

COMMUNICATIONS, DATA, CONSUMER DIVISION



**FCI: SETTING
THE STANDARD
FOR CONNECTORS**

With operations in 30 countries, FCI is a leading manufacturer of connectors. Our 13,500 employees are committed to providing customers with high-quality, innovative products for a wide range of consumer and industrial applications.

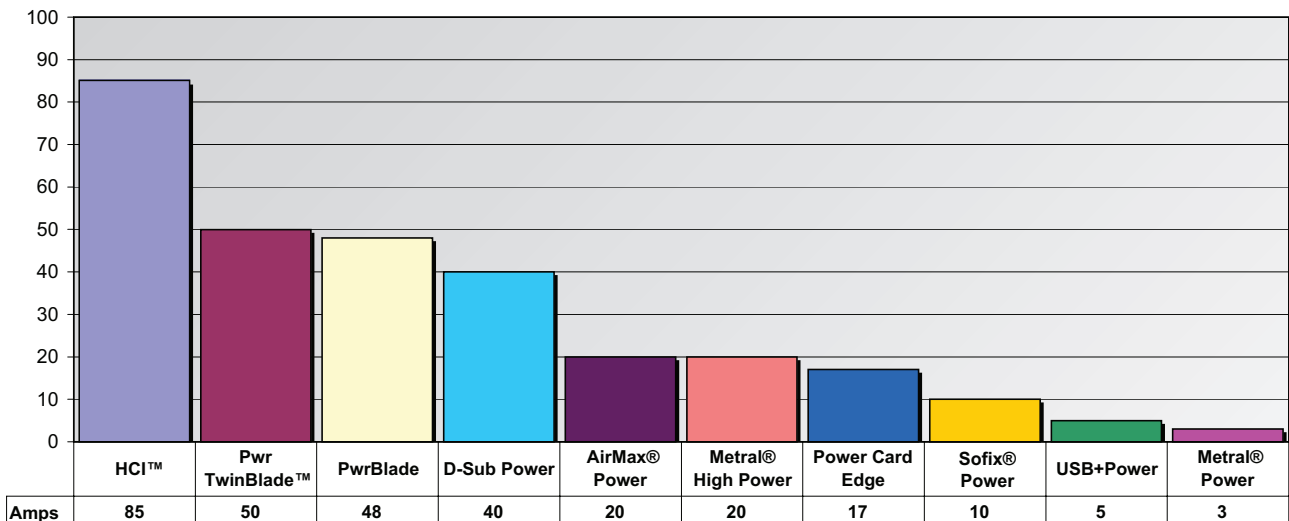


FCI offers a broad range of power connector solutions for power supply and backplane-to-card interfaces as well as bus bars and cable assemblies for power distribution.

FCI understands the evolving market requirements for power connectors and continues to provide innovative and cost-effective power product solutions to address the challenges of increasing power density and facilitating airflow for thermal management.

FCI can provide the design engineer with end-to-end power solutions for chassis-based equipment designs. FCI is ready with the right power solution for you.

FCI Power Solutions
Maximum Current Per Contact (in Amps)
(30 Degrees C T-Rise without Airflow)



Power Supply Solutions

▶ PwrBlade® Connector System	4
▶ HCI™ Connector System	8
▶ Power Card Edge	10

Backplane-to-Card Solutions

▶ AirMax VS® Power Connectors	12
▶ Metral® High Power Connectors	14
▶ Metral® Power Connectors	16

Power Distribution Solutions

▶ Bus Bar	18
-----------	----

Power I/O Solutions

▶ PwrBlade® Cable Assemblies	20
▶ Pwr TwinBlade™ I/O Cable Assemblies	22
▶ D-Subminiature Power Connectors	24
▶ USB + Power	26
▶ Sofix® Power Connectors	28

Miscellaneous

▶ Notes	30
---------	----

PWRBLADE® CONNECTOR SYSTEM

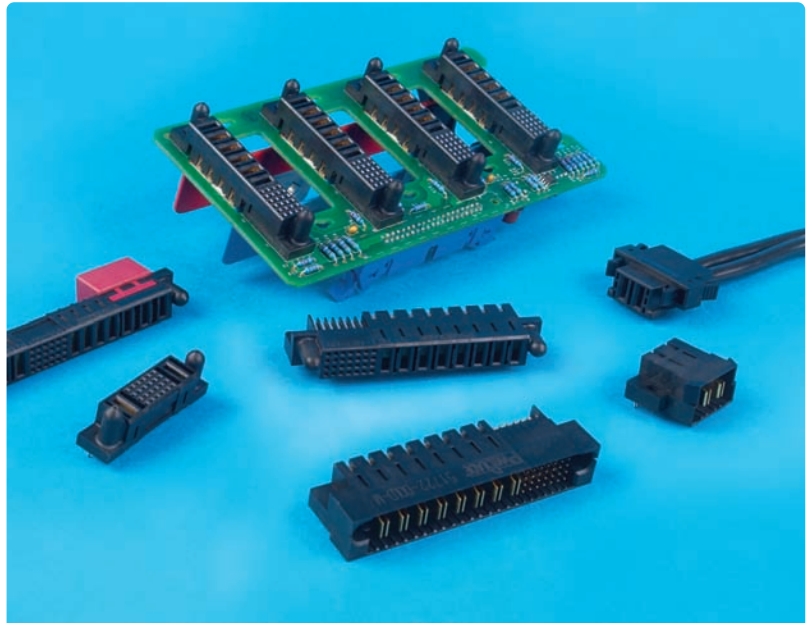
DESCRIPTION

The PwrBlade®, power distribution connector system from FCI includes power and signal contacts to provide power distribution and power control in a single connector. Options for either vertical or right-angle versions of both headers and corresponding receptacles deliver support for coplanar, backplane or mezzanine connections. The connectors are ideal for robust power connections to embedded AC/DC power supplies or for board-to-board connections in servers, storage enclosures and communications equipment.

Initially developed to enable the implementation of Server System Infrastructure (SSI) Standards for Distributed Power Supplies (DPS), Mid-range Power Supplies (MPS) and High-end Power Supplies (HPS), PWRBLADE connectors are also available in wide variety of other configurations with either solder or press-fit board termination. The connectors can also be customized to address unique application requirements.

PwrBlade® connectors can be provided with one to 20 power contacts and zero to 148 signal contacts. Individual power contacts are rated at 48A current-carrying capacity; connector configurations with multiple power contacts are rated at 30A per power contact as tested for 30°C temperature rise in still air. An available cable port option provides segregated AC contacts for cable pass-through applications.

Capability for two levels of sequential mating for power contacts and two levels for signal contacts can support up to three levels of sequencing of power and signals. Sequential mating of ground, followed by power and signals can be used to provide “hot swap” capability. Molded guide posts on the header engage with the corresponding receptacle connector to assure alignment during blind-mating.



FEATURES & BENEFITS

- Provides contacts for power distribution and power control
- Robust 0.100" (2.54mm) pitch for signal contacts and 0.200", 0.250", or 0.300" spacing for power contacts
- Rugged blind-mate design
- 48A/individual power contact; 30A/contact for 10 contacts at 30°C rise in still air
- 60A per UL test guidelines
- Capability for up to 20 power contacts and 148 signal contacts in up to 8 inches
- Up to 3 levels of sequential contact: 2 for power and 2 for signals
- Options for solder or press-fit termination
- Board retention devices provided to secure connectors during processing
- AC cable port option (cable pass-through)

TARGET MARKETS

- Data
- Telecommunications
- Datacom/Networking
- Industrial/Instrumentation

APPLICATIONS

- Power supplies
- Servers
- Storage enclosures
- Communications equipment
- Hot-swap redundant N+1 power distribution systems

MATERIALS

- Housing
 - Glass-filled high temperature nylon
 - Color: Black
- Contacts
 - Power contacts: Copper based alloy
 - Signal pins: Phosphor-bronze
 - Signal contacts: Copper based alloy
- Plating
 - All contacts: 0.76 µm (30 µin.)
 - Gold over 1.27 µm (50 µin.) nickel

ELECTRICAL PERFORMANCE

- Insulation Resistance
 - Power contact: 10,000M ohms
 - Signal contact: 500M ohms
- Withstanding Voltage
 - Power contact: 2500 volts DC
 - Signal contact: 1000 volts DC
- Current rating: 30A for single powered contact; de-rated to 30°C for 12 powered contacts at 30°C temperature rise with zero airflow
- Current rating: 60A for 10 contacts when tested to UL guidelines.
- LLCR: <20 milliohms

MECHANICAL PERFORMANCE

- Mating force:
 - 25 ounces per Power Contact
 - 3.5 ounces per Signal Contact

TECHNICAL DOCUMENTS

- Product Specification: GS-12-149
- Application Specification: BUS-20-067
- PwrBlade® Worksheets for custom design or layout
 - 51696 – Vertical header
 - 51697 – R/A header
 - 51698 – Vertical receptacle
 - 51699 – R/A receptacleContact your local FCI representative to obtain these worksheets.

TOOLING

- For Press Fit tooling contact your local FCI Sales Representative

CERTIFICATIONS & APPROVALS

- UL ,CSA and TUV approved

PACKAGING

- Trays

PwrBLADE®
Power Distribution Connector System

PART NUMBERS

SERVER SYSTEM INFRASTRUCTURE (SSI STANDARD)

Distributed Power Supply (1 Power + 24 Signal + 1 Power Configuration)

Server	Tin/Lead	Lead-Free
Right Angle Receptacle	51416-001	51416-001LF
Vertical Press-Fit Receptacle	51666-001	51666-001LF
Power Supply		
Right Angle Header	55415-001	55415-001LF
Vertical Header	51952-001	51952-001LF
Vertical Press-Fit Header	51952-002	51952-002LF

High-End Power Supply (12 Power + 24 Signal Configuration)

Server	Tin/Lead	Lead-Free
Vertical Receptacle	51261-XX001	51261-XX001LF
Vertical Press-Fit Receptacle	51617-XX002	51617-XX002LF
Power Supply		
Right Angle Header	51219-XX002	51219-XX002LF

Mid-Range Power Supply (6 Power + 24 Signal + 5 Power Configuration)

Server	Tin/Lead	Lead-Free
Right Angle Receptacle	51625-XX001	51625-XX001LF
Vertical Press-Fit Receptacle	51667-XX001	51667-XX001LF
Power Supply		
Right Angle Header	51624-XX001	51624-XX001LF
Vertical Header	51860-001	51860-001LF
Vertical Press-Fit Header	51860-002	51860-002LF

AC CABLE PORT RIGHT ANGLE RECEPTACLE

Power+Signal+Power+Cable	51894-YYY	51894-YYYLF
Power+Cable	51919-YYY	51919-YYYLF
Signal+Power+Cable	51921-YYY	51921-YYYLF
Power+Signal+Cable	51923-YYY	51923-YYYLF

AC CABLE PORT VERTICAL RECEPTACLE

Power+Signal+Power+Cable	51897-YYY	51897-YYYLF
Power+Cable	51925-YYY	51897-YYYLF
Signal+Power+Cable	51927-YYY	51927-YYYLF
Power+Signal+Cable	51929-YYY	51929-YYYLF

Note: The XX and YYY utilized in the part numbers above are placeholders for certain product specific criteria. Reference the product drawings to obtain detailed dimensions and complete part numbers.

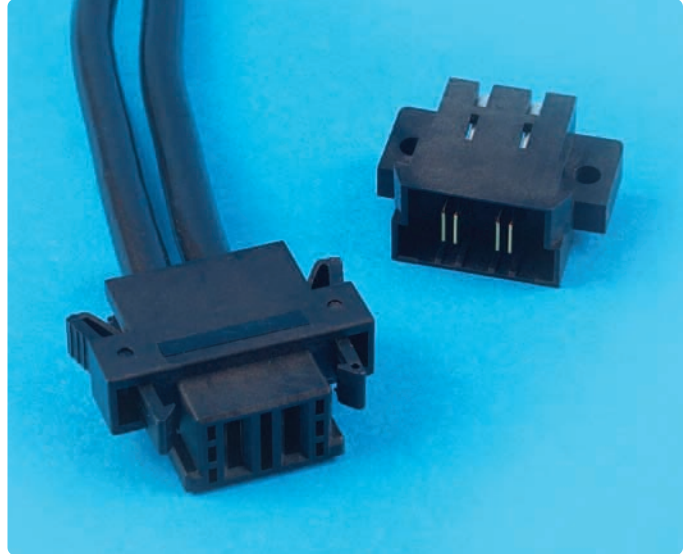
For non-SSI applications other configurations are available upon request.

ASSOCIATED PRODUCTS AND CAPABILITIES

PWRBLADE® CABLE ASSEMBLIES

FCI offers PwrBlade® cable assemblies and connectors that are designed to mate to PwrBlade® right-angle or vertical board-mounted headers. By expanding beyond board-to-board applications, designers can now connect power supplies and power distribution subassemblies in a wider range of applications. The combination of cable connection capability with FCI's proven PwrBlade® board-to-board system provides a universal power distribution connector system.

FCI's PwrBlade® I/O connectors are available in squeeze-to-release form factors for applications that require active latching and in panel-mount configurations for modular installation of large power distribution systems. PwrBlade® Cable Assemblies can be found on page 18.

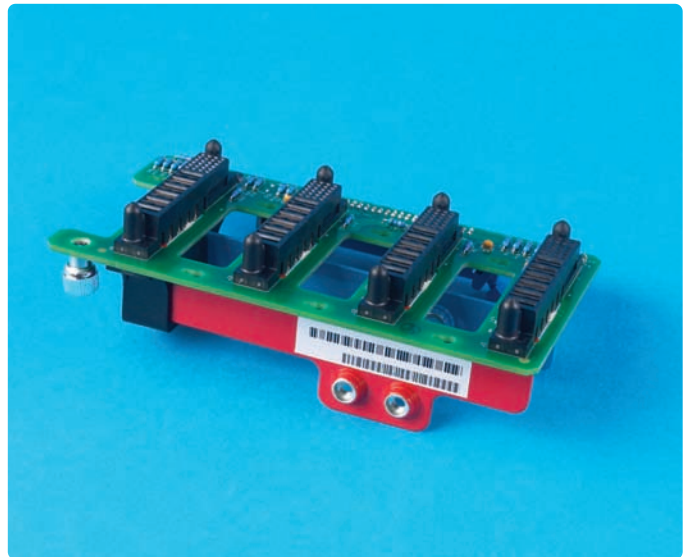


FCI offers a wide range of power and signal PwrBlade® cables assemblies in both squeeze-to-release and panelmount configurations. Please go to page 20 for more information.

CONNECTORIZED POWER DISTRIBUTION SYSTEMS

FCI has the capability to integrate PwrBlade® connectors into power distribution systems that are based on laminated bus bars and plates that provide predictable performance and repeatable accuracy. From simple to complex power distribution requirements, FCI can design a system that saves space, lowers cost and provides pluggable modularity to allow equipment expansion and changeovers.

FCI Power Distribution systems are engineered for easy connectivity. FCI's expertise and wide selection of connectors and cable assemblies makes it fast and easy to connect power to backplanes and boards, while bus components are matched to your physical system for easy installation and maximum space efficiency.



FCI possesses the unique capability to integrate PwrBlade®, HCI™, other power connectors or cable assemblies as a part of a BusBar Power Distribution solution. Please go to page 18 for more information.

HCI™ CONNECTOR SYSTEM

DESCRIPTION

The HCI™ connector system anticipates the continued trend toward increased system power demands that is driving the need for increased power density. The HCI™ connector system is designed to address requirements that extend beyond the capability of FCI's proven PwrBlade® connector system, the industry standard for DC power supply interfaces and power distribution.

The HCI™ connector system likewise provides capability for both power and signal contacts in a single connector to enable power distribution and power control. Integrated HCI™ power connector solutions, enabling DC power, AC power, and signal contacts in a single molded housing, also provide incredible flexibility to address requirements for custom configurations.

The HCI™ connectors employ stamped and formed power contacts, initially pioneered by FCI with its PwrBlade system, as an innovative and cost effective alternative to expensive screw-machined contacts for high-current applications.

The touch-proof HCI™ housing is designed to optimize airflow. The housing permits airflow through the connector by providing vents above the signal field as well as vents above the power contacts that permit airflow away from the mated interfaces and along the entire length of the contacts.

Available HCI™ options support standard coplanar (right-angle header to right-angle receptacle) and backplane (right-angle header to vertical receptacle) form factors.



FEATURES & BENEFITS

- Integrated design with power, signal contacts and guides in a single connector housing
- Vented housings dramatically improve airflow and thermal performance while maintaining touch-proof design
- Lowest product height in the industry for a cost-effective, stamped-and-formed power connector with comparable current rating
- Single short detect contact is available as an option to 'power-on' the application
- Flexible, expandable product platform permits variation in the number and placement of signal, DC and AC power contacts within the molded housing
- Integrated, industry-standard molded-in guidance system compensates for four degrees of radial misalignment for predictable cost effective blind mating
- Hard Metric mating compatibility (12.5mm from card-edge to board in the backplane)
- Options for either perpendicular or coplanar board-to-board configurations
- 3.0mm column spacing for signal contacts enables use of up to 4 & 5 oz. copper layers without any PCB manufacturing issues
- Press-fit termination of vertical backplane receptacle and through-hole solder termination of right-angle headers and receptacles are available to meet application requirements

TARGET MARKETS / APPLICATIONS

- Servers
- Storage
- Telecommunications
- Datacom / Networking

MATERIALS

- Housing
 - Glass-filled High Temperature Nylon
 - Color: Black
 - UL 94 V-0 Compliant
- Contacts
 - Power contacts: High Performance Copper Alloy
 - Signal pins: Phosphor-Bronze
 - Signal Receptacle contacts: Beryllium Copper
- Power Contact Plating
 - Separable Interface: Min 0.76 µm Au Over Nickel
 - Solder tail: Min. 0.5 µm Sn (Mating Tin) Over Nickel
- Signal Contact Plating
 - Separable Interface: Min 0.76 µm Au Over 1.27 µm Ni On the contact Area
 - Solder tail: Min. 2.54 µm Sn Over 1.27 µm Ni

ELECTRICAL PERFORMANCE

- Current Rating
 - 52 Amps – 10 contacts fully energized at 30°C temperature rise in still air
 - 85 Amps – 1 contact fully energized at 30°C temperature rise in still air

MECHANICAL PERFORMANCE

- Mating Force: The force to mate a receptacle connector and compatible header shall not exceed 36.5 ounces per power contact and 3.5 ounces per signal contact.
- Withdrawal Force: The withdrawal force shall not be less than 26 ounces per power contact and 0.64 ounces per signal contact.

TECHNICAL DOCUMENTS

- Product Specification
 - GS-12-380 (Preliminary)
 - BUS-12-090 (HPC Product specification)
- Application Specification
 - GS-20-070 (Draft)

APPROVALS AND CERTIFICATIONS

- UL, CSA and TUV approvals pending

PACKAGING SPECIFICATION NUMBER

- GS-14-1073



POWER CARD EDGE

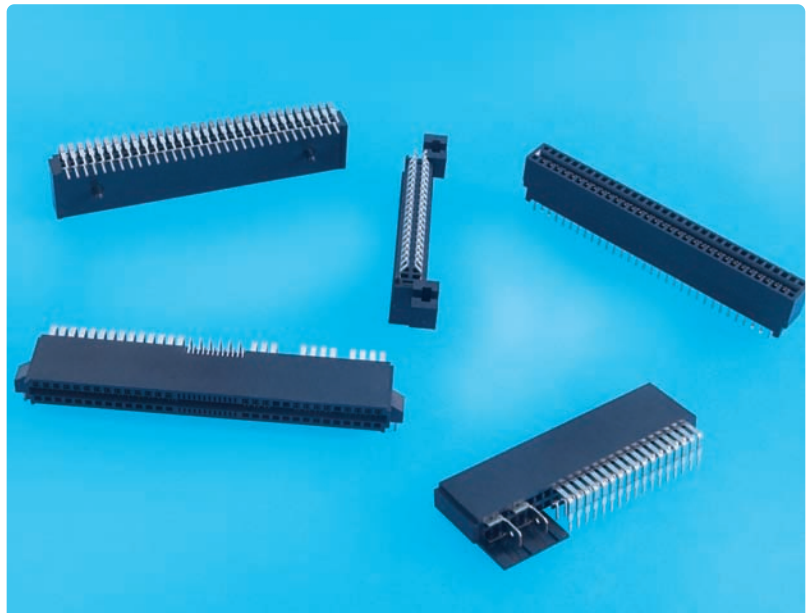
DESCRIPTION

The Power Card Edge connector is a cost-effective connector system that can be used for DC power output from embedded AC/DC power supplies or for power distribution between boards within an enclosure. The connector range includes options for right-angle, vertical, or straddle-mount solder termination. The connectors' low profiles are ideal for use in enterprise data or communications equipment, particularly in servers and external storage systems.

The width of the Power Card-Edge connector body is 9mm or less, making it well-suited for use in 1U rack-mount servers or on power distribution boards inside 1U redundant power supply assemblies. The low connector profile helps maximize airflow through a power supply for increased cooling.

Adjacent power contacts are positioned on 2.54mm pitch along the card edge. Power contacts are manufactured using a high-conductivity copper alloy. Each power contact is rated for up to 7A current measured at 30°C temperature rise in still air. Signal contacts are positioned on 1.27mm pitch.

Right-angle, vertical and straddle-mount connectors are available in various circuit counts with a full complement of power contacts. Right-angle connector options also include versions that combine power and power control signal contacts or power contacts and an integrated AC pass-through port in a single connector.



FEATURES & BENEFITS

- One-piece card edge design provides cost-effective power delivery with capacity for up to 7A per power contact
- Narrow connector body enables use in 1U servers and power supplies
- Low-profile design helps maximize airflow for system cooling
- Option for integration of signals and power in a single right-angle connector supports both power control and power distribution
- Integrated connector design simplifies board assembly
- Right-angle product range includes versions with molded posts or metal fork-locks for retention
- Straddle-mount connectors feature mounting ears for secure PCB attachment
- An optional AC cable port enables a cable pass-through solution
- RoHS compatible design enables compliance with environmental regulations

TARGET MARKETS / APPLICATIONS

- Servers
- Storage
- Telecommunications
- Datacom / Networking

MATERIALS

- Host Connector
 - Housing: High-temperature thermoplastic (UL-94 V-0)
 - Color: Black

MECHANICAL PERFORMANCE

- Durability: 200 mating/un-mating cycles
- Insertion Force: Vertical & Straddle mount 8.0kg Kgf maximum
Right Angle: 13.62kg Kg f maximum
- Temperature Range: -5°C to +105°C

ELECTRICAL PERFORMANCE

- Current Rating: 7A current measured at 30°C temperature rise in still air
- Insulation Resistance: 5000MΩ Min. for power Contact
- Withstanding Voltage: 1000 V/RMS 60hz for Power Contact
- LLCR: Right Angle 20-35 milliohms
Straddle Mount < 20 milliohms
Vertical < 20 milliohms

APPROVALS AND CERTIFICATIONS

- UL ,CSA and TUV approved

PACKAGING

- Trays

PART NUMBERS

Right Angle Solutions	
Description	Base Number
5 power + 12 signal + 5 power	10028886
7 power + 12 signal + 7 power	
10 power + 12 signal + 10 power	
14 power + 12 signal + 14 power	
With AC Power port	10055090
2x14, 2x17, 2x22, 2x24, 2x25, 2x28, 2x29, 2x31, 2x32 power	10035388
Vertical Solutions	
Description	Base Number
2x19, 2x32, 2x35 power	10046971
2x8 power	10046972
Straddle-Mount Options	
Description	Base Number
2x19, 2x23 power	10034908

Use the base numbers to reference the product drawings to obtain detailed dimensions and complete part numbers.

AIRMAX VS® POWER CONNECTORS

Part of the AirMax VS® Connector Family

DESCRIPTION

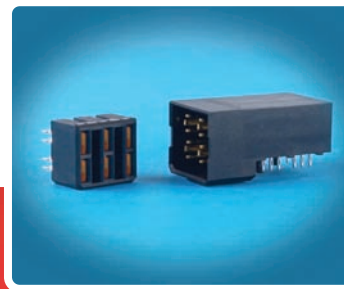
These compact high-power connectors complement the AirMax VS high-speed signal connector offering. Contacts are flat except for minimal forming at the plug contact's mating interfaces, which enables the use of high conductivity base metal. The unique insulator design includes openings to help air flow around the contacts to improve heat dissipation. These design features contribute to the connectors' higher current-carrying capacity.

Each contact in a 1x2 connector module is designed to carry a maximum of 40 Amps, or a total of 80 Amps per module. Individual contacts in the 2x2 or 2x3 modules are designed to carry a maximum of 20 Amps. Reference the current rating chart for additional information.

The right-angle headers and vertical receptacles enable power connections at a backplane-to-daughtercard interface. Each header offers 2, 4, or 6 individual power contacts positioned in 1x2, 2x2, or 2x3 arrays. The backplane receptacles are offered in only 2x2 and 2x3 configurations; the 2x2 receptacle mates to either the 1x2 or 2x2 header configuration. The protected backplane receptacles are UL 60950 Compliant (Finger Probe).

Standard-profile 1x2 and 2x2 right-angle modules stand 14.7mm above the top surface of the PCB. The lower-profile 2x2 and 2x3 modules are designed to match the 11.5mm above-board height of AirMax VS 3-pair signal connectors. The lower vertical profile enables the power modules to be employed on the same 16.7mm slot pitch as the 3-pair signal connectors, or as a means to increase air flow in a chassis having wider slot spacing.

A 2x2 right-angle receptacle extends use to co-planar applications when used with a 1x2 or 2x2 right-angle header.



FEATURES & BENEFITS

- Current rating to 80 amps for 1x2 or 2x2 modules
- Hard Metric (HM) Equipment Practice
- Layout compatible with AirMax VS and Millipacs® connector series
- 1x2, 2x2 or 2x3 contact configurations for backplane applications
- Standard-profile 1x2 and 2x2 right-angle modules extend 14.7mm above the PCB
- Lower-profile 2x2 and 2x3 modules stand only 11.5mm above board
- Options for first-mate/last-break sequencing, 2 mating lengths available
- Protected Backplane connector UL 60950 Compliant (Finger Probe)
- Options for 1x2 or 2x2 Co-planar applications
- Press-fit termination
- Compatible with lead-free processing temperatures

TARGET MARKETS / APPLICATIONS

- Data
 - Servers
 - Storage Devices
 - Computing Platforms
- Communications
 - Switches
 - Routers
 - Internet Equipment
- Medical
- Instrumentation

MATERIALS

- Contact Base Metal: Copper Alloy
- Contact Finish
 - Gold over nickel on separable interface
 - Tin-lead over nickel on press-fit tails
- Housing: High temperature thermoplastic (UL 94V-0)

MECHANICAL PERFORMANCE

- Durability: 100 mating cycles
- Mating force: 31.2N maximum per 1x2 or 2x2 module
- Unmating force: 9.0N minimum per 1x2 or 2x2 module
- Press-fit insertion force: 67N maximum per individual contact tail

ELECTRICAL PERFORMANCE

- Voltage rating: 150V DC
- Contact Resistance: 1.0mΩ maximum
- Current Rating: Maximum amps per contact for different header and receptacle test configurations with dual (double sided) external copper pads of noted weight

SPECIFICATIONS

- Product Specification: GS-12-220
- Application Specification: GS-20-023
- Safety: UL 60950 & IEC 60950-1 Prevention of Operator Access to Energized Parts

ENVIRONMENTAL

- Per Central Office requirements, Telcordia GR-1217-CORE

APPROVALS AND CERTIFICATIONS

- Per Central Office requirements, Telcordia GR-1217-CORE

PACKAGING

- Tubes



Receptacle Type	Number of Connectors Fully Powered	Copper Pad Weight	Maximum Current Per Contact	
			1 x 2	2 x 2
Vertical Receptacle (2x2)	1	5oz	40A	20A
	Up to 5 adjacent	5oz	32A	14A
	1	2oz	32A	15A
	Up to 5 adjacent	2oz	27A	12A
R/A Receptacle (2x2)	1	2oz	37A	18A
	Up to 5 adjacent	2oz	29A	14A

PART NUMBERS

	Number of Contacts	Contact Array	Height Above PCB	Part Numbers	
				Vertical Receptacle	Right-Angle Header
Backplane Application	2	1x2	14.7mm	10028916-xxxxP00LF**	10028918-001LF
	4	2x2	14.7mm	10028916-xxxxP00LF**	10028917-001LF
	4	2x2*	11.5mm	10028916-xxxxP00LF**	10073379-001LF
	6	2x3*	11.5mm	10061290-xxxxxxPLF**	10061289-001LF
Co-planar Application	2	1x2	14.7mm	10052620-P00LF	10028918-001LF
	4	2x2	14.7mm	10052620-P00LF	10028917-001LF
	4	2x2*	11.5mm	10052620-P00LF	10073379-001LF

Notes: * indicates the connector set matches the above-board height of an AirMax VS 3-pair signal connector. Other above-board heights are available compatible with 5 and 4-pair signal connectors.

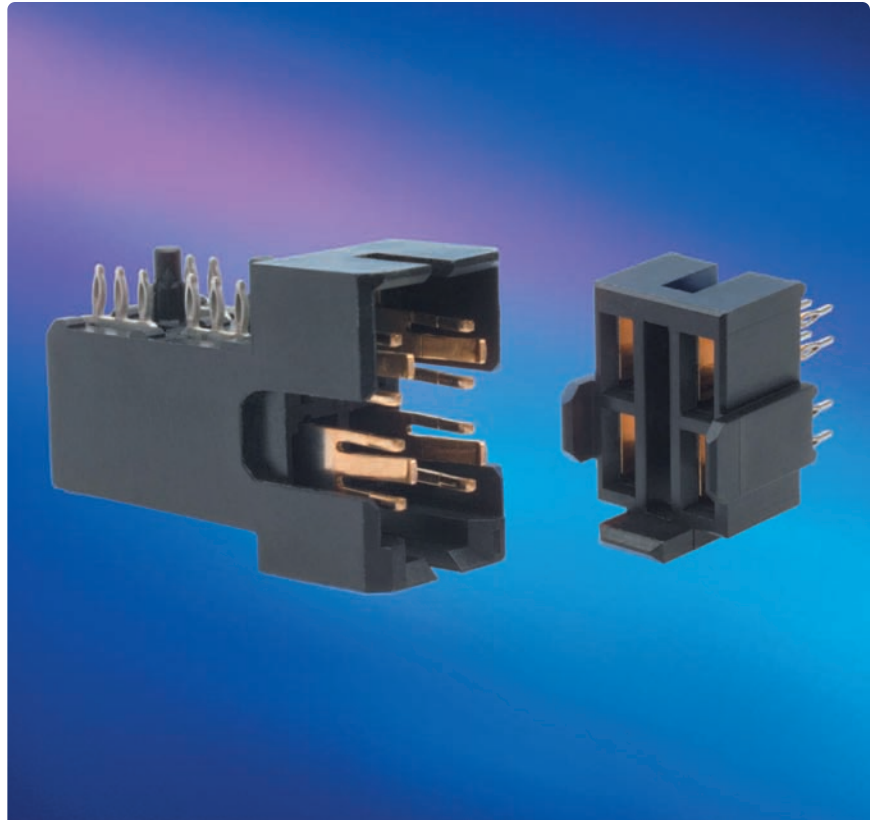
** xxxx and xxxxxx are placeholders for contact mating length combinations. Reference the product drawings for available options.

METRAL® HIGH-POWER CONNECTORS

Part of the Metral Backpanel Connector Family

DESCRIPTION

These compact high-power connectors complement the Metral® Standard Signal and Power connector offering. The right-angle headers and vertical receptacles enable high-power connections at the backpanel to daughtercard interface. Each high-power module provides either 2 or 4 individual contacts positioned in a 1x2 or a 2x2 array. Each connector module is designed to carry up to 80 amps current. The chart under Electrical Performance provides more detailed information on current rating. The unique insulator design includes openings to help air flow around the contacts to improve heat dissipation.



FEATURES & BENEFITS

- Available in 1x2 or 2x2 contact configurations
- Rated for up to 80 Amps current for a single module
- Voltage Rating: 150V
- Receptacle connectors can be provided with two contact lengths to enable first-mate/last-break sequencing
- Protected backpanel receptacle connector is UL 60950 (Finger Probe) compliant
- Layout compatible with Metral 2mm backpanel connector family
- Press-fit termination

TARGET MARKETS / APPLICATIONS

- Data
 - Servers
 - Storage Devices
 - Computing Platforms
- Communications
 - Switches
 - Routers
 - Internet Equipment
- Medical
- Instrumentation

MATERIALS

- Contacts: Copper Alloy
- Plating:
 - Gold over nickel on separable interface
 - Tin or tin-lead over Nickel on press-fit tails
- Housing: High temperature thermoplastic, UL 94V-0 compliant

ENVIRONMENTAL

Per Telcordia Central Office requirements

MECHANICAL PERFORMANCE

- Mating force: 31.2N max per connector
- Unmating force: 9.0N min per connector
- Press-fit insertion force: 67N max per individual contact tail

ELECTRICAL PERFORMANCE

Number of Connectors Fully Powered	Copper Pad Weight	Current Ratings (maximum amps per contact)	
		1 x 2	2 x 2
1	5oz, double sided	40	20
Up to 5 adjacent	5oz, double sided	32	14
1	2oz, double sided	32	15
Up to 5 adjacent	2oz, double sided	27	12

PART NUMBERS

Part Number	Description
10009536-001	Vertical receptacle, 8.0mm mating length
10009536-002	Vertical receptacle, 6.5mm mating length
10025058-XXXX	Vertical receptacle, "XXXX" designates FMLB (First Mate, Last Break) loading pattern options
10009542-001	Right-angle header, 2x2 Contacts
10009556-001	Right-angle header, 1x2 Contacts

Notes:

- Each receptacle can be used with either header. See product drawings for additional information.
- Add a "LF" suffix to the part number to designate Lead-Free and RoHS-compliant options.

SPECIFICATIONS

- Product Specification
 - GS-12-220
- Application Specification
 - GS-20-023
- Safety
 - UL 60950 & IEC 60950-1 Prevention of Operator Access to Energized Parts

PACKAGING

- Tubes

METRAL® POWER CONNECTORS

Part of the Metral® Backpanel Connector Family

DESCRIPTION

The Power Connectors are functional building blocks in the Metral® modular backplane interconnect system. All connectors are designed in accordance with the IEC 61076-4-104 standard. The comprehensive connector range in the Metral® family supports power solutions in combination with other functions like signal and coax. Each power module provides 8 or 10 individual contacts, and each contact designed to carry 3 amps current. The available termination options support press-fit or solder-to-board application. Other options provide capability for rear plug-up or staggered pin lengths to support sequential mating. Easy-to-use and cost-effective application equipment is available for press-fit connectors to keep assembly times, as well as production costs, to a minimum.



FEATURES & BENEFITS

- ▶ 3 Amps per individual power contact
- ▶ Designed in accordance with IEC 61076-4-104
- ▶ Modular design offers system design flexibility
- ▶ Stackable end-to-end with other Metral modules without loss of positions
- ▶ 12 mm wide power modules are form and fit interchangeable with signal modules on the same footprint
- ▶ “Eye-of-Needle” compliant section provides gas-tight, press-fit termination
- ▶ First-Make-Last-Break options that enable sequential mating are available in the vertical header
- ▶ RoHS-compliant options aid compliance with environmental regulations

TARGET MARKETS / APPLICATIONS

- ▶ Communication
- ▶ Instrumentation
- ▶ Medical

MATERIALS

- Housing: Liquid Crystal Polymer (UL-94 V-0)
- Terminal: Phosphor Bronze
- Plating:
 - Separable interface: Gold or GXT™
 - Solder tails: Tin over Nickel
 - Press-fit: Tin over Nickel and Tin-Lead over Nickel

PERFORMANCE

Per Telcordia GR1217-CORE, Central Office requirements

MECHANICAL CHARACTERISTICS

- Insertion force: 1.5 N max per individual contact
- Withdrawal force: 0.3N min per individual contact
- Durability: 200 cycles (Telcordia)
- Temperature: -55°C to +105°C

ELECTRICAL CHARACTERISTICS

- Current rating: 3 Amps nominal (4 Amps Max) current per contact
- Withstanding Voltage: 1000 VAC
- Insulation resistance: > 5000MΩ (> 1000MΩ after environmental exposure)

APPROVALS AND CERTIFICATIONS

- Underwriters Laboratories Inc. (UL file no. E66906)
- Canadian Standards Association (CSA file no. LR46923)

PACKAGING

- Headers Vertical: Tube
- Headers Right Angle: Tray
- Receptacles Right Angle: Tube

PART NUMBERS

Description	Termination	Base Number	
		4 Rows (8 contacts)	5 Rows (10 contacts)
Header, vertical	Press-fit	70236	89099
Header, right-angle	Press-fit	HM1K41	HM1K51
Receptacle, right-angle	Press-fit	88949	89096
Receptacle, right-angle	Solder	89039	85876
Receptacle, vertical	Solder	93239	94561

BUS BAR

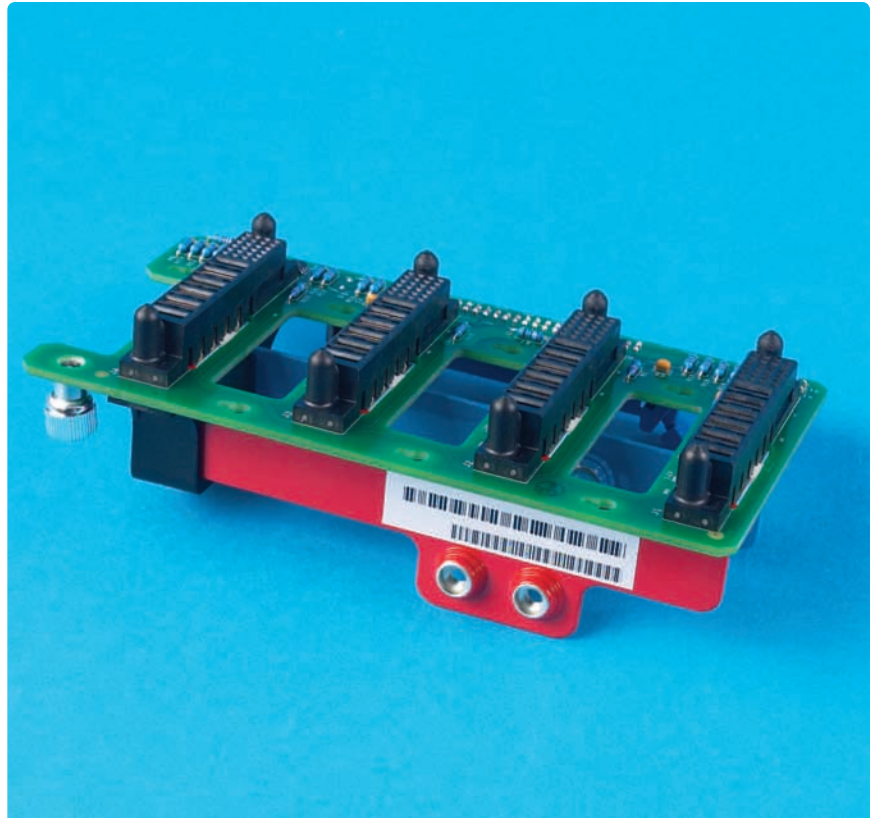
DESCRIPTION

FCI Power Distribution Systems are based on laminated bus bars and plates that provide predictable performance and repeatable accuracy. From simple to complex power distribution requirements, FCI can design a system that saves space, lowers cost and provides pluggable modularity to allow equipment expansion and changeovers.

FCI Power Distribution Systems are engineered for easy connectivity. FCI's expertise and wide selection of connectors and cable assemblies makes it fast and easy to connect power to backplanes and boards, while bus components are matched to your physical system for easy installation and maximum space efficiency.

FCI has been a leader in power distribution technology for over 20 years and offers full in-house design and modeling capabilities along with a global manufacturing footprint.

FCI combines a broad line of power distribution products with the ability to engineer new solutions as required. The result is a cost effective approach that offers the best mix of custom engineering and off the shelf cable assemblies providing a wide array of power solutions.



FEATURES & BENEFITS

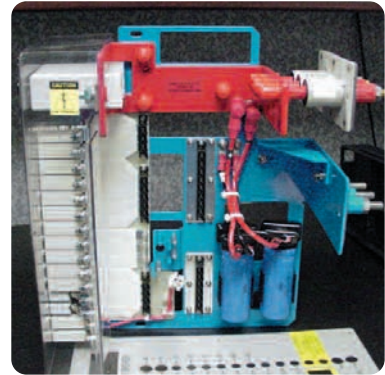
- Cost Effective
 - Fewer conductors can feed multiple outputs, optimizing available cabinet space.
 - Integrates functional components related to the power distribution such as breakers, switches, connectors and cables.
 - Enables quick and easy installation into the cabinet. When feeding multiple devices with a common voltage, a bus bar is more economical than standard wiring.
- Mechanical Properties
 - Rigid prefabricated construction, high durability, quick & easy maintenance, requires less space than wire harness, adapted connection technology & cost effective installation.
- Electrical Properties
 - High voltage distribution with low voltage drop, low characteristic impedance, low inductance, reduced noise levels & improved EMI/RFI characteristics.
- Thermal Advantages
 - Bus bars inherently generate less heat (voltage loss) than traditional cables. Moreover, due to their geometry bus bars are also better at dissipating heat than cables.

TARGET MARKETS / APPLICATIONS

- Telecom
 - Primarily used in base stations, telecommunication switches and PBX Telco Switch.
 - Distributes power from supply to backplane & cards
 - Compact structure allows extra space
- Data
 - Used in data processing solutions, storage systems, routers, servers and workstations.
 - Transports high currents with low voltage drop
 - Direct connection to backplane
- Industrial
 - Used in all applications
 - Motors, railways and airplanes

COST EFFECTIVE

- Fewer conductors can feed multiple outputs, optimizing use of available cabinet space
- Integrates functional components related to the power distribution such as breakers, switches, connectors and cables
- Enables extremely quick and easy installation into the cabinet
- When feeding multiple devices with a common voltage, a bus bar is more economical than standard wiring
- Eliminates complicated wiring
- Fully tested



MECHANICAL PROPERTIES

- Rigid prefabricated construction with custom profiles & shapes
- Efficient use of cabinet space and PCB surface
- Requires less space than a wire harness
- Integrates components related to power distribution
- Fast, error-free and cost-effective installation
- Quick and easy maintenance
- Fully insulated
- Modular

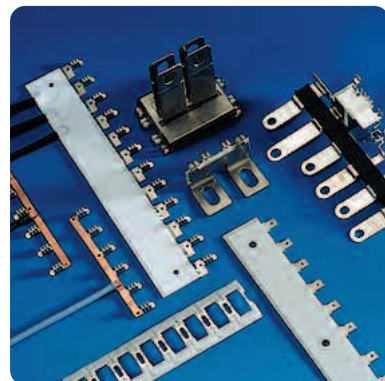


ELECTRICAL PROPERTIES

- High current density – 5A/mm²
- High voltages – up to 4kV
- Multiple voltages
- Clean power distribution: high capacitance, low inductance
- High voltage distribution with low voltage drop. Low resistance
- Integration of Bus Bar onto PCB can replace power and ground traces
- 1500 VAC and 1000 VDC Hi-Pot test
- Option for EMI shielding

THERMAL ADVANTAGES

- Bus bars inherently generate less heat (voltage loss) than traditional cables
- Due to their geometry bus bars are also better at dissipating heat than cables.
- Every design includes complete analysis of current flow, thermal characteristics, voltage drop, and inductance to ensure maximum efficiency



PWRBLADE® I/O CABLE ASSEMBLIES

DESCRIPTION

The PwrBlade® cable connectors are designed to mate to PwrBlade® right-angle or vertical board-mounted headers. By expanding beyond board-to-board applications, designers can now connect power supplies and power distribution subassemblies in a wider range of applications. The combination of cable connection capability with FCI's proven PwrBlade board-to-board system provides a universal power distribution connector system.

FCI's PwrBlade® I/O connectors are available in squeeze-to-release form factors for applications that require active latching and in panel-mount configurations for modular installation of large power distribution systems.

The PwrBlade® power distribution connector system provides both power and signal contacts to enable power distribution and power control in a single connector. Initially developed to enable the implementation of Server System Infrastructure (SSI) Standards for Distributed Power Supplies (DPS), Mid-range Power Supplies (MPS) and High-end Power Supplies (HPS), PwrBlade connectors are also available in wide variety of other configurations. The connectors can also be customized to address unique application requirements.



FEATURES & BENEFITS

- Provides contacts for power distribution and power control
- Robust 0.100" (2.54mm) pitch for signal contacts and 0.200", 0.250", or 0.300" spacing for power contacts
- Rugged Blind-Mate connector system
- Pluggable power supply interface
- Flexible Power crimp-to-wire terminations accommodate 8AWG, 10AWG, 12AWG and 14AWG gauge wire
- Flexible crimp-to-wire terminations accommodate 22 AWG, 24AWG, and 26AWG gauge wire.
- Up to 3 levels of sequential contact: 2 for power and 2 for signals
- Modular product design and manufacturing process allows product flexibility
- Stamped and selectively plated power contacts provide a cost effective solution
- RoHS compliant design meets current environmental standards

TARGET MARKETS

- Data
- Telecommunications
- Datacom/Networking
- Industrial/Instrumentation

APPLICATIONS

- Power supplies
- Servers
- Storage enclosures
- Communications equipment
- Hot-swap redundant N+1 power distribution systems

MATERIALS

- Housing
 - Glass-filled high temperature nylon
 - Color: Black
- Contacts
 - Power contacts: Copper based alloy
 - Signal pins: Phosphor-bronze
 - Signal contacts: Copper based alloy
- Plating
 - All contacts: 0.76 μm (30 $\mu\text{in.}$)
 - Gold over 1.27 μm (50 $\mu\text{in.}$) nickel

ELECTRICAL PERFORMANCE

- Insulation resistance: 20M Ω min.
- Withstanding voltage: 1,200 V RMS
- Current rating: 48 A for single powered contact; de-rated to 30A for 12 powered contacts at 30°C temperature rise with zero airflow
- Current rating: 60A for 10 contacts when tested to UL guidelines.
- Contact resistance: 0.5m Ω max. at rated power

MECHANICAL PERFORMANCE

- Mating force: 12 lbs. typical for 11 power, 24 signal configuration

ORIENTATION

- Squeeze-to-Release latching
- Floating Blind-Mate Panel-Mount

TERMINATION

- Power: 8 AWG, 10 AWG, 12 AWG
- Signal: 22 AWG, 24 AWG, 26 AWG

SPECIFICATIONS

- Product Specification: GS-12-149
- Application Specification: BUS-20-067
- Packaging Specification: GS-14-1093

CERTIFICATIONS & APPROVALS

- UL ,CSA and TUV approved

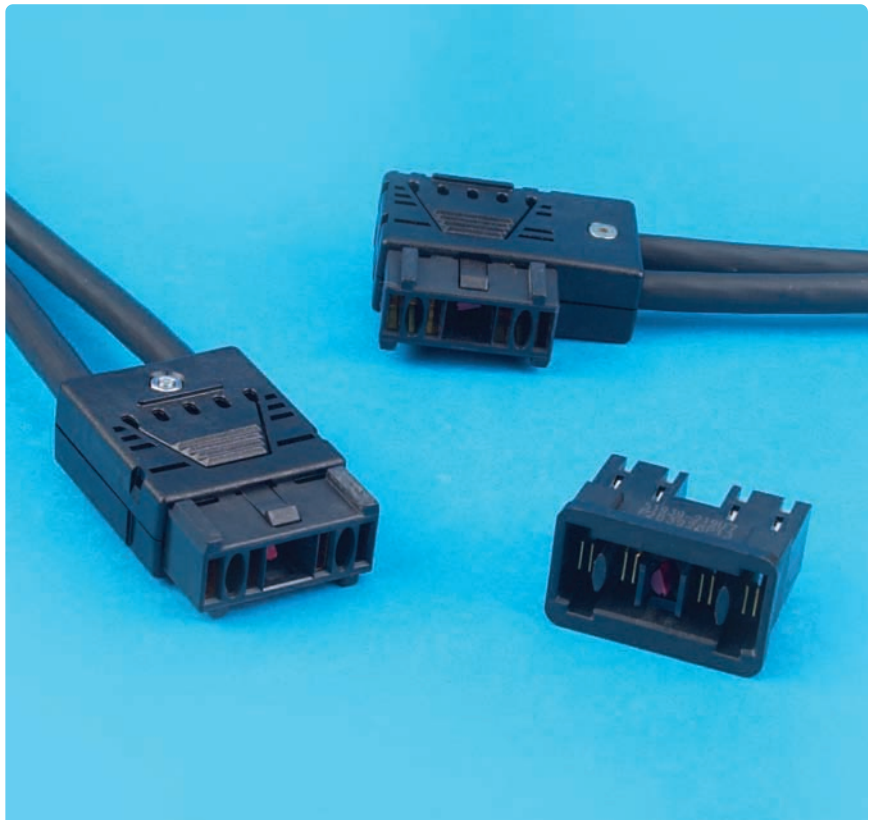
Contact your local FCI sales representative for cable assemblies

PWR TWINBLADE™ I/O CABLE ASSEMBLIES

DESCRIPTION

The Pwr TwinBlade™ cable system is designed to support applications that demand the supply of high power. The Pwr TwinBlade™ connectors employ a proven contact system in a touch-proof design that is capable of supporting currents of up to 50 Amps per contact. The system consists of cable connectors in orientations of right angle or straight cable exits mating to a right angle board connector.

Other connector features include an active latch, four different coding options and polarization to ensure proper mating. The design provides capability for termination of various cable diameters and wire sizes of 6 AWG and 10 AWG. FCI is able to provide the industry with component cable kits as well as cable assemblies terminated with Pwr TwinBlade™ connectors.



FEATURES & BENEFITS

- Modular system provides right-angle and straight cable connectors
- Right-angle board connector enables front I/O applications
- Robust, touch-proof connector design
- Four different cable-entry directions possible
- Active latching system
- Polarized design ensures proper mating
- Four coding options
- Supports multiple wire sizes

TARGET MARKETS

- Communications
 - Wireless base stations
 - aDSL/ vDSL Access equipment
- Data
 - Servers
 - Storage

MATERIALS

- Power Contact Base Material
 - Brass alloy
- Board Connector and Cable Connector Housings
 - High temperature nylon
- Plating
 - Minimum 0.8 um Au over minimum 1.27um Ni in the contact area
 - Minimum 2um Tin on crimping area

SPECIFICATIONS

- Product Specification: GS-12-389
- Packaging Specification: GS-14-1093

CERTIFICATIONS & APPROVALS

- UL 1977
- Touch-proof per IEC 60998-1 and IEC60668-2

ELECTRICAL PERFORMANCE

- Current rating: 50Amps per contact at 75°C ambient temperature with no forced airflow
- Operating Voltage: 80 Volts DC at 25 Amps
- Short Circuit Capacity: 5 operations carrying 3000 Amps for 10ms
- Insulation Resistance: 1GΩ when measured in accordance with EIA 364 TP 21
- Connector Rating: 2kW, 100A@20V to 25A@80V

PACKAGING

- Trays

MECHANICAL/ENVIRONMENTAL PERFORMANCE

- Insertion Force: shall not exceed 40N
- Withdrawal Force: shall not be less than 15N
- Durability: 50 cycles
- Operating Temperature Range: -20°C to +75°C

PART NUMBERS

Description	Part Number
Right Angle Entry Cable Connector	10056526
Straight Entry Cable Connector	10066104
Right Angle Board Connector	51939-219

Reference the product drawings to obtain detailed dimensions and complete part numbers.

Contact your local FCI sales representative for cable assemblies

D-SUBMINIATURE POWER CONNECTORS

DESCRIPTION

The D-Subminiature power connector range is a standard interface widely used in many market segments. FCI offers connector options that accommodate either all Power or mixed Power and Signal contacts. The connector form factors are directly inspired by those of the traditional D-subminiature signal connectors, long used as standard I/O connectors in many types of electronic equipment. The power connectors are also principally used for I/O solutions because of their robust and shielded design.

The product family includes many versions, all using standard metal shell dimensions, providing great flexibility to the system design engineer:

- All power contacts: 2V2 (2 power contacts, coded version), 3V3 (3 power contacts, coded version), 3W3 (3 power contacts), 5W5 (5 power contacts) and 8W8 (8 power contacts)
- Mixed signal and power contacts: 5W1 (5 contacts of which 1 power and 4 signal contacts), 11W1, 7W2, 21W1, 17W2, 13W3, 9W4, 25W3, 21WA4, 27W2, 47W1, 24W7 and 36W4.



FEATURES & BENEFITS

- PCB connectors:
 - Both socket and pin genders
 - Right-angle and straight versions
 - Traditional solder-to-board or press fit termination.
 - Pin-In-Paste (PIP) can be offered on request.
 - Right-angle connectors can be provided with connector heights and footprints that conform to either European version (stand-off 7.2 mm and pitch 2.54 mm) or US version (stand-off 6.3 mm and pitch 2.84 mm) requirements
 - Large choice of front accessories (threaded inserts, screw locks) and PCB accessories (metal brackets, harpoons)
- Cable connectors:
 - Both socket and pin genders
 - Signal solder bucket contacts are pre-assembled in the connector.
 - Power contacts are sold and assembled separately in solder bucket or crimp versions.
 - Large choice of plastic, metalized plastic and metal hoods with straight or angled cable exits.
- RoHS-compliant options aid compliance with environmental regulations

TARGET MARKETS / APPLICATIONS

- Telecommunications
- Instrumentation/Industrial
- Medical
- Datacom

MATERIALS

- Thermoplastic (UL-94 V-0)
- Color: Green
- Applicable Soldering Process: Lead-free wave soldering compatible
- Contact area plating (Signal and power): Gold over nickel
- Termination area plating (Signal and power):
 - Power: Tin over Nickel
 - Signal: Gold over Nickel

MECHANICAL PERFORMANCE

- Insertion Force: $\leq 5\text{N}$ per contact
- Extraction force: $\geq 0.3\text{N}$ per contact
- Durability: 200 mating/un-mating cycles or 500 mating/un-mating cycles
- Temperature Range: from -55°C to 125°C

ELECTRICAL PERFORMANCE

- Current Rating:
 - Power contacts: from 10A to 40A max. per contact for 30°C temperature rise in still air
 - Signal contact: 7.5A max. per contact measured at 30°C temperature rise in still air
- Insulation Resistance: $5000\text{M}\Omega$ min. for power and signal contacts
- Withstanding Voltage: 1000V RMS 50Hz for power and signal contacts
- Contact Resistance: $\leq 7.3\text{m}\Omega$ per contact for power and signal contacts

SPECIFICATIONS

- Centerline Spacing (Signal and Power): 2.54mm or 2.84mm

APPROVALS AND CERTIFICATIONS

- UL Approved

PACKAGING

- Trays

PART NUMBERS (EXAMPLES)

Right Angle Solutions				
Connector Configurations	PCB Connectors	Cable Connectors	Power Contacts	Hoods/Backshells
3W3 (3 power)	DAV3W3P500G40LF	DA3W3SA00LF	8638SS4005LF: 40A socket, solder bucket version	8655MH1511LF: 3W3 or 7W2 (size A)
7W2 (2 power + 5 signal)	DA7W2S743H30LF	DA7W2PA00LF	8638PPC1005LF: 10A pin, crimp version	Metal hood, straight exit
Straight Solutions				
Connector Configurations	PCB Connectors	Cable Connectors	Power Contacts	Hoods/Backshells
5W5 (5 power)	DBV5W5P300G40LF	DB5W5SA00LF	8638PPS4005LF: 40A, pin, solder bucket version	86303639BLF: 5W5 (size B) Plastic hood, straight exit
8W8 (8 power)	DCO8W8S300G30LF	DC8W8PA00LF	8638PSC3005LF: 30A, socket crimp version	8655MHRA3701LF: 8W8 (size C) Metal hood, right angle exit

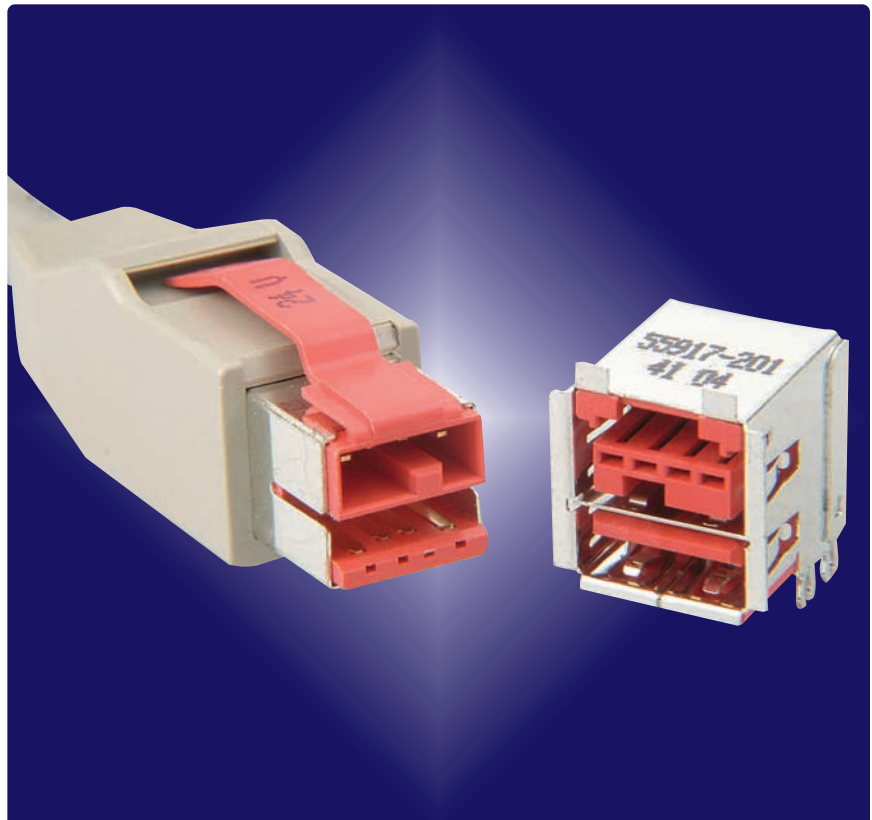
Contact your local FCI sales representative for cable assemblies

USB + POWER CABLE ASSEMBLIES

DESCRIPTION

The USB + Power interconnect system was developed by FCI to address higher power requirements of devices using USB signaling. USB + Power adds 4 power contacts to the interface providing a total of 5 amps of additional current carrying capability compared to 1 amp for standard USB. For many devices, this eliminates the requirement for a separate power source reducing the number of cables required. For peripherals not requiring the additional current, the USB + Power receptacle will mate with a standard USB 'A' plug.

To insure proper mating, USB + Power is individually keyed and color coded for 5V, 12V, and 24V.



FEATURES & BENEFITS

- Provides up to 5 amps of current carrying capacity eliminating the need for an external power supply in most peripheral devices
- Receptacle mates with standard USB 'A' plug
- Keyed and color coded for different voltages
- Positive latching insures proper mating and retention
- Fully shielded providing USB 2.0 data performance
- Hot plugging capability

TARGET MARKETS / APPLICATIONS

- Data
- Consumer
- Datacom/Telecom
- PC
- Point of sale
- Hubs
- Speakers

MATERIALS

- Receptacles
 - Housing: high temperature thermoplastic UL94V-O rated
 - Contacts: Copper Alloy
 - Shell: Copper Alloy
- Cables
 - Cable jacket: PVC
 - Contacts: Copper Alloy
 - Data conductors: 28 AWG twisted pair
 - Power conductors: non-twisted pair
 - Shield: aluminized foil and 65% coverage tinned copper braid

MECHANICAL PERFORMANCE

- Meets USB standard
- Durability: 1,500 cycles

SPECIFICATIONS

- USB Compliant
- Product Specification: GES-12-130
- Agency Approval: UL/CSA
- Packaging Specification: GS-14-1093

ELECTRICAL PERFORMANCE

- Operating Voltage
 - USB: 5Vdc
 - +Power: 12Vdc/24Vdc
 - Withstanding voltage: 750 vac rms.
- Current rating
 - USB: 1 amp/contact
 - +Power: 3 amp/contact
 - Low level contact resistance (LLCR): 30mΩ max.
 - Signal impedance: 90Ω +/- 15%

PACKAGING

- Receptacles: tubes
- Cables: one per bag

PACKAGING

Description	Base Part Number PCB Receptacle	Base Part Number Mating Plug Kit
Standard A Plus Power	55917	74233
Slimline A Plus Power	57489	57496
Slimline A Plus Power - mid board mount receptacle	10011029	57496
Slimline A Plus Power - under board mount receptacle	10063583	57496

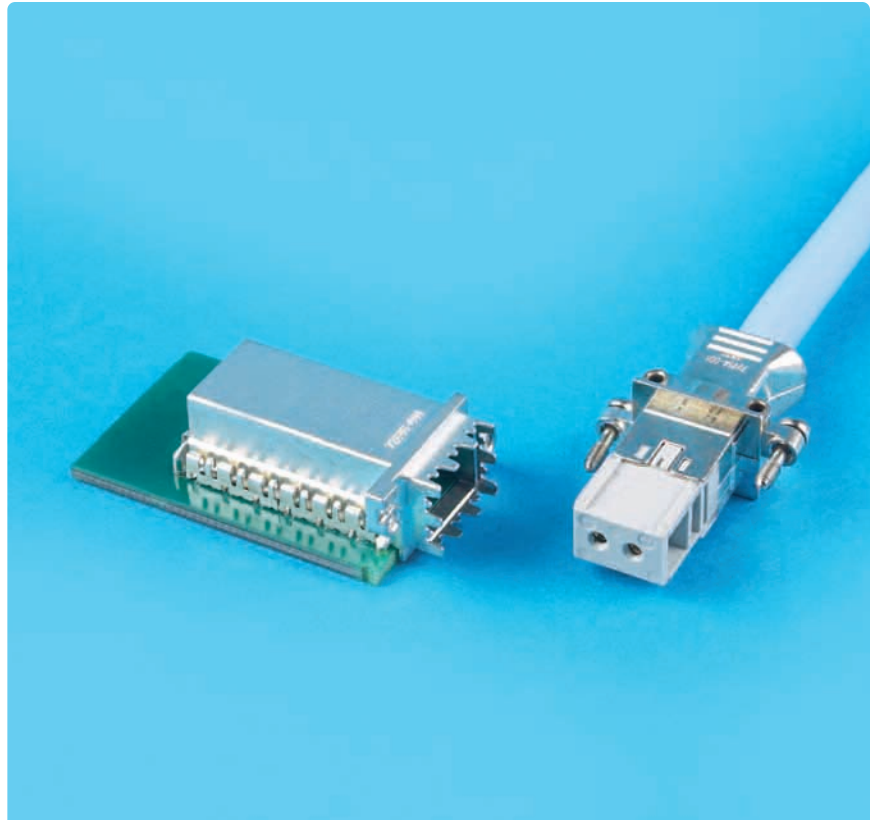
Contact your local FCI sales representative for cable assemblies

SOFIX® POWER CABLE ASSEMBLIES

Part of the Metral® Backplane Connector Family

DESCRIPTION

Higher input/output density and signal speeds demand management of EMC. The Sofix® front I/O interconnect system is comprised of right-angle headers and cable plugs that are suitable for the distribution of power and signals. Sofix connectors are fully shielded down to the PCB level to provide EMC shielding at the sub-rack/front panel level. When used with appropriate cables, the emission level from these links is well below IEC/CISPR 22 and FCC part 15 class B requirements. Sofix power connectors feature a robust design and are suitable for applications in systems with slot pitch as low as 15mm. The design rules for the Sofix family of I/O connectors are derived from the Metral system (IEC 61076-4-104). As such, the Sofix system can be used as complement to the Metral backplane connector family or applied as dedicated I/O solution.



FEATURES & BENEFITS

- Unique EMC properties
- 10 Amps per power contact
- According to IEC 60950 and UL 1950
- Hot pluggable
- Robust design
- 15mm slot pitch
- RoHS-compliant design

TARGET MARKETS / APPLICATIONS

- Communication
- Instrumentation
- Medical
- Hazardous environments

MATERIALS

- Plug
 - Housing: Polybutylene Terephthalate (PBT UL94 V-0)
 - Terminals: Copper Alloy
 - Covers: Zinc Alloy
- Header
 - Housing: Liquid Crystal Polymer (UL-94 V-0)
 - Terminals: Copper Alloy
 - Covers: Zinc Alloy
 - Ground Spring: Stainless Steel

PERFORMANCE

- Per Telcordia GR1217-CORE, Central Office requirements

MECHANICAL CHARACTERISTICS

- Insertion force: 20 N max
- Durability: 200 cycles (Telcordia)
- Temperature Range: -40°C to +70°C

ELECTRICAL CHARACTERISTICS

- Current rating: 10 A per contact
- Withstanding voltage: 1000 V RMS
- Initial Insulation resistance: 5000MΩ minimum.

APPROVAL & CERTIFICATIONS

- Underwriters Laboratories Inc. (UL file no. E66906)
- Canadian Standards Association (CSA file no. LR46923)

PRODUCT SPECIFICATION

- Header: GS-12-307
- Cable Connector: GS-12-308
- Recommended Cable specification:
 - Copper 2.5mm²
 - Overall Ø 1.95mm
 - Total diameter Ø 8.0mm max.
- Packaging Specification: GS-14-1093

PACKAGING

- Headers: Tubes
- Header accessories: Bags
- Cable Connector components: Bags

PART NUMBERS

Description	Part Number
Header Right Angle with 15 Amp filter	72846-204LF
Cable connector kit	72824-201LF

Contact your local FCI sales representative for cable assemblies

For more information on FCI sales offices,
headquarters, agents and local distributors,
visit www.fciconnect.com



Americas - Tel.: 1 (800) 237 2374

Europe - Tel.: 33 1 39 49 21 83

Asia/Pacific - Tel.: 65 6549 6666