

Fact Sheet

I/O COMMUNICATIONS

► What are Input/Output Communications?

- Any connector, cable assembly or optical transceiver used to connect one piece of equipment to another is considered an input/output or I/O connector solution. These connectors may also be referred to as “ports” on equipment, for example a 48 port Ethernet switch has 48 I/O ports.
- Connectivity enabling information processing systems to interface and communicate with peripheral devices and the outside world, delivering both power and signal.
- I/O communications high speed data transfer rates depend on interconnect design, application and industry standard.

► In-the-Know

- The demand for improved global communications and cloud computing is driving the need for increased speed and associated infrastructure capable of transferring information from one device to another in a fraction of seconds, while meeting various protocol and system security requirements.
- As data rates increase and equipment size becomes smaller, the importance of EMI (Electromagnetic Interference) and thermal management becomes more critical in product design. Minimizing EMI, power consumption, and internal heat becomes a difficult balancing act, but is necessary to ensure competitive performance and a high degree of signal integrity.
- TE offers standardized interconnect and cable assembly solutions to help design customer continuity, convenience, and cost requirements.
- TE’s product development engineers have a comprehensive understanding of I/O requirements in all of the end markets and applications described above. Our broad offering of communications I/O products are designed to satisfy the diverse needs of these markets.

► Target Markets

- Data Communications/Telecommunications
- Industrial Automation
- Instrumentation
- Aerospace, Defense and Marine
- Automation and Control
- Handheld/Personal Devices

► Typical I/O Applications

- Office and Business Equipment
- Servers and Storage
- Routers/Switches/Servers/Storage
- On-Machine Industrial Communication
- Personal and Handheld Devices
- PC Peripherals
- Displays
- Process Controllers
- Medical Equipment
- Communications Equipment
- Networking Systems and Equipment

► Design Navigator

Inside the I/O Communications solutions guide you will find an opportunity to help virtually any customer select the most appropriate I/O product for their application, regardless of their market or industry focus. The Design Navigator section of the guide displays the key attributes to consider when selecting an I/O product. This tool will assist you in discussions with your customers so you can guide them in selecting the most appropriate I/O products for their design.

I/O designs are often driven by communication protocol standards, physical layer standards, performance and application certifications or material compliance standards all shown in the Design Navigator. At your fingertips you now have a tool that will lead you to TE’s broad portfolio of I/O interconnect covering every application option, from high speed data transfer to rugged industrial communications.



► Key Questions to Ask Your Customers

- Do you have a requirement for an input/output communication connection to deliver power and/or signal?
- What is the data transfer rate for your I/O connection?
- Does your data rate performance require EMI/ESD protection?
- Is there an industry standard such as Ethernet, IEEE, InfiniBand, SAS, Fibre Channel, or PCIe that you are trying to meet for your I/O connection?
- Does your I/O connection require a latching, push/pull, or quick connection?

Design Navigator

Get more information on te.com by clicking on the product names below.

Pitch (mm)	Number of Contacts	Max Data Rate per Lane (Gbps) ²	Max Current Rating per Contact (A) ²	High Vibration Performance	Environmental Protection	Power & Signal Corrosion	Durable in Harsh Environments	Quickconnect / Disconnect
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Standards

1 DATA COMMUNICATIONS / TELECOMMUNICATIONS ¹	Pitch (mm)	Number of Contacts	Max Data Rate per Lane (Gbps) ²	Max Current Rating per Contact (A) ²	High Vibration Performance	Environmental Protection	Power & Signal Corrosion	Durable in Harsh Environments	Quickconnect / Disconnect	Standards
AMPLIMITE D-Subminiature Connectors	1.27 x 2.54 - 2.74 x 2.84	9 - 120	N/A	7.5	●	●	●	●	●	SCSI 2 & 3, RS-232, ISO-11569, IPI-2, HIPPI, IEE 802.3 MII, VESA, RS-232
CeeLok FAS-T I/O Connectors	N/A	8	10	1.0	●	●	●	●	●	MIL-DTL-38999, Ethernet, USB, SATA/eSATA
CFP Compliant Connectors / CXP Connectors & Cage Assemblies	0.8	84 - 148	12.5	0.5	●	●	●	●	●	Ethernet, InfiniBand
CHAMP Board-to-Board & Wire-to-Board Connectors	0.8/1.27/ 2.16	14 - 100	1.0	3.5	●	●	●	●	●	UL, CSA, SCSI, VHDCI
Circular Plastic Connectors (CPC)	N/A	3 - 63	N/A	60	●	●	●	●	●	UL, CSA, VDE (select parts)
DEUTSCH DMC-M Single Module Connectors	2.54	1 - 20	10	90	●	●	●	●	●	EN4165 - ARINC 809 - BACC65 - UL
DEUTSCH Wildcat High Density Connectors	1.73	3 - 64	N/A	5.0	●	●	●	●	●	N/A
Heavy Duty Connectors (HDC)	N/A	1 - 150	N/A	420	●	●	●	●	●	UL, CSA, VDE
Mini Serial Attached SCSI High Density (Mini SAS HD) Connectors	0.75	36	12.0	0.5	●	●	●	●	●	SAS 2.1, PCIe
PARALIGHT™ Active Optical Cable Assemblies	N/A	N/A	14.5	350	●	●	●	●	●	N/A
QSFP+ Fiber Optic Transceivers	N/A	N/A	10.0	N/A	●	●	●	●	●	SFF-8436, 40GBase-SR4 Ethernet and InfiniBand
Quad Small Form-Factor Plus (QSFP+) Connectors	0.8	38	16.0	0.5	●	●	●	●	●	Ethernet, InfiniBand
Quadrax High Speed I/O Connectors & Contacts	N/A	1 - 12	2.0	1.0	●	●	●	●	●	MIL-DTL-38999, ARINC 404, ARINC 600
RJ point five Connector Systems	1.27	8	1.0	0.5	●	●	●	●	●	Ethernet
RJ45 Modular Jacks	1.27	8	1.0	1.5	●	●	●	●	●	TIA, IEC, FCC, Ethernet
Small Form-Factor (SFP & SFP+) I/O Products	0.8	20	16.0	0.5	●	●	●	●	●	Fibre Channel, Ethernet
USB Connectors	2.0	9	5.0	0.9	●	●	●	●	●	N/A
X2 Rails & Connectors	0.8	70	3.125	N/A	●	●	●	●	●	Ethernet
XFP Cages, Connectors & Module Systems	0.8	30	10.0	N/A	●	●	●	●	●	Ethernet, CTN
2 INDUSTRIAL COMMUNICATION / AUTOMATION & CONTROL ¹										
AMP Power Series Wire-Applied Connectors	N/A	4, 6	N/A	20	●	●	●	●	●	UL, CSA
AMPLIMITE D-Subminiature Connectors	1.27 x 2.54 - 2.74 x 2.84	9 - 120	N/A	7.5	●	●	●	●	●	SCSI 2 & 3, RS-232, ISO-11569, IPI-2, HIPPI, IEE 802.3 MII, VESA, RS-232
AMPLIMITE Hybrid Connectors (Power Coax Mixed)	0.109	3 - 36	N/A	32	●	●	●	●	●	MIL*
AMPSEAL Sealed Connector Series	2.0 x 4.0	8 - 35	N/A	17	●	●	●	●	●	UL, ISO/IEC
CHAMP Board-to-Board & Wire-to-Board Connectors	0.8 / 1.27 / 2.16	14 - 100	1.0	3.5	●	●	●	●	●	UL, CSA, SCSI, VHDCI
Circular Plastic Connectors (CPC)	N/A	3 - 63	N/A	60	●	●	●	●	●	UL, CSA, VDE (select parts)
Command Series Switches	N/A	4, 8, 12	N/A	5.0	●	●	●	●	●	UL, CSA, NEMA1, 12 & 13
DEUTSCH DMC-M Single Module Connectors	2.54	1 - 20	10	90	●	●	●	●	●	EN4165, ARINC 809, BACC65, UL
DEUTSCH DTS-RJ45 Ruggedized Shielded Connectors	1.27	4, 8	1.0	N/A	●	●	●	●	●	Cat5e
DEUTSCH Wildcat High Density Connectors	1.73	3 - 64	N/A	5.0	●	●	●	●	●	N/A
Heavy Duty Connectors (HDC)	N/A	1 - 150	N/A	420	●	●	●	●	●	UL, CSA, VDE
Industrial Mini I/O Connector System	N/A	8	1.0	0.5	●	●	●	●	●	Cat5e
Industrial RJ45 / Industrial Ethernet Connectors	1.27	4, 8	10	0.5	●	●	●	●	●	UL, CSA, Cat5e, Cat6
Industrial Switches	N/A	N/A	N/A	25	●	●	●	●	●	RU, CSA, VDE, UL
Industrial USB Connectors	2.0	4	0.12	0.5	●	●	●	●	●	UL, CSA, USB 2.0
Keylock Switches	N/A	2, 3	N/A	5.0	●	●	●	●	●	N/A
M8/M12 Connector Systems	N/A	3 - 4	1.0	5.0	●	●	●	●	●	UL, CSA
Micro-MaTch Board-to-Board & Wire-to-Board Connectors	1.27	4 - 24	N/A	0.5	●	●	●	●	●	N/A
Motorman Hybrid Connectors	N/A	13	1.0	20	●	●	●	●	●	UL, CSA, VDE, ISO/IEC, Cat5e
Quad Small Form-Factor Plus (QSFP+) Connectors	0.8	38	16.0	0.5	●	●	●	●	●	Ethernet, InfiniBand
Quadrax High Speed I/O Connectors & Contacts	N/A	1 - 12	2.0	1.0	●	●	●	●	●	MIL-DTL-28999, ARINC 404, ARINC 600
RJ45 Modular Jacks	1.27	8	1.0	1.5	●	●	●	●	●	TIA, IEC, FCC, Ethernet
Small Form-Factor (SFP & SFP+) I/O Products	0.8	20	16	0.5	●	●	●	●	●	Fibre Channel, Ethernet
XFP Cages, Connectors & Module Systems	0.8	30	10.0	N/A	●	●	●	●	●	Ethernet
3 PERSONAL COMPUTER / HANDHELD DEVICES ¹										
AMPLIMITE D-Subminiature Connectors	1.27 x 2.54 - 2.74 x 2.84	9 - 120	N/A	7.5	●	●	●	●	●	SCSI 2 & 3, RS-232, ISO-11569, IPI-2, HIPPI, IEE 802.3 MII, VESA, RS-232
CHAMP Board-to-Board & Wire-to-Board Connectors	0.8 / 1.27 / 2.16	14 - 100	1.0	3.5	●	●	●	●	●	N/A
Connectors for HDMI Standards	N/A	19	10.2	0.5	●	●	●	●	●	N/A
Digital Visual Interface (DVI) Receptacles & Cable Assemblies	N/A	24 - 29	3.96	1.5	●	●	●	●	●	N/A
D-Subminiature Connectors for VGA Standard	N/A	9, 15	N/A	●	●	●	●	●	●	N/A
RJ point five Connector Systems	1.27	8	1.0	1.5	●	●	●	●	●	N/A
RJ45 Modular Jacks	1.27	8	1.0	1.5	●	●	●	●	●	TIA, IEC, FCC, Ethernet
USB Connectors	2.0	9	5.0	0.9	●	●	●	●	●	USB
4 INSTRUMENTATION ¹										
AMPLIMITE D-Subminiature Connectors	1.27 x 2.54 - 2.74 x 2.84	9 - 120	N/A	7.5	●	●	●	●	●	SCSI 2 & 3, RS-232, ISO-11569, IPI-2, HIPPI, IEE 802.3 MII, VESA, RS-232
AMPLIMITE Hybrid Connectors (Power Coax Mixed)	0.109	3 - 36	N/A	32	●	●	●	●	●	MIL*
CeeLok FAS-T I/O Connectors	N/A	8	10	1.0	●	●	●	●	●	MIL-DTL-38999, 10/100/1000 Ethernet, USB 2.0/3.0, SATA/eSATA
CHAMP Board-to-Board & Wire-to-Board Connectors	0.8 / 1.27 / 2.16	14 - 100	1.0	3.5	●	●	●	●	●	UL, CSA, SCSI, VHDCI
Circular Plastic Connectors (CPC)	N/A	3 - 64	N/A	5.0	●	●	●	●	●	UL, CSA, VDE (select parts)
Corcom Power Entry Modules	Refer to the Featured Product section for more product details.									
DEUTSCH DMC-M Single Module Connectors	2.54	1 - 20	10	90	●	●	●	●	●	EN4165, ARINC 809, BACC65, UL
DEUTSCH Wildcat High Density Connectors	1.73	3 - 64	N/A	5.0	●	●	●	●	●	N/A
Industrial RJ45 / Industrial Ethernet Connectors	1.27	4, 8	10	0.5	●	●	●	●	●	UL, CSA, Cat5e
Industrial USB Connectors	2.0	4	0.12	0.5	●	●	●	●	●	UL, CSA, USB 2.0
M8/M12 Connector Systems	N/A	3 - 4	1.0	5.0	●	●	●	●	●	UL, CSA
Micro-MaTch Board-to-Board & Wire-to-Board Connectors	1.27	2 - 24	N/A	0.5	●	●	●	●	●	N/A
Quadrax High Speed I/O Connectors & Contacts	N/A	1 - 12	2.0	1.0	●	●	●	●	●	MIL-DTL-38999, ARINC 404, ARINC 600
RJ point five Connector Systems	1.27	8	1.0	0.5	●	●	●	●	●	Ethernet
RJ45 Modular Jacks	1.27	8	1.0	1.5	●	●	●	●	●	FCC

¹ For cable assemblies using specified interconnect, visit the [TE Cable Assembly website](#).

² May vary based on application and product selection

UL - Underwriters Laboratories Listed
 RU - Recognized Under
 CSA - Canadian Standards Association
 * See product page on te.com for Mil specs