telecomm and network communications applications. With years of experience designing and manufacturing fiber optic cable assemblies for both harsh and benign environments, all Approved cables are 100% optically tested and factory terminated. Available in: OM1, OM2, OM3, OM4, OM4+, OM5, SM

FIBER OPTIC PATCH CABLES



With a variety of multi-mode and single mode options, all Approved patch cables are designed to optimize performance while remaining cost-effective. Rigorously tested for repeatability and loss, Approved cables utilize emerging technologies to satisfy smart data center demands to 100GB and beyond.

CONNECTOR OPTIONS

ST, SC, FC, LC, MT-RJ, MU, mSFP, MTP/MPO in Single-Mode and Multi-mode configurations.

BENEFITS

Lighter, thinner, higher speed with greater bandwidth than copper. Fire/gas resistant. Low insertion loss and attenuation. Excellent environmental adaptability.

MTP/MPO FAN-OUT CABLES



With options available in multi-mode, single-mode and multiple core sizes, Approved MTP/MPO break-out cables are ideal connections for patch panels, data distribution and transceiver routing in the current 40GB and 100GB environments. Approved break-out assemblies provide up to 80% space savings while reducing costs by up to 25%.

CONNECTOR OPTIONS

MTP break-outs to single-fiber leads terminated with LC, MU, FC, mSFP, SC and ST connectors.

BENEFITS

Manufactured with MTP Elite fiber optic connectors for better reflectance/loss properties than MPO. Fully configurable for break-out length and stagger. Plenum rated cables are fire and gas resistant. Available in fiber jacket sizes from 1.60mm to 3.00mm.

TRUNK CABLES



With a variety of multi-mode and single-mode options, Approved's bundled cable solutions are designed for best-in-class data center installations. They provide an ideal solution when time is critical and when standardization is valued. Approved trunk cabling minimizes pathway congestion and enables the data center to scale quickly while accommodating technologies such as parallel optics which are used in 32/64/128GB fiber channel and 10/40/100GB ethernet.

CONNECTOR OPTIONS

ST, SC, FC, LC, MT-RJ, MU, mSFP, MTP/MPO connectors.

BENEFITS

Reduces on-site installation time by up to 75%. Configurations available from 2 to 144 strand fibers. Eliminates field termination while reducing pulling and cable dressing times. Pre-testing, factory termination and labeling minimize delays.



APPROVED CUSTOM LABELING & CONFIGURATION

Approved can custom build your cables, break-outs and trunks for any requirements, including: length, fan-out and stagger. In addition, Approved can custom label your optics and cables with: logo, serial number, barcode, length, port number and/or instructions.



APPROVED CABLE MANAGEMENT

INCREASE FUNCTIONALITY WHILE SAVING ON SPACE AND BUDGET.

Approved cable management systems are designed to provide efficient, functional organization of fiber optic hardware in data centers, premise installations and telecommunication networks, making termination and management of fiber optic connectivity cost-effective, simple and intuitive.

RACK MOUNT SLIDING PANELS



With the ability to add multiple configurations of adapters and cassette components, Approved rack mounts are the cornerstone of your fiber distribution frame. Approved panels are made of 16-gauge steel with black powder coat finish. Available in 19" and 23" cabinet mounts, our panels provide interconnect or cross-connect capabilities between outside plant, riser and/or distribution cables.

BENEFITS

Available in 1U, 2U, 3U and 4U options which accept 3, 6, 9 and 12 individual cassettes and/or adapter plates. Capable of multiple connectivity configurations consisting of pre-terminated assemblies, field termination and pigtail splicing. Ability to mix fiber and copper connectivity within the same patch panel. Shipped complete with strain relief brackets, routing clips, guides and mounting brackets and includes a side patch cord exit, hinged front door and a sliding tray for ease of installation.

MTP/MPO CASSETTES

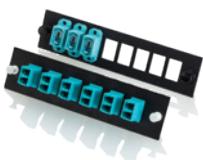


With the ever-growing density of cabling within the data center, Approved pre-terminated cassettes are specially designed to reduce installation time and cost for your fiber distribution infrastructure. With a modular design that fits into rack mount sliding panels, Approved cassettes are compact in size and enable trunk cable connection break-out up to 24 fibers.

CONNECTOR OPTIONS

Available in 8, 12 and 24 fiber configurations for MTRJ, SC, LC connections.

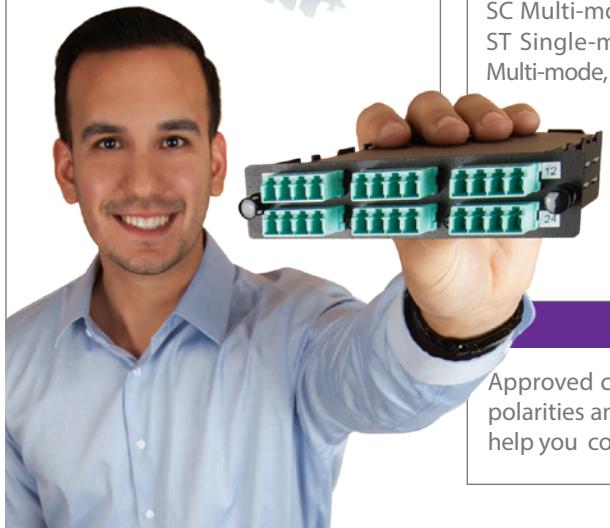
ADAPTER PLATES



With over 20 different configurations in a variety of fiber counts, Approved adapter plates provide a "one-size-fits-all" approach to cable management. Available with factory installed or field-installable connectors, Approved plates provide an efficient way to securely mate connectors at main cross-connects, intermediate cross-connects, data and telecommunication rooms.

CONNECTOR OPTIONS

MTP/MPO, SC Multi-mode Simplex, SC Single-mode Simplex, SC-APC Single-mode Simplex, SC Multi-mode Duplex, SC Single-mode Duplex, SC-APC Single-mode Duplex, ST Multi-mode, ST Single-mode, LC Multi-mode Simplex, LC Single-mode Duplex, LC-APC Duplex, LC QUAD Multi-mode, LC QUAD Single-mode, MTRJ, E2000 Single-mode, E2000-APC Single-mode & blank plates.



APPROVED CUSTOM CASSETTE CONFIGURATIONS

Approved can custom build your cassettes to fit any requirement, including: multiple MTPs, polarities and ultra-high densities. Contact an Approved Fiber Optic Connectivity Specialist to help you configure a cable management solution to maximize your space and budget.



PASSIVE FIBER TAPS

PROVIDING NETWORK VISIBILITY FOR DIAGNOSTICS AND MAINTENANCE.

Approved passive fiber taps offer a simple solution for getting data from your optical network into your monitoring and security tools. This provides for easy and transparent diagnostics and maintenance of your network without affecting network operations. Passive taps are inserted between network devices and allow network traffic to be split off into exact duplicates of the signal without any disruption to the network activity for the most accurate real-time and proactive monitoring and analysis.

SINGLE TAP - SC CONNECTORS



<u>Split Ratio</u>	<u>Mode/Media</u>	<u>Wavelengths</u>	<u>Speed</u>	<u>Part #</u>
90/10	Single Mode OS2 (9/125 micron)	1310/1550 - CWDM/DWDM	Up to 100G	SSCSM91
80/20	Single Mode OS2 (9/125 micron)	1310/1550 - CWDM/DWDM	Up to 100G	SSCSM82
70/30	Single Mode OS2 (9/125 micron)	1310/1550 - CWDM/DWDM	Up to 100G	SSCSM73
70/30	Multi Mode OM4 (50/125 micron)	850nm	Up to 40G	SSCMM73
50/50	Multi Mode OM4 (50/125 micron)	850nm	Up to 40G	SSCMM55

DOUBLE TAP - SC CONNECTORS



<u>Split Ratio</u>	<u>Mode/Media</u>	<u>Wavelengths</u>	<u>Speed</u>	<u>Part #</u>
90/10	Single Mode OS2 (9/125 micron)	1310/1550 - CWDM/DWDM	Up to 100G	DSCSM91
80/20	Single Mode OS2 (9/125 micron)	1310/1550 - CWDM/DWDM	Up to 100G	DSCSM82
70/30	Single Mode OS2 (9/125 micron)	1310/1550 - CWDM/DWDM	Up to 100G	DSCSM73
70/30	Multi Mode OM4 (50/125 micron)	850nm	Up to 40G	DSCMM73
50/50	Multi Mode OM4 (50/125 micron)	850nm	Up to 40G	DSCMM55

SINGLE TAP - LC CONNECTORS



<u>Split Ratio</u>	<u>Mode/Media</u>	<u>Wavelengths</u>	<u>Speed</u>	<u>Part #</u>
90/10	Single Mode OS2 (9/125 micron)	1310/1550 - CWDM/DWDM	Up to 100G	SLCSM91
80/20	Single Mode OS2 (9/125 micron)	1310/1550 - CWDM/DWDM	Up to 100G	SLCSM82
70/30	Single Mode OS2 (9/125 micron)	1310/1550 - CWDM/DWDM	Up to 100G	SLCSM73
70/30	Multi Mode OM4 (50/125 micron)	850nm	Up to 40G	SLCMM73
50/50	Multi Mode OM4 (50/125 micron)	850nm	Up to 40G	SLCMM55

DOUBLE TAP - LC CONNECTORS



<u>Split Ratio</u>	<u>Mode/Media</u>	<u>Wavelengths</u>	<u>Speed</u>	<u>Part #</u>
90/10	Single Mode OS2 (9/125 micron)	1310/1550 - CWDM/DWDM	Up to 100G	DLCSM91
80/20	Single Mode OS2 (9/125 micron)	1310/1550 - CWDM/DWDM	Up to 100G	DLCSM82
70/30	Single Mode OS2 (9/125 micron)	1310/1550 - CWDM/DWDM	Up to 100G	DLCSM73
70/30	Multi Mode OM4 (50/125 micron)	850nm	Up to 40G	DLCMM73
50/50	Multi Mode OM4 (50/125 micron)	850nm	Up to 40G	DLCMM55

TAP RACK HOUSINGS & BLANKS



<u>Part Description</u>	<u>Tap Ports</u>	<u>Part #</u>
1U, 19" Fiber Tap Rack Panel	8	FT-1U19-8

<u>Part Description</u>	<u>Includes</u>	<u>Part #</u>
Port blank and mounting snaps	1 blank cap, 2 snaps	FT-BLANK



LIFETIME WARRANTY

Approved Transceivers, DACs and Fiber Optic cables come with an industry leading **lifetime warranty** and toll-free technical support.



WARRANTY SAFE

Approved products **will not void your OEM warranty**, and they present zero service-level risk. Federal law protects you and your rights.



IN-SYSTEM TESTED

All products are tested within their intended system in Approved's Environmental Test Lab ensuring **100% guaranteed compatibility**.



NETWORK EMULATION

Approved networking products are tested using the **Shenick Test and Measurement System** which provides comprehensive performance analysis on modules during emulated application flows.



DATA CENTER CERTIFIED

Approved's entire product line has been **certified compliant** within the data center environment and appears on the AVL of most major telecom and technology corporations.



CUSTOM PROGRAMMED

Approved networking products are programmed in-house and can be custom coded with client name, part number and serial number.



SAME DAY SHIPPING

Approved maintains an extensive inventory ensuring **same day shipping on 98%** of orders placed before 2:00PST.



EVALUATION PROGRAM

Approved allows you to verify the quality and reliability of our products by offering an industry leading **30-day evaluation program**.